

NEXT

M A G A Z I N E

ISSUE 1.0

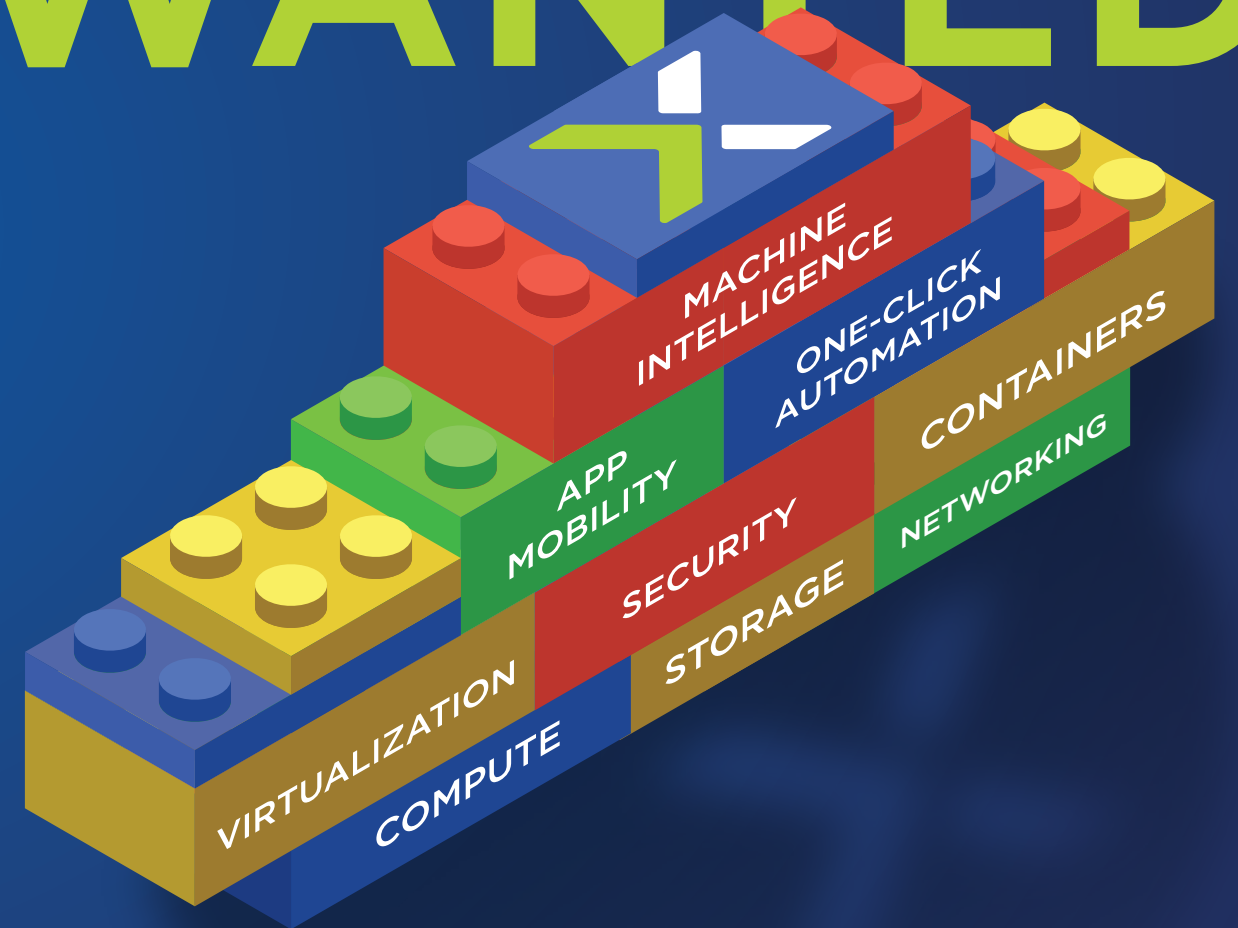


Digital Disruption
Who's Leading the Charge?
ART LANGER

Tech Investments
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Edge Computing: A New Frontier
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Issue 1
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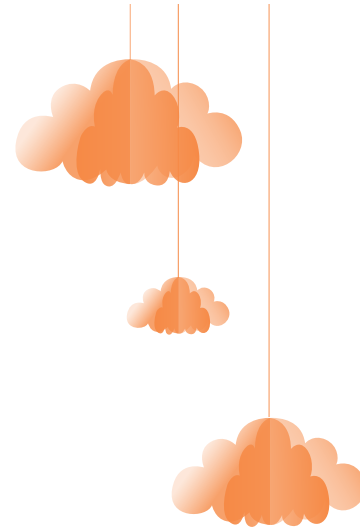
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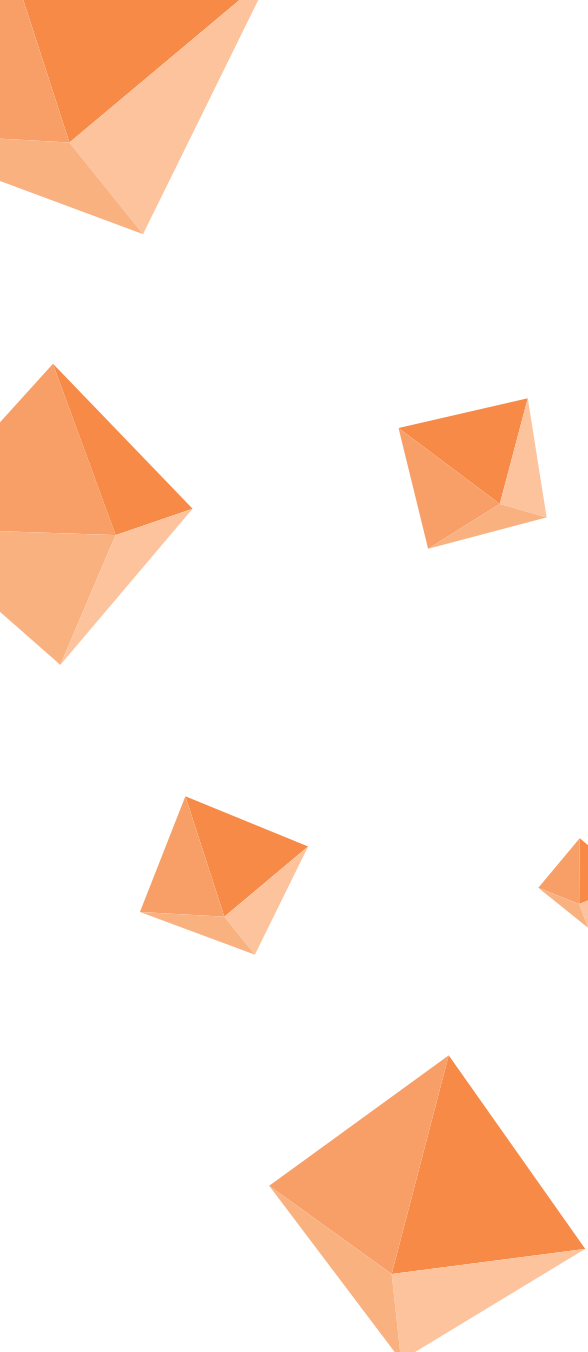
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Welcome to the premier issue of NEXT Magazine, created for fellow visionaries and disruptors!

Each issue will offer practical advice, bold ideas, and occasionally controversial opinions from some of the industry's leading change agents. From universities to boardrooms to datacenters—you'll hear from people who are reimagining what's possible in business and technology.

Our inaugural issue features insights from the former head of design at Google and Yahoo, CIOs and CTOs making waves in their companies with new and innovative strategies, top university professors, visionary company founders, and even the first female chess Grandmaster—just to name a few.

Read on, enjoy, and learn what's next in cloud economics, digital transformation, edge computing, women in tech, and the secret to picking your next new hire.

Julie O'Brien
Vice President, Nutanix Corporate Marketing

OPINIONS



DIGITAL DISRUPTION:

Who's Leading the Charge?

WHY IT SHOULD STEP UP TO THE PLATE—AND 8 TIPS TO HELP IT SUCCEED

-By Art Langer

It should be no mystery that corporations need to be technology-centric when developing their competitive strategies. Staying viable in your given industry requires the ability to creatively exploit digital technologies. Still, many organizations continue to struggle to formulate digital strategies and to do so fast enough to ward off new and more agile competitors. Ultimately, new technologies are accelerators of change, and organizations must move fast to adapt or risk becoming obsolete.

SO WHO WILL BLAZE THE DIGITAL TRAIL FOR THESE FIRMS?

IT organizations should be quick to raise their hands. Whether you are a technology entrepreneur, CIO, CTO, or project manager, overcome your shyness about jumping into the digital end of the technology revolution with two feet. Remember that, if anything, digital technology is complex and requires the advanced skills that IT leaders bring to the table.

BIO

Dr. Arthur M. Langer is the Director of the Center for Technology Management at Columbia University. He is the author of numerous books including *Guide to Software Development: Designing & Managing the Life Cycle* (2016), *Strategic IT: Best Practices for Managers and Executives* (2013 with Lyle Yorks), *Information Technology and Organizational Learning* (2011), and *Analysis and Design of Information Systems* (2007), and has numerous published articles and papers relating to digital transformation, service learning for underserved populations, IT organizational integration, mentoring and staff development.

The question is how can IT professionals integrate better with their business partners and assume a leadership role that allows them to develop better digital-based organizations?

Ultimately, that requires a seat at the business-planning table. You can get there by proactively interacting with various business units and departments while informally pitching ideas for using digital technologies to the company's advantage. Eventually, one will take hold. Soon, your cross-departmental peers will become accustomed to looking to you and your organization for new ideas that take advantage of digital in ways that blow past your competition.

DISRUPTOR OR DISRUPTEE?

Perhaps the word most used to describe the accelerating change brought upon by technological innovation is *disruption*. The topic is more often referred to as "digital disruption." Digital disruption shortens the lifecycle of successful products and services, which means organizations have to keep developing new products to compete. We have seen brands such as Nokia significantly lose market share and have to readapt to stay current in the ever-changing realm of tech.

Companies need to recognize that their market share could be disrupted very quickly. You can usually determine your typical disruption exposure by observing indicators such as consumer satisfaction levels or market sensitivity to product pricing. So the timing of a successful disruption is very dependent on whether the market is ripe for a new product that improves customer service at a lower price or offers more service options. Ultimately, firms need to think about whether they want to be disrupted or be the disruptor.

RISKY BUSINESS

Being in the right place with the right disruptive idea is not solely a mathematical calculation. It may be predictable in many ways, but there will always be risk factors because of the complexity of variables at work in any market. However, if you do decide to transform your business model, you must move quickly; the time to act and complete an initiative is critical.

Be sure to take into account that all disruptions will have a failure rate. For example, when an athlete plays soccer, not every kick towards the net results in a goal. The same goes for disruption. The challenge then is to determine an acceptable success rate. Always remember that if you don't kick the ball, you can't score. Taking risks is simply a requirement of digital transformation. Thus, businesses need to launch many initiatives of which some percentage will be successful.

