

enterprise leadership
IT Strategies for Delivering Business Value

Three Conversations

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INTELLigence: Interview with Martin Curley, CTO, Intel

“If you’re trying to change a culture to support innovation, you need to have tools and methodologies in place, and you need to have metrics.”

If you want to deploy IT for business value, then you’ll need to innovate. That’s the mantra of Martin Curley, global director of IT innovation for Intel Corporation, and that’s the subject of his book, *Deploying IT for Business Value*. Curley is responsible for stimulating, supporting, and nurturing the development of new products, services, and methodologies by Intel’s IT employees. He also oversees the worldwide Intel Innovation Centres, which enable IT employees to work with Fortune 500 customers and government agencies. He sat down with Enterpriseleadership.org to talk about how Intel creates an environment for IT innovators.

EL: Martin, we’ve interviewed dozens of IT executives from Fortune 1000 companies — you’re the first global director of IT innovation that we’ve interviewed. Can you tell us about your role? If we were to visit an Intel Innovation Centre, what would we see?

MC: The primary role I have is around stimulating and creating innovation and creating an environment and set of tools to help our IT organization, and folks actually beyond the boundaries of our IT organization, innovate. My organization also does a lot of building prototypes, trying to

drive new products and services across the chasm into production at Intel, so our Intel employees and our customers can get more value from IT. I’d almost say that there’s a new discipline emerging around IT innovation, which is the intersection of information technology as a discipline, and innovation as a discipline.

But if you were to walk into one of the Innovation Centres — and we have a network of these worldwide now — they’re not very fancy, they’re not high-cost, and you would see Intel IT employees working on some disruptive prototypes — that might be one activity. You might see some innovation training going on because there are some emerging tools and techniques that people are just starting to become aware of that can significantly increase the yield of innovation. You might see a customer executive workshop going on — in our Ireland Innovation Centre, we’ve hosted more than 20 workshops with various European governments around topics like transforming education or healthcare using IT. You’d certainly see a lot of showcases, and a mixture of “soft leadership” around emerging practices or the latest Intel products and new usage models associated with those products. So, you’d see a mix of activities.

EL: Are the people staffing your Innovation Centres full-time staff? Or, if someone in the IT group had an idea, could they submit that and be involved in developing the idea in an Innovation Centre?

MC: We have quite a small team maintaining the infrastructure and creating the environment. There are a number of different mechanisms that enable IT employees who have a good idea to submit that idea. We have a virtual Innovation Centre, and they can submit it there. We have the concept of an innovation assignment; if someone has a particularly good idea, they're able to take time out of their "day job" and work in the Innovation Centre to bring that idea to fruition. One employee in Sacramento who had a very interesting idea of using our new Viiv technology in the home for remote power monitoring and more efficient use of air conditioning took an assignment, and worked on a project with some of the local utilities there and tried some new algorithms around air conditioning; it looks like it could add significant value. Or, employees have taken an innovation assignment to work on a specific application that would add value to a particular set of Intel engineering.

EL: So, they are rewarded for coming up with innovative ideas, and there's a support environment for this?

MC: Exactly. For innovation to prosper, you need to create a "virtuous circle" around it. If you're trying to change a culture to support innovation, you need to have tools and methodologies in place, and you need to have metrics. Andy Grove, one of our founders, often says, if you can't measure it, you can't manage it. So, you need to have

different metrics in place. And then you need incentives, to recognize and reward innovators. We'll have some awards for the person who actually discovers and develops an innovation, but we also have one award for an information catalyst, for somebody who was especially effective in creating an environment that enables or fosters innovation.

EL: It's fascinating how that happens — you have the one guy who has the idea, and the other four who helped to make it happen.

MC: You've just hit on an important point: Innovation is a team sport. To use the soccer analogy, it's important to recognize the person who provided the assist for scoring the goal. For every one person that has the idea, perhaps there are eight or nine or more people who are needed to get that idea into production, get it into use.

EL: You were most recently Intel's director of IT, People, Intellectual Capital, and Solutions. What exactly did you do?

