EPISODE 839

[INTRODUCTION]

[00:00:00] JM: Cloud computing, open source and mobile computing are trends that are affecting every organization. When a large organization adapts to these trends, it is commonly referred to as a digital transformation. Digital transformation causes many companies to reframe their business as a software company. A candy manufacturer must now think of itself as a software company that makes candy. An insurance company must now think of itself as a software company that issues insurance.

Capital One is a bank that was started in 1988. Capital One has always had an emphasis on software, but the company's digital transformation has affected it as much as any other company. The company is migrating to the cloud, building out microservices, rolling out continuous delivery pipelines and shifting the internal culture to be more adept at using software.

Hilary McTigue is a senior director of data engineering at Capital One. She joins the show to discuss her experience implementing a digital transformation within a large company. Subjects that we discuss include culture, management strategy, and the sequencing of different phases of a digital transformation.

Full disclosure, Capital One is a sponsor of Software Engineering Daily.

[INTERVIEW]

[00:01:32] JM: Hilary McTigue, you are a senior director of data engineering at Capital One. Welcome to Software Engineering Daily.

[00:01:38] HM: Thank you. Thanks so much for having me.

[00:01:41] JM: I want to start by talking about a term called digital transformation, which is part buzzword, but part reality. It's becoming more and more a reality and less and less of a

buzzword. So I've been going to conferences for the last three years, and digital transformation was something that was getting pitched three years ago. But today it's really materializing into an actuality. How has the digital transformation trend looked from the point of view of a bank?

[00:02:12] HM: Yeah. It's interesting. From a tech perspective here at Capital One, we are attacking the same kinds of problems that a lot of forward-thinking type companies are attacking. There is the move to the cloud, machine learning, automation, AI, dev ops. We always are keeping a keen eye towards our performance, reliability, resiliency, and we really focus on innovation. A lot of the new – The transformation move to the cloud is really allowing us to be innovative and creative and we're really taking advantage of that. Really, the endgame here is it lets us deliver quality solutions to our customers a lot quicker.

[00:02:55] JM: You mentioned a few trends, cloud, and open source, and dev ops. I think there's actually one other trend that doesn't often get mentioned in the world of digital transformation, which is mobile computing, and mobile computing, like for a bank, that's certainly changed both the workloads that customers are putting on your systems. But it's also changing the way that people can interact internally, and you have to build internal tools that are relevant to this. How does mobile fit into the world of digital transformation?

[00:03:25] HM: Yeah. I mean, I think it's important to keep mobile in mine for everything that you do. I mean, we're all attached to our devices, and whether we are talking about our internal systems here at Capital One or mobile apps for our customers, it's just a really big focus for us. Because as you said, we're always on everywhere and we need to make sure that that is a forefront of our strategy for everything that we're building.

[00:03:49] JM: I think these changes, they've been going on – So I first worked as an engineer I think like 7 years ago, 8 years ago maybe, and even just in that window of time I have seen the changes to how companies are run. There're both cultural changes and technological changes. Can you describe the cultural changes and the technological changes and how team structure has changed?

[00:04:15] HM: Yeah. It's really interesting you bring that up, because technology is moving so quickly and it's a lighting pace and it's really exciting, and I think we as engineers, we get really

excited about diving into the new tech and creating new things and trying out new tech stacks. But it's important not to lose focus on the fact that you are also changing the way that your business is working and how people are interacting with your systems. It's important not to lose sight of the fact that there are customers or users of your systems who maybe have been using the same systems for perhaps years, and as we modernize and we go through our digital transformation, we are then going to ask people to do things a new way.

Even though the new tech has enabled us to move more quickly, be more performant, be more scalable, we're still asking folks to change. Some folks are going to move across or along the change curve in a different pace than others. I think it's just really important to keep that in mind as you go through the journey. We focus a lot on the technology, but there's a whole other component of that, and that is leading people through that change curve and ensuring that they're comfortable and plan for that really from the beginning of your journey.

One of the things that we've done at Capital One is we've set up our Tech College. Tech College is an internal college for not only our engineers to go and get access to classes both online training or real-time classes, but also our business partners can go out there and learn how to use these new tools that we're creating and take advantage of the new paradigms that we're implementing here. It's really very exciting.