IT leaders need to be the advocates and executors of change. They must provide the leadership and the direction to help navigate an organization through digital transformation. All this means that IT leaders must reinvent themselves into a role that transcends being the person who keeps the lights on. IT leaders who fail to seize this opportunity will likely be locked into a permanent support role. Indeed, many organizations have already established new C-level positions such as the Chief Digital Officer and Chief Innovation Officer, who are responsible for the digital strategy in their firms.

Just how do you become that executor of change? Here are eight tips for success:

#1

Change the business cycles of technology investment. Technology investments must become part of the everyday or normative processes, rather than being tied to economic opportunities or shortfalls. In other words, it's not a good idea to base new ideas around a specific event, new technology, or competitive announcement, then wait for the next event to take the next step. This approach creates discontinuities in culture shift, when dealing with digital disruption must be a 24/7 proposition to succeed.

#2

Encourage your organization to upgrade legacy operations. Do this by reviewing processes, examining talent, and reconsidering staff roles and responsibilities. Ultimately, organizations must have the willingness and ability to start anew and say: "OK, we're going to do it in a completely different way."

#3

Get closer to the company's customers. Whether you're in the B2B or B2C business, eventually, there is a consumer. An IT leader that can help the business use technology to improve its responses to consumers' needs is invaluable.

#4

Embrace the ever-changing landscape of tech. The previous experiences that organizations have had with IT are not a good indicator for its future use. Technology innovations must become more digitally focused and evolve through infrastructure, learning, and process evaluation.

#5

Remember that digital technology is central to competitive strategy. IT leaders need to ensure that technology opportunities are integrated with all discussions on business strategy.

#6

Manage digital innovations through intracompany and customer linkages. As noted, IT leaders must establish interfaces across the business by being very active with various departments and units, especially with business customers.

#7

Pay close attention to intellectual capital. Managing this knowledge requires IT leaders to create processes that transfer tacit knowledge to explicit knowledge.

#8

Embrace an adaptable mindset. Successful IT leaders must develop architectures, manage change, and deal with short- and long-term projects simultaneously. Most importantly, they need to convey that not all projects will succeed or have long life cycles.

IT leaders can be game changers when it comes to leading organizations through digital transformation. But first they need to take initiative. Become engaged with business partners and customers to help your company take advantage of digital innovation so that it can retain—or even surpass—its standing in your industry.



ON OPERATING SYSTEMS AND DARWINISM

- By Dheeraj Pandey, CEO, Nutanix

For the last forty years, the world of computing has seen a consumption model change almost every decade. And in every cycle, the unit of compute -- the "server" -- has become smaller and shorter-lived than its predecessor. Mainframes were big and had a lifespan of a couple of decades. Unix servers powered by HP-UX, AIX, and Solaris were smaller (and cheaper) than Mainframes, and lived for 10+ years. The Windows and Linux servers running on Intel x86 were smaller than their larger Unix counterparts, and had a lifespan of 5 years. The virtual machine "server" became invisible, a hundred could be packed within a single x86 server, and typically lived for a few months to a couple of years. And with containers and lambda, the unit of compute continues to shrink and become even more ephemeral and stateless.

With these consumption model changes, the world of computing has also seen a couple of operating systems emerge every decade. Solaris and Windows in the 90s, Linux and VMware in the 2000's, and now Amazon AWS in the last five years. The ones that withstood the test of time had three things in common:

- (A) THEY WERE REALLY EASY TO USE,**
- (B) THEY WERE EXTENSIBLE VIA APIS,
AND MOST IMPORTANTLY,**
- (C) THEY WERE UBIQUITOUS, I.E.,
LOCATION AND PLATFORM AGNOSTIC**

Interestingly, Solaris, despite being a popular OS of its time, failed all three tests of survivability.

EASE OF USE: SURVIVING & THRIVING

The industry has come to know Nutanix for our ease of use. For the casual observer, that would all be about Nutanix Prism and how we've built 1-click delight into our end-user workflows. Prism has morphed over time from systems management to operations management, with search and machine learning becoming the cornerstones of this control plane engine. And rightfully so, the control plane itself is graduating from being a pane of glass purely for ITOps to an app-centric self-service portal built for developer workgroups.

But ease of use demands way more than an intelligent consumer-grade control plane. Reliability, availability, and serviceability are equally important pillars without which a distributed system can be very difficult to use. Moreover, common requirements of a secure system -- confidentiality and integrity of data and services -- can make ease of use extremely elusive. This is the reason why most products are either secure or simple, but not both. Equally important are APIs to make a system easily extensible and configurable. If a product has no easy way to interface with other products in the environment, it fails the ease-of-use litmus test. And finally, a company that doesn't obsess on customer support and service cannot be easy to interact with.



As OC Tanner evolves into a software product company, we need the agility of a public cloud with the security of a private cloud. Nutanix gives us both in a hybrid cloud architecture. Even better, the money we save with Nutanix goes straight into technology product development.

Niel Nickolaisen
OC Tanner
Chief Technology Officer

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Long-lasting technology companies obsess about this trifecta of interfaces: the human-computer interaction ("man-machine"), the computer-computer interaction ("machine-machine" APIs), and the human interaction (customer service).

UBIQUITY AND "NATURAL SELECTION"

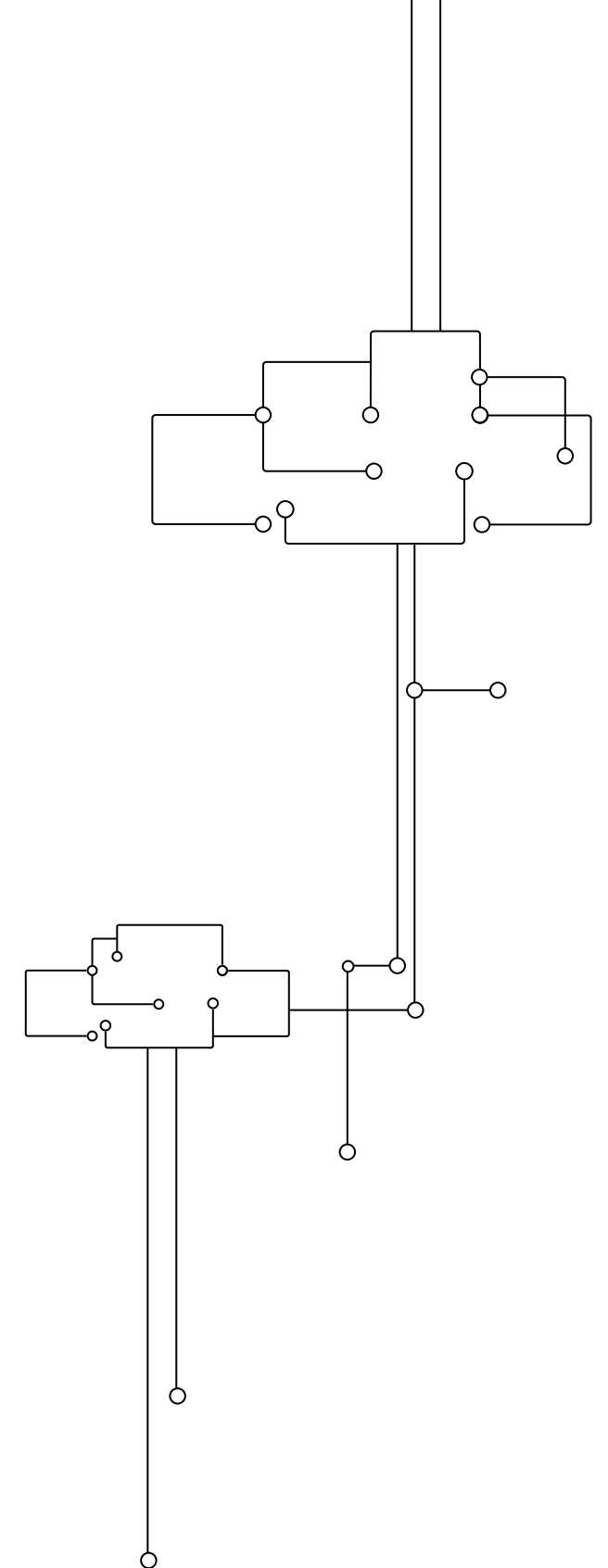
Windows was the epitome of ubiquity, with its presence on desktops, servers, and embedded devices. Public cloud providers are trying to make their operating systems omnipresent by standing up datacenters all around the world. VMware is trying hard to become ubiquitous beyond its current on-prem x86 presence. Microsoft, with its Azure push, is working equally hard to make its OS location-agnostic. In the last 5 years, they've also shunned platform "hubris" to build apps that work on MacOS, iOS, and even Linux. There is no finish line for the incumbents, even after two decades of a dominant market presence.

In the past 8 years at Nutanix, we've built software that is truly platform agnostic. Despite the fact that we've created a full-blown hypervisor in AHV, and our own appliance form-factor, we've built data and control planes that act like "apps" to the underlying hypervisor and hardware. This means that the platform competes on its own merits, as do the apps, without one being a crutch to the other. And this self-assuredness makes us compete with ourselves, providing our partners a level playing field to co-mingle their innovation with ours. The "survival of the fittest" competition is what gives us real evolutionary advantage!

With our software working on palm-sized Intel NUCs (and drones), a broad spectrum of x86 servers, and now on high-end IBM Power servers -- and with our OS services running on 4 hypervisors, including our own -- we've ended up becoming more accessible than the most established operating systems in enterprise datacenters. More importantly, we've made applications ubiquitous by making sure we blur the boundaries between hypervisors and between hardware platforms -- with capabilities such as cross-hypervisor replication, 1-click migration, and 1-click provisioning of entire apps.

Of course, in this day and age of cloud, our quest for ubiquity is not complete without our software being available as a service. The next leg in our journey towards invisible infrastructure involves blurring the lines between on-prem and off-prem clouds. How apps "naturally select" one versus the other -- depending on economics of elasticity, security, and dispersion -- will be the truest test of design and evolution.

DARWINISM FTW.



Adaptive Culture

STRUCTURING IT IN THE FACE OF CONSTANT CHANGE

-By Niel Nickolaisen

An expert in IT organization design once told me, “Design your structure first, then align the work your team can handle to that structure.” I thought I hadn’t heard him correctly as I’ve been reasonably successful doing the exact opposite my entire career. Strategy shapes structure. How could it be any other way? Turns out the approach that I came to intuitively has a name. It’s called *reconstructionism*. It’s a business theory first proposed by professors W. Chan Kim and Renee Mauborgne, authors of the Blue Ocean Strategy for creating and dominating uncontested market spaces. While structuralists believe that strategy should be structured around an existing environment, reconstructionists believe that the environment should be recreated to meet the needs of new strategic objectives. Reconstructionists create new opportunities by seeing beyond the limitations of the current environment.

STRATEGY BEFORE STRUCTURE

Given the pace of change in IT, it seems logical to me that creating an adaptive culture—one that is willing to constantly reinvent itself—is the only way to keep pace in such a dynamic marketplace. On every team I’ve ever led, we always approached organization structure by first defining our high-level goals. Because it’s easy to get overwhelmed with the sheer number of competing objectives, I developed a decision framework to help not only define objectives, but to align the amount of effort and resources we should apply to each initiative to maximize value (see sidebar).

