



The Cloud Computing Guide for Construction

Table of Contents

- Cloud Computing Basics 3
- Industry Trends/Drivers 4
- How the Cloud can Transform your Business 6
- Use Cases 9
- Cloud Economics 12
- Moving to the Cloud 15
- Choosing a Cloud Computing Partner 19
- Authors 23

Cloud Computing Basics

Most people are already using the cloud in their daily lives, whether they realize it or not, according to Hallie Wheeler, Business Development Director at Webformed. Wheeler explains that cloud software and storage are “something you can access from anything that has an Internet connection. Think of your Yahoo, Gmail, or Hotmail account. You alone have the password, and you can access your email from any computer, smartphone or tablet as long as it has an Internet connection. Isn’t it convenient? In its simplest form, that is cloud software (sometimes called Software as a Service). You are already using the cloud in your day-to-day life!”

The Cloud has become an everyday resource that helps enable our daily routines.

The Cloud has become an everyday resource that helps enable our daily routines. Consider how things such as electricity, water, natural gas, telephone service, and television are provided by companies that specialize in delivering those services, and you can begin to wrap your mind around the parallels with cloud computing. As Robert Keahey, IT business and social strategist/commentator at SummaLogic explains it, utilities and telecoms provide services on a scale “that makes it economically feasible for large numbers of customers to consume at a lower price. And, the customer doesn’t have to buy, build, and maintain all the equipment required to provide the service. Simply put, this is what cloud computing does for the digital age. And just like the power grid that delivers electricity to your house, the Internet delivers these cloud computing services to your home, business, mobile phone, or car.”

In this cloud computing guide, David Bullock and other industry experts walk through why the Construction industry is choosing the cloud, how your business can benefit, and what you can do to compete more effectively.

Industry Trends/Drivers

The construction industry is a very traditional sector, albeit one that is embracing new technology faster now than at any time in its past. Like many industries, the construction industry is now consuming IT services and solutions at an accelerating rate, needing to acquire more and more computing power, with bigger and faster servers to run the latest business critical applications. Although costs of servers may have reduced in recent years, the need to keep servers and software updated incurs significant capital costs and construction firms are finding they have to recruit and retain highly skilled IT staff to keep their existing infrastructure and applications working.

What is moving in the Cloud?

Applications and solutions are being consumed in the Cloud, from traditional applications such as email (Microsoft Exchange) through to the latest buzz within the industry, BIM (Building Information Modelling). Over the last 10-20 years the industry has sought better and more cost effective ways of working with IT.

Collaborative Portals in the Cloud. The first real cloud-based solutions appeared in the form of collaboration portals such as 4Projects and Union Square. These enabled information sharing (e.g. drawings) as well as collaborative boards to allow information to be centralised around construction projects. Savings were associated with these early solutions, not least in reproduction costs given the number of revisions to drawings during the life of a construction project and the need to print these and send out to all associated parties.

Construction's Move to the Cloud. CRM solutions such as Project SalesAchiever and Microsoft CRM also entered the cloud space providing centralised views of their companies' business, pipeline and relationships. The Cloud platform means that users can access "live" information from anywhere in the world – essential for construction companies where staff are often working remotely or moving across sites. E-Tendering and E-Procurement soon followed with products such as Causeway Tradex and a new industry standard "CITE" (Construction Industry Trading Electronically). These products allowed

waste to be taken out of the industry by linking up trading partners, such as Contractors and Builders Merchants, removing paper based communications such as Invoices, Purchase Orders and Delivery Notes. Enterprise Resource Planning (ERP) solutions such as COINS and Causeway have also made the transition into the cloud and by using the latest technology and solutions they are finding that interoperability and integration is becoming far easier.

The Future: BIM

By far the biggest buzz within the construction sector globally is that of BIM (Building Information Modelling). This is a process involving the generation and management of digital representations of physical and functional characteristics of a facility. The resulting building information models become shared knowledge resources which support decision-making in relation to a facility from the earliest conceptual stages, through building design and construction, its operational life and its eventual demolition.

Benefits of BIM. For the professionals involved in a project, BIM enables a virtual information model to be handed from the design team (architects, surveyors, civil, structural and building services engineers, etc.) to the main contractor and subcontractors and then on to the owner/operator. Each professional adds discipline-specific knowledge to the single shared model. This reduces information losses that traditionally occurred when a new team takes 'ownership' of the project, and provides more extensive information to owners of complex structures.

Summary

Given the increased appetite within the industry to produce, manage and consume more and more information it has become clear that in order to compete and become a lean organization in these trying economic times, businesses have had to look at everything they do and utilize all the tools and solutions available. Cloud computing has enabled these companies to work smarter, harder and more economically than ever before and the signs are that this transition into cloud will enable businesses within the Construction Industry to make significant cost savings at a time when the recession had lead to challenging trading conditions. But the cloud is about more than cost-reduction. Looking to the future, Construction firms which move to the cloud should be able to use their enhanced IT capabilities to be more flexible, agile and competitive players in the future.

How the Cloud Can Transform Your Business

According to recent research, 79% of construction businesses expect current operating conditions to be same or worse than 2011, however 59% feel better placed to deal with the tough challenges of 2012 than they were for the recession of 2008 ('Industry better prepared for challenging year ahead', Luke Cross Jan 2012).

Cloud Benefits for Construction Companies

Why this general optimism? There is a renewed focus on collaborative relationships between clients and the main contractor and to those operating in the supply chain. According to Paul Morrell, Government Chief Construction Advisor ('The Year Ahead', January 2012) this is where the potential for innovation and a better offer to clients lies. Couple this with new technologies enabled through cloud computing and it not only creates an immediate cost saving internally (as well as within the supply chain) but also impacts on working practices and relationships up and down the supply chain.

Technology in the cloud is not new to the construction industry. In the late 90's many project teams were looking at waste within the industry, especially when it came to drawings and revisions and the potential to save many \$100's on reproduction costs. Construction collaboration portals were born out of this need and some might say were an early form of cloud computing.

Focus on Core Business. Construction companies often become embroiled in implementing and managing IT systems to assist them in running their organizations, but this takes them away from their core business of building things. Moving to the cloud therefore allows you to focus on your core business (construction) rather than dealing with IT.

For the construction industry, cloud computing is a great leveller.

Competing on a Level Playing Field. For the construction industry, cloud computing is a great leveller; the smallest contractor could have the same computing power of the largest. So, for example, small architectural practices are able to compete on a more level playing field against the largest global ones, without being impeded by hardware and software costs.

Reasons for Construction Companies Moving to the Cloud

There are four main reasons for moving into the cloud for construction businesses:

1. Flexibility

- Ideal for those organizations looking to compete, but who have limited technical in-house resources
- Ability to work from any location – construction site, home, office, on the move

2. Agility

- Keeping IT staff (or lack thereof) trained and up to date with the latest software – all delivered via cloud provider
- New services can be rolled out quickly, even to remote construction sites, with little to no internal resource used for deployment

3. Cost-efficient

- Opex not capex, reduced upfront investment, reducing risk at a difficult time in the construction industry
- No on-going server maintenance/management

4. Scalability

- Scale up (or down) the numbers of users or types of apps whenever you need, which can be driven by building projects won or collaborative partners for example
- Don't need to worry about capacity planning, hence overcoming difficulties in future planning, given the construction industry business cycle and volatility

Savings in the Cloud

Depending upon the solutions that you move into the cloud there are a number of key savings. These could be in the form of operational costs if moving your onsite comms/pbx into the cloud and having a cloud based unified communications strategy. By utilizing this form of technology and embracing video conferencing, IM and presence based practices, construction companies can significantly reduce their overheads in terms of travel to site, accommodation etc. Meetings which

traditionally were face-2-face can now be done from anywhere thus reducing unnecessary travel time and expense and providing more productive time for your staff.

Many construction companies are finding that they have to spend more and more money on bigger and shinier devices with lots of twinkling lights, and have to place these in nice air conditioned rooms, which themselves have to be made more secure from external as well as internal threat. They then have to employ a team of highly skilled staff who need to look after them and make sure they are kept constantly updated, dusted and shiny. By moving these boxes out of their buildings they are not only saving money on the purchase of these servers in the first place but all the infrastructure costs that go with them. The savings can soon add up from having to replace computer hardware every 2-3 years, the man hours spent keeping the servers ticking over, the utility costs associated with heating, cooling, power and light, and removal of the stress and strain of servers crashing. By moving IT into the cloud construction businesses can get back to what they do best; developing, constructing and maintaining building sites.

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There are many different types of businesses within the construction industry, from Architects who design the buildings, Engineers and Consultants who advise on the construction process, Product Manufacturers and Suppliers who make all the materials which constitute the actual building through to Contractors who actually build them.

In most sectors within this industry, organizations range in size from some very large players to, at the other extreme, some very small niche players. Yet within construction we are seeing more and more organizations, of all sizes, adopting cloud technologies by moving their IT consumption from the traditional on-premise server-based technology to hosted/cloud based provision using the internet to serve rich applications to the desktop without the need to own/house their own computer servers. The case studies described in this paper highlight some of the reasons why organizations are moving to the cloud.

Replacing Legacy

A global steel manufacturer recently moved their legacy Lotus Notes infrastructure to the cloud, adopting Microsoft Office 365 to take advantage of the Cloud based Microsoft Exchange. This eliminated the need to have their own servers internally which were becoming outdated and in need of considerable capital expenditure to keep up to date. It also meant that they could provision new users to the business far quicker than ever before.

Security and Flexibility

A worldwide infrastructure contractor recently took the move to adopt cloud for email, comms and document management. The cloud solution offered a number of benefits. Obviously the ability to use the latest communication technology such as Microsoft Lync for instant messaging and teleconferencing has meant they save money on call charges and travel expenses, since a significant amount of their traditional face-to-face meetings are now being held remotely. By providing their staff

with a more flexible working environment they have reduced their actual office space. Employees are now able to work from home, on-site, or anywhere else they may need to. This has resulted in huge savings on office space, along with associated costs such as power and light. However, their reasons behind adopting a cloud based email solution were far more business critical. Over the previous year their own servers had crashed a number of times, wiping out email access for hours, sometimes days at a time. The cost to the business was potentially many thousands of dollars in lost revenue, before factoring in the loss of visibility and impact on the image of the company to its clients and prospective clients. Fortunately, moving their email to the cloud has provided them with service levels and guarantees to help ensure this will not happen again.

Competitive Advantage

A manufacturer of renewable energy products recently adopted a cloud-based CRM system to ensure it provided its sales force with the latest tools but without costs inherent with on-premise installations.

The possibility of implementing CRM had been rejected a number of years previously due to the large upfront costs. This was a concern as they knew a number of the larger players in the industry had recently implemented on-premise CRM solutions, thus putting them at a disadvantage. The

advent of cloud has now enabled them to compete on a level playing field and have access to the same sort of business tools as those companies far larger than them.

Construction companies of all sizes are increasingly looking to cloud-based solutions in order to reduce their cost base in a highly competitive and often very low margin environment.

Construction companies of all sizes are increasingly looking to cloud-based solutions in order to reduce their cost base in a highly competitive and often very low margin environment. However, as these cases demonstrate, many are finding an array of wider benefits can be accrued in moving to the cloud.

Cloud Computing Economics

Moving to the cloud can help your business realize efficiencies and savings that were once reserved for big enterprises. The cloud has become democratized, as vendors have wised up to the fact that there is money to be made by catering to a full range of businesses, regardless of size. So ample rewards are available for the smart SMB that knows where it's headed, and the best way to get there. But it's not all

blue skies—the level playing field that cloud computing enables can be fraught with dead-ends and gotchas, especially when it comes to the all-important bottom line. How can your organization avoid ROI missteps and mistakes that can turn your dream opportunity into a nightmare initiative?

Moving to the cloud can help your business realize efficiencies and savings that were once reserved for big enterprises.

Checklist

1. Do your homework and know what you're currently spending.
2. Define your business needs before evaluating pricing models.
3. Understand the difference between CAPEX and OPEX.
4. Apply cost benefit analysis, impact assessment, and due diligence to your cloud initiative.

1. Do your homework and know what you're currently spending.

"First, have a clear scope and user expectations before beginning. Have a clear cost structure for existing services. Let's use email, for example: the cost of servers, energy, resources, software, service levels, disaster recovery—all things that must be identified prior to undertaking an ROI. I believe you will find that commodity activities are the best candidates for cloud opportunities."

(Dion Alley, President, International Business Partners)

2. Define your business needs before evaluating pricing models.

"It is paramount to clearly define your needs before you start shopping for a cloud solution. The similarities in cloud offerings would begin and end at the need for increased value and better redundancy. For example, clouds for Software-as-a-Service (SaaS) would be focused on resource availability. Hosting clouds would emphasize scalability. Storage clouds would rely on fast hardware and data capacity.

"When comparing our options, we looked at what was being charged and evaluated them against our goals. We settled on a company that does not charge solely per-time-unit, but rather, charges a base rate and only charges for usage which is beyond that included in our base package, which is more consistent with traditional web hosting companies. So we know what our resource limits are, and if we ever cross those lines we know what to expect from it. As a result, we save about 60 percent per month on our hosting costs and we still have instant scalability when it is needed."

(Christopher Ryan, Business Consultant & Project Manager, Prime Logic Consulting)

3. Understand the difference between CAPEX and OPEX.

"Cloud services don't require capital investments (CAPEX) to be made by the client, so using a pure OPEX model can be attractive for some organizations, as it will allow them to expand and contract quickly with immediate impact to the books. This may be hard to stuff into an ROI model, but it's an

important intangible. Most cloud vendors are going to charge a rate called 'consumption.' If you don't know what your consumption is on a continual basis then get ready for something similar to the first cell phone bill you get when your teenager started texting (this is circa unlimited texting plans)."

(Scott Archibald, President, Accelerated Business Consulting)

4. Apply cost benefit analysis, impact assessment, and due diligence to your cloud initiative.

"Common business practices such as cost benefit analysis, impact assessment, and due diligence must be applied as you would in any assessment of business change.

- "Cost benefit analysis: Does this make financial sense aligned with short and long term goals?"
- "Impact assessment: How will my business processes change, what new skills and expertise will I need, what resources will be freed up?"
- "Due diligence: What are the legal implications for using the cloud, what jurisdictions would cover the data, what are the associated risks and how can I make them acceptable?"

(Andrew Rice, Business Development EMEA, HP Information Security)

Moving to the Cloud

Moving from one home to another is a chore. You must consider your new location carefully, choose a reputable realtor, inventory your possessions, decide what to keep and what to pitch, pack carefully, hire a mover, and mentally prepare for life in your new surroundings. Curiously, it's not unlike moving your business to cloud computing. When your company is ready to "pick up and move" to the cloud, keep the following best practices in mind—from deciding what to "pack" and engaging a "realtor" to preparing for the culture shock of your new environment—to make your migration smooth and successful.

Checklist

1. Carefully consider what you intend to move to the cloud to avoid subpar performance.
2. Scope the resources needed for your deployment thoroughly.
3. Be prepared for the cultural shifts that accompany moving to the cloud.
4. Migrate to the cloud as you would to a larger on-premises server.
5. Purchase high-quality monitoring software for your virtual environment.

1. Carefully consider what you intend to move to the cloud to avoid subpar performance.

"You need to be thoughtful about what you put into the cloud, what level of expectations to set around it being in the cloud, and what provisions to make to mitigate performance issues.

"Perhaps the answer is to add/improve your bandwidth. Perhaps the answer is to add some caching services to your connectivity. Perhaps the answer is to set the right expectations for usage. Perhaps the answer is to alter the configuration of the data set so that it's not one big massive chunk.

“No matter what combination of the above turns out to be helpful, the underlying answer must include a thoughtful look at what your organization will move, why it will move it, and what the ramification of that move will be. Migrating to the cloud is not the same as simply moving data or apps to a location that is farther away from you than it is now. Not unless you’re looking to relive the days of modem and ISDN connections, as it pertains to larger data sets.”

(Andrew S. Baker, Information Security & IT Operations Consultant, BrainWave Consulting Company)

2. Scope the resources needed for your deployment thoroughly.

“Most any VAR that you are purchasing your hypervisor from should have capacity planning tools that you can use to assist in planning your deployment. Make sure you purchase enough resources to cover a full year of server/data sprawl and determine what the costs are to add resources later.”

(Steve Heusser, Operations Manager, SolutionPro)

3. