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# Mobile Computing and the Cloud

The Impact of Disruptive Innovation on  
Enterprise Information Management (EIM)

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## Introduction

The OpenText Enterprise Information Management (EIM) White Paper Series is a set of publications from OpenText™ on the topic of Enterprise Information Management.

EIM is the discipline of discovering, managing, extracting value from, and building applications on top of unstructured enterprise information. At OpenText we know these Enterprise Information Management practices as the next generation of enterprise software.

To help present the topic of EIM, it will be described and detailed in the following white paper series:

- Enterprise Information Management (EIM)
- The Social Enterprise
- It's all Connected
- Focused on the Value
- The Journey and Information Flows
- Enterprise Content Management (ECM)
- Business Process Management (BPM)
- Customer Experience Management (CEM)
- Information Exchange
- Discovery
- ***Mobile Computing and the Cloud***
- Security
- Governance, Compliance, and Risk Management
- Customer Case Studies

These white papers will be delivered in a series starting in the fall of 2012 and completed throughout 2013.

## Disruptive Innovations

Mobile Computing and the Cloud are two of the most important new trends in IT to impact enterprise information. My objective with this whitepaper is to look at the trends, challenges, and benefits of mobile and cloud technologies in the context of Enterprise Information Management (EIM).

A typical IT reaction to the emergence of new technologies is to determine which applications can be moved into the cloud and which can be modified for mobile. But more lofty goals can be set. In his article for the Harvard Business Review (January – February 1995) *Disruptive Technologies: Catching the Wave*, Clayton Christensen defines the term *disruptive technology*, now more commonly referred to as *disruptive innovation*, as “an innovation that helps create a new market and value network, and eventually goes on to disrupt an existing market and value network (over a few years or decades), displacing an earlier technology.”

As disruptive innovations, mobile and cloud technologies fit this definition to a fault. Moreover, the emergence of these two technologies at roughly the same time and the extent that each one helps fuel the growth of the other makes the disruptive effect all the more powerful.

Both phenomena represent a tremendous opportunity for a progressive enterprise to think differently about how it works with its customers, or more specifically, how it provides better products or services to them.

The enterprise should not only be trying to figure out what legacy systems it can adapt to this new environment, but should also determine the value of these new disruptive innovations and how they will expand the ability of the enterprise to compete successfully in its marketplace.

In this paper, I'll examine mobile as the new user delivery mechanism of choice and its impact on how organizations need to rethink their infrastructure and application platform. Then I'll discuss why the cloud is changing the role of IT from an infrastructure-delivery organization to a business-value-delivery organization. Finally, I'll take a look at how both cloud and mobile are transforming Enterprise Information Management.

# Mobile: Extending the Information Last Mile in the Post-PC Era

## The Mobile Wave

The mobile market recently passed an important milestone. In 2011, mobile data revenues eclipsed \$300 billion for the first time ever. More importantly, it's also the first year ever that non-messaging data revenues made up the majority of overall global data revenues at 53 percent. The mobile industry is characterized as the most vibrant and fastest growing industry on the planet. The same report suggests that data is on pace to make up 95 percent of global mobile revenues by 2015.<sup>1</sup> If there was ever any lingering doubt that the "world was going mobile," these numbers put those concerns to rest.

Mobile communications is an essential part of the global fabric. With almost 70 percent global subscription penetration as of 2010, mobility is everywhere.<sup>2</sup> Mobile represents a singular opportunity to build an entirely new model for how organizations do business, impacting the ability to extend and manage enterprise information and business processes for both internal users and external customers.

Because of its ability to bring together remote location and preferences in a time-relevant manner, mobile is creating new, highly targeted decision-making opportunities and making them available to a much larger set of users than ever before possible with a PC or laptop.

Fueled in part at least by mobile, modern enterprises are generating exponentially more data today than they have in the past. More access points mean more data. The volume of data and the velocity at which it's being created is staggering. Every day we are creating 2.5 quintillion (2.5 X 10<sup>18</sup>) bytes of data. That means that 90 percent of the data in the world today was created in the last 2 years.<sup>3</sup> Traditional databases and information management systems simply do not keep up with the velocity and growth any longer.

Collectively this data surge has been referred to as Big Data, the latest buzzword for a growing problem that has been around for a while. It has also been clearly identified as top concern by mobile IT industry professionals.

Chetan Sharma Consulting is a leading consultancy in the mobile market space. Annually they undertake a Mobile Industry Predictions Survey. Their 2013 results garnered from mobile IT industry professionals are also highly instructive and represent insight into how internal users see mobile impacting their organizations.

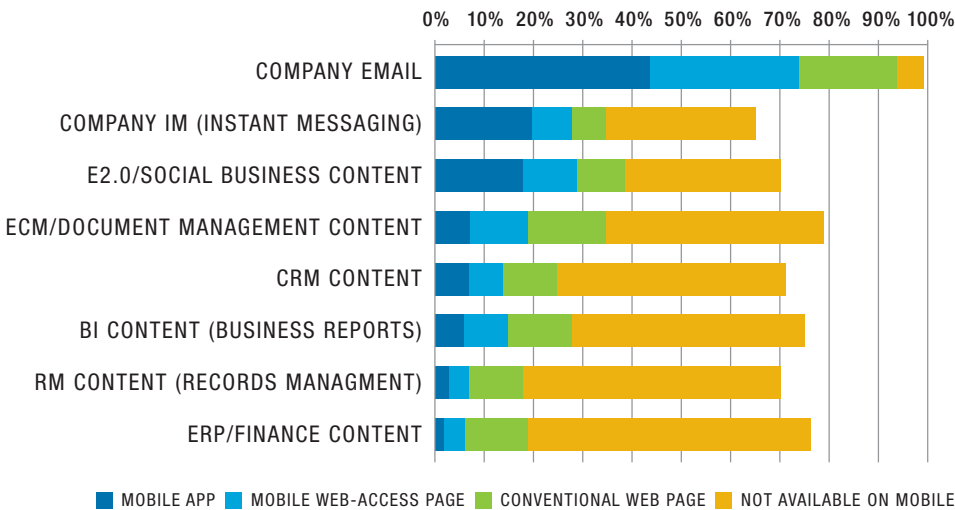
The top six categories in their survey are all data-related and all represent significant growth potential for carriers in the enterprise or B2B market as their traditional fixed-line businesses continue to dwindle. The categories include:

- Mobile Payments
- Mobile Cloud Services
- Mobile Commerce
- Big Data
- Connected Devices
- Mobile Enterprise

The consumer-facing or B2C markets continue strong with messaging, mobile payments, and social media as areas of strength in both the developed and developing worlds. Mobile is not just about smartphones; both tablets and smartphones in the Chetan survey are viewed as “taking over computing” at the expense of the PC which is perceived as “falling off the cliff”.<sup>iv</sup>

More importantly for the enterprise markets, mobile moves decision making to the frontlines with teams in the field – both internal and externally with your supply chain. There is no doubt that globally this has helped to fuel a continuing slowdown of PC shipments.<sup>v</sup>

The proliferation of mobile is making its mark on the enterprise. Often defined as a consumerization of the office environment, the Bring Your Own Device (BYOD) trend has created new headaches for IT departments. Exponentially more data is coming in to enterprise assets from an array of mobile platforms in different formats – opening the door to dramatic increase in governance, security, and integration challenges across the entire EIM spectrum. Unfortunately for IT departments, closing the doors on mobile is not going to do any good; the horse has already left the barn. Studies have shown that 73 percent of enterprises have non-IT managed devices accessing corporate resources.<sup>vi</sup> As illustrated in the graph below, the system data types being accessed are fairly typical across industries<sup>vii</sup>:



**FIGURE 1:**

System Data Types Accessed on Mobile Devices in the Typical Organization  
 (Source: Doug Miles, *Making the Most of Mobile – Content on the Move*, AIIM, 2011)

The impact on EIM is profound.

The race is on. The good news is that it is still early.

**Business Challenges**

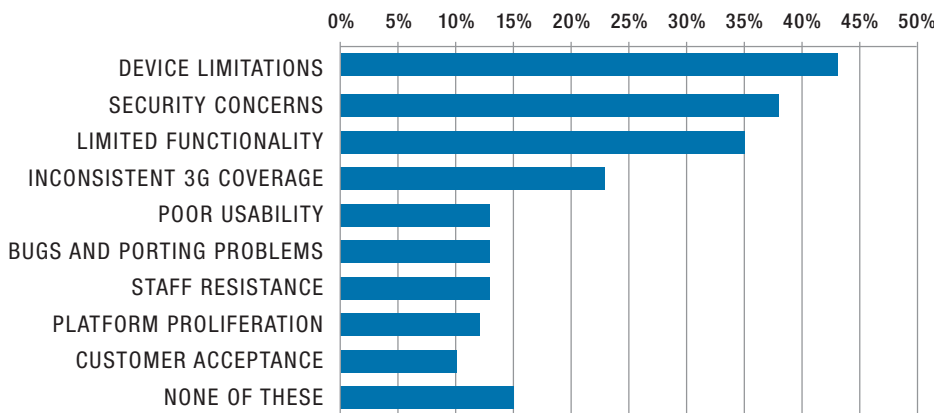
One of the core challenges that any enterprise needs to confront is how to efficiently manage content and its underlying business processes. This is fundamental to any business. How does it reach out and communicate with the consumers of its products or services? Mobile technology is making this exponentially more difficult.

There is a veritable cascade of mobile devices entering the enterprise and typically, there is no coherent enterprise mobility strategy. The presence of these devices can throw IT departments into utter turmoil. Departments frequently lack the right tools to manage these devices, which results in increased cost. Risks of data loss, data breach, and non-compliance also increase significantly.

Mobile’s entry to the enterprise is unusual in that it started from the bottom up. Over the last few years, more and more individuals have acquired smartphones and personal tablet devices have been appearing on the radar of corporate IT. This has become so common that the trend has a name: Bring Your Own Device (BYOD). A pro-active mobility strategy is crucial if the enterprise is to avoid potential risks and additional costs. All too often an enterprise is reactive in response to some type of an incident – a data breach or data loss being the most common. Change is slow, but it is happening.

**Enterprise Concerns in a BYOD World**

There are major challenges with having enterprise assets on a proliferation of unknown devices that the business does not have the ability to secure. Security has always been a major concern for corporate IT, but with mobile it’s not only the level of security inherent in the mobile device itself (or the relative lack thereof), but also the fact that mobile means you are taking data with you wherever you go. The graph below clearly illustrates that security, as well as limitations of the device itself rank very highly in terms of enterprise concerns.



**FIGURE 2:**

Common Issues with Mobile-specific Applications

*(Source: Doug Miles, Making the Most of Mobile – Content on the Move, AIIM, 2011)*

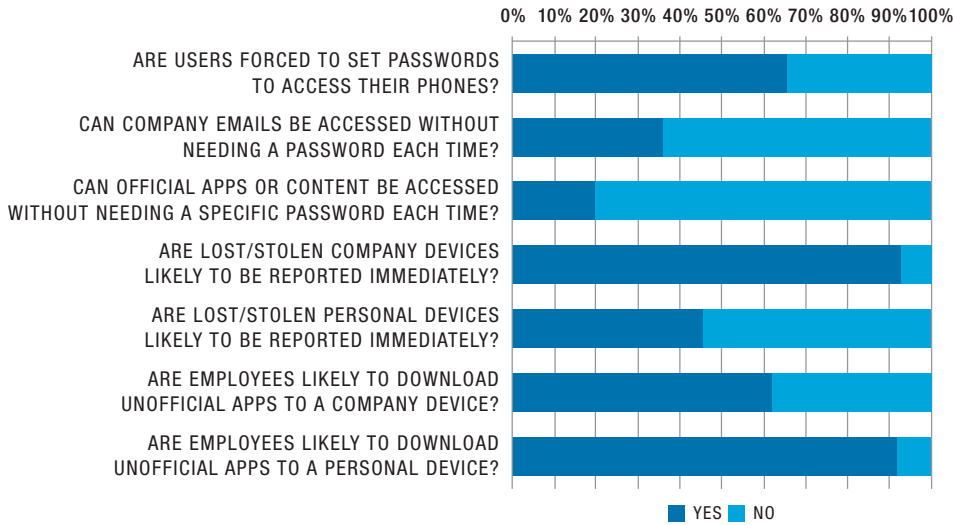
Add to this the multitude of heterogeneous platforms with varying levels of interoperability within the enterprise infrastructure and corporate IT is finding the need to shift their focus from their traditional mode of security via infrastructure to security for applications and information squarely into the realm of EIM.

More people using systems means increased cost. Moreover, if there is a problem with a mobile-specific application, who addresses it – corporate IT, the user, the carrier, the device manufacturer?

**Some BYOD Solutions**

*Coordination of Corporate Assets - Onboarding*

BYOD is about building a secure virtual container for enterprise applications and information. Access policies need to be managed to ensure compliance with all existing security policies. Recent survey responses suggest that results have been mixed.<sup>viii</sup>



**FIGURE 3:**

Compliance and Security Issues with Mobile Devices

*(Source: Doug Miles, Making the Most of Mobile – Content on the Move, AIIM, 2011)*

Employee responses to their relative willingness to download unofficial apps to company and personal devices are particularly troubling.

The device itself is not the point of control moving forward. An important first step in this process however is the registration and onboarding of new devices, preferably from a single point of control. Registration allows these devices to be identified and user credentials to be validated, otherwise IT will have no way to differentiate and control network and data access privileges. This is a crucial step.

It should come as no surprise that security and scalability are top priorities in mobile application development. The sector is also relying heavily on well-designed services oriented architecture (SOA) to make this happen. To quote Michael Facemire, senior analyst at Forrester Research Inc. “Mobile demands scale. If SOA is done properly, you have a much higher level of engagement with mobile users.”<sup>ix</sup>



### *Cost Control*

There is little doubt that mobility costs are going to continue to rise. A few key statistics make the case. Average smartphone usage nearly tripled in 2011 and each tablet device generates 3.4 times as much data as the typical smartphone. The typical mobile employee currently uses an average of 3.5 devices ranging from smartphones and laptops, to netbooks and tablets.\* Corporate IT needs to ensure that they can support all these devices without dramatic increases in costs, with minimal impact to bottom line profitability. Additional costs without additional revenues are never a winning combination.

Controlling these costs is crucial, but needs to happen within the context of a corporate IT strategy. Efforts to date have too frequently consisted of ad hoc, knee jerk efforts at frugality, without a view towards the potentially negative impact of that frugality.

### **Mobile Opportunities**

One of the key benefits of mobility is its ability to enrich remote interactions and make them more effective. Defining remote is a straightforward exercise: it's any interaction that doesn't occur behind a desk. From a sales executive to a worker on a factory floor, a physician, and a policeman— as they are given real-time access to information, their efficiency and productivity increases.

Enriching remote interactions with a given mobile device is certainly important, but how you make the applications that facilitate these interactions available is equally important. Mobile provides a new universe of opportunities to rethink how we structure the information that flows out to the remote user.

### **Rethinking Mobile Applications**

The need to make information accessible to your customers has not changed. The explosion of access points to enterprise information that mobile introduces complicates information delivery considerably. Corporate IT can no longer only concern itself with managing resource flows from laptops and on-premise workstations. Organizations must consider fundamental changes to the nature of the applications that deliver information to their users and customers.

Traditional software development in the enterprise has always been complex. Add mobile into the equation and complexity increases. It is simply not realistic to think that the enterprise can continue to develop applications the same way it always has.

The issue is not just about establishing information management controls for the way you used to do business. You need to rethink your applications in order to take advantage of the new capabilities that mobile makes available to you as a business. Get it right and you stand to gain significant competitive advantage for your enterprise. Get it wrong and you could impede your ability to compete in your market(s).

## Consumerization of the Marketplace

There are literally thousands of mobile applications available for the consumer market – everything from games, social networks, newsreaders, travel booking apps, etc. Users have become comfortable with how the user interface (UI) is built and interacting with their device. Not everyone is an engineer, and gone are the days of 100+ page “quick start” guides and extensive training sessions to learn an application.

As the demand for platform-to-platform and application-to-application integration continues to grow, there has also been a significant acceleration in the development and sophistication of open APIs. This is all part of a larger shift towards consumer-centric development strategies. Proliferation of access devices means more and more people have access to enterprise systems.

It is inevitable that the general level of technology expertise is going to decrease. This is what fuels that consumer-centric approach. More simplicity on the user interface equates to more complexity and flexibility required in backend and application coding. When there are exponential increases in the numbers of users across a broader spectrum of sophistication, this also means orders of magnitude increase in how that information is both managed and presented – a significant EIM challenge. This applies equally across a broad range of technologies – the cloud included – as well as the types of data structures being managed and used. These are the traditional structured data sets that corporate IT has long experience in dealing with, typically in a relational DBMS environment, as well as unstructured data where corporate IT has relatively little experience. Web click streams, data log files, and assorted social media data feeds are the primary sources for unstructured data.

This has clear implications to application architectures which must evolve to accommodate these developments. This trend began with the earliest public cloud environments and has only accelerated with mobile. It is also fueling changes in traditional enterprise application environments. User expectations are changing, and developers are slowly but surely accommodating these changes.

A feature like touch screens provides a good example. Originally developed as a means of making digital assets accessible to smaller mobile devices, we are already seeing it incorporated into tablets and laptop-size devices. As recently as ten to twelve years ago:

- An enterprise software application would have been targeted almost exclusively to a highly technical consumer of the application – more often than not, an engineer.
- A typical reaction to some issue in the user experience of that enterprise software would have been: “don’t worry; we’ll fix it next time.”

This approach is simply no longer possible. It would not be commercially viable in today’s marketplace. Companies are consuming information today from more channels across mobile devices. The range of technical sophistication of the users providing this input is also much wider. The nature of information production is changing and by extension, the way it’s consumed and managed is also changing. Information management must be ready to meet this challenge.

## The Enterprise UI – A New Face for Mobile Era

The implication of consumerization is that your enterprise applications need to be offering an experience that is comparable to consumer-grade applications. It's about better use of information through greater personalization and use of context, like geography.

The mobile UI experience is different from the desktop experience. It's simpler, and of necessity much smaller to accommodate the limitations imposed by a significantly smaller display. Integration of technologies like GPS for geographically-based interactions and cameras for image capture were never even imagined for the desktop, yet each of these operate on very different platforms that now need to be accommodated by corporate IT. Add into this mix the sheer numbers of mobile device models, operating system environments, and screen sizes and you only just begin to understand the complexity of the problems presented here.

## Backend Architecture Implications

Organizations need to build applications differently. With a multitude of devices on the network, applications need to scale considerably more. Enterprise systems should offer the right API to enable data brokerage from a variety of user experiences; in other words, they have to be able to write once and reuse many, many times. It's essential that application architecture include composite applications that are delivered through cloud-based integration brokerage services. Finally, security challenges directly impact the way the system backend is architected. Since applications are going to be accessed by mobile devices, these devices will often be outside of the network. How does the enterprise architect their applications to cope with this new model?

To this end new kinds of middleware are evolving to deal with mobile diversity, most commonly referred to as Platform-as-a-Service (PaaS). Traditional middleware for both mobile and conventional environments federates services through a physical server; PaaS does so through the cloud for mobile environments.

Early responses to all these concerns represent the first wave of what Forrester Research Inc. refers to as Smart Process Applications (SPA), which is discussed in more detail later in this white paper. These applications will largely be cloud based, making them easier to deploy, support, and continuously improve. Software-as-a-Service (SaaS) will be the dominant delivery platform, providing applets for mobile users to add their opinions or approvals to options or decisions under consideration. It will, in fact, be the combination of the two – mobile and cloud – that represent a clear competitive differentiation.

OpenText was quick to identify these information management challenges and has evolved as an early leader in this space with our introduction of product offerings like the Mobile Wave platform and the Social Workplace applications for use on iOS, Apple® and BlackBerry® devices.

## The Cloud is the Future

A recent KPMG study found that 81 percent of businesses were either evaluating cloud services, planned a cloud implementation, or already had a cloud implementation in place.<sup>xi</sup> How business moves to the cloud may be in doubt, but they are moving there. The benefits to business are real. The cloud provides agility, flexibility, and scalability while helping to control costs – a major concern in an era of seemingly ever shrinking IT budgets. As always, the devil is in the details. The enterprise must figure out how to do this efficiently and cost-effectively.

### Public vs. Private vs. Hybrid

When it comes to cloud computing, there is no “one size fits all”. Companies are faced with a strategic choice among the different models of cloud computing available to them.

- **Public** – Services provided over the Internet. A customer’s infrastructure and/or applications are hosted by a cloud service provider on the service provider’s premises. It is generally inexpensive and hassle free for the customer, since the service provider is managing all aspects of the environment.

Downsides for the customer include lack of control, frequent slow speeds due to the connection being over the Internet, and a perceived lack of security. Public services do offer security, but since companies have relinquished control of their data assets in this scenario, the perception that security could not possibly be as good as what the company could provide for itself is very real.

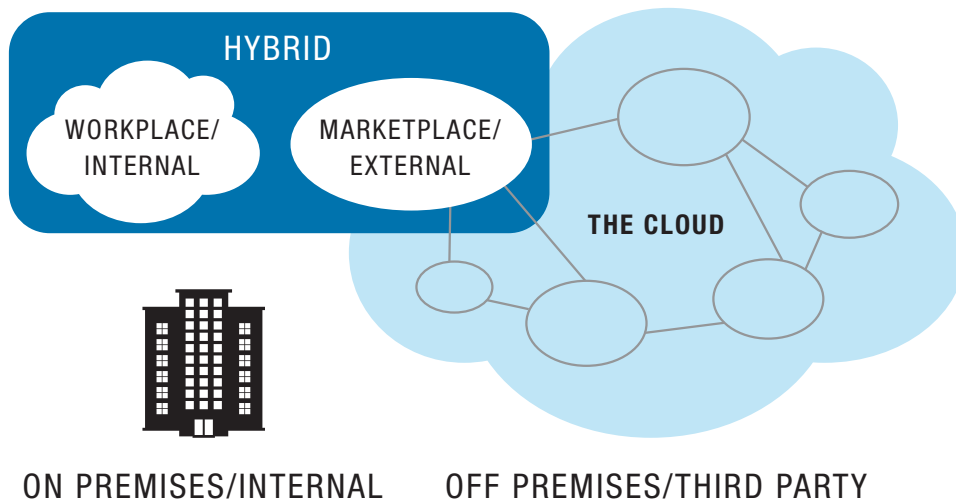
- **Private** – Services are hosted on a private platform in the customer’s data center. This offers greater control, more security, higher performance (since it’s inside the customer’s intranet), tighter regulatory compliance, and it is customizable.

Chief downside for the customer is that costs are almost always higher. They require investment in the hardware, the software, and maintenance costs, as well as the cost of labor required to manage these assets. With a public cloud service, all these costs are borne by the provider. There is also the issue of a capacity cap. If an organization runs out of storage or compute capacity, they must bear the cost of adding it, which typically means additional capital expenditure. A public cloud provider can readily add capacity for modest additional operational expenditure.

Fundamentally these two options come down to a choice between cost and control. This is why so many organizations choose a hybrid solution.

- **Hybrid** – Just as the name implies, this is a combination of public and private clouds and is proving to be an extremely popular model. It’s an easy way, for example, for companies to segregate sensitive versus non-sensitive applications. Sensitive stays in-house and non-sensitive is available to the public environment. A transitional platform, hybrid cloud environments will be the enterprise platform of choice through 2016, en route to a future dominated by public and private clouds.<sup>xii</sup>

## CLOUD COMPUTING TYPES



**FIGURE 4:**

Types of Cloud Services

### Now What?

No matter what kind of cloud service you select, the fundamental question remains about what business value the cloud brings to your organization. How does the cloud impact your organization’s ability to manage key enterprise applications and functionality in order to fulfill your mission? What additional functionality or capabilities does the cloud provide that allows you to expand or improve your business and maintain a competitive edge?

Gartner views the architecture of cloud computing as three foundation layers<sup>xiii</sup>:

- The application service layer (mostly known as SaaS), delivering user application functionalities, such as Enterprise Content Management (ECM), Customer Experience Management (CEM), Discovery, Enterprise Resource Planning (ERP), Customer Relationship Management (CRM), human capital management, collaboration, web conferencing, email, and a myriad of other scenarios, including those for specific vertical markets.
- The application infrastructure service layer (usually called PaaS), implementing database management system (DBMS), application server, messaging, Information Exchange, Business Process Management (BPM), MFT, B2B integration, data and application integration, service-oriented architecture (SOA) governance, and a variety of other “middle tier” application services.
- The system infrastructure service layer (commonly referred to as IaaS), providing core computing, networking, and storage services.

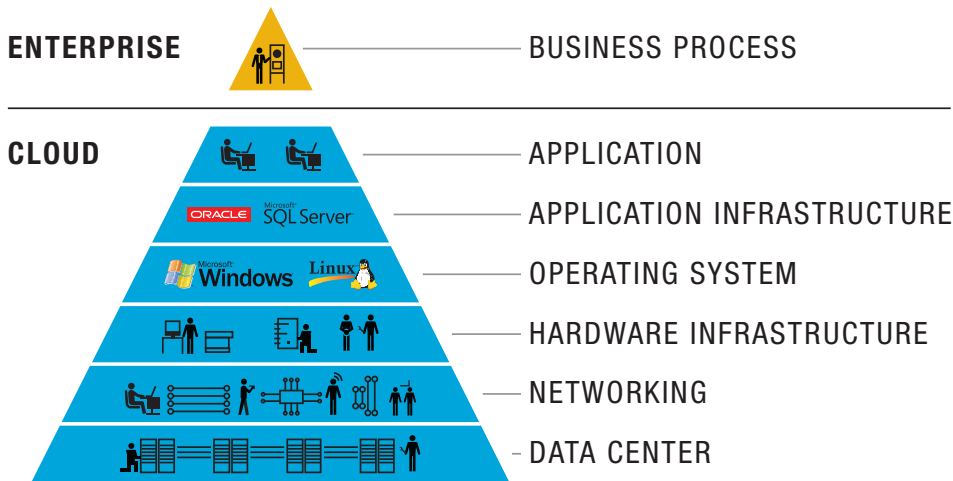
### Cloud Services – A Detailed Overview

The best way to think about these architectures is as a continuum: distinct layers within an integrated whole that function as integral components of a business process that facilitate the exchange of information. The pyramid in Figure 5 provides a helpful visual reference to these concepts.

Managed hosting services, or Infrastructure-as-a-Service (IaaS) provides the foundational layer, also frequently referred to as the raw infrastructure. The networked, hardware infrastructure resident within a data center is the physical basis for the software stack that will reside on an organization's cloud. This is typically the first step taken by most enterprises. They give up a bit of control in exchange for maintaining the ability to architect and manage applications.

The operating system layer is next, where the enterprise elects to follow the Microsoft® Windows® or Linux path.

Next is the middleware piece, depicted here as Microsoft® SQL Server® or Oracle® databases. These are representative selections, but by no means the only options. Not only can this layer include any database solution, but it will also frequently include web servers, application servers, and a myriad of other tools intended to optimize performance and ensure and maintain data security and integrity. Collectively this constitutes a comprehensive application infrastructure (PaaS).



**FIGURE 5:**

An Integrated Cloud Platform

Taken as a whole, this continuum represents an integrated cloud platform, whether on premise or in a public environment. Business applications reside at the top of the stack and will typically be a part of an on-premise environment. Information flows freely both within and between each of the layers.

### SOA and Cloud – Reinforcing Each Other

Cloud can provide enormous advantages to the enterprise in terms of self-service, scalability, flexibility, pay-as-you-go, and improved time-to-value. Making the move to the cloud successfully requires an architecture that will support all of the new capabilities. There is general agreement among business leaders and analysts that the move to a cloud environment requires a solid service oriented architecture to provide the infrastructure required for a cloud implementation.<sup>xiv</sup>

“Cloud computing is a deployment architecture, not an architectural approach for how [to] architect your enterprise IT [as SOA is].”<sup>xv</sup>

## Cloud as a Business Service

The role of the cloud has changed significantly for the enterprise in a relatively short period of time. Early incarnations were almost always limited to an Infrastructure-as-a-Service (IaaS) offering. This was particularly evident with the public cloud providers like Amazon® Web Services, RackSpace® and Savvis®. Each of them had already offered managed, hosted environments to their customers for some time, so it was relatively easy for them to adapt that to the cloud – particularly a public cloud where the advantages of scale came into play – one environment to manage with multiple tenants in that environment.

It quickly became apparent that the cloud is an ideal platform for providing value-added services. The earliest cloud instances in the marketplace were IaaS. Their earliest customers, in turn, were companies looking to provide an application infrastructure layer or PaaS. The economic advantages of this are clear. If you have one stable, managed foundation that you can make available to multiple users, as the architect of that foundation you are going to minimize costs and maximize your potential ROI. As a consumer of the platform you are accomplishing two things immediately. First of all, you are trading the high cost of capital investment and management of the environment for a typically modest monthly fee. Secondly, the enterprise can focus core IT resources on their core business, not on managing a data center.

An enormous amount of data can flow into any cloud environment. That data only flows out as information, i.e. data that has value as an asset to the business if it can move freely throughout the enterprise. Being able to facilitate information exchange is an important growth area for IT. Gartner estimates that growth in information exchange will represent roughly \$2.5 billion in revenues by 2015.<sup>xvi</sup> This is crucial piece of the EIM equation.

Let's look at a simple example to illustrate: a standard order placement for a product. This initiates a business process to generate an order form, create a pick to pull the product from inventory, create a packing list, package the product, ship it to the customer, and generate an invoice based upon financial terms on file. What happens if the customer reports that a critical component of the product is defective or worse yet, it was known that this component was defective before the customer's order was shipped but there was no process in place to flag the defective piece in a systematic fashion and change it out? This is precisely the kind of new capability that information exchange can make available for the enterprise.

This kind of error can be incredibly costly, generating not only ill-will with customers, but additional costs to fill the same orders more than once, and in some extreme cases, claims for liability and damages from customers. The key elements here are the efficient and precise management of processes, as well as the transparent brokerage of information throughout all facets of the enterprise and all the affected business processes.

## New Opportunities for Cloud Services

The new data and services brokering capabilities of the cloud offer a lot of opportunities for unleashing the value of EIM across the enterprise. Thanks to the cloud's brokering capabilities, organizations can now more quickly realize the EIM vision: a truly integrated way of managing, governing, consolidating, and extracting value from enterprise Information.

## What this Means for EIM

### Integration Brokerage: A Core Element of an Integrated EIM Cloud Strategy

A lesson to draw from the example above is that the elements of EIM are not implemented in isolation. At the beginning of this discussion, mobile and cloud environments were introduced as disruptive innovations. Each helps fuel the growth of the other. This technological synergy makes the disruptive impact all the more powerful.

Integration Brokerage (IB), as Gartner defines this space, is a category of discrete IT outsourcing for integration projects, such as those involving cloud services integration and supply chain integration. IB is one of three primary cloud service broker roles and combines cloud-based B2B integration infrastructures with people and processes to help companies with initial implementation and ongoing project management for a wide range of cloud and B2B integration projects.<sup>xvii</sup>

### Smart Process Applications – The Face of Integration Brokerage

Applications represent the customer-facing component of EIM. Terminology in this area varies. Forrester Research Inc. defines this area as Smart Process Applications (SPA), delivered largely in the cloud. The focus here is predominantly on the automation of business processes for unstructured data. This is the next step beyond ERP systems, which typically handle structured data well. This is truly the “last mile” of business process automation. Forrester Research Inc. describes Smart Process Applications as follows:

- **Imported or embedded awareness data relevant to the business activity.** All collaborative business activity starts with a set of data that provides the trigger or backdrop or framework for that activity. In the creation and management of contracts, that data set will be the repository of existing contracts and standard contract terms and conditions.
- **Document capture for incoming documents, forms, and faxes relevant to the business activity.** Many, but not all, collaborative processes still start with a mound of incoming paper documents and faxes that require manual work to process. Examples include customer forms for new account openings, invoice documents for invoice processing, customer requests and feedback forms in retail, sales orders in manufacturing, and applicant information in recruiting and hiring. To tackle this paper burden, Smart Process Applications support an integrated document capture solution for scanning and indexing incoming paper, managing incoming faxes, and supporting electronic signatures for high volumes of documents in the 30,000- to 50,000-per-year-range. This document capture solution will be integrated with Business Process Management (BPM) and Enterprise Content Management (ECM) capabilities.
- **Embedded analytical tools designed for a business activity.** The people engaged in a business activity will need analytical tools designed for the task at hand, not a generic set of business intelligence (BI) reports and query tools. Those responsible for corporate risk management will need predictive analytical tools that can highlight potential threats to business operations or assets. Those engaged in preparing a new marketing campaign will want descriptive analytics that show historic results from past campaigns and current information on the demographics of the target audience. People in a social services organization managing client cases will need diagnostic analytics to understand the causes of the problems the client is facing. A sourcing team will need analytics that identify the best spend categories for strategic sourcing negotiations.

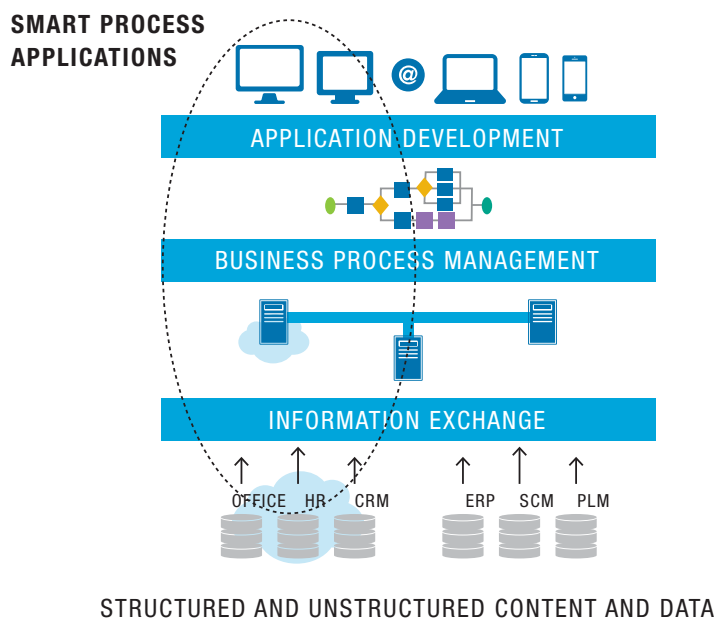


- **Collaboration platform for people to create content needed for the activity.** The people in the activity are meant to accomplish something, not just sit there in analysis paralysis. They need to work together to create a deliverable, whether it's a report, a plan, a problem resolution, a recommendation for action, or any other kind of work object. Those people may be employees in an office, but they may equally be employees on the road, contractors or consultants, customers, suppliers, or other partners. They will need to share ideas, submit their own solutions, critique and comment on the contributions of others, and work and rework the deliverable that will define what should be done next.
- **BPM tools for executing the steps involved in the activity.** Having identified and created a solution, a remedy, or a call for action through collaboration, people then need to execute the steps needed to turn planning into action. This is where BPM elements of workflow, rules engines, enterprise application integration, process modeling, process monitoring, and dynamic case management come into play.

SaaS is the dominant delivery platform for SPA. In addition to these core features, SPA will largely be cloud-based, making it easier to deploy, support, and continuously improve. Indeed, much of the growth in SaaS applications will be Smart Process Apps that complement core transactional applications, rather than in SaaS apps that replace those transactional apps.<sup>xviii</sup>

OpenText has augmented the Forrester Research Inc. SPA framework by adding information exchange through multi-channel communications. Information needs to flow between organizations, partners, and customers. This ability to exchange information in any format between any senders and receivers interconnects Smart Process Application elements to address business process needs.

Smart processes will also require access from mobile users using smartphones and tablets. They will involve applets for these mobile workers to add their opinions or approvals to options and decisions under consideration. However, neither one of these capabilities individually, is differentiating for Smart Process Applications. Many categories of software are adding both mobility and cloud, which will quickly become table stakes for SPA — vendors must add them to be competitive.



**FIGURE 6:**

BPM + Information Exchange =  
Smart Process Applications

## Information Exchange and Business Process Management

Figure 6 provides a good visual within the context of information exchange. At the foundational level, B2B Managed Services are deployed in the cloud or as components within a hybrid model. Customers consume BPM and Information Exchange services as a cloud service or in a hybrid model. Information Exchange uses web-based messaging services for delivery of content to users from the cloud and on premise. A BPM suite provides process automation and management, including case management, BPM, rules, and business activity monitoring.

Finally, an application framework creates packaged, composite web UI and business applications – both fixed and mobile that leverage BPM and information exchange. This is a Smart Process Application.

Information Exchange facilitates the efficient, secure, and compliant exchange of information, both inside and outside the enterprise. Documents and associated data must routinely be brought together for use in processes and case management to make this a reality. OpenText has implemented cloud-based file sharing and is working to integrate mobile technology.

Information Exchange is a critical component of EIM. The vision for Information Exchange is clear: it is the ability to exchange any information in any format between any devices. Enterprise users should be able send and receive any information to anyone regardless of format and device involved in the exchange. Effective Information Exchange technology allows people to receive a fax, for example, and have it automatically transformed into an email and delivered to the device of choice. This is only the beginning. If you extend this concept to a global address book, its potential is clear: the ability to exchange messages with anyone quickly and securely, wherever they are, in any format, on any device.

Business-to-business interaction also needs to be transformed. Businesses today are struggling to exchange information for a whole host of reasons. A frequent challenge is the internal exchange of information. Providing business with the services they need to empower communication and information exchange with all internal divisions (for the large enterprise), as well as with other businesses will represent an incredibly compelling enterprise asset. These types of B2B managed and integrated services can easily be tailored for specific use cases in vertical industries.

Like any other application, mobile devices provide a user interface to consume and interact with information. The key differentiator is that a mobile application tends to happen in real time, as well as being more focused on just the information needed in context. The cloud provides organizations with the services required for that information to be produced and processed. Mobile delivers the information to customers. Cloud is the broker that supports and provides all the required information services. The combination of the two is incredibly powerful and allows customers and users make those last mile decisions – approve that purchase order, validate that contract, and more. Both these technologies are capable of bringing exciting new capabilities to the enterprise.

To provide this type of integration on premise requires that the enterprise become an integrator, which is likely not its core business. A much better approach to leveraging cloud and mobile is to work with an organization that has these kinds of integration skills built into their corporate DNA.

## Enterprise Content Management (ECM)

Virtually every application and every business process contains some content. This content needs to be managed and stored. The core requirement has not changed. What is different is where that content is coming from, where it is being stored, and how it is being accessed.

Data sovereignty is also a huge issue. Any information that has been converted into a digital format is subject to the laws of the country in which it is stored. It is common for companies or governments to require that content be managed in such a way that it does not leave their borders or does not enter certain other countries. One of the most visible examples here is the EU Data Protection Directive. The U.S. Department of Defense (DoD) UID and RFID regulations also apply – not just to the DoD, but to anyone who hopes to do business with the DoD.

Any cloud-enabled ECM governance framework needs to provide the ability for content to be tied to a specific geographical set of rules. EIM delivers these capabilities within an information governance framework that is expanding rapidly to accommodate mobile and cloud computing.

## Customer Experience Management (CEM)

Effectively managing the customer experience is critical to any successful business. The extent to which an enterprise exceeds their customer expectations and provides a superior experience across all touch points is what makes an organization stand out from its competition. One of the most important implications of both mobile and cloud technologies is the consumerization trend discussed earlier, or the extent to which both have dramatically expanded the number and nature of customer touch points.

The need for a comprehensive EIM framework that accommodates CEM is of critical importance. EIM products like Mobile Wave are already reducing the cost and complexity of creating, developing, and delivering a rich universe of mobile applications, reaching the broadest audience possible, and providing customers with high-quality mobile experiences.

## Discovery

The nature of Discovery is providing rich search capabilities and content analytics that function throughout the range of the EIM environment. The introduction of mobile and cloud environments complicate Discovery by several orders of magnitude with the introduction of additional data formats, operating systems, and applications.

Discovery technologies are being developed to incorporate an ever expanding range of mobile and cloud platforms.

## Summary

This paper opened with a reference to Clayton Christensen and his landmark discussions in 1995 about disruptive innovations in the marketplace. Professor Christensen followed up his original article with a book, *The Innovator's Dilemma, When New Technologies Cause Great Firms to Fail* in 1997. The title summarizes the key point he wanted to drive home – great companies can fail even if they do everything right. The key distinction here being that “right” is defined as doing things the way they have always done them. Mobile computing and the cloud represent precisely the kinds of disruptive innovation he was talking about.

The good news is that organizations that pay attention to disruptive trends and successfully leverage the new capabilities that these technologies bring to the marketplace will thrive and dominate in their respective market segments.

OpenText has embraced mobile computing and the cloud at the core of its EIM strategy and is committed to providing the means of making this a reality for the enterprise. Mobile computing and the cloud are important architectures that provide a framework for the enterprise to extend and expand its ability to serve its customers. Both disruptive innovations should be evaluated within the framework of a coherent strategy that takes into account all aspects of an enterprise business strategy. To examine them in isolation would be missing the enormous potential they bring to the table to expand the capabilities and services organizations provide for their customers.

Mobile computing and the cloud are disruptive technologies that affect every aspect of a business, or each of the EIM pillars ECM, BPM, CEM, Discovery, and Information Exchange. The ubiquitous nature of their impact, coupled with a seamless user experience will allow the enterprise to unleash the full power of information. Disruptive technologies, by their very nature, shake up the status quo. At the early stage of adoption and implementation, the full scope of their impact is difficult to predict. Mobile computing and the cloud are no exceptions, particularly in view of their influence across the entire EIM spectrum.

The OpenText Mobile Wave and Social Workplace applications are part of a growing mobile portfolio. The OpenText Cloud is also undergoing a rapid phase of expansion. More information: <http://www.opentext.com/2/global/products/products-mobility.htm> and <http://www.opentext.com/2/global/products/opentext-cloud.htm>.

## OpenText Locations

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- Montreal, QC
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- Kingston, ON
- Calgary, AB

**U.S.:**

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- Tucson, AZ
- Norcross, GA
- Irvine, CA
- Tallahassee, FL
- Chicago, IL
- New York, NY
- Rockville, MD
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- Alameda, CA
- Bellevue, WA
- Tampa, FL
- Reston, VA
- Arlington, VA
- Rochester, NY
- San Antonio, TX

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### EMEA

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**Germany:**

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- Oldenburg
- Düsseldorf
- Kempten
- Hamburg
- Bad Homburg v.d.Höhe

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- Wimbledon
- London
- St Albans

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**Sweden:**

- Stockholm
- Gothenburg

**Switzerland:**

- Baden

**The Netherlands:**

- Hoofddorp

**Ireland:**

- Clonakilty

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- Madrid

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- Klagenfurt
- Wien

**Czech Republic:**

- Prague

**Italy:**

- Rome

**Finland:**

- Espoo

**South Africa:**

- Johannesburg

**U.A.E.:**

- Dubai

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- Osaka

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