[00:06:15] JM: A lot of these enterprises that are going through a "digital transformation", they are faced with this barrage of like to-do-lists basically, where it's like, "Okay, continuous delivery," which means continuous integration, which means also needing to move microservices and break up the monolith, which means also introducing dev ops and etc., etc., etc. It can feel like the scope of changes that you need to make to your technology is so immense that you don't even know where to start, and there are some opinionated roadmaps about how a digital transformation should proceed. Like often times I see continuous integration as kind of the first place to go. Do you have any strong opinions about what is the first thing to do for an organization that is initiating a "digital transformation"?

[00:07:08] HM: Yeah. I think you need to inspire a cultural change as well as a technical change. It really comes back to being all in on your transformation, and you need to focus

holistically on the enterprise and how you are going to get the entire business to go through this transform together as one cohesive unit.

I know our senior executives have some best practices that they have encouraged us to follow early on in our journey, things like infused tech into your mission itself. Start with the end in mind and take on the difficult things first and keep it simple as you move through the journey itself.

[00:07:54] JM: Let's get into particular technologies. Cloud is a broad trend and I feel weird asking a very broad question. But I'm just using it as a beachhead to getting into more specific questions. How do you use the cloud?

[00:08:13] HM: Yeah. So in 2015, Capital One announced a partnership with AWS, and how do we use the cloud where anything new that we build we are building on the cloud? We are enabling cloud services for all of our new tech that we're building and we're even taking our so-called legacy applications and reengineering them for the cloud. We use a lot of the core AWS services, the storage, the compute services and other tools, like Lambda and RDS.

[00:08:45] JM: When you think about your career in technology, does the modern cloud and your usage of it within Capital One, does it kind of feel like using a framework did back in the day, or maybe still today, like Spring Framework, for example. Spring Framework, you've got kind of a slightly opinionated, but still very open way in which you can choose to do things. Now, Spring Framework is not exactly a monolithic framework, but it sort of came up in the times of you're running this on your own infrastructure, and we can give you things like Cloud Foundry to help you manage your own infrastructure. But now that we've got the cloud, it seems like the cloud is kind of becoming a framework for places that really just need to build good infrastructure and they don't really want to roll their own things when they can avoid it. It's almost like a framework. Do you think that analogy holds?

[00:09:42] HM: Yeah, I do. It's amazing how the technology has just gone through an incredible transformation, at least throughout my career, without dating myself. I remember when the internet became really a big thing.

Now, I think about the days when we had to wait months to get infrastructure before we can standup a new system, and all of the planning and the frustration and the wait that went into that. That's all gone now with the cloud.

As far as the framework, yeah, I think that you can follow certain prescriptive architectures and methodologies for implementing things and I think it's important still to be well-managed though. You don't want a free for all out there. So I think in that sense, having a framework and some guidelines and some well thought out architecture patterns are really important to have.

[00:10:33] JM: So I've never been in the position where I'm running an organization that's big enough where I start to look – I mean, organization or infrastructure that's big enough to look through the – So I know on AWS you've got not just the AWS services, but you have this huge marketplace. You have this huge catalogue. It's almost like the Amazon, like catalog for buying clothes or dog food or whatever. You've got like monitoring, and logging, and continuous integration, and it's like over here it's like an AWS service, and over here it's Datadog, over here it's CircleCI, over here it's some other thing. How do you choose which providers? How do you make an assessment between these different tools?

[00:11:14] HM: Yeah, it's a good question. As we implement different solutions in the cloud, we really look towards probably the more mature services that if proven themselves to be ready for an enterprise our size. Our needs as a large corporation are often going to be different than smaller companies. We really need the scalability, the reliability that more mature tools and the cloud are going to offer.

Interestingly, if there are tools out there that perhaps aren't quite 100% meeting our needs, we will work with folks to customize certain tools. We'll partner with our vendors to get the features that we need as an enterprise built into these tools. Obviously, there's open source out there, and we can contribute to that and contribute back to open source products and build in the features that we need as well. So I love that there's a lot of ways that we can work around the tools that are available there and make them what we need.

[00:12:25] JM: Under what circumstances do you just say, “As many tools as there are, as great as the tools are, we actually we need to build something in-house rather than wiring together cloud tools.” How do you choose when to build versus when to buy?

[00:12:41] HM: Yeah, that’s a great question. For us, it takes a mix. I would say that we tend to default to build actually. I mean, we are an engineering technology company and we like to build. Even if we start with the foundation of something, because our needs are so unique, we often will – We build in-house.

However, we’re not going to move forward with a build if there’s a mature tool out there that already meets our needs and does what we need to do and then the cost of building is negated at that point. So I don’t think it’s really black and white. I think you really have to take each individual scenario and look at the technology, look at your use case, look out into the future for what you’re going to need and make the decision.

[00:13:27] JM: Can you take me through perhaps a build versus buy decision or just an engineering decision where you have to end up building something, and take me through the process of building and shipping that particular feature or backend service.

[00:13:43] HM: Yeah, I can give you some examples of – Actually, where we have worked with vendors. For example, on our warehousing solutions, we partnered with vendors to build or add on to a product that they were offering. We partnered closely with that vendor and gave them many features and requirements that the product as it was didn’t actually meet our needs, and we said, “Hey, we need A, B, C.”

That vendor actually built that product out for us, and now it’s one of their prime offerings. Yeah, it’s really neat, because we’re able to – We actually influence what the industry is doing, what the industry is building because of what Capital One needs. Again, we really just keep our focus on how can we deploy our products and our features to meet our customers’ needs, and we’re just always laser-focused on that and then that we give that back to our vendors, and it’s fun to see that evolve.

[00:14:49] JM: This is one of the coolest trends that was not really present when I started doing this show. But it seems like the relationship between companies and vendors and then the "service integrators", the kind of like spin up a consultant army, is getting better and better. The perfect example is the Google Anthos announcement recently, and I think Anthos was kind of a maturing of a previous product that they had, kind of the service integrator platform where it's like, "Here's a place where service integrators and large organizations can mingle and form relationships with each other." Because that's what we need. Because this whole digital transformation thing is such an immense trend, which is why it's like, "All right, I'm willing to use that term now," because it really is like an industry-wide transformative trend and there's so much opportunity, and yet so few engineers.

[00:15:45] HM: Yeah. It's funny you bring it up. I really hadn't thought of it that way, but you're right. The relationships and the partnerships I think is a better word that we have with our vendors today look very different than what they did 15, 20 years ago. Back in the day it was, "Here's what we're offering. Take it or leave it, and we're going to charge you –" Now we really partner together to build things and build great products and it definitely is a trend towards the better and I think it left all of us be more innovative.

[00:16:15] JM: You alluded to a warehousing solution, data warehousing. You're a senior director of data engineering. One of the trends in data engineering is this increasing subtlety between what has historically been referred to as OLTP versus OLAP workloads. So OLTP being these transactional workloads where like maybe I'm editing a specific record and a specific database. It's like one specific transaction for a bank. It might literally be a banking transaction, like, "I am making a single write to the database. I want my three phase commit, or whatever. To accept that that write is fully integrated into the dataset," versus this OLAP kind of query, where like, "I want all the records that are associated with this kind of transaction. I want all the balances of all my accounts totaled up so that I can get a total and make sure that we've got a clear balance sheet or whatever." But these things are not so discreet anymore. Can you describe how you see the OLTP versus OLAP workloads in the modern data environment?

[00:17:26] HM: Yeah, I do agree that they are converging a big. But I think we really see the OLAP and the analytical loads as, like you said, more of the reporting, the drill down, the drill across, the deep history and the analytics, and what are the insights and the knowledge that I

can gain from all of these data that I have collected? Which is a different focus than say, the OLTP, which is going to be our transactional type of a function. So I see that, is even though the technologies within the warehousing and the database space, they're getting blurry, I do still think there's a fit for purpose use with the different technologies there.

[00:18:09] JM: When you have that fit for purpose use – So, ideally, the thing is like as a user, as an end user, it would be a magical experience if I could like issue MapReduce scale queries from a personal finance application. We don't seem to be there yet. I mean, do you agree that that would potentially be a desirable characteristic that we would be able to get from our consumer applications?

[00:18:35] HM: Yeah, absolutely. I think we are going to watch the technology evolve and the blurry lines between these tools are going to keep blurring. I think it's one of the most fascinating things right now, to keep your eye on how these data warehousing and database tools are converging and how they're all blurring a line. But, yes. I think when you're able to use click a button and get all your insights, it's going to be great.

[00:19:05] JM: Now, an application like social media, or even a shopping cart, you can have eventual consistency be okay in many circumstances. To me, banking seems like an area where you kind of want to avoid eventual consistency. Are there areas of banking where you think of eventual consistency as being applicable or is it mostly like do you want strong consistency out of your data workloads?

[00:19:36] HM: It really depends on the use case I think. There's so much that you can do with data and insights you can gain, and it really depends on what you're trying to do and what you're trying to glean. So, yeah.

[00:19:51] JM: As you have refurbished the infrastructure over the years of the digital transformation, how has your approach to creating and deploying services within Capital One changed?

[00:20:05] HM: Yeah. So, it's changed quite a bit. We've adapted an agile methodology. So we really encourage innovation. We encourage iteration, quick development cycles. We really focus

on our MVP or minimal viable products throughout our product creation. We're a very collaborative organization. I love that we have hackathons when we have tough problems to solve. We sponsor hackathons throughout the enterprise that are really fun and get everyone involved and creative.

I think another thing I would say here is that it's okay to fail, and our transformation journey and our movement to the cloud and our relentless focus on the customer, it all leads to – Some of it will lead to it's okay for us to fail, and you have to create that culture of people not being afraid if things don't work out perfectly the first time. We don't have to wait for three month deployment schedules and months for hardware to come in if we need to scale. We have the ability to be so much more creative and innovative right now. That really allows us to operate in an environment we were not really afraid to fail, and that's exciting, exciting time to be in.

[00:21:25] JM: How do you manage your hackathons?

[00:21:28] HM: How do we manage them? Yeah, we bring in just – we actually ask teams, "Hey, we've got this problem. You guys want to sign up? We have folks sign up." Think about some solutions they want to bring to the table, and then we all get together and we really make it fun, and we have different teams come in and create their solutions, and we'll do a presentation at the end and usually go forward with a few. We've gotten some good stuff there.

[00:21:55] JM: Interesting. So it is mostly like problem-oriented? I remember when I worked at Amazon, there was one time a hackathon around like making the elevators better. I think it was like a totally theoretical hackathon. I don't think we actually had access to like elevator infrastructure, but there was this like kind of meme within the company of these elevators and you have like rush hour and then the elevators are super busy and then it's like – It was kind of this ideation hackathon, but there were other events there where it was just like people can come up with their own ideas totally from scratch. So do you think it's better to have a problem-oriented hackathon or just totally open?

[00:22:35] HM: Usually we have a problem that we're going to solve in the sense that I don't see many free-for-alls, for example, but usually there is one specific, and it could be a broader problem. I think it's fun and it lets us, again, be very innovative, and I think it's something that a

lot of folks will actually come to Capital One because we are creative in that way and we allow folks to get involved and feel a part of the problem solving part of an organization. If you look at a problem and you think, “Gee! That’s interesting.” Well, go ahead. Let’s see what you got.

[00:23:12] JM: Coming back to the digital transformation cultural question. So one thing I’ve seen is a lot of organizations are going from a place where a lot of the innovation was proceeding in a top-down fashion, and this was partly because the tools used to be so much harder to work with. So you have this top-down. You have this waterfall, and we did that for very good reasons, like tech was really, really hard to build. It was very, very hard to stand up a database, for example.

So it made sense to like, “Okay, the executive makes a decision. That falls down to the CTO. It falls down to the CSO and CIO and so on, and it’s just this waterfall.” Back then, it wasn’t really considered drudgery. It just like this is the way we have to do things. Overtime, it has become more and more of a kind of a bottoms up thing where like teams are getting a little bit more independent. Responsibilities are sort of like more loosely defined. The abstractions are better to work with.

How do you encourage a culture of – By the way, you still need top-down selection and top-down innovation in many, many circumstances. How do you see the tension between the bottoms-up and the top-down innovation in a typical software enterprise?

[00:24:36] HM: Yeah, I think that that’s part of the reason you need to be all in from all levels. So if your executives are bought in, it’s going to enable everyone to be in as well. Like you mentioned, a way that the technology field is transforming right now, it allows everyone at every level to be creative and come up with solutions and be innovative.

We have a problem called TDP at Capital One. It’s the technical development program, and it’s a program for recent college hires. They come into Capital One and they do this, like a two-year rotation. They’re embedded within engineering teams, and it’s one of the most fun and successful programs that we have. It lets these junior engineers who are just starting their career to partner with more senior folks and they get to learn from them. Even, these sometimes are folks who haven’t been in the workplace before.

So they can learn from the more senior folks, and then the senior engineers get a chance to pass on and mentor and teach the junior engineers. It's really great to see everyone at all levels getting involved and solving the tough problems. I specially enjoy working with the young women who are coming out of college today, being a woman in tech.

I love to have the opportunity to work with the young women who are starting their career and into service as a mentor and a guide for them and talk to them about my tech journey and how I got into this crazy technology field.

[00:26:15] JM: What advice do you have for people out there who either are looking for a mentor or who would like to contribute mentorship?

[00:26:23] HM: Yeah, it's a great question. So I think if you're looking for a mentor, you want to look around for somebody who you feel like you have – You can establish a great relationship with trust and openness and come prepared with specific questions or issues that you'd like to tackle and be real open with that. If you are a mentor and you're looking for mentees – I mean, within Capital One, we have programs that you can easily get involved and get out there and say, "Hey, I'm looking for somebody to mentor." In my experience, there's almost always people out there looking to partner a mentor, a mentee, and I really think it's up to the two to make that relationship and make it what you want.

[00:27:13] JM: Yeah, I've seen this approach different ways. I've worked at companies where they almost standardize the mentorship relationship, and sometimes it works out really well. I've been paired with people who become – They were mentors at one point in my career and that mentorship has evolved into a relationship of equals, which is just a magical thing if you can manifest it.

So do you so – Are there like internal tools that you make for that, or do you like have mixers? Because I agree with you, that like if somebody doesn't want to mentor or they don't have the initiative to go for it. You're not going to force them – You're not going to be able to force them to get a mentor.

[00:27:53] HM: Right. Yeah, you don't want to force that. It won't work. But I don't know that – It's not so formal. I think that there's – It's easy to just put fillers out to be able to get a mentor, mentees. I think it's a common thing here. So it's not something that's seen as, "Oh, I'm going to have a hard time finding a mentor. People are pretty open about it and it's just part of a culture and the DNA.

[00:28:21] JM: When you talk about recruiting, and particularly on the new grad side. I remember when I was an intern or when I was a new grad, I swear, the amount of work that I was able to deliver that was actually useful to the company is so minimal. In retrospect, what I wonder is does a big organization really just see internships and really early employees. Is that kind of like an option or just kind of like a bet on like, "Okay, in 6 months, or 8 months, or 12 months, or maybe even after your entire internship, there's a percentage chance you will become a fulltime employee." Then there's a percentage chance that you will be able to actually contribute something meaningful to the organization. Is that the framework, or am I – Was that a uniquely inept intern or early engineer?

[00:29:15] HM: I won't say you're uniquely inept. But, definitely, that is not our experience here. We aren't asking people to go grab coffee. Our interns, we want them to learn. They are embedded with engineering teams. They are given real assignments to work on. We hire folks out of college, our new hires. I would say we actually put them on the more interesting projects that we have and we have a keen focus on making sure that they are learning, they are challenged, and that they are focused on the toughest problems.

For example, machine learning is often something that a lot of new hires want to focus on. So we make a point to say, "Hey, what are you interested in doing? If it's machine learning, let's hook you up with one of your rotations with the machine learning folks. If you're interested in data engineering," which is how I get to interact with a lot of the TDPs, they've shown an interest in data. So it's certainly not just come in and we're going to put you where there's an empty desk. It's, "What do you want to work on, and we'll match you up with the best engineering team," and they're absolutely hands-on in a code doing things that make a difference.

[00:30:30] JM: Coming back to the question of service deployment, service management, I've often heard of larger enterprises that have a platform engineering team where the platform

engineering team will standardize certain mechanisms of deployment, or maybe a “service mesh”, or everybody has to use Kubernetes, or everybody has to use containers, or everybody is using Cloud Foundry, something like that. Do you have a platform engineering team?

[00:31:00] HM: We do actually. We have several. There are several enterprise-wide platforms that we have out there as options. For example, our warehousing, some of our warehousing platforms, our monitoring platforms. Those are implemented and managed by platform engineering teams. So those teams are accountable for implementing the platform, managing the platform. Making sure it’s scalable, it’s reliable. So they’re really the heart of these platforms.

Then that allows other tech companies or the other engineering teams to really focus on what they want to focus on, which is developing software using these platforms, and they don’t have to worry about the things that the platform engineering side of the team really loves to handle and loves to dig into. It really is a win-win for us and it lets us deploy our software in a much quicker way, because we’ve got software engineering teams working on the software and the platform team is handling the platforms and it really works out well for us.

As a matter of fact, we even focus on building tools to provide transparency in our different platforms. A lot of times if you don’t have access to a platform, you can’t see some of the intricacies of the performance of the platform, etc. We build tools around the platforms to enable self-service. Again, that just lets us move quicker and it lets us be more creative with our solutions.

[00:32:33] JM: Do you know what areas the platform engineering teams like prioritize? I guess I want to know what things are – You want to make opinionated and what things you want to be agnostic. Some people have different tastes in monitoring tools or continuous delivery tools. Where do you want to standardize and where do you want to let engineers kind of have their freedom?

[00:32:54] HM: Yeah. I think it’s always going to be somewhere in between. You’re not going to want a free-for-all, but you definitely want to have some governance and guidelines there. What we found is that offering solutions for the engineering teams to use is a great way to allow our engineering teams to be creative and have a hand in the process and choosing the tech. You

have to make sure that your tool that you're putting out there as options are fit in with your philosophy of being well-managed.

[00:33:34] JM: What's your approach to monitoring and logging and tracing tools?

[00:33:38] HM: Yeah. I'd say the digital transformation has enabled us to kind of get creative in this area. So we can collect logs from everywhere now. That is something that we're able to do. We can up our game here in this space. So we collect logs. We have real-time monitoring in place. There's a lot we can do with the logs. We can look at machine learning on those logs. There's just so much more data that is available to us and it helps us troubleshoot more quickly. It helps us identify problems more quickly. Of course, all that leads to greater experience for our engineers and our customers, and that's something that really has been enabled by the transformation for us.

[00:34:23] JM: Have you found that logging data to be useful more as a defensive tool and a way of identifying bugs, or have you found like high-level business level value from the logging?

[00:34:36] HM: It can be both. I think that, traditionally, it was more reactive, like let's go back and look at the logs and see what happened. But now that we're able to more easily collect the logs and monitor, we're going to continually become more proactive with that and actually gain business value. So I think that's a journey we're still on, and we're really pushing towards that.

[00:34:59] JM: The space of monitoring and logging and tracing is often associated with people who are dev ops or on-call. Is that mostly the purview of the dev ops peoples or do you find that monitoring and logging and tracing is also useful for the developers?

[00:35:15] HM: Oh, definitely both. I think that dev ops, one of its main tenants is everyone is going to get involved. You build it, you own it, and logging is not only for the operational team. It's also for the developers, and I think that what we're seeing is these teams were given more closely together and the operation teams are actually using a lot of the knowledge that they're gaining and bringing that back to the dev teams to create even better products with the insights that they're gaining from all the logs.

[00:35:47] JM: Do you have particular operations teams, or do you have more of a philosophy of people who build it should run it?