With our goals defined we next ask ourselves how we should be organized to deliver on the goals – and deliver them quickly. As part of this process, we assess the current organization—what’s working, what’s not—and readjust our plan to ensure our goals are realistic and achievable. For instance, if one of our goals is to become strategic partners to the lines of business, but we have a reputation as “the gang that didn’t shoot straight,” we have some additional work to do. No one is going to consult us for strategic initiatives if we can’t handle the basics, like reactive incident response.

CASE STUDY IN ITERATIVE INNOVATION

In a previous role, I inherited an IT team that was a bit of a train wreck: low credibility had sapped it of all personal motivation and engagement. As a team, we collaborated on our initial goals and decided that we needed to get good at delivery, get good at incident management and resolution, and fix the broken relationship with the rest of the company. Only after our goals, and the KPIs we’d use to track success, were defined, did we focus on how best to organize ourselves to meet those objectives. In our case, the fundamental legacy IT structure—software engineering, service desk, IT Ops, application administration, etc.—was functional. What we were lacking was a sense of issue ownership and accountability across the organization. Therefore, to improve the likelihood of achieving our goals, we moved to a structure built on cross-functional delivery and service management teams led by a person who owned the customer relationship.

Only by making serious, sustainable progress toward achieving these initial goals, did we earn the right to go for our end-game objective: to transform from reactive support to proactive service delivery and strategic innovation. Building on the

foundation we created, we focused the strategies to achieve these new goals, and once again realigned the organization that would best assure success. This time, we aligned the organization around customer types—external customers, internal customers, and our own IT customers. This gave us the level of customer intimacy we required to truly understand each of our customers’ unique needs.

CREATE A CULTURE OF TRUST AND OWNERSHIP

If you follow my approach, you will find yourself making changes to your organization as often as required to meet the needs of your business. Constant restructuring—no matter how important the reason—will destroy morale if you haven’t cultivated a culture of trust and ownership. As a leader, you can do this by focusing on the *what* of the work, and communicating *why* it matters. But leave the *how* to your team. Push decision making and problem solving deeper into your organization, and trust them to make the right decisions.

Even still, not everyone will embrace change. Focusing on goals first and organization second has a tendency to blow up existing hierarchies. I recall one leader on my team who, try as I might, could not deal with how his role had changed. He was frustrated that the functional and technical skills that got him where he was in his career did not translate to him winning the new role of cross-functional team leader.

Change, while uncomfortable, spells opportunity for those who embrace it. For the rest of my IT management team, this approach was the perfect accelerator for their careers. They learned how to influence by listening and collaborating with other teams, rather than relying on position or technical expertise, and helped everyone move forward. In a world where IT is horizontally integrated across virtually every area of business, that’s an invaluable skill to have.



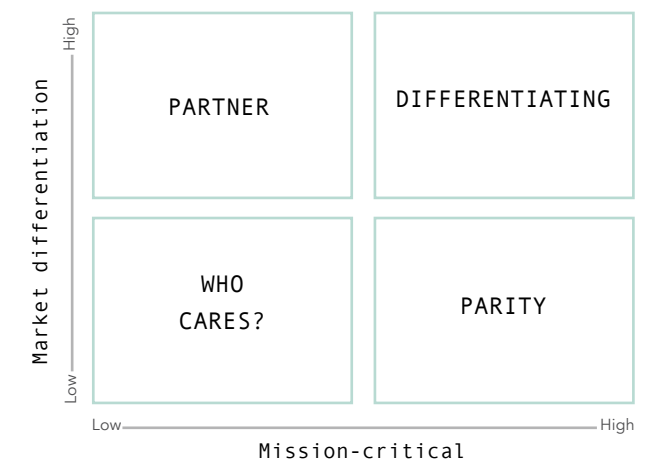
Decision Framework for Purpose Alignment

I developed this model for decision making to ensure that our IT resources are always focused where they will deliver the most business value.

Always focus on the right side of the chart. Activities that are market differentiating and mission critical are things we must do better than anyone else. Activities that are essential to the business, but don’t create competitive advantage are parity projects, meaning we need to do them as well as our competitors, but no better. Save innovation and creativity for differentiating projects. For parity, don’t customize or reinvent the wheel, but conform your processes to the way market-leading systems perform that work.

Very rarely do we encounter projects that offer market differentiation that is not core to the mission. When we do, these are ideal projects to outsource to partners. Projects that are neither differentiating nor critical... who cares? We don’t do them. Neither should you.

PURPOSE ALIGNMENT



BIO

Niel Nickolaisen is the chief technology officer at O.C. Tanner Co., a Salt Lake City-based human resource consulting company that designs and implements employee recognition programs. Niel is a frequent writer and speaker on transforming IT and IT leadership.

WHAT LIES BEYOND OPERATIONS

HOW ONE CIO IS CHAMPIONING DIGITAL CHANGE.

IT has struggled to align with business goals for decades. But now the rubber is finally meeting the road: it's more important than ever that IT succeed at adding business value in the era of digital transformation.

Folks throughout organizations are creating ways to disrupt their markets because the advanced and automated technical capabilities are there to support it. Anyone can spin up a cloud service and use digital tools without having to formally consult IT. So it's time that IT fully harnesses the available capabilities, makes cultural and process changes, and plays its part in keeping the revenues flowing so that it stays relevant.

As CIO at Sligro Food Group, a €2.8 billion B2B food service company in the Netherlands, Maurice van Veghel took on this very challenge. His job these days is to add value to IT and to help the department do its back-office job transparently, so that it can contribute to disruption efforts in more strategic and meaningful ways.

REINVENTING IT

To succeed, van Veghel took a gutsy risk when he revamped his own role at the company, a gamble that has so far paid off. A 10-year veteran at the 85-year-old Sligro Food Group, van Veghel was accustomed to overseeing operations and development that ran on an aging but reliable IBM AS/400 mid-range platform and home-grown RPG-based applications. He realized that if the company wanted to move forward in ways that included expanding its business into additional countries, it would have to change up the way it did things.

The CEO and CFO empowered him in leading a charge to transform the old platform and to ready the traditional wholesale food company for looking at IT in a new, digital light. "Without the full support of senior management, large-scale changes are a 'mission: impossible,'" van Veghel says.

"At a certain point, you realize slowly but clearly that IT is becoming the core of your business in a way," he says. "We cannot expand with our current platform. We can't take it to another country and reprogram it in another language."

Van Veghel knew that his own future at the company hinged on his being able to transform the company from traditional processes, and he was determined to use technology to make it happen. He also knew it was possible that his company's leaders might say no.

Fortunately, they didn't. Van Veghel took a deep breath and hired a successor to his operations role. Building and maintaining a smooth-running, stable operational castle, then giving it away to another owner was tough, he says. But in return, he got the chance at opening doors and windows of digital opportunity throughout his company.

FEWER TASKS, MORE INNOVATION

He created a core team to help move IT from "delivering a facility to delivering a business" that consists of all young potentials of his current staff and sits between IT and senior management. The traditional IT team reports to van Veghel's replacement director of operations. The new core team has spent about nine months so far creating the

Maurice van Veghel transformed himself from operations guru to digital activist to help usher his company into the next era of business.



environment – culturally and financially – that will allow the organization to think, plan, and function in higher-level terms and worry less about operations.

Not that operations isn't important, van Veghel says. "It's just not rocket science anymore. It's easier to deliver IT with all the technology that we have, and with the cloud, it's much easier to create processing power, storage, whatever you need. So time is freed up to go beyond operations, where we care more about basic technology choices and less about the details."

What does that mean organizationally?

"Not all the people [in the IT department] are equipped to go beyond operations," van Veghel acknowledges. He reckons that about 30 percent of his former IT team could be "made suitable to perform in the new digital era."

ALL ON BOARD

Van Veghel is the leader of the digital transformation effort and "the board is the most important other component" of the effort, he says (see story, "From the Cold Room to the Board Room," page 24). Getting the board "on board" involved, in part, reserving five afternoons where an external speaker came and talked about "topics that CEOs wouldn't have been interested in five years ago, like minimal viable product, service bus, agile development, and business IT alignment," he says.

The team is poised to embark on getting itself positioned for doing business – and IT – in a whole new way, now that the organization has been set up, resources and budget have been found, and the board has bought into the idea.

If all goes according to plan, Sligro will be well on its way to expanding into new countries and becoming more than a traditional B2B food service wholesaler. The company hopes to become even more focused on customer centricity while using all the digital capabilities available.

"Managing our business in more countries and firing up more new online propositions must be the result of all the effort," van Veghel says.

Within Sligro Food Group in the new era, IT will still be on top of operations and guarding the castle. But it also means having new bridges to new online propositions, new ecosystems, and new countries. The role of IT will transform to providing guidance in technology and talent to agile business teams while still remaining in control of IT governance and architecture.

"AT A CERTAIN
POINT, YOU REALIZE
SLOWLY BUT CLEARLY
THAT IT IS BECOMING
THE CORE OF YOUR
BUSINESS IN A WAY"

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FROM THE COLD ROOM TO THE BOARD ROOM

REINVENT YOUR COMPANY AROUND TECH DESPITE
WALL STREET PUSHBACK, SAYS INDUSTRY VETERAN



If you're not investigating how technology can drive your business, you're in trouble. And doing that involves taking a long-term view of your company's future despite Wall Street's obsession with quarterly numbers.

So advises Virginia Gambale, managing partner of Azimuth Partners, LLC, and a former senior technology executive at several multinational firms. Gambale has also served on more than 20 public and private boards.

The reason for Gambale's dramatic statement?

"Technology used to 'enable' your business. Now it truly 'drives' the business," she says. And that requires innovation and direction from the boardroom down—a flip from traditionally relying on the IT department to figure out how to innovate with tech. Now, she contends, it's the companies with forward-thinking board directors who live with innovation and disruption in their day jobs that will empower companies to prevail.

THE CHALLENGE FOR LEGACY COMPANIES

Without taking full advantage of the digital capabilities now available, an organization's very future is at stake. Here's why: Businesses that haven't transformed themselves digitally become legacy companies, Gambale explains. "Legacy companies can be eclipsed at any time" by a new player starting out with all of today's digital tools at its fingertips.

And it's very difficult to innovate within legacy environments, which tend to put all their energies into the operations of the traditional business. That doesn't leave time or resources for finding and executing on all the new opportunities that digital affords.

That's why Gambale advocates that technology move from the "cold" room (the data center) to the boardroom so that, from the top down, technology and business goals are inherently intertwined. She recommends having a defined plan to disrupt your own business with dedicated resources. That means planning to sunset businesses that are legacy with a heavy asset base and tying these plans to compensation at the highest levels in the company.

Legacy companies would do well to set up a venture fund or innovation lab populated with employees that focus exclusively on the new venture, she advises, because of the difficulty with innovating within the four business walls where traditional operations are taking place.

WHAT ABOUT WALL STREET?

Not helping matters is Wall Street's traditional and continued preoccupation with quarterly earnings reports.

Similarly, wealth managers find it difficult to quantifiably recommend you invest in a company you have your eye on if its margins are too small or the company appears to be spending more than is typical of its peers. Again, the focus is on numbers on paper and not what the company is doing to reinvent itself and possibly its industry.

Yet any business that wants to survive into the future needs to be preparing to fully leverage the digital advances that are available today. And Wall Street itself should be asking, "How are you investing in technology?"

But instead, financial analysts tend to harp on what they know, which is why costs aren't lower and margins wider. Gambale implies that the Street should have learned its lesson with Amazon years ago.

"Amazon was berated for not being profitable, though it was heavily investing in building out its infrastructure behind the scenes. It then unveiled a lucrative new business, Amazon Web Services, which was immediately profitable. The result was an aha! moment that changed financial models for investors," Gambale says.

And yet, it's rare to hear board members and investors ask corporate leaders the simple, yet powerful question about how companies are investing in technology. Gambale goes so far as to say that she would be "dumbfounded" to hear this question asked on a typical earnings call.

Why is the technology question so important? First, fully embracing today's digital capabilities can improve the quality of what you already have. Witness Tesla. The overall look of its vehicles hasn't changed all that much but the cars continue to gain more and more automated capabilities that are revolutionizing the auto industry.

Second, digital can also allow a business that would have been impossible without the technology to be conceived, such as on-demand car services like Uber and Lyft, or new vacation lodging options that offer ultimate flexibility such as VRBO and Home Away.

Bottom line: If you don't do it, someone else will.

PUSHING BACK

How does a company embark on a fully digital turnaround when beholden to Wall Street for quarterly numbers? Gambale advocates that companies push back when questioned about traditional numbers by financial analysts during earnings calls. "Companies need to educate the Street and talk about how they see the company changing down the road. They need to explain that they are busy investing in the future and revisiting their lifecycle and supply chain."

Sure, some companies will want to keep their exact digital disruption plans in stealth mode and won't be willing to tip their hand to their competitors by divulging all the detailed plans for change. But you can provide examples for direction.

IT'S ROLE

Given Gambale's advice, what's to become of traditional IT? Gambale points out that some CIOs with both left and right brain leanings can do both operations and vision, though finding that type of individual is rare. You really need a visionary CIO, incited to drive technology by the CEO, and someone else to drive down the cost of existing hardware and software infrastructures. Otherwise, the company could have difficulty funding both the status quo and the new digital endeavors at the same time.

CIOs that don't delegate will be continually pulled back into day-to-day minutiae and will have a hard time moving forward. See how Sligro Foods Group is handling balancing existing operations with new digital endeavors in "What Lies Beyond Operations," (page 18).

ECONOMIC OUTLOOK

How will businesses rise to these challenges? Gambale acknowledges that the current U.S. administration in Washington will slow the urgency at which we begin. However, the economy is friends of the consumer, and that's not going to change. "We still have to understand that we exist for the purpose of our consumers, unless the consumer is a government agency. The consumer will continue to demand what it needs, and business will self-select based on that appetite."

She warns that there are enough sizeable giants, such as Amazon, Apple, and Google with their tentacles in everything. "They are not stopping. If you're not holding up your end, these companies will fill the gap."

"AMAZON WAS BERATED FOR NOT BEING PROFITABLE, THOUGH IT WAS HEAVILY INVESTING IN BUILDING OUT ITS INFRASTRUCTURE BEHIND THE SCENES. IT THEN UNVEILED A LUCRATIVE NEW BUSINESS, AMAZON WEB SERVICES, WHICH WAS IMMEDIATELY PROFITABLE. THE RESULT WAS AN AHA! MOMENT THAT CHANGED FINANCIAL MODELS FOR INVESTORS."

HIERARCHY FOR SUCCESS

Gambale specifies what she believes should be taking place at every organizational level for companies to succeed in digitally disrupting themselves for future success. All should be looking at disruption from different points of view, she says.

BOARD LEVEL:

Institute the most advanced thinking possible with board members who understand future consumer-driven needs and have the ability to govern within that context.

MANAGEMENT TEAM LEVEL:

Every CEO needs to be carefully selected to empower the right kind of innovation that needs to take place, driven by goals and metrics established in that direction, regardless of what Wall Street is saying. They should think heavily about the composition of the labor force. During earnings calls, they should answer questions about the business but also talk about how they see their business in the future. Push back to defend those forward-thinking investments when hammered about margin compression or that costs are out of line with competitors'. Explain that if they don't invest in the company's future, that's when the financial analysts should start worrying.

EMPLOYEES:

Every employee of every company should step into what they believe is their ability to contribute, influence, and participate in the future and not worry about losing their job. If they can create [the future] they will have it; if they can't, they will lose it, Gambale says.

The age of complicated and unreliable IT is over.

Learn how to break down silos with the new Lenovo ThinkAgile™ SX for Nutanix with Enterprise Cloud Platform software. Read the IDC white paper at www.lenovo.com/hyperconverged.

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UNDERSTANDING THE REAL ECONOMICS OF A PUBLIC CLOUD-FIRST STRATEGY

By Steve Kaplan

WHEN IT MAKES SENSE TO GO ALL IN ON PUBLIC CLOUD, AND WHEN IT DOESN'T

When a prospective customer tells me that her organization has a “cloud-first strategy,” the typical justification goes something like this:

“The CIO wants it.”
“The Board thinks we should be using the cloud.”
“We want to reduce costs.”

While public cloud certainly makes all kinds of sense for many workloads, blindly “hugging” the cloud—at least, the public cloud—is not the answer to all IT headaches.

The reasons have to do with limitations of public clouds: the inability to customize your cloud solutions, the cost and complexity of pulling workloads out of the cloud, and a lack of control on the part of your IT staff, to name a few.

Before we look more deeply into limitations of public clouds, let’s take a step back and examine the main driver behind cloud-mania: digital transformation and disruption.

THE DIGITAL TRANSFORMATION IMPERATIVE

Digital transformation is well on its way to reshaping every industry, and cloud technology, including virtualization, is a big part of the success. The results can be stupendous. Domino’s Pizza in 2009, for example, was struggling with a perception of mediocrity, almost no growth, and a stock price in the doldrums.

When J. Patrick Doyle took over early the next year as CEO, however, he transformed Domino’s from a pizza company to what he terms a technology company that also happens to deliver pizza. Half of the 800 headquarters employees are now engaged in software, analytics, and big data. Domino’s makes it extremely easy to order a pizza, including via Twitter and Facebook Messaging. Domino’s stock has increased 2000 percent—more than other notable technology companies such as Amazon, Apple, and Google.

Kodak’s story, on the other hand, shows what can happen when organizations ignore the digital imperative. Kodak invented the digital camera back in 1975, but it doubled down on film rather than disrupting its existing business. Kodak went from a market cap of \$30 billion, 145,000 employees, and two-thirds global camera market share to filing for bankruptcy in January 2012.

There’s just no turning our backs on digital.

LEGACY INFRASTRUCTURE IMPEDIMENTS

There are operational reasons, too, for following through on the digital imperative. Legacy infrastructure—meaning, centralized storage + storage network + compute + virtualization—is expensive and complex in almost every way. As such, it makes business agility very difficult to achieve, which has led many to seek out cloud solutions. Some of the many drawbacks of legacy infrastructure include:

- Risk of overprovisioning because of large purchase increments that lock you into old technology
- Multiple management systems and manual operations that impede flexibility and slow down deployments
- Scaling limitations that have you possibly outgrowing the solution too soon
- Limited resiliency for capex reasons; you have to buy multiple boxes to get it
- Multi-hop support and lack of end-to-end visibility that leads to operational firefighting
- Complex, big datacenter footprint that’s expensive to buy and upgrade

PUBLIC CLOUD AS ANTIDOTE

Businesses have been turning to the public cloud to get the agility and faster time to market they need. And who can blame them? They benefit by:

- No infrastructure concerns
- Fractional consumption and “pay as you go” pricing models
- Continuous innovation and automatic technology upgrades

But, as mentioned, public cloud services have multiple drawbacks:

Lack of customization: Public cloud services offer limited customization. Organizations are not able to get customized service-level agreements (SLAs) for individual applications, for example. They can’t install hardware-specific capabilities such as custom application-delivery rules built around a particular load balancer or take their mesh of firewalls to the cloud and perform service-insertion and microsegmentation.

Data Governance and Security limitations: In addition to not satisfying privacy laws within certain countries and jurisdictions, there is also physical data security that should be examined. Public cloud does not enable control, or even purview, over who has access to the datacenter servers. Even security specialty firms are not immune to public cloud hacks. And due to the exposure public cloud enables, user error can more easily result in security breaches.

Performance inconsistency: Since public cloud requires shared infrastructure, customers have continually variable performance of all resources: CPU, memory, I/O to storage, and network. They cannot guard against “noisy neighbors” (at least not without more expensive dedicated hosts) which compete for resource consumption.

Access costs and provider lock-in: It is relatively inexpensive to move workloads into the cloud, but can be very costly to pull them back out—both to access your own data and to move workloads to another provider. As one example, uploading data to AWS, Google, or Microsoft is free; however, downloading ranges between 9 - 22 cents

per gigabyte. Also, the expense of moving to a different provider can limit your options if your original provider should raise prices, fail to meet SLAs, have security issues, or otherwise fail to meet your expectations.

Responsibility without authority: Moving to public cloud leaves IT with responsibility for data and application access but no authority over it once it leaves the premises. Their customers yell at them for issues such as slow application performance, but IT can't just pick up the phone and ask their public cloud provider to move their slow application to a different server. The public cloud model is that the cloud is a "black box," in which the provider hosts apps and data wherever it makes best economical and operational sense for the provider.

Solution cost: The public cloud is expensive – at least for predictable legacy workloads, and these type of workloads make up the majority of applications at the typical enterprise. It does make economic sense to put cloud-native and elastic workloads in the cloud. If, for example, IT is going to set up a customer-facing web server and doesn't know if it will get a thousand hits a day or a million, it is more economical to put it in the public cloud rather than likely "over-buy" on-premises infrastructure to support the high end of possible hits. On the other hand, predictable workloads are more comparable to a rent vs. buy scenario. If you're going to use a car just a few weeks a year, it makes sense to rent it when needed. If you're going to use it all year round, buying is more economical. Predictable workloads can typically be run on an on-premises architecture for half the cost of a public cloud.

Edge Computing: In his video, The End of Cloud Computing, Andreessen-Horowitz general partner makes the case that computing is increasingly shifting to the "edge." Autonomous cars, drones and IoT devices often require real-time decision making that cloud latency inhibits.

DOING THE MATH

While both public and enterprise clouds provide the agility necessary to achieve digital transformation, the cost and complexity of the public cloud can make using it as your "cloud first" strategy very expensive. In addition to the rental cost of putting workloads in the public cloud, the time to make the transition can take years. Meanwhile, the organization still has to pay for its on-premises infrastructure and probably for most of its on-prem IT staff. It must also hire new staff, or contract with consultants, who have the expertise to implement the specialty backup, redundancy, and security required for the public cloud.

TCO CASE STUDY: ENTERPRISE CLOUD VS. AWS

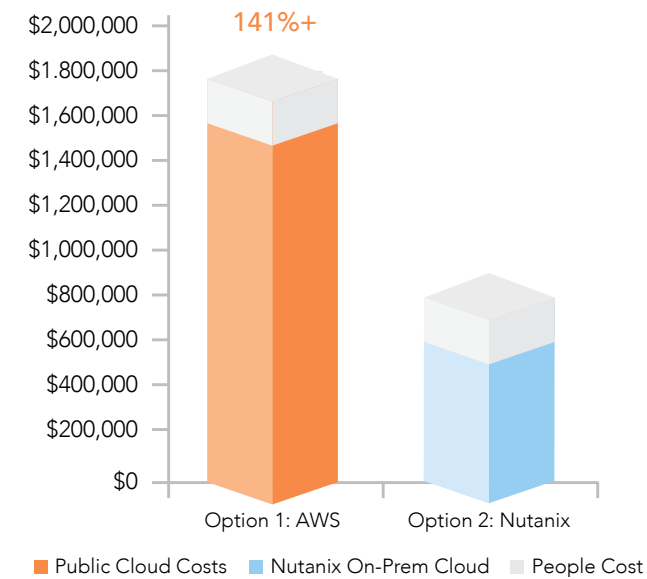
Let's look at some hard numbers. Table 1 shows the results of a TCO analysis that Nutanix provided for a gaming company that was running all its workloads in Amazon Web Services (AWS) and was becoming very concerned by their rapidly escalating monthly invoices. Utilizing the company's actual AWS invoices, the analysis showed that by moving predictable workloads to an Enterprise Cloud environment, it would save almost \$1.5M over five years. The company subsequently moved about half of its workloads from AWS.

TABLE 1: AWS VS. NUTANIX

TCO: AWS vs Nutanix				
YEAR	AWS	NUTANIX	NET CASH FLOW	TCO REDUCTION %
Investment	\$122,822	\$316,423	(\$193,601)	
Year 1	\$314,797	\$24,230	\$290,566	
Year 2	\$435,070	\$117,393	\$317,676	
Year 3	\$469,724	\$118,761	\$350,963	
Year 4	\$507,631	\$187,580	\$320,051	
Year 5	\$549,868	\$154,421	\$395,448	
Total	\$2,399,912	\$918,808	\$1,481,104	62%

Table 2 shows another example of the results of a TCO analysis for an equipment supply company running 68 virtual machines (VMs) of C4.4xlarge and M4.xlarge with compute turned off during off-hours. Five-year costs for AWS were projected at \$1,782,962 vs. \$742,059 for Nutanix, a \$1,047,903 savings.

TABLE 2: AWS VS. ENTERPRISE CLOUD - TOTAL COST COMPARISON OVER 5 YEARS



WHY NOT BOTH? THE HYBRID CLOUD SOLUTION

Depending on your application mix, it might make sense to have a hybrid cloud-first strategy that embraces both the private cloud for the control and customization you need and the public cloud for any cloud-native and elastic workloads you have. This hybrid approach can give you the best of both worlds.

Any IT infrastructure decision, whether legacy, public cloud, or enterprise cloud, should be carefully evaluated within the context of the organization's long-term business objectives and application mix. This is the only way to ensure an organization selects the optimal architecture for enabling success.

THE MOST ANCIENT LESSON IN PEACEMAKING

FROM NEGOTIATING THE IMPOSSIBLE

-By Deepak Malhotra

Among the oldest peace treaties in history is the Treaty of Kadesh, which was negotiated between the Egyptian and Hittite empires over three thousand years ago, in the middle of the 13th century B.C.E. With neither party willing to continue incurring the costs of war, and with each side wary of looming conflict with its other neighbors, Pharaoh Ramesses II and King Hattusili III sought to negotiate an end to the conflict. Such attempts are difficult not only because the issues at stake may be contentious or complex, but because, often, neither side wants to make the first move. The side that comes asking for peace may look weak rather than wise or magnanimous, a signal that no leader can afford to send.

A comparison of the translations reveals that the two versions are, as we ought to expect, very similar. But there is at least one important difference. The Egyptian translation states that it was the Hittite's who came asking for peace terms. The Hittite version claims exactly the opposite.

When it comes to deal-making, diplomacy and resolving disputes, it does not matter which culture you examine or what kind of negotiation you investigate. It does not matter why people were fighting or why they chose to settle their differences. Some things never change: the need for all sides to declare victory is at least as old as recorded history itself.

EVEN SEEMINGLY IMPOSSIBLE DEADLOCKS
AND CONFLICTS CAN BE RESOLVED IF WE SHED
THE ASSUMPTION THAT OUR ONLY SOURCES OF
LEVERAGE ARE MONEY AND MUSCLE.

And yet, a deal was reached. Despite having been drafted thousands of years ago, the treaty has many of the hallmarks of more recent agreements, including provisions proclaiming the end to conflict, the repatriation of refugees, an exchange of prisoners, and a mutual assistance pact if either side was attacked by others.

One other characteristic makes their accord similar to what we often see today—in peace treaties, commercial agreements, and successful efforts at resolving conflicts ranging from international disputes to arguments between spouses. This feature is only apparent in the Treaty of Kadesh because it was recorded in two languages: hieroglyphics (the Egyptian translation) and Akkadian (the Hittite translation).

The Treaty of Kadesh also exposes a more fundamental insight about negotiation and peacemaking—and one that lays the foundation for this book: *Even seemingly impossible deadlocks and conflicts can be resolved if we shed the assumption that our only sources of leverage are money and muscle.*

This is especially important to keep in mind when you are dealing with a situation that seems hopeless. When even your most generous offers are being rejected, when your well-intentioned attempts at addressing the issues are being thwarted, and when you have little power with which to impose a solution, you need a different approach and other sources of leverage. This book provides such an approach and reveals those sources of leverage.

Excerpted from *Negotiating the Impossible*, by Deepak Malhotra. Retrieved from www.NegotiatingTheImpossible.com with permission from the author.



Zen and the Art of User-centric Design

TALKING UX WITH DESIGN GURU AND YOGI, IRENE AU

Q You've been the head of design for teams at Google and Yahoo. You're currently Operating Partner at Khosla Ventures. And you're a dedicated yogi that somehow finds time to teach weekly classes. What led you down your career path, and how do your passions for design and yoga intermingle?

A I have always been a math and science geek who loves technology. While in graduate school, I grew especially interested in how people and computers relate to each other, and wanted to focus my development of technology towards solving people's problems. Design is the intersection between people, problem solving, and creation.

Yoga and design inform each other at many levels. I think like a designer when I create my yoga classes, always with an intention and purpose in mind and a map for how we go from the beginning to the end of class. Yoga creates the space, physically and mentally, for better design work to happen. You can read the articles I have written on this topic in my essays "Design and the Self" and "Mindfulness Practices for Greater Focus, Empathy and Creativity."

Q How would you define user-centric design? What are the guiding principles?

A User-centered design is the practice of designing with an explicit understanding of people's behaviors, goals, motivations, and feelings. We study tasks, environment, and workflow, to design products and experiences based on the way people naturally behave and to support their needs. It is an iterative practice that includes empathy-building by involving users throughout the entire design and development process.

Q Why is user-centric design important and how does the customer benefit?

A When a product or experience is well-designed, it saves people time, reduces cognitive load,

and preserves willpower and goodwill towards others. Beyond ease of use, good design leaves people with a sense of delight and joy when they interact with the company. A company's offering, whether a product, service, or experience, is part of a dialogue between it and its customers. So good design is how the company implicitly and explicitly communicates to its customers how much they care and value them.

Q Are B2B technology companies starting to embrace design as a competitive weapon? Any examples of companies you think are doing a good job with user experience?

A Slack is perhaps one of the most wildly successful B2B companies because of its design. They were certainly not the first company to offer a messaging app for internal use, but their app makes communication fun, efficient, and collaborative. I'm not sure that Slack chose to embrace design "as a competitive weapon," but their founder, Stewart Butterfield, always embraces good design because he believes it's the right thing to do. Why put bad software out in the world? They are striving to make the best offering possible, and in doing so, they created a product that is well designed, which serves as the basis for the company's success.

Q Why do you think it's been difficult for more enterprise IT companies to embrace design?

A There are many reasons why enterprise companies would place less value on user-centered design. B2B enterprises are often selling to other companies' IT departments, not directly to the people who would be using their software. As such, these companies tend to optimize for what the purchasing IT departments are looking for, which is typically related to cost and feature set. If the people paying for the product don't care about design, the people selling the product have little incentive to prioritize design. Second, once companies choose a vendor, there is often little incentive to switch--especially when the



product is custom software. The old adage “No one ever got fired for buying IBM or Microsoft” still holds weight with some business customers. These are the ones that would rather take the “safe” road by buying software from a known company, than from an unknown upstart with a well-designed product.

That mentality is quickly changing, however. People’s expectations for how software should be designed have elevated over time. As consumer users, we enjoy the simplicity and power of applications like Google Docs and Gmail, and we have come to expect the same level of quality in the user experience of the tools we use at work. Even Microsoft and IBM have invested significantly in design over the last few years to stay competitive.

Q What advice would you give UX designers, or other champions of user-centric design, for selling this approach to senior management?

A Design is an opportunity to help companies cut costs, make products better, and build a brand that inspires loyalty from customers. To that end, here are a few ways to build motivation internally for better design:

1. Conduct a user experience audit for your company. Print every screen for every interface for every product that your company sells, then tape the printouts to a wall. When we can look at all of our products side-by-side, that’s when we usually start to see vast inconsistencies and a lack of coherence, which is detrimental to building a strong brand. It also reveals inefficiencies in product development: if teams find themselves reinventing the wheel for the same kinds of tasks or features that exist somewhere else, that’s time that could be better spent innovating or working on more important problems.

Ultimately it’s not enough for a particular group to champion better design within a company. Everyone at the company needs to feel some ownership of the design and customer experience.

2. Video customers while they’re using your product. Record what they do, how they use the product, and capture their commentary. Then show relevant video clips to executive stakeholders to help them understand how users interact with and feel about the product and the company to build motivation to solve user problems.

3. Understand where the major customer support costs are coming from -- what are the top issues customers are calling about? What does the sales team hear from current and potential customers about the company and product that may discourage them from closing a deal? Work with functions beyond engineering and product management to find out how your company’s design affects the bottom line, and tie that back to product development priorities.

Ultimately it’s not enough for a particular group to champion better design within a company. Everyone at the company needs to feel some ownership of the design and customer experience. That’s why it’s so critical that the message comes from the highest

levels of the company that design is important. From there, everything about how the company acts and thinks is affected, from budgets to product development process to executive reviews. Anything short of that will fail design.

Q How do you see design continuing to impact the evolution of tech?

A Design will only become increasingly relevant as technology becomes more pervasive in everyday lives and matures. This phenomenon reflects the classic Technology Life Cycle. When technology is first introduced, the focus is on getting the technology right. There is significant investment in R&D just to get the technology to work. As the technology proves to be successful and starts to mature, design becomes the differentiator and becomes the means by which companies distinguish themselves from competitors. Design also enables the technology to appeal to a wider audience, moving beyond early adopters and the early majority to capture markets that include the late majority and laggards.

AHV, We’ve Got Your Back(up).



Computing Gets Edgy

IoT devices will soon process 40 times more data than the cloud. That could mean a whole new operating system and an extended data center for enterprises.

-By Satyam Vaghani, VP, Technology, Nutanix

My four-year-old and I are watching a BBC documentary on the Boeing 787 Dreamliner airplane. While my son loves the electronic window shades and the colorful cabin lights, I am both amazed and incredulous at the narrator's claim that the two General Electric GE9x engines on the plane produce 1 terabyte of operations data per day from 5,000 sensors mounted on each engine.

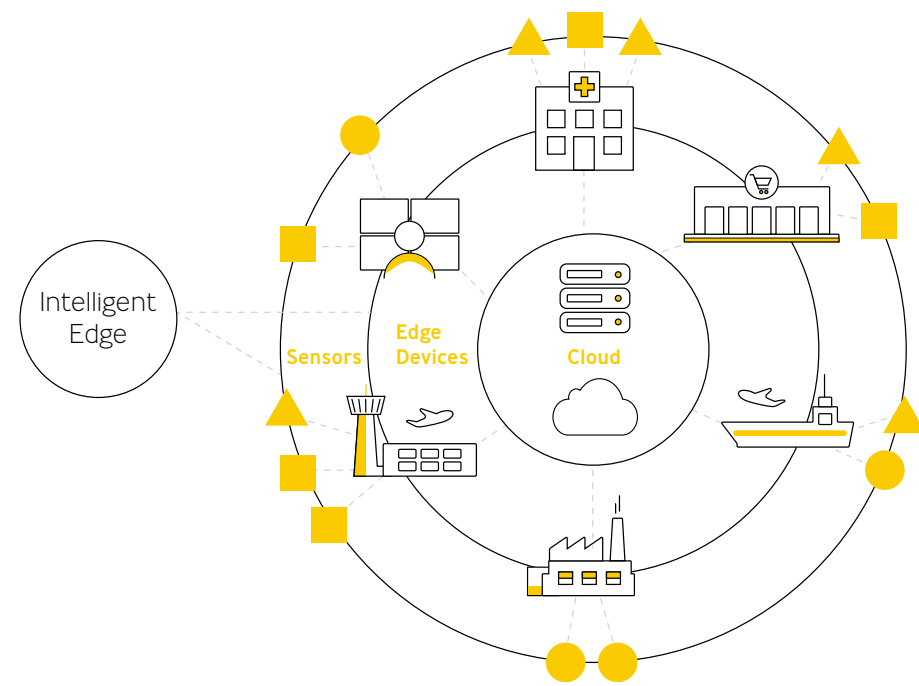
A quick search reveals an estimated 7,000 planes in the air over the U.S. at any given time, for a total of about 24,000 flights per day. As these new engines become pervasive, they will conservatively generate roughly 10 petabytes of engine data per day.

Now this is what you call big data. And most of it is processed on "the edge"—right there, in real time, on board the plane. The plane serves as its own data center, one with wings, to optimize engine operation. Only a small fraction of this data makes it to the cloud to help plan maintenance and aid future engine design.

NEW FRONTIER IN COMPUTING

The sensors and computers on the planes constitute one example of a universe of connected machines that form the Internet of Things (IoT). They represent a new frontier in computing: a distributed network of sensors and data processing units in planes, automobiles, buildings, hospitals, battlefields, stores, factories, and other places around the world. These IoT edge devices will far surpass the compute and data capabilities of our current flagship of computing innovation: the cloud.

This new universe of machines begs for a new type of operating system (OS), one that spans both edge devices and the cloud to offer a seamless layer of services required by most IoT applications. We can be certain about the need for such an IoT OS because, after all, every significant change in computing in the past—from desktops to servers to smartphones to the cloud—has triggered the invention of new OSes engineered specifically for the new paradigm.



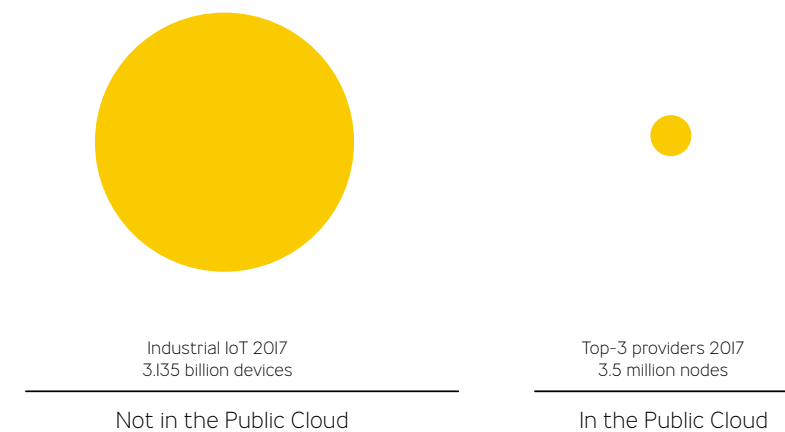
RISE OF THE EDGE

Wait a minute, you might be thinking. It seems that we've barely scratched the surface of the current centralized cloud-computing paradigm. Yet we already see processing shifting to an intelligent edge-computing model dominated by IoT? How can this be?

The paradigm shift has mostly to do with businesses requiring that things happen in real time, whether the precision-sensitive application at hand is driverless cars, augmented reality, or on-the-spot facial recognition. And just look at the numbers: Gartner estimates that roughly 3.5 billion business IoT devices are in operation today—three orders of magnitude more than the roughly 3.5 million servers that power the top three cloud providers. The above number doesn't include consumer IoT devices (Fitbits, smart refrigerators, voice assistants, and so forth), which would bring the total to more than 8 billion devices today and about 20 billion by 2020.

WHERE ARE THE DEVICES TODAY?

Sources: Gartner, IDC

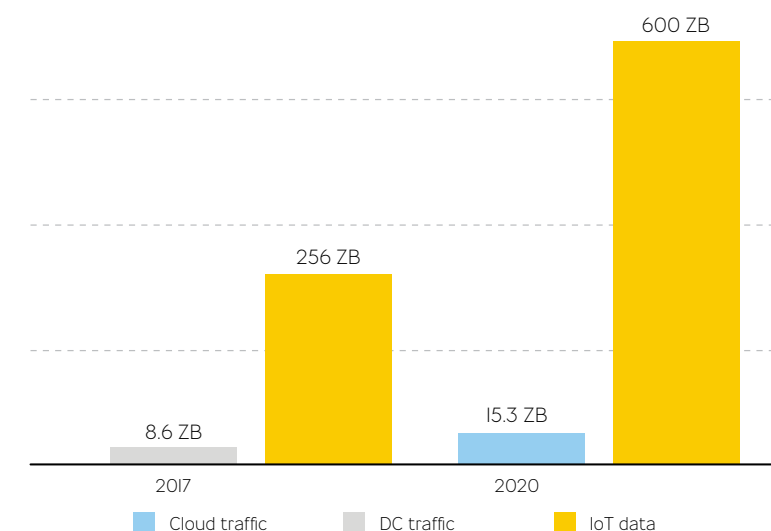


IoT experts now agree that most sensor data needs to be processed on the IoT edge. Again, most IoT applications depend on real-time processing and quick decision-making. They can't afford to reach out to a remote cloud or data center for latency, reliability, and scale reasons.

It is this collection of sensors, actuators, and smart edge devices with cloud connectivity that together form what we call the intelligent edge.

INTELLIGENT EDGE BLOWS PAST CLOUD

Sources: Cisco Global Cloud Index, Memoori



REAL-TIME SCENARIOS

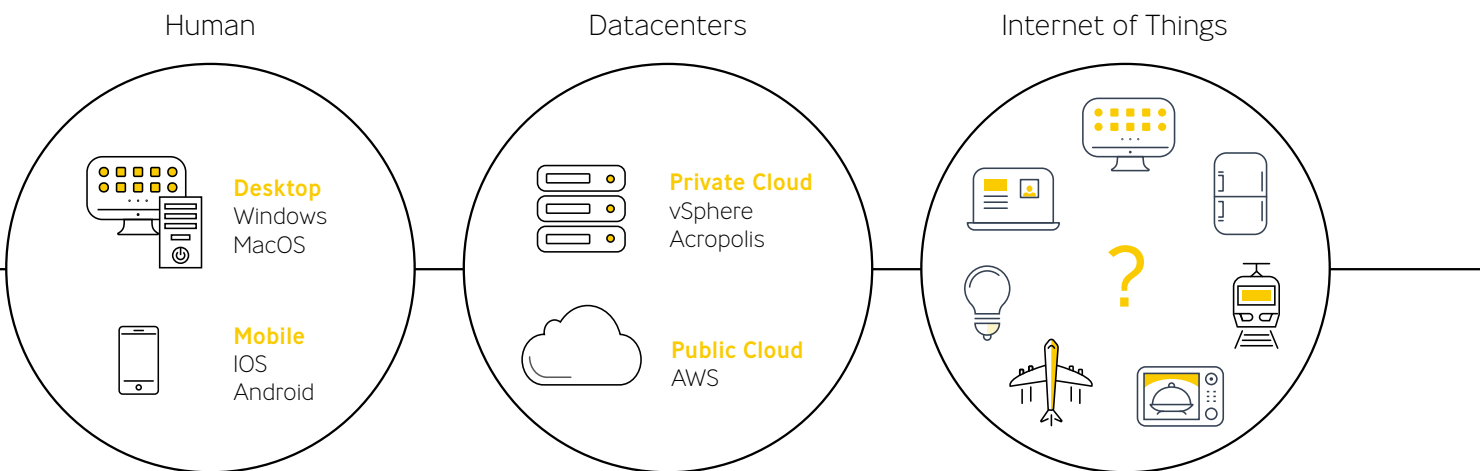
Real-time processing is necessary to instruct an autonomous vehicle, for example, to halt at a stoplight or avoid a pedestrian in the middle of the road. Drones must instantly steer clear of trees, houses, and people. Devices on an oil rig must help rig operations regardless of connectivity to the mainland. Medical systems in a hospital cannot afford to trust network connectivity to the cloud for analysis to make life-saving decisions.

In other cases, intelligent processing on the IoT edge is needed to filter the data before it is forwarded to the cloud. For example, a smart building or airport system needs to extract crowd sizes, person-of-interest information, and other data from video streams and forward that to the cloud instead of sending the whole video stream itself.

In short, intelligent edge devices now work alongside sensors and actuators to provide real-time analytics and actions. The intelligent edge moves computing much closer to the source of data. There will be intelligent edge nodes scattered across your entire industry, whether that's in retail stores, factories, hospitals, or some other environment.

The Cisco Global Cloud Index estimates that this year, intelligent edge devices will process 256 zettabytes of data, 32 times more than all the traffic in all public and private clouds of the world combined. By 2020, the intelligent edge will process 40 times more data than the cloud (see figure 4). So companies must start planning for the intelligent edge as their extended datacenter over the next five to seven years.

A NEW PARADIGM NEEDS A NEW OS



ROLE OF THE CLOUD

Does that mean that the cloud – public or private – is moribund? No. There is plenty of room for non-real-time number-crunching and storage that takes advantage of the scale and virtual nature of the cloud. The results of such computation in the cloud could even be critical to how intelligent an intelligent edge could possibly be.

For example, the model that drives a self-driving car is trained on all driving data in the cloud and downloaded to the intelligent edge on-board the car. Or the model to detect an object, a person of interest, or cancerous cells is trained in the cloud and downloaded to the intelligent edge at smart buildings, airports, and hospitals, respectively.

WHAT PROBLEMS NEED SOLVING?

There are traditional problems to be solved with any new computing paradigm. For example, there's usually a shift in network traffic patterns that requires new design and capacity-planning initiatives. And there is always the matter of securing new edge devices coming onto the network.

Network, security, and operation challenges are important and must be solved. But in a way, they are tablestakes. There are also unique problems that, when solved, will make edge computing and the IoT ubiquitous and open the door to rapidly developed IoT applications:

- **A new IoT ecosystem OS to make infrastructure invisible.** Let's return to the concept of an IoT operating system. Suppose that the industry created an IoT OS that spans sensors and intelligent edge devices to the cloud with data services, network optimization, and security baked right in. The model would be similar to the way an Apple iPhone (device) and iCloud (cloud) operate today.

Standardized security end to end would be one important benefit. Another is that the IoT landscape today is heterogeneous, with a mix of protocols. Devices and cloud services from different vendors aren't necessarily able to communicate with one another, and developers must focus on adapting the unique piece parts at hand to create end-to-end IoT applications. Today it takes a large amount of domain expertise to even transport and secure data coming from edge to cloud. The boundaries between sensors, intelligent edge devices and the cloud should just be abstracted away, handled by an IoT OS.

A consistent operating system for the new model with edge computing at the base, feeding up to end-user computing and to data centers and clouds, will have to come to fruition before IoT can truly fulfill its promise. That promise is to delight customers with the many applications that can run at the edge to transform businesses and industries.

- **Enabling rapid IoT development.** To that end emerges the other problem worth solving. That's to help IoT developers at non-high-tech companies rapidly develop IoT applications without being experts at machine learning, data science, scale, and security. This would

entail a modular high-level function approach in the IoT OS environment.

For example, a curated image processing function offered by the IoT OS could abstract away the actual mechanics of using machine learning to train an object recognition model, setting up a data pipeline to analyze live video streams from sensors, and so on. A curated analytics module can derive basic conclusions from a data stream (for example, 80 percent of flights leaving the JFK airport with more than 150 passengers are late by 10 or more minutes) without requiring a data scientist. The modular high-level function approach can dramatically reduce the cost and increase the speed of developing interesting IoT applications.

CREATE AN EDGE STRATEGY

Till now, you've likely evolved to take advantage of private cloud and possibly public cloud resources. Now it's time to add to the cloud continuum by embracing the concept of a single layer of conscience—an OS—that spans the intelligent edge and both private and public clouds. The cloud is just another component of the stack, the others being sensors and intelligent edge devices.

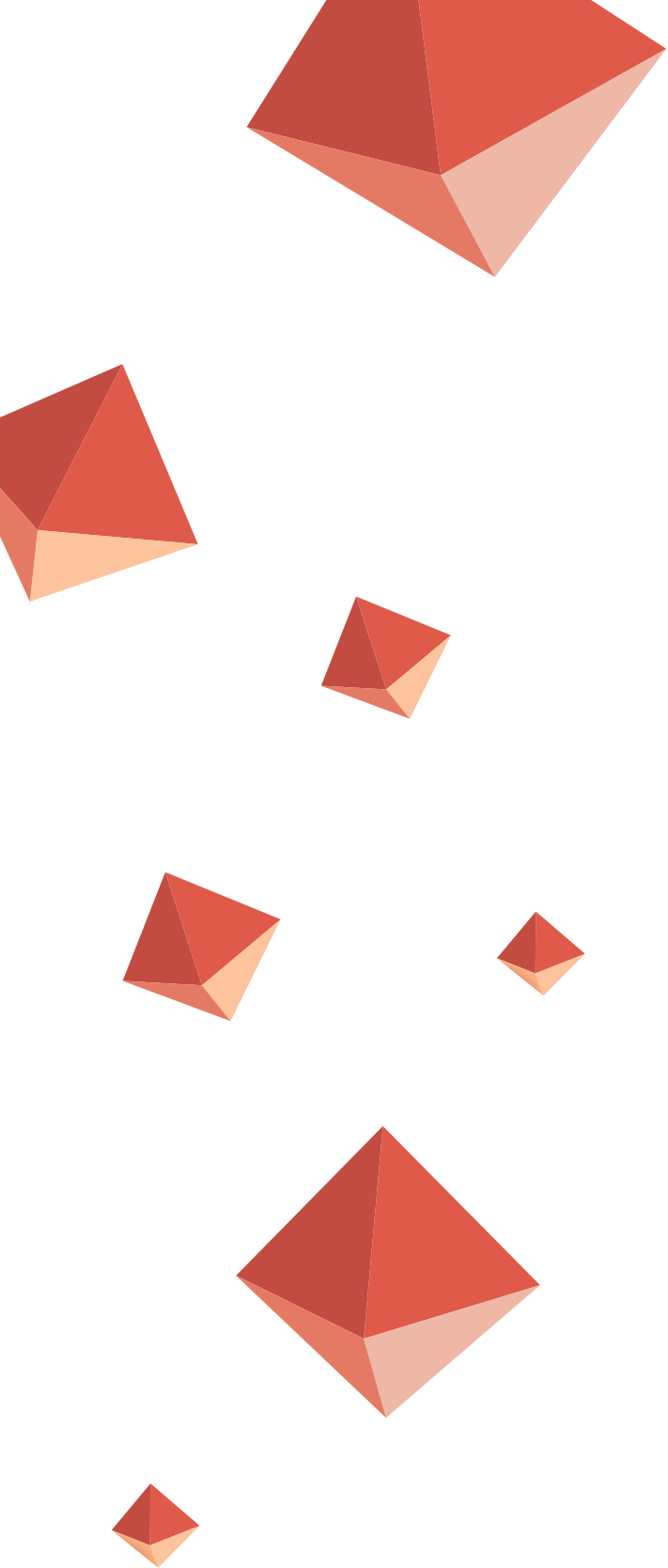
All components of the continuum will have a role to play and will feed into one another and support one another.

There are edge applications already at work today, but imagining the true power and sophistication of the intelligent edge is like trying to imagine the power of Google Maps before the smartphone was ever invented. A traffic light could double as a facial recognition node that helps find and catch criminals. Smart cities will put an end to traffic jams and parking problems. Smart airports will ensure airplanes always depart on time. Smart healthcare will make high quality care more widely available and possibly more affordable.

Whatever the next sexy IoT application, the time to have an edge strategy is soon. Cloud computing and edge computing provide significant, yet different, benefits, and smart IT strategists will be sure to take full advantage of both.

A consistent operating system with edge computing at the base, feeding up to end-user computing and to data centers and clouds, will have to come to fruition before IoT can truly fulfill its promise.

|| A consistent operating system with edge computing at the base, feeding up to end-user computing and to data centers and clouds, will have to come to fruition before IoT can truly fulfill its promise. ||



“ENTERPRISES ARE ENTERING A DIGITAL ECONOMY MOVING
FROM AN ERA OF IT INDUSTRIALIZATION TO THE ERA OF
DIGITALIZATION WHERE NEW BUSINESS MODELS BRING THE
DIGITAL AND PHYSICAL WORLDS TOGETHER.”

-KEVIN J. ARBOUR, VICE PRESIDENT OF ENTERPRISE SERVICES AND TECHNOLOGIES AT EMPIRE LIFE.

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NORMALIZING TECH FOR WOMEN: AN INTERVIEW WITH ADRIANA GASCOIGNE

The future of women in tech—how can we ensure that girls grow into fearless professionals in a traditionally male-dominated world? We got the inside scoop on Girls in Tech from Founder and CEO Adriana Gascoigne

Tell us a bit about the mission of Girls in Tech. How do you inspire girls and women to pursue their interest in technology or interact with technology more? Do you cater to a specific age group?

Girls in Tech is the largest worldwide group dedicated to women in the early to mid-stage of their career. We have a very heavy Millennial following. Our goal isn't just to inspire girls, it's to empower them. We do this by offering a variety of programming and support, ranging from networking events, to our Global Classroom program (virtual coding classes), to startup boot camps, women startup pitch nights and more. We realize that women in tech have a range of interests and needs. Our organization is designed to provide support for them at many levels. It's also very flexible, allowing individual chapters to customize programming for their community.

Where does your passion stem from? Were you into tech as a girl?

It's hard not to be interested in tech, especially living in San Francisco. It touches you everywhere you go in this city, in everyone you meet. And, across the world, it's hard to not work for a tech company any more, even if you don't think you're doing it in the traditional sense. Technology is everywhere and it's a foundation in the way we live and work.

For me, I'm personally interested in technology from a product and entrepreneurship perspective. I'm drawn to the idea of making things; trying something new; fulfilling a need. Entrepreneurship is in my DNA, and I think it has been since I was a little girl. My family instilled that in me, and I grew up seeing my parents live a flexible, hardworking lifestyle. I knew I wanted that for myself.

What is the single biggest challenge facing women in tech today?

I don't think you can boil it down to one challenge. If there's anything we've learned, it's that the issues are incredibly complex and interconnected. There's

subconscious bias, the pay gap, societal expectations, sexual harassment. These are all issues women must navigate every day.

Any particularly compelling anecdotes of girls or women who are embracing their inner geek thanks to your program come to mind?

I think the coolest thing about our program is that we are normalizing tech for women. We're telling them, "You can do this. It's available to you. Come and try it. Experience it. You're not alone." We're breaking down that wall for them, one day at a time. We receive feedback all the time, from online channels to in-person at events, that our programs are changing lives. Women leave our events and programs with a boosted confidence level, practical takeaways and a stronger network. There's a lot to be said for that.

Why and how are you partnering with Nutanix?

Nutanix is a progressive company inside and out. They lead with a purpose. We're so pleased that Nutanix CIO, Wendy Pfeiffer, will be speaking at the Girls in Tech Catalyst Conference, June 20-22 in San Francisco. Nutanix has stepped up in a big way to support the conference. One of our joint initiatives focuses on providing scholarships to students in underserved areas, allowing them to attend the conference. This is so exciting; getting students in our doors means we're able to expose them to these incredible leaders at such a young age. They're going to see what success looks like, what women in STEM look like—that's incredibly powerful. Seeing is believing.

Why should tech companies care about diversity?

The whole point of technology is to drive innovation, to solve problems. You cannot do that in a vacuum. It takes a spectrum of experiences, perspectives, backgrounds and skillsets. That's the beauty in all of it. When you approach a problem or a product with a mixed bag of people, you've got the resources you need to truly push boundaries. Tech companies who still do not understand this are not only not progressive—they're leaving money on the table.

If you could give one message to girls around the world today, what would it be?

This message has been said, but it can't be said enough: Don't stop. Don't give up. Imagine what you want to be and where you want to go with your life and career and don't stop until you get there.

A WINNING MOVE

WHY YOUR NEXT HIRE SHOULD BE A CHESS PLAYER



Susan Polgar knows something about winning. She was only four years old when she won her first chess tournament in her native Hungary with a perfect 10-0 score. At fifteen, she became the highest-ranked woman player in the world. In 1986, she broke the gender barrier by being the first female chess player to qualify for the Men's World Championship. And in 1991, she became the first woman in history to win the Men's Grandmaster title.

With experience like that, she also knows something about how the traits in successful chess players can be valuable to businesses.

"Chess teaches discipline and problem solving skills at a very early age," says Polgar. "People can be trained in the specifics of a particular field, but it is much harder to ingrain these deeper attitudes and skills in an employee that hasn't already acquired them."

A NOBLE HISTORY

According to historians, the precursor of the game we know today was invented in 6th century India. As one story goes, the rajah (king) was gravely concerned with a gambling craze that had gripped his kingdom. To combat what he felt was a weakness rotting society, he summoned a holy man to create a new game, one not based on luck, but on the qualities of valor, judgement, prudence, foresight, endurance, and analytical reasoning. Thus, the game of kings was born.

For Polgar, chess is more than a game. It's a way to prepare young people to succeed in an increasingly competitive and complex world. "According to research, test scores improved by 17.3% for students regularly engaged in chess classes," says Polgar. "This compared to 4.6% for children participating in other extracurricular activities." Teaching life skills through chess is a passion of Polgar's. She is head coach of the Webster University chess team (ranked #1 in the nation), director of SPICE (the Susan Polgar Institute for Chess Excellence), promoting chess at the collegiate level, and founder of the Susan Polgar Foundation, which promotes the educational, social, and competitive benefits of chess for girls and boys of all ages across the United States.

CHESS MAKES SMART HIRES

In many ways, chess imitates life. "I'm in control of my own destiny. I'm responsible for my own actions," says Polgar, philosophically. At the same time, chess can be merciless. You can make seventy perfect moves, but it only takes one bad move to lose the game. "Chess teaches you to plan ahead."

Here, according to Polgar, are some of the ways in which chess prepares its students for success on and off the tournament floor:

Discipline. It's tempting to make the first move that comes to mind. "This is especially true of young people," says Polgar. "We teach our students patience and critical thinking. Always consider your options, and how your competitor may respond." Chess teaches you to always consider your circumstances. There may be five or more options you need to explore before deciding on the best course of action.

Mental and Physical Endurance. We all know that chess takes considerable concentration, but physical stamina? "My students didn't understand why I insisted on making exercise part of our curriculum," says Polgar. "Then they experienced their first competition. It lasted thirteen hours." While their competitors were exhausted, and began making mistakes, Polgar's team was able to capitalize on those opportunities to win the match.

Preparation and Competitive Analysis. Chess is a game of theories and pattern recognition. "We may have three to four months to prepare for a competition, says Polgar, "We use that time to try to understand potential competitors and how they may handle specific situations." To do so, players pore through a database of more than ten million games. Talk about big data. These are the actual moves of Grandmasters and chess champions from hundreds of years of recorded games. Psychology also comes into play. Young competitors may not have the patience of a more experienced player, for example. "In this case, you may want to draw out the game," Polgar says with a smile, "and wait for their mistakes."

Problem Solving. Entire games have been won and lost through pre-planned moves based on time-tested patterns. However, due to near infinite combinations, players typically run into a situation they've never encountered after the first ten or fifteen moves. "To consistently win, you must understand how to apply your knowledge of patterns to new situations," says Polgar. "Winning always comes down to critical thinking and problem solving."

Self-Assessment. Many of us have trouble assessing our strengths and weaknesses objectively. To remain competitive, chess players must coldly analyze their wins and their losses, and leave their emotions at the door. Polgar trains her students to be self-aware, and to take responsibility for their actions: Did I underestimate my opponent? Was I afraid to take risks? "You examine each move and learn from your mistakes," says Polgar. "You can't just say you had a bad day."

THE WORLDS OF CHESS AND IT HAVE MUCH IN COMMON

Even the ancient game of chess knows the effects of digital disruption. It used to be an advantage to live near or

travel to tournaments where you could meet world-class players. Today, you can play online with Grandmasters from anywhere in the world.

"Computer technology has leveled the playing field," says Polgar. "Chess engines and data analytics have sped up the process of studying game records—what used to take hours can now be achieved in seconds." Technology is not only helping to refine the skills of the world's best players, it is widening the playing field. "Thanks to the Internet, many of the winners of student competitions now come from remote places—small villages in India and China, as opposed to big cities in Russia and Eastern Europe," says Polgar.

Gender equality is still an issue. Despite the achievements of women like Susan Polgar, and the dozens of female Grandmasters for whom she helped pave the way, the sport, like IT, has a way to go when it comes to gender equality. "When I first qualified to compete for the World Championship, I was not allowed to play," says Polgar. "Back then, it was still called the Men's World Championship. It was the 1980s, and people actually thought women couldn't compete with men because they were not as smart, would talk too much, or would be a distraction."

Unfortunately, the issue persists. As recently as May 2017, a Malaysian girl was forced to withdraw from a national tournament after her knee-high skirt was deemed "seductive" and "a temptation." The girl was 12-years old. "Sadly, this sexualization has a devastating effect on girls, who tend to drop out of the sport once they reach a certain age," says Polgar. There is also a shocking disparity in earning potential that severely limits options for girls. While men compete for prize pools totaling \$2 to 4 million, women's competitions typically top out at \$60,000. "At a certain point, girls with otherwise great career potential conclude that chess is not yet a viable profession for women," says Polgar.

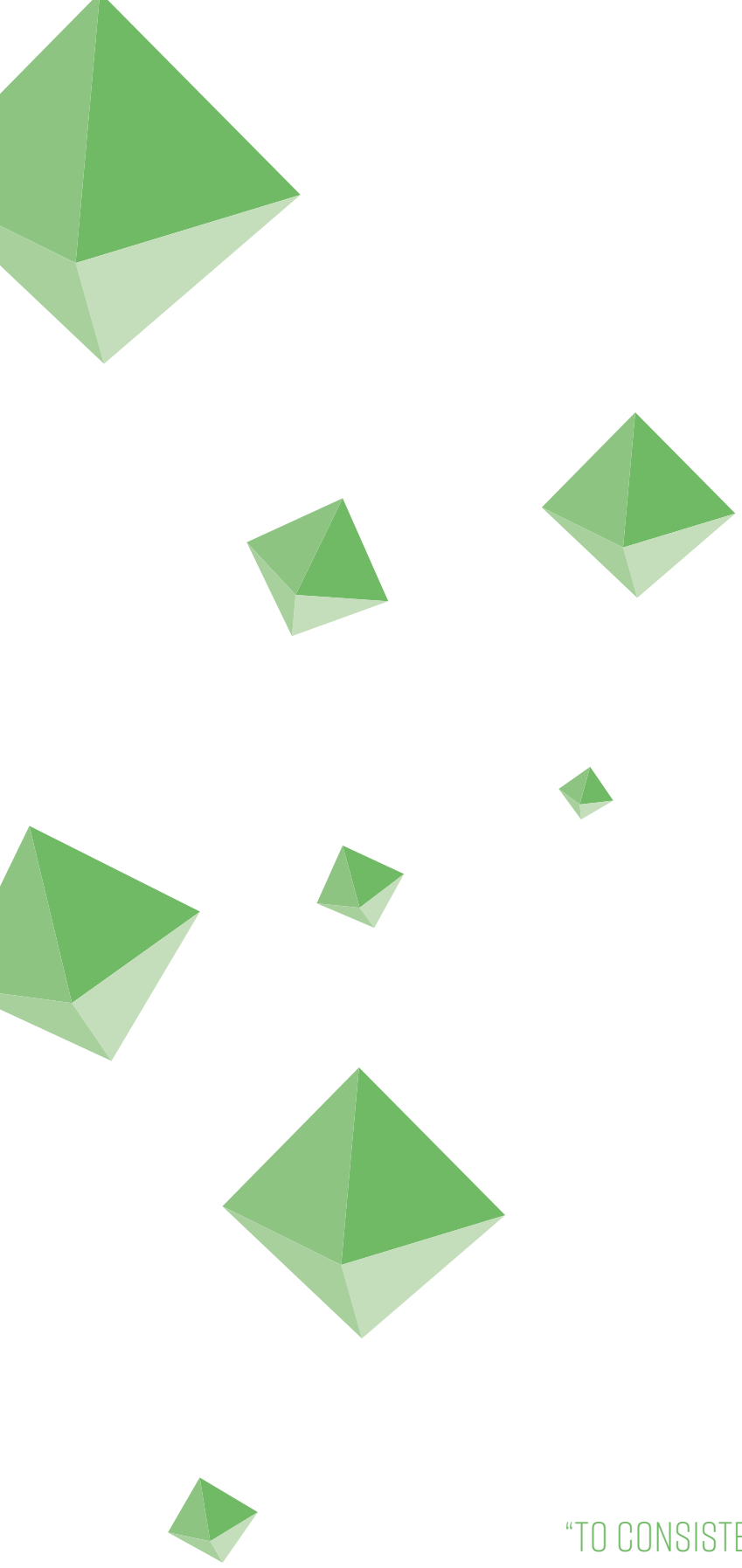
WHAT YOU CAN DO ABOUT IT

The Susan Polgar Foundation was created in 2004 in large part to launch the first nationally recognized chess events for girls in the United States. Since then, they have awarded more than \$5 million in prize money for both girl and boy events, and hope to get more colleges offering chess scholarships.

Chess is ideal for preparing young people for careers in the 21st century. However, for girls to benefit, attitudes toward women need to change, which includes pouring more money into women's chess. "Corporate sponsorships are a win-win," says Polgar. "Sponsors get the brand recognition they deserve (within the vast chess community of over 700 million strong worldwide and over 45 million in the US) by supporting a great cause, while investing in the workforce they'll need in the future."

If you would like to donate or otherwise get involved in the Susan Polgar Foundation, please visit: www.susanpolgar.com/foundation/.





“TO CONSISTENTLY WIN, YOU MUST UNDERSTAND HOW TO APPLY YOUR KNOWLEDGE OF PATTERNS TO NEW SITUATIONS. WINNING ALWAYS COMES DOWN TO CRITICAL THINKING AND PROBLEM SOLVING.”

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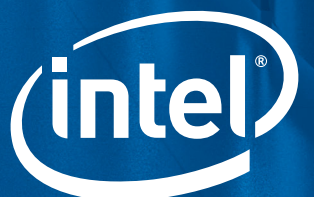
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