



Reinventing Communication

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Quarterly



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Hamish Caldwell discusses the evolution of wireless networks, careers, agility, and communications – and their implications on strategy and practice.

DesignIntelligence (DI): 25 years ago, you left design practice to redirect your career into technology convergence, joining AT&T. It was a strategic refocusing, a reinvention of sorts that now brings design and construction types an informed, external perspective about technology. What did you see that led you to make that change?

Hamish Caldwell (HC): In the late 80s and early 90s, I was tasked with the complete digital transformation of the practice and business operations of Lord Aeck and Sargent Architects. That was not a common role for someone in a design firm in those days. As an extension,

through the vision of Larry Lord for architects to expand the value they create for clients and for profitability, I initiated the practice of providing clients with strategic technology consulting services. That meant that I got to help healthcare clients, like the world's largest AIDS research center and Dr. David Ho at the Aaron Diamond AIDS Research Center in New York City.

DI: Time Magazine's Man of the Year, back then.

HC: That's right. And I'm glad to still see him on TV today talking about COVID. But I also advised higher education clients — another Lord Aeck and Sargent market

segment. I helped clients like Emory University integrate emerging internet and communications technologies into their building programs, for which my colleague architects would then shape building designs to accommodate those inputs.

From that experience I could see digital technology — what we were doing in our practice, and what our clients were having to deal with in their technology adoption — was the way of the future. As a result, I

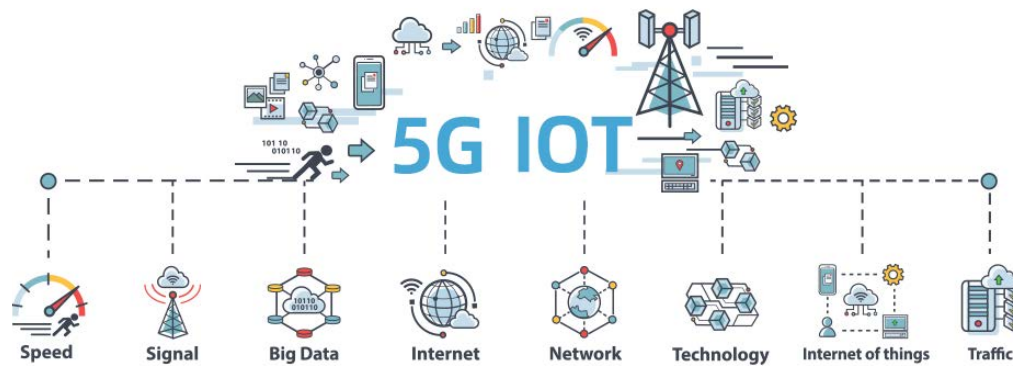
pursued a master’s degree in computer science at Georgia Tech. I wanted to leverage that education to make a career shift. That degree enabled me to get a job at BellSouth and get involved in the delivery of communication services. I rode the exciting wireless wave that would become cellular communications — the worlds of wireless voice and data, smartphones, the Internet of Things, and the many incredible things we now take for granted.

DI: You were using that expression, “the Internet of Things” in the 80s?

HC: No. That didn’t exist in the 80s. What did exist was telemetry. That was, you could connect your copy machine or other device to a phone line. If it gave some fault, it could send a simple signal. Telemetry became machine-to-machine in the early 2000s. Tying it to design practice, a thermostat could be a machine connected to an alarm system. If a fault was measured, it would send an alarm. Then with the internet, things evolved from analog communications, like fax machines — you heard the bzzzz, bang, boom — to packet and digital, where you heard nothing. Finally, it has become the Internet of Things, simply meaning a network of internet-connected devices. All that has been similar technology, just newer versions.

DI: How long did you stay with BellSouth?

HC: I had 16 years in the telecom space with BellSouth, Cingular Wireless, AT&T Wireless, then AT&T — all one corporate family that evolved through mergers, acquisitions, and rebranding. I



5G and IoT Will Be Leading a Paradigm Shift in M2M Communication Management

gained experience in creating new business models, designing, marketing and selling new communication solutions. AT&T wanted me to move to Dallas, but with my wife being a chaired professor at Emory University, that was not an option we wanted to pursue. So, it was time for a reinvention.

DI: What are you doing now? Who are your customers, and do you still engage the design and construction industries?

HC: I left the corporate world in 2013. I spent the next year or two as a Chief Marketing Officer for hire and consultant. I worked in some software turnaround businesses funded by private equity firms and with some startups. That evolved into our current partnership, the Wireless Insiders Network. We're a boutique firm of peers — there are eight of us. Each of us was an executive inside companies like AT&T and Verizon. We help clients access, sell, and build relationships — particularly channel relationships — with the likes of

AT&T, Verizon, and T-Mobile. Our clients tend to be based in North America, Western Europe, and Israel, and they provide anything these large telecom and cable companies need to run their businesses or sell to their customers. Whether they're consumers, enterprises, or government or higher ed customers, we help with strategic executive relationship development to accelerate sales and revenue.

DI: Does that serve the built environment industry?

HC: Yes. Some of our clients are selling Internet-of-Things solutions for smart buildings. Those solutions require communications networks underpinning things. The internet is just a set of communication connections, in different forms. Some are wireless on WiFi, some are cellular, some are on fixed networks with cables, some are fiber. It doesn't matter. There are connections of some kind, and there are devices of some kind. Those devices sometimes are a smartphone or a thermostat with a SIM card inside it. Just a

cellular-connected thermostat. Then there's an application, a dashboard or an interface somebody can use to control the smart building or get reports on the performance of the HVAC system within the smart building.

Another design and construction industry use is in remote field workforce applications. You now see people running around jobsites with cellular-connected tablets. They have software on them. My client might be the provider of the software or the tablet. Or they might have something that goes in the network to manage the Internet-of-Things solution. It could be the solution. It could be the platform on which the solution is built. It could be the billing system the construction company uses for that Internet of Things. Our services can be anything within that end-to-end solution.

DI: Can you talk more about your organization and team?

HC: I'm fortunate, because my partners have also reinvented



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themselves. All of us worked in software startups and small businesses before we worked in corporate telecom. Each of us had corporate roles in various countries. One was Verizon's representative in Greece, running a Greek telecom business. In their reinvention journeys, everybody brings a unique background. But what we have in common is flexibility, adaptability, optimism, and enthusiasm. We don't know what the answers are going to be. If we did, we wouldn't want that job. We like the discovery, the creativity. We have confidence in ourselves and in each other.

As a team, we've got each other's back. We have trust. We started working together without all meeting in person. We're spread around North America, US and Canada. But as you become experienced, it doesn't take long in a conversation to know: can I trust this person or not? Do they really have the skills they think they have? As you meet people like that, you know you can work

together, so you don't worry or feel you have to be an expert in everything. You feel confident you'll bring in experts if you need them. It's liberating to have the confidence to admit you don't know. I sometimes tell clients, "Sorry, I can't do this job for you. Because I only want to do jobs I'm confident I can do. I'm sorry. I wish I could do it, but I can't." With that kind of candor, you build trust relationships, and that opens a world of opportunity where anything is possible. And you're not cutting yourself off — only repeating yourself to do what you already know how to do.

Staying open-minded has been an important reinvention lesson. But you need judgment about what you can do. In our company we bring different expertise. Some have expertise in sales, others in marketing. One partner is a former network operations leader at AT&T. Others are strong and experienced in diversity, leadership, and cultural leadership of teams. We know our

strengths and what we enjoy, then find the right fit and skillset.

DI: It's one of the great ironies: the world of technology is largely about sociology. What technologies are you working with now? Things we don't know about yet that will converge to reshape life in design and construction and the built environment at large? For example, can you expound on 5G?

HC: 5G is a hot topic these days. But it's just the newest version of a whole set of technologies that underlay the world of cellular communications. It's called 5G because in the late 90s, what was available was 2G. 2G was just analog communications. It had crackly noise quality and was inefficient and costly. And you had these big bulky things that looked like bricks you called mobile phones that weighed a ton.

The next thing was 3G, and the next was 4G. Now we're coming to 5G. The Fifth Generation. Every one of these evolutions has been an improvement of throughput, the speed of communications, and a

reduction in the latency, or delay. So, when you send something, does it take a long time to get there or not? Also, the volume, or capacity. It used to be, in Atlanta, a limited number of people could make a phone call at one time on a cell phone. Nowadays, millions of people can make a cell call simultaneously. With the Internet of Things, it'll be billions of devices and people communicating at the same time and at a lower cost per unit. We could have made it 20 years ago that millions of people could do it, but it would have cost so much that market adoption would have not happened.

What does that mean for the design and construction industry today? You've got folks all over job sites looking at tablets. They can request a document, and it arrives quickly whether it's a spec, a drawing, or whatever. That's great, and that's on 4G, and it's on an amazing device, a tablet. It's not heavy, and it has great screen resolution. It's not that big. With 5G, maybe you'll be doing augmented reality on the job site. You have your hard hat and glasses, looking at an actual field condition

and overlaying the design document in real time. Maybe the client avatar walks through the building. And they're simultaneously doing it with high-resolution imagery. You may notice over time with these technologies — everything's shrinking, getting lighter, with longer battery life.

5G brings a more real-time seamlessly integrated, high-speed virtual world. You can imagine what people can use that for on the job site. Maybe you have design teams around the world collaborating. As we've found by necessity due to COVID, we're able to do things we didn't know we could. I heard of someone doing Zoom sessions sitting in a kayak on a lake, and that's on 4G. Imagine what we'll be able to do with 5G.

DI: Such potential. 5G's speed and throughput has the power to take us from representation — drawings and BIM — to simulation and analysis of complex, connected systems. Things like COVID and wildfires.

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HC: Very much so. Some of what 5G gives us isn't going to be visible. The value is what 5G does at lower cost and higher volume. Now, it's affordable, because the cost of the communications — transportation of data over wireless networks — will be so cheap we can do a lot more of it. One example in consumer worlds is autonomous vehicles. As a wireless technology, 5G is good when you want to cover a wide area like a city. Inside a building, you might use a wireless technology like WiFi. They have different performance conditions and abilities to reach different surface areas. They use different approaches. But when you want to be able to keep doing it while you're driving a car at high speed you need 5G cellular technology.

If you want to do something like smart buildings keeping track of HVAC, temperature and air quality, and building occupancy, and nobody's moving at 60 mph down the hallway, WiFi works. You choose different wireless technologies for different applications, and they operate at different cost points.

Construction and engineering can have autonomous backhoes and tractors on job sites working 24 hours — if there are no noise problems for the neighbors, of course! Drones are already measuring material quantities and surveying progress on job sites. Because their cost has gotten so low, they can move from being science projects to being scaled commercial industrial solutions.

An acronym I've used for years in the wireless industry is the “DNA” of wireless: Devices, Networks and Applications. Whether we're talking 2G, 3G, 4G, 5G, WiFi, WiFi 6, it doesn't matter — you need to think about all parts of the DNA. What's the device? Because it's great, if I've got 5G network. But if I don't have a 5G-capable device, then I'm not getting the benefit of the 5G network. You need the device, the network, and the application. For example, in a smart building with thermometer and video camera, it's not the camera alone. All the data the camera captures has to come back into an application that maybe uses

cloud-based machine learning or AI to recognize what's happening inside the image captured by the camera. The data transmitted over the building WiFi, then, needs an access point where it goes on to the fiber or cellular. You have to think of the D, N, and A, the whole thing, not just one or the other.

DI: beyond 5G, are there any major technological movements afoot, or that you're seeing near term, through a design and construction lens? What's the next big thing?

HC: On the network side, it's 5G. On the application side, the A, it's about the cloud. When you and I started our careers we had IBM PCs, and the data was on our desks. The drawing was on your desk. Then, we'd connect them with networks, and they were on the network in the server at the end of the hall. Nowadays, the data is in the cloud. In the AEC industry, the building management industry, surely the data is in the cloud.

DI: You'd be surprised. There's still a surprising amount on people's desktops.

HC: Why should the AEC industry care about the cloud? Well, if you're working with Renzo Piano's firm in Italy, and the building and contractors are in China, having it all on the cloud connected with high-speed communications, means the whole design operation of the practice is no longer just one group in one location coming in at 7:00 in the morning and leaving at 8:00 at night. You run your business knowing you've got a multi-time-zone team collaborating, leveraging shared data, simultaneously accessed or not, but safely, accessibly, in the cloud. You need security and privacy, but there are plenty of advances there.

If we've got all this data and it's in the cloud, we can begin to look at artificial intelligence, also known as machine learning, to constantly assess that data. This software — not humans — can look at data, maybe across multiple projects, and learn. For example, we can learn from the project we did two years ago. Now I see today, this young architect seems to be repeating a similar design from two years ago that ended up in a

change order. Maybe I should flag that architect immediately. "Warning! Two years ago, a change order came out of this detail." Now we're augmenting the skill base of architects and engineers, based on machine learning that has been using the existing data set for customized training and risk management. What is the AEC industry doing to adopt machine-learning methods to improve the practice and the quality of buildings?

DI: What has been game changing for you?

HC: One thing is the speed of change, and how globally interconnected we all are. I worry there may be more friction injected into the world of communications. It may be good for some, but bad for others. We're all used to one internet. In truth, China has always had its own internet. Its own Chinese wall. Russia also has their own internet. They have had a spigot on what they let through. We are at risk in the future of having different "internet continents". The Western world, the Eastern Europe world, the Asian



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world. That will be unfortunate. It might become walls going up again, a new kind of Iron Curtains going up again, in a technological sense. I'm not for that, but that is a risk I see ahead.

It's very unpredictable, and it's changing rapidly. None of us, certainly not me, is good at predicting the future. Near term, you get some sense of what's happening. We've seen barriers go up, so that's no prediction. We just saw TikTok get a deal intervened visibly by the US government. If I've had any success, it is by constantly observing and questioning, and making informed guesses, and usually getting it wrong. But if you have a path, you have momentum. With momentum you can adjust your direction based on

the new reality. Rather than sitting it out and waiting to see what the new reality will be, you've got to be in the game, because you lose background too quickly if you think you can just take a break for a while and not keep informed.

In a design practice you've got to be doing something rather than nothing. You've got to be investing. You may pull back the amount and rate of investment, and you have to manage and plan for change. But you can't just say, “We'll just put it off and look at that again a year from now.” You have to keep your toe in the water, particularly for the adoption of new technologies. You don't need to go all in at the deep end. But don't do nothing because it seems unclear how it's going to play out. Because

you can probably transition from where you land to somewhere better more easily than if you wait and miss the window.

DI: Situational awareness is a new leadership skill. Constantly looking. Maybe that's always been the case, but in a world that changed slowly, you could get away with setting direction and commanding from on high and looking about less frequently. No more.

HC: The trick is to be elastic. Don't stretch yourself and your team to the breaking point but acknowledge you're not a loose rubber band. You need tension in the elastic. Stretch, and know you're stretching it, and involve people in being part of the stretch.

DI: Can you think of any other non-traditional service paths, post-COVID?

HC: If I was in the AEC community, I'd look at what the building occupancy rates are doing. What are they forecasting actual occupancy rates are going to be? What are property values and lease rates going to be? Because I think a lot of businesses are going to find they need less space. COVID is like having a car accident. Nobody said, "Well, I'll just see what it's like, if I have nobody in the office for the next year and a half." But now it got dumped on them, and they're finding the world keeps on moving. As architects, what is the client brief or program of the future? Architects can be the ones to give strategic advice, because clients don't know the answers.

The industry needs to look at how different kinds of use patterns are going to change, because even grandma is comfortable doing a video conference right now. Same for the retail, online shopping, and healthcare industries. Architects can

take this as an opportunity to work out how that's going to impact their clients' needs, and how they can adjust, be elastic, and offer new services that relate to those new needs.

DI: How would you advise an architectural client looking to reinvent themselves? Where should they invest to ready themselves for an uncertain future?

HC: It's not easy — the idea of changing the engine while flying the plane. If you're a mid-sized practice in a city like Atlanta, you've got 10 or 15 architects, or 50 architects. You've got some reasonable predictability about how your business operates. How many people you need, how many jobs you've got, the cost, the profit, the benefits to the people. It's a complex system. Why would you voluntarily say, "Let's change it?" Well, it's not going to be voluntary. Something's going to force you to change more than likely.

A few suggestions. I'd look for analogs on how to operate. One parallel that comes to mind is the



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software world’s transition around 2000. Software developers used to write code, then test it, debug it, fix it, and test it again. This was called the waterfall, a serial process. But then they transitioned, because they were doing bigger projects — and designing and building buildings is a big project. A lot of different people and information types are being brought together, and it all has to come to a point at the end where the building works and doesn’t leak.

In the software world that pivot became what is called “agile.” There’s an entire agile methodology, where you have scrums. You don’t try and do the whole thing, get it right, and correct a few bugs. You do a little bit at a time. You chunk it down into smaller manageable pieces, and you’re constantly using scrums. A big part of the transition is the mentality and the behavior of your people. I remember and respect greatly some of the architects who were near retirement when I was a young professional coming into the business. If I had told them, “We’re not going to even try and get it right

before we go talk to the client. We’re going to admit to the client we know some of this is wrong. We don’t know which part yet. But we’re going to quickly iterate and keep iterating,” they would have freaked out — and fired me. But maybe in today’s world, clients are also adapting their expectations.

DI: It’s paradigm-busting. Those with that old mindset can’t even entertain that kind of thinking. They were taught to “draw it once, right.”

HC: Yes. Maybe the industry needs to look for new paradigms in other industries that have made transitions. What are the similarities to look for? It’s like looking for flexibility. You recognize errors are there, but you’re going to quickly fix them. It’s a different dynamic. That would be a suggestion for firms: look for new paradigms from other industries. Learn from how they made their transitions from big monolithic projects, down to many small modules that are then integrated together.

DI: What are you worried about?

HC: I'm worried that despite all the technology, and all the mass consumer and business adoption by younger people, there's too much individual experience and isolationism happening. A growing demographic is so conversant and comfortable with smartphones and social media, virtual reality, and online gaming, but are they losing the basics?

Business leaders, principals in architecture firms, have to swim against that trend. They need to ensure people are truly active listeners with one another, that their human interactions and communications are actually understood, so they learn. Because a

lot gets missed as people become more isolated. They increasingly think they are independent. I'm worried about diminished active listening and thoughtfulness.

Just because communications can happen rapidly over a network, doesn't mean that a human is actively thinking about it. It just means they've got more to think about in less time. They need an attitude of being thoughtful. To consider the pros, cons, and risks. Think it through. Check with other people. Check their assumptions. Do some tests. You can't skip these steps. Otherwise, quality's going to suffer. That's what I worry about — people not doing enough active listening, true communication, and collaboration.

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Hamish Caldwell is a Partner in Wireless Insiders Network, providing strategic advisory services. He also serves as a visiting scholar at Georgia Tech's Center for the Development and Application of Internet of Things Technologies (CDAIT.) Formerly, he spent over 16 years with Bellsouth/AT&T and was the IT director at Lord, Aeck Sargent Architects championing the firm's digital transformation in the 1980s and 90s.

He has extensive consulting and leadership experience in creating, delivering, and growing high-technology product and service businesses in consumer and enterprise segments. He is accomplished in technology, mobile broadband and converged solutions, mobile computing and devices program strategy, marketing, product management, business case development, lifecycle operations, mergers and acquisitions, corporate strategy, and developer/supplier partnerships.