MC: Five or six years ago, we developed a business plan to help transform the Intel IT organization. And one of the gaps that were identified in the plan was that we weren't managing our global people resource in an integrated fashion — we had four or five thousand employees across 50 different sites. The role of director of IT, People, Intellectual Capital, and Solutions was created to manage our people as an integrated resource, identifying the future core competencies for the organization and putting curricula in place. We also created an intellectual capital program to encourage IT employees to submit and mention disclosures.

Because Intel created this new position and initiatives, our IT organization is probably the fastest growing contributor to intellectual property. Four or five years ago, perhaps we might've had one patent issued, and today, we're doubling the number of patents, or the number of invention disclosures, every 18 months. And I think this past quarter, we had more than 200 invention disclosures submitted and more than 20 patents approved from our IT employees.

EL: Nicholas Carr, in his book, *Does IT Matter?*, made the point that many CIOs are stuck in a situation where they're spending 70, 80 percent of their time just keeping the infrastructure running, the lights and phones and the network. And this causes executive management to wonder, "Well, we could outsource that function; what is it of value does IT really provide?" From your perspective, what would you say to a CIO trying to get out of that mode?

MC: Nick Carr's book promoted a healthy debate within the IT profession in terms of whether IT can add value. I firmly believe that IT *can* add competitive advantage, and in some cases, competitive necessity, and some of Nick Carr's premises are based around the view of IT as a utility.

I think it is very important that a CIO look at the IT value chain and understand where the spend is. I wouldn't contest Nick Carr's point that 70 to 80 percent of the spend is in keeping the lights on, and I think the CIO needs to work really diligently to see how that spend can be reduced. One way would be to deploy new technology; for example, remote management technology. A higher-leverage activity that the CIO could take on is using the concept of design for assembly,

which is used extensively in the automobile or consumer electronics industries: As you're designing solutions or cars or whatever, you're designing for the lowest operating costs. So if the CIO can inculcate the strategy that when solutions are developed, they're developed for lowest TCO, that would ultimately help.

I think the job of the CIO is to not just optimize the operation, and make sure service-level commits are met, but to try to take spending out of operations and move it up the value chain into solutions delivery and particularly into innovation. We've seen evidence, some internal and some external, that you'll get a higher return on your dollar if you invest in the innovation space rather than the operations space. There are some role models — Dell for example, and Wal-Mart — these are companies where IT really is a competitive advantage, and I think the CIOs there have been really successful in terms of trying to minimize the operations spend and invest in innovations that add value to the business.

EL: Let's talk about using IT as a competitive advantage. How do you go about doing that, what are some ideas that would be useful to other CIOs?

MC: We're starting to see a pattern emerge around IT innovation as a process; we see that there are at least six things that have to be in place for an innovation to be successful. The first one is that there is actually a problem or opportunity that needs to be fixed or to be addressed and someone actually has a vision as to how that can be achieved. One example would be Westminster Wireless City — the CEO there had a vision of how wireless technology could potentially transform the city of London, but he really didn't know how to

bring his vision about. He worked with his own IT department and with some support from one of the Intel Innovation Centres to build a prototype that eventually ran to a working implementation.

But most innovations don't come from "blue-sky thinking"; they come from addressing a specific problem or a potential opportunity. Necessity is the mother of invention, as the saying goes. Typically then, an IT solution has to be associated with fixing a problem or seizing an opportunity, and very often, a business case has to be there. IT went from irrational optimism before the dot.com crash to irrational pessimism. Today, there's a modicum of normality coming back to IT investments, but a business case is a prerequisite.

And then there are three vectors where the most difficulty are. As IT professionals, we naturally think of technical risk and the IT solutions. But with every IT investment, there's an associated business investment. There may be a business process change that needs to happen, there may be an organizational change that needs to happen, and the last vector is perhaps the most difficult — very often a customer change is required, or even a societal change. Many of the innovations that are being introduced today are touching many parts of society, and society's willingness and ability to adopt an innovation are really crucial to the innovation being successful.

EL: So then, the question might be, how do you measure the relative value of IT innovation to profit?

MC: This is something the whole profession has wrestled with. One solution that we find quite effective is what we call the "value dials." We identify the critical business

variables at Intel and maintain a list of those, and the monetary value of driving a change in each of them. When we are developing a value proposition for a particular innovation, instead of having a very "wooly" statement — "This application might improve supply chain flexibility"-- we'll actually hard code into the value proposition that, for example, the goal of this project, which will improve supply chain flexibility, will be to reduce our days of inventory by one day and achieve a one percent market share increase in a particular market.

EL: Ah — put some real teeth into it.

MC: Absolutely. And we then know the direct value of reducing the days of inventory by a day, or improving our market share by one percent, and that gives us the numbers that form the business case. And then the IT organization or the project team and the business team work together to do the best they can to realize that result. And by measuring that, we can see if the solution or project actually delivered what it set out to achieve.

EL: Does Intel have a budget for IT innovation, or is it parceled out of everyone else's existing budget?

MC: We do have a budget, and just to recognize that innovation happens everywhere, a small part of that budget is centrally managed. That part of the budget is to help stimulate, capitalize, and create an environment for innovation. Also, to do research, we have a central research group that is working on some specific agenda. The remainder of the innovation budget is split out amongst our various organizations within the IT organization — innovation is happening everywhere, and we are trying to do more innovation more effectively and

increase the return on innovation by catalyzing and better supporting innovation.

EL: Tell us about some of the innovation projects that you've worked on at Intel.

MC: One example is of a particular solution under development called Miramar. One of the challenges that companies like Intel face globally is how to enable employees in different parts of the world and in different time zones to collaborate. Miramar is an emerging application that we developed to try to provide a solution to that. We have a vision called “better than being there” — that you could have a remote meeting experience that is actually better than physically being in the room with somebody through computer mediation. Miramar is in its early days, but today, on employees' desktops, we have 3D immersive environments where they can better organize, and better locate, and better connect, information.

EL: To what degree does IT organization carry over to the external, product side?

MC: Quite a bit; our primary focus is internal, to help the IT organization be more innovative and develop more solutions, but we see an increasing pull on both sides. We work with our product divisions to give them ideas and help them build new features into the products, and we have done a lot more work with Intel's customers than we originally would've expected, with, for example, European governments. We will very often work with our sales team and with your fortune 500 execs in workshops looking at specific problems and how an innovative solution might be able to help. There is a significant crossover.

EL: Do you see any disruptive innovations that could change IT within the next five years? I'm curious about your views of the use of RFID or WiMax, in particular. Are people coming up with ideas on how to use that kind of technology?

MC: Yes, and I think the pace of change in terms of new and disruptive technology emergence is happening much faster than any of us could potentially have conceived of. I'm sure if you held this interview in a year's time, there are things that will be quite commonplace in our vocabulary that we don't know about today. But you mentioned two specifics, RFID and WiMax. We've been involved in projects in a hospital in Korea in neonatal care, where the mother and baby have RFID tags to avoid mix-ups; and in a hospital in Milan, we've been using RFID working with the hospital and a system integrator to make sure that blood transfusions don't get mixed up. So, in some industries, RFID is becoming pervasive; in other industries, it's going to take more time for it to proliferate. WiMax is a hugely exciting technology; it really is the classic disruptive technology and moving very fast. I think in a year's time, if you'd have this interview, WiMax will start to widely diffuse, with a 10x degree of deployment compared to today. Certainly, the economics are staggering compared to putting fiber in the ground, but as it normally happens with new technologies, you'll get hype. Gartner has that very famous “hype curve,” and I think there is hype around WiMax. However, we have been trialing it at the Ireland Innovation Centre and Innovation Centre in the UK, and the performance is very good. We're using it in production, and in the construction we have going on of a new factory, many of the

suppliers that are working with us are connected via WiMax, and their Internet access is very effective and probably a tenth of the cost of a conventional connection. So, WiMax is very exciting and is actually very real.

The IT Innovator's Dilemma, the Solution, and What's Next: Interview with Author and Educator Clayton Christensen

"To decide whether an innovation has potential, executives need to watch what people are doing, and then decide if the product they're proposing will help people do a better job of what they're already trying to do."

How can one know whether a particular technology will change the way we live or work? What signs do you look for to tell if an emerging company is going to survive? These are just some of the questions that Enterpriseleadership.org put to Dr. Clayton M. Christensen, a technology management professor at the Harvard Business School.

In his groundbreaking bestseller, *The Innovator's Dilemma*, Christensen exposed the crushing paradox behind the failures of many key industry leaders — (mis)judgments like pleasing the most profitable customers and ignoring disruptive technologies, such as Linux and network-attached storage devices. In *The Innovator's Solution*, Christensen makes the case that innovation and profitability are more predictable than managers may believe. And, in his book, *Seeing What's Next*, he provides a model, for those of us without any proprietary information, of how to forecast how innovations will affect companies and industries, and how to make the right decisions.

EL: How can a CEO monitor the pulse of his company's marketplace to determine whether the company will succeed or fail?

CC: By looking at data in the present through a lens of good theories, a CEO can forecast whether the company is on track to become more prosperous or to fail. Data about the distant past always exists. If the CEO is using data to understand whether the company will be more successful or not, then the CEO will always be driving into the future, while glancing in the rear view mirror. For example, if your innovations will help your company sell better products to existing customers, then these sustaining innovations will not necessarily result in future growth, even if it appears that you are innovating and that your profits are improving. If you look at this through the lens of my research, it would cause you to be worried. On the other hand, if your innovations are disruptive — ones that create new growth markets — even though they improve current financial results, you

could say you are laying the foundation for an exciting future.

EL: What are the indicators that a business or an industry is ready for disruption? You talked about companies that produce products that no one buys and/or product improvements that no one will pay for. What are some of the other signs to look for?

CC: There are two types of disruptions: low-end and new-market. A low-end disruption might occur only if two conditions are met:

- Customers at the low-end of a market don't value, and won't pay for, further product improvements.
- Someone has figured out a lower-cost business model that can be attractively profitable at the discount prices required to win the business of those customers at the low end.

The first condition identifies an entirely new market sector. If there is a specific population that doesn't have the skills to satisfactorily accomplish specific tasks, nor the money to buy the needed products, then they'll have to rely on the expensive and inconvenient help of experts. If that population exists, the second scenario occurs when someone else develops a technology that provides that specific population with an affordable and easy alternative for accomplishing their tasks.

EL: Given what you just said, where are the innovative opportunities for a major company, such as General Motors? How are they going to stay ahead of their competitors?

CC: If GM is trying to be innovative by making either better or larger sport utility vehicles, then I would really be worried. Seeing GM make innovations to its OnStar systems translates to a really exciting new growth business — one that's disruptive. If GM tries to sell Buicks in Japan or China, then I would remark that it might yield profits — but not create a lot of exciting new growth. On the other hand, if GM were to sell cars in China at a \$4,000 price point, I would say the opposite.

By looking at innovations through the lens of good theory, you can tell whether today's innovations will produce tomorrow's results.

EL: How can a CIO encourage the company's use of innovative or disruptive technologies?

CC: It's not the realm of a CIO to do this. The most exciting markets are the ones whose size can't be quantified. If a CIO finds himself or herself generating reports that innovating managers rely upon to assess the potential of the innovation, the CIO will be misleading people almost every time. To decide whether an innovation has potential, executives need to watch what people are doing and then decide if the product they're proposing will help people do a better job of what they're already trying to do.

EL: In what industries is a lot of disruptive innovation going on?

CC: Salesforce.com is a disruptive innovator to a sustaining technology company like Oracle. Linux has an operating system in Web-based computing that has become the OS of choice for handheld devices. It's really an exciting, disruptive innovation. Regional airlines are an exciting disruptive innovation that are just killing the major airlines, and SANDisk, which makes flash memory, is a disruptive innovation that is killing the disk drive industry. Wireless 802.11 and WiMax are pretty exciting innovations in telecom.

EL: Right now, another disruptive technology, the Blackberry wireless network, is embroiled in a patent lawsuit. Can a force like this hinder a disruption?

CC: It happens occasionally to sustaining innovations. Intellectual property protection impacts innovation in both positive and negative ways. A lot of times, patent issue thickets arise that make it difficult for anyone on the sustaining tier to create a meaningful innovation. For disruptive ones, the intellectual property issues almost never matter.

EL: Some years ago, StorageNetworks built an IT infrastructure from commercially available hardware, raised more than \$200 million, and offered organizations a third-party source for immediate storage, like a public service utility. EMC validated the concept. But StorageNetworks couldn't sustain that business; it offered backup stores, then started licensing its software. Eventually, StorageNetworks went Chapter 11 and couldn't even find a buyer. What went wrong here?

CC: I haven't really studied this company in depth. With the caveat that I haven't crawled inside, I'll tell you some of the things I worry about as I watch emerging companies. First, when you start a business, you may *think* you know, but you don't really know, if you have the right strategy. Likewise, you don't really know who are the right customers and what job they are trying to get done. You start out with a deliberate strategy, and you think, *this is the right thing*, when in fact, you almost have to know for sure that, initially, you're going to be wrong. Therefore, you have to get in the market quick with a little of that conviction, then figure out what *will* work later.

One of my books cites a colleague's study of 400 Harvard Business School graduates who started new companies. Half have been successful; half haven't been. The graduates who founded about 90 percent of the companies that succeeded said they didn't entirely trust the strategy they used when they raised money. They ended up selecting another strategy that enabled them to succeed. The difference between the successes and the failures wasn't that the successful ones got it right the first time. They just had money left over after they got it wrong. They learned from their mistakes in time to shift gears.

EL: What do you mean by “good investment money” and “bad investment money”?

CC: Bad money flows into something with the willingness to accept big losses. You've got the expectation that the more you spend, the more you'll earn later. You spend the money expecting your strategy is right. There probably was a good business opportunity somewhere for StorageNetworks. However, it's accurate to say that StorageNetworks didn't have the right initial strategy, and spent a lot of time pursuing it. Or you can say that StorageNetworks employed a deliberate strategy aggressively from the beginning, and spent to get big fast.

How IT Changed the Cellular Communications Marketplace: Interview with Thaddeus Arroyo, Chief Information Officer for Cingular

“Regardless of what industry you are in, you also need to view yourself as the leader of that business and focus on whether the initiative is for support, or for new development.”

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Thaddeus Arroyo, Cingular's chief information officer, makes sure that IT does more than oversee the internal IT infrastructure, but also works closely with business units to develop new product offerings. The end result includes an assortment of features that have become firsts in the cellular industry.

Enterpriseleadership.org sat down with Arroyo to discuss the IT governance process, quality initiatives, Cingular's merger with AT&T, and the ways IT helps to differentiate Cingular's offerings among competitors.

EL: How is IT organized at Cingular?

TA: IT provides the critical foundation that holds the enormous common IT infrastructure together. It's a build-and-run organization. I have a team that makes sure IT and the business units work harmoniously with each other. This is where governance begins. As work flows in, it goes to an

engineering factory where the designs are put together and then delivered to the development and integration teams.

It takes a tremendous amount of manpower resources and servers to handle functions such as provisioning servers, processing each customer's bill, and maintaining both front- and back-office operations. A substantial technology fabric compresses this into a couple of context screens that allow end users to either interact with us or their sales representatives or to provision their cellular services.

EL: Can you elaborate on your governance process?

TA: All IT investments pass through my planning group, called Planning and Business Operations, which consists of IT representatives from across the business. This group first estimates a cost for each project to be funded. Working with representatives from the business units, the group then analyzes all requests for IT investments and prioritizes those investments according to estimated project cost, function, consistency with business strategy, return on investment, and risks. A project can't be funded unless the business unit approves it. Fewer, more focused initiatives work better than many scattered, not-well-executed projects.

EL: Do you use quality programs such as Lean, Six Sigma, or CobIT?

TA: We don't use all of the elements of any one of these programs. Instead, we've taken

attributes from each one and combined them into our quality program, called the Wireless Unified Process. It consists of a formal systems development lifecycle process that begins with governance and goes through delivery and on-going operations. The true test of this program is how well we do with a general control audit and the quality of our output. We've tried to tailor the program around these elements so we could make sure financially-significant applications comply with Sarbanes-Oxley.

EL: Do you have the IT Infrastructure Library in place?

TA: No. I'm familiar with ITIL; we use many aspects of it in our Wireless Unified Process for support and delivery of IT services. We call it "managed services." We tend to look at components that help us improve the operability and then build them into our managed services concept.

EL: How do you gain economies of scale with functions such as the call center?

TA: Prior to the merger with AT&T Wireless, we had 60 mini-call centers, which we consolidated down to 20 larger centers in rural areas. This move enabled us to leverage technology across all of our call centers to create the appearance of a virtual call center. Our integrated call management technology allows us to select from any call center the next available representative who has the appropriate skill set required for the call. We're weaving AT&T in our virtual call center model. AT&T originally had a combination of in-house and outsourced call centers.

Our goal is to focus on why customers call and to eliminate the need for them to call us.

EL: What about IT infrastructure economies of scale?

TA: Our shared data systems model has helped us gain scale, especially for deploying services. For example, we don't necessarily put in one server for each application. We run our applications on shared servers based on the nature of the application and the availability of servers. We tend to put in larger servers. We also have a large storage area network fabric. This shared concept enables us to gain a higher overall workload. We also can do more load balancing.

EL: What is Cingular's company value proposition? And, how about IT's?

TA: We're the largest wireless company in the United States. We've created the largest mobile-to-mobile calling community, and we support it with some unique features. Our value proposition focuses on continuing to make the customer's wireless experience as simple as possible.

IT helps Cingular to carry out its value proposition. We're leveraging technology to continue to deploy self-service mechanisms. Improvements to our interactive voice response system, Star Services, allow customers to get critical information more easily than calling a customer-service representative. Since many of our customers prefer different paths to communicate with Cingular, such as the Web, we put more functions online for things such as setting your mailbox, or looking at unused minutes.

EL: How does IT support the competitiveness of the company as a wireless leader?

TA: Rather than have IT function as a traditional cost center, I've established it as a thought center, to enable our company's business strategy. For example, the IT marketing members on Planning and Business Operations work with the marketing leaders to show how technology can be leveraged to improve the business process.

This process has worked well for us. If you're familiar with Cingular, then you've heard of rollover minutes. It's an IT innovation, not a network product. The ability to track minutes and roll them over each month resulted from a close collaboration between IT and marketing. While we were looking at how we could differentiate ourselves in the marketplace, we came up with the concept of modifying our billing systems to track and create a product around it. It's very complex to look beyond a given cycle in a specific month. Rollover minutes has served us well. It's closely linked to the Cingular value proposition.

EL: Any other examples you can provide about how IT contributes to Cingular's competitiveness?

TA: Our Clarify CRM infrastructure is really to help us eliminate customer calls, not for order management. When customers call, we note in Clarify any commitments we made to solve customers' problems. Clarify ensures that there is follow-up. If we don't follow up, then Clarify sends the incident report to the next management level. This process enables us to identify why

customers call and for us to make every effort to solve their problems.

EL: Can you talk a little bit about how you handled the merger with AT&T Wireless?

TA: From the start, we had a very aggressive plan to launch the Cingular Common Service — one product in the marketplace — within one week after closing the deal. Think about it: You've two different companies with two separate sets of systems. The Cingular product works only if it's provisioned on the right network. To this end, we had to build a lot of things prior to close when we were still competing vigorously with AT&T Wireless. We had to put in place technology that allowed us to treat every legacy AT&T Wireless system and every Cingular legacy system as one customer base.

After we rebranded all of our company-owned retail stores, we had to provision the servers on the new Cingular infrastructure. Again, all of this happened because of IT's ability to work closely with the business units. They had a vision, and IT showed them how we could carry out their vision and support it.

EL: What can a CIO in an insurance company learn from you?

TA: Regardless of what industry you are in, you also need to view yourself as the leader of that business and focus on whether the initiative is for support, or for new development. You need to have a strong governance process in place. Next, you need to select your bets wisely and manage the scope of projects to a level that reduces your risk factor and improve the probability of success. You need to look carefully at the

projects you take on and how you phase them in. For example, I won't approve a project that doesn't have a material deliverable phase within 12 months. There isn't an industry today that doesn't have a material requirement for IT at least in part of the fabric.