[00:35:55] HM: It's really both. I think that there's operation team to always be your frontline, but there isn't that traditional canyon between what used to be the operations team and your development team. That divide between the two is really shrinking and it's becoming more of a partnership and more of a collaboration between the teams to make the products that we roll out the best that they can be. That's a great thing to see.

[00:33:26] JM: Has the on-call levels of intensity improved since the improvement of cloud tools and improvement of Kubernetes or containerization?

[00:36:39] HM: Yeah, definitely. Because we're able to deploy much more quickly now. We can isolate workloads. We are able to implement fixes much faster. So, yeah. I'd say everyone's life is becoming a little bit less challenging now that we've gone through our cloud transformation and less frustration for our engineers, and our operations teams is always a good thing.

[00:37:05] JM: Since you mentioned workload isolation, you often get – Or at least in the places I've gone to, there's often this scenario where you have a huge monolithic application that's doing something really important and nobody understands how it works. When you're in this kind of situation, do you just kind of like put that thing in a container and say, "Okay. We're putting it over here. We're going to be maybe put acceptance tests on it and make sure it's black boxed. It does what we want it to do, but we're not going to like touch it otherwise," or do you have somebody actually go in and do the surgery necessary to actually understand what this thing is doing?

[00:37:44] HM: Yeah, we're going to understand what the thing is doing. Especially as we migrate and we modernize our applications, we need to know. We are going to understand what those ops do, and I think that the days of having those monolithic applications of black boxes are hopefully in the past.

[00:38:06] JM: That's my sense too. That's one of the things that makes me most optimistic. I'm like, "Maybe it's not so bad." This is kind of like why I became a podcaster is I was like, "I don't want to work on these monoliths. They're too hard."

[00:38:21] HM: Yeah. I think we're going to see a lot less of that.

[00:38:26] JM: I swear. It was like two or three jobs in a row where it's like, "Okay, step one is write unit tests for this monolith." I'm like, "Okay, that sounds easy enough," and it was not easy.

[00:38:37] HM: It is not. Yeah.

[00:38:38] JM: It's like, "Okay, first, set up the debugger. Okay. So I've got to step through this monolith. Okay. How do I do that? Wait. How does it work with the networking?" It's just awful, but now it's actually becoming more creative and you have more latitude. You have more autonomy.

[00:38:55] HM: Absolutely, and it's really nice to see – Like you said, when you've been doing this for a while and you see the lack of frustration that the engineers have because they are free to be more creative and they're not constrained by some of the factors that did constrain us 15, 20 years ago.

[00:39:16] JM: How important do you think it is for an enterprise that's going through a digital transformation to contribute to open source repositories either as a charitable gesture or to genuinely understand what's going on?

[00:39:31] HM: Yeah, I think it's important. I think engineers love to do it as well. So, yeah, we're investigating, open sourcing some of our tools that we've built. We have a really robust open source office that helps us see the process and guides us through that, and I think if the time is right and it's the right tools, then definitely you contribute back.

[00:39:57] JM: Do you think open source will move up the stack? What I mean by that is I think it's interesting that most of the open source tools these days are kind of backend-y tools, like Kubernetes, or MySQL, or other data systems. But I see no reason – I mean, we have

WordPress. There's a few other open source kind of frontend-y tools. There's really not that much though.

It seems like the open source world is primed to start developing things that are higher up in the application layer. Would you agree with that?

[00:40:32] HM: Yeah, I do. I don't see why it wouldn't go there. I think it's exciting to think about all the different possibilities that are out there and there's new stuff popping up every day. So, yeah, I agree with you. I think it will.

[00:40:46] JM: Paint a picture for me for what banking looks like in 10 years.

[00:40:50] HM: Banking looks easier than ever in 10 years. Customers are extremely happy with our products and services. They're easy to use. Everything is geared towards the customer, customer-facing. Customers don't dread banking. They love it. That's what I see.

[00:41:13] JM: Yeah. I mean, I can imagine things like I'm near a Starbucks and my bank says like, "Would you like a free cup of coffee. We're going to buy you a free cup of coffee because we love you as a customer so much." I think there're so many subtle improvements to kind of your experience with a bank that could materialize. Do you have a wish list for like futuristic banking subtleties that you'd like to have?

[00:41:46] HM: I mean, yeah, I don't know if you've seen our Capital One Cafes, but –

[00:41:50] JM: Actually, that's a great point. There's a friend who whenever I used to visit San Francisco, I would go to the Capital One Café and meet with him, and I was like, "This place is awesome. There're no coffee shops with any space to work in San Francisco, and there's this bank that happens – they have a café."

[00:42:11] HM: Yeah. Exactly. That is absolutely not what you would think of as a traditional bank, but you go there and you can feel relaxed and get coaching on your money and get advice if you need it and grab a cup of coffee. So it's funny that you mentioned that.

[00:42:28] JM: Okay. So there're people out there listening right now that are going through this digital transformation process. Capital One seems to have done or is on the path to doing this pretty productively, pretty successfully I would say, relative to the average. Do you have any other tips or subtleties that people might not see in digital transformation marketing messages or vendor solutions' guides? What unique piece of advice can I extract from this conversation about how to do a digital transformation?

[00:43:00] HM: I think it goes back to what we are talking about really, where be all in on your transformation. All levels, from the bottom, from the top, it has to be – Your transformation must be an integral part of your culture and your transformation. We all need to be singing the same tune and get great talent. Get great talent and enable people to be innovative and so that they can be creative, and that's not only going to track rate talent, but that's going to keep them here to.

[00:43:35] JM: All right. Now, let's say I'm running a lumber company. My lumber company is an international conglomerate and we're doing great financially and the future is bright for the lumber market. But I'm like a lumber executive. I don't know anything about like digital transformation, and you're an engineer in the organization. Maybe you've even like classified as an IT person and you step into this organization and you're like, "Oh my gosh! There's so much that could be done if we went through this digital transformation.

Let's say you have a brief audience with the CEO. What compelling arguments do you make, or how do you frame this digital transformation idea to somebody who like literally just threw out their beeper and got their first smartphone?

[00:44:24] HM: Yeah. Well, that's funny. Definitely, you'll want to tell the benefit of a digital transformation. By that, I mean, the ability to move quicker to deploy features faster, to make your customers happier. Without a digital transformation, you will be stuck in the old world and the old way of doing things, which is often slow and frustrating. So if you want to offer the best services and you want to offer the best products, then you will need to embrace the digital transformation. That's going to allow you to move quick and implement and be creative.

[00:45:05] JM: To conclude, you have been in technology for a long time. Can you just tell me your brief career trajectory? How did you get started in technology and how did you wind up where you are today?

[00:45:18] HM: So how did I get started in tech? That's a funny story actually. I had graduated from college with a general degree in marketing and management actually and I wasn't really excited with a lot of the job opportunities that were out there. So I decided to go ahead and investigate going to grad school.

One of the professors might had worked with throughout my last couple years at school had suggested looking into the IT program for grad school and I thought, "Hmm. Well, I like computers. I had tinkered around with them a bit and I thought, "All right. Let me investigate that."

So over the summer I took a few prerequisite classes for the grad school program and one of them was actually – Yeah, I'm dating myself here. One of them was actually a COBOL programing class, and I took that class over the summer and I completed my first assignment and I was extremely proud of my first COBOL assignment. I was living at home with my parents and I brought my assignment how to show them. It was this big stack of – The COBOL code was this big stack of that dot matrix printout paper.

I brought it home and I just was so proud of myself and I showed it to my dad and I said, "Look what I did. Look what I did in class today," and he picks up the stack of papers and he looks at me and said, "Well, that's great. What is it do?" I looked at him and I said, "Oh! It says "Hello World"." I was so proud of my Hello World code that I knew that I had found the right career for me and just stick with a passion of mine, I love making things work and tinkering with things. No one else seemed to get it around me why that was exciting. But to me, I thought it was great, and that's how I ended up in tech and I have been doing it many, many years since then.

[00:47:24] JM: Hilary, thank you for coming on the show. It's been really fun talking to you.

[00:47:26] HM: Thank you so much for having me. I appreciate it.

[END]