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THE DIGITAL ENTERPRISE: **TRANSFORMING BUSINESS IN THE CLOUD**

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In 2006, Lending Club - a San Francisco-based financial services startup - launched a personal lending business in the cloud. By 2013, the company was already earning $98 million in revenues. At the end of 2014, Lending Club raised $1 billion in its IPO and a few weeks later, the company announced a partnership[1] with Chinese Internet giant Alibaba that will provide financing for manufacturers in the United States to buy products and supplies through the Chinese marketplace. On its website, Lending Club touts that web-based technology is how they can offer lower lending rates to customers; a competitive advantage which has attributed to the company's meteoric growth and expansion into other products such as small business loans.

Similar success stories include Airbnb, Lyft and Uber - all stars of the so-called sharing economy. While the fact that these upstarts have been cloud-based businesses since day one doesn't account for all their success - freeing overhead and technical complexity has no doubt helped them move on the dime, shaking up traditional markets like transportation and hospitality. The cloud, some say, is giving companies an edge up through reducing the friction in processes and lowering barriers to growth. "Technology has emerged that freed Uber from having to be an expert on absolutely everything in its app," reported BetaBoston[2], in 2014.

Cloud transformation isn't just for emerging companies. The rapidly maturing infrastructure of the public cloud has finally hit the big time for big business. Many large companies have been dabbling in Infrastructure-as-a-service (IaaS) for years. Now, well-known, major brands are taking the plunge to commit critical parts - if not all – of their IT infrastructure to the public cloud. These pioneers have every reason to be optimistic about what the future holds.

BIG COMPANIES IN THE CLOUD

Phillips Healthcare and Salesforce.com[3] are working together to deliver an open, cloud-based care coordination platform, which will transform the way healthcare is delivered. The cloud applications will collect patient health data through mobile devices and allow clinicians to remotely monitor at-risk patients. Condé Nast and GE are two of the growing number of enterprises that are going all in with the public cloud, selling off data center space and transforming their vast IT organizations, enabling them to operate in a more efficient manner. Major cities, like Boston, are even jumping into the game, with ambitious goals to improve the quality of life for citizens through the use of cloud technologies.[4]

Lionsgate, the studio responsible for global hits such as "The Hunger Games" franchise and "Divergent", was one of the first of its industry to convert to a public cloud infrastructure. The company used AWS to reduce the time required to deploy infrastructure from weeks to days (or hours in some cases) for key applications such as SharePoint and SAP. Doing so has been a "win" for IT as the business can be more responsive to trends in the marketplace, according to one of the company's senior IT executives.[5]

TOP DRIVERS FOR PUBLIC CLOUD TRANSFORMATION

Public cloud is no longer an experiment for enterprise companies – it's a better way to run a business. Since 2012, cloud investments have increased by 19% with enterprises spending, on average, $3.3 million a year (compared to SMBs spending $400,000), according to a 2014 survey by IDG Enterprise.[6] Spending on cloud solutions will account for almost a quarter of IT budgets in the coming year, and enterprises are leading SMB in adoption and planned use of IaaS and PaaS models. Adoption is on the upswing because companies are seeing benefits that positively affect revenues and benefit customers.

HBO is indicative of the sweeping changes running through the entertainment and media industries due to technology disruption. Instead of relying solely upon contracts with broadcasters and cable providers to reach customers, now HBO offers a service to stream content directly to consumers over the Internet. That's a model capable of bringing more profits to HBO and more flexibility for customers that wish to unbundle their paid TV content. Prior to inexpensive cloud infrastructure, an effort like this would require distribution partners that act as a middleman – effectively controlling access to end customers. Enterprises now understand that their customers are accessible and hungry for direct services.

THE DIGITAL ENTERPRISE CAN BE CHARACTERISED BY THE FOLLOWING CAPABILITIES:

- All IT and business processes are 100% digital, and as much as possible, hosted in the public cloud;
- Companies access computing resources and advanced features in the cloud when they need them and shut them off when they don't – eliminating decades of IT waste. These cost savings drive a different investment model for innovation due to the "pay for use" cloud model.
- Launching services and applications in support of new business initiatives in this on-demand environment is an order of magnitude faster than traditional IT environments, enabling the digital enterprise to be more responsive to market changes;
- Innovation is critical to survival, yet the digital enterprise can do it in half the time, killing slower competitors. The public cloud plays a crucial part in highly flexible, iterative application development to support new ideas and services.
- IT departments benefit from unified management in the public cloud, since a single management interface eliminates the complexity of multiple management systems and delivers better reliability across applications.
- Interoperability is easier in the cloud, as providers such as AWS have an open architecture meant to support many different software and hardware technologies. This lowers integration and support costs while enabling complex workloads like Big Data.
- IT's focus becomes business process innovation not "keeping the lights on."

Companies that complete the transformation to becoming a public cloud-based enterprise will find powerful new ways to interact with and serve customers and gain agility from end-to-end automation that saves money and time. Ultimately, those traits can lead to a competitive advantage.

LEADING AREAS OF INVESTMENT IN THE PUBLIC CLOUD

While the public cloud is a suitable environment for nearly every IT project or application, a few core application areas have proven out consistently for ROI and business alignment.

BATCH COMPUTING

Batch computing, which includes high-performance computing (HPC), analytics and other short-term, large-scale workloads is well-suited to public cloud IaaS because of its big data processing requirements. These applications handle financial reporting and regulatory audits but also business-driving scientific tasks involving large volumes of raw data, as in genomics processing or R&D. HPC applications are often prohibitively expensive to procure and maintain in an internal data center with the flexibility and speed that such workloads require. HPC used to require that IT departments lease time on supercomputers. This meant scheduling jobs weeks ahead of time, and if the results were not optimal, enduring another cycle of waiting and rescheduling—at even higher costs.

In the public cloud, however, companies benefit from the instant, on-demand infrastructure – no need to buy, install and manage a rack full of servers, storage and routers for workloads that only occur periodically. Instead, a company can affordably provision the ultimate environment for speed and performance, and then take it off-line once the job is done. A company could run 1,000 to 10,000 cores for less than $10,000 per run, in the cloud.

For example, a large insurance provider was running month-end financial processing on-premise, a process that took two weeks of each month to complete. That gave the business only a few days each month to analyze and react to the data. Once the company migrated the application to AWS, it was able to cut the processing time to just 24 hours. The cost of running this application in the cloud was a mere 10% of managing it internally. It's hard to argue with the agility benefit here, much less the economics.

GENERAL BUSINESS APPLICATIONS

General business applications are typically not designed with the cloud in mind, but can run well in virtualized environments. These applications include ERP systems like SAP and PeopleSoft, collaboration tools like Microsoft SharePoint and Lync, sales tools such as CRM, accounting systems and internally-built industry applications. Large enterprises have resisted moving business applications to the cloud because of lingering concerns around security and governance as well as change management. Moving to SaaS hasn't been widely accepted either, since large companies tend to require customization for different lines of business, diverse customer segments and verticals they may serve.

Yet times have changed: migrating core business applications is fully supported in public cloud IaaS environments today. Providers such as AWS have focused on enterprise needs in recent years, delivering best-in-class security controls, larger instance sizes, S3 storage for backup and recovery, geolocation controls and support for Microsoft SQL, Oracle, and MySQL databases. These innovations are available at prices that continue to go down, making the economic proposition for running business applications in the cloud hard to ignore. Yet the agility from standardized deployments and automation, key characteristics of the public cloud, is just as imperative. As companies undergo IT transformation efforts, moving to Agile methods for continuous development, the cloud is helping business managers be more responsive to market needs. Consider an upgrade to a critical system in five minutes, not five hours, or a new feature on a customer mobile app deployed within days of its conception. As companies move more everyday business applications to the cloud, the rate of innovation and competitiveness can grow at even faster rates.

APPLICATION DEVELOPMENT

Many IT organizations dip their toes into the public cloud to better support the move to modern, agile development processes. The cloud is a natural fit for developers, and development/test projects often lead to the migration of production applications.

The on-premise environment poses several limitations for IT. For one, developers can't easily test and deploy new features due to infrastructure constraints. When they need more capacity to do so, it can take weeks to procure and install new technology. Funding might be an issue to expand resources for a new project or feature. Without an organization-wide strategy and support for the public cloud, developers will "go rogue" – spinning up external cloud services in an ad hoc fashion, creating silos between application development and IT operations. That manifests later in issues around governance, security, quality and more.

Another significant advantage for application development teams is the concept of "unlimited infrastructure." By using large scale cloud services such as AWS, application development teams are not limited by design patterns geared towards capacity constrained hardware. The sky is the limit as application development teams can now plan for and use unlimited infrastructure and therefore be more responsive to business and user needs. This can be a powerful enabler to innovation as enterprises pull together inexpensive infrastructure "Lego "pieces to build the next generation of applications for end users.

Companies that support agile, cloud-based application teams can also attract top talent--people who understand the latest iteration of infrastructure technologies and whom have the mindset to take risks.

CLOUD-NATIVE APPLICATIONS

Cloud-native applications have been written with the strengths and weaknesses of public cloud IaaS in mind. The main benefit of building Cloud-native comes in the form of cloud services that offer more functionality than just a virtual machine. IT teams have been constrained for years when it comes to infrastructure, stuck with a physical or virtual machine and associated storage. In the cloud, IT can see extreme benefits from leveraging Cloud-native services such as DynamoDB, RedShift, Kenesis, Elastic Beanstalk and many others. These services help enable workflow or use cases that were previously too expensive to cost justify, such as social media processing, video transcoding or large throughput interactive applications (think interactive SuperBowl ads) – see figure 1.0 . These applications can run well in a variety of infrastructure configurations and have minimal integrations with existing on-premises infrastructure and applications. They often incorporate big data requirements.

Figure 1.0

For instance, many enterprises are looking to leverage social media datasets for analytics or workflow processing. These datasets are large and transform on a daily basis. Application developers can use AWS Kinesis to set up a real-time data ingestion endpoint to process terabytes of data on a daily basis for less than the average team latte bill. In another example, a consumer goods company is using Elastic Beanstalk to deploy hundreds of marketing websites to ensure consistency, high availability, ease of management and lower costs.

Many enterprises are starting to leverage Cloud-native web services to solve age-old problems more efficiently. One good example is the data warehouse, a concept created to centralize an organization's critical data for correlation queries and other analysis to better understand everything from customer buying behavior to vendor performance. Building a data warehouse on-premise was an exercise in constrained capacity or overprovisioning or both. Vendors charge high fees for software and hardware designed to handle the large data loads and throughput required by today's enterprise data warehouse. Amazon's Redshift product is a Cloud-native approach to the costly data warehouse problem. This highly scalable and elastic infrastructure means that companies can now deploy petabyte-size warehouses in minutes, not weeks or months and at prices that can be a mere 10% of on-premise costs.

SPEEDING TRANSITION TO THE CLOUD

In order to maintain a competitive edge in the marketplace, companies must meet customer demand and preferences: consider the impact that Amazon continues to have on the retail and eCommerce space. Consumers keep coming back to Amazon because of the frictionless experience of ordering name-brand products across dozens of categories in minutes, and receiving them in a day or two. Yet for most companies, change is still too slow. IT departments in particular need to help remove the barriers to the digital enterprise transformation. Following, are some ideas for making the journey smoother and more successful.

1. OVERCOME RESISTANCE FROM THE INSIDE:

Some companies are proceeding with extreme caution when it comes to migrating production applications into the public cloud. Educating senior IT and business people as well as engineers who are afraid of what effect the cloud could have on their organization requires patience and time. Start by sharing how the major cloud providers such as AWS have an open architecture, and are transparent in the way their platform operates and what types of controls companies can configure over servers and data. Secondly, help holdouts understand that in the public cloud, your company is gaining a competitive advantage from having the latest technology. Cloud-native technology is more advanced and flexible than what your business can get from established IT vendors. Finally, the argument that security is not as strong in the cloud compared with on-premise security is no longer valid. AWS offers industry best in class security features, such as encryption of entire solutions from transit to rest to transit; the provider also separates physical from logical infrastructure in its facilities to deter hackers. A recent announcement from Box.com highlights the state of cloud security: The company now has an enterprise feature set that is fully encrypted and incorporates remotely-managed encryption keys so that Box.com never has access to a customer's dataset.

2. CREATE A CLOUD-FRIENDLY CULTURE:

Companies often struggle when moving to the cloud because their staff hasn't adopted the right mindset. This begins with the concept of provisioning and de-provisioning resources on the fly. That brings power – in the name of innovation and speed. Without the budgetary or time constraints of traditional IT environments, organizations can accomplish so much more with the cloud. But will they know how and when to push that lever? Instead of spending time on the front end planning and designing an environment that is a perfect technical fit for an application, IT professionals need to jump in and experiment. With cloud infrastructure and features changing monthly if not weekly, IT needs to anticipate platform changes rather than solving issues which may not exist in a few months. Economics and performance are getting better all the time. Companies can host increasingly complex workloads such as 100 terabyte big data projects in the public cloud – which was impossible two years ago. Thinking ahead as to how the cloud can meet your emerging business need is to gain an edge. Finally, there's the utility nature of the cloud which requires real-time planning. With physical infrastructure, a company has committed to a long-term investment that is fairly static. With cloud, one can turn resources on and off as needed on a daily basis and thereby save money.

3. RESHAPE STAFF:

In the early days, IT workers expressed concern that their jobs would go away once cloud companies took over the deployment, management and maintenance of core technology. Certainly, this is the case in companies with a bloated IT staff but mostly, it's a matter of redirecting staff, not letting them go. Performance, monitoring and security management are still important internal roles, yet IT professionals can now free up time to connect with the business on developing new revenue-driving, productivity tools and customer-facing services. Working closely with business counterparts is not a natural role for some developers and engineers, but it's a necessary transition. Another positive impact of moving to a public cloud-based environment is that IT organizations can attract and retain a higher level of talent. These are the individuals who want to be on the cutting edge, and whom are interested in making a business impact beyond tuning servers and applications. The job market remains tight for individuals with experience in cloud technologies and development. A best practice is to find experienced enterprise architects who are willing and able to learn about cloud infrastructure.

4. ADOPT A CLOUD-FIRST STRATEGY:

When given a choice between cloud-based or on-premises deployment, CIOs may find a tendency for IT employees to stick with what they know. By framing cloud as an optional delivery method, CIOs and CFOs only encourage holdouts. If remaking your business into a 100% public cloud-based business is the goal, take away some of that choice. A CIO can provide an exception for on-premises deployment – once certain rigorous requirements and conditions are met. Show IT workers the benefits of a cloud-first model: they can work with cutting-edge tools, develop and experiment more quickly, be more creative, and grow their market value. Major corporations like GE have drawn a line in the sand by making a bold statement to move its entire billion-dollar business to the public cloud. Can you?

5. AUTOMATE EVERYTHING:

The cloud infrastructure has matured to support sophisticated IT automation. With the tools available today, there's no reason why IT workers should manually configure, provision, de-provision, monitor and upgrade systems. Next-generation tools are designed for the task of managing applications and data in the cloud, and public cloud providers are continually working to make their environment simpler to use. Without automation, a cloud journey is simply about using a cheaper data center – not about real transformation and agility. Automation is not just about saving money and time, but helping the business respond to a market or customer need when it matters. Imagine an email from your marketing director that she wants to push a last-minute campaign to coordinate with a major industry event. Imagine being able to say: no problem.

CONCLUSION

In conclusion, cloud transformation isn't just for emerging companies; it is vital to the success of every enterprise in this digital age. In this paper, we looked at four common use cases that enterprises commonly select when starting the digital journey. Due to the rapid rate of innovation by public cloud providers and the rate of transformation taking place in the enterprise, companies will not be able to compete effectively without leveraging these new technologies.

Committing to the digital, cloud-based enterprise can be a leap of faith for a company with a long history of running applications and systems internally. Executives should be encouraged by the fact that public cloud services are maturing rapidly and adoption is growing across all industries. The major cloud providers are continually targeting enterprises with more features, such as database as a service, military-strength encryption and physical security, elastic storage, larger instance sizes and more. All the while, the cloud continues to deliver a price-performance ratio that is far better than on-premise environments. Some CIOs are reporting 50 to 75% lower infrastructure management costs. Those savings bring incredible market power from cheaper and faster innovation, a more customer-centric orientation, responsiveness and user productivity.

The question is no longer – should our business move to the cloud – but how quickly?

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2nd Watch is an enterprise workload management provider that helps companies accelerate data center capacity growth through adoption of the public cloud. The company's public cloud-native services and tools implement and automate critical workload management processes including migration, procurement, provisioning, operations, financial management, and governance. 2nd Watch has helped hundreds of customers increase agility and lower operation costs by shifting workloads into more than 75,000 instances in the public cloud. The venture-backed company is headquartered in Seattle, Washington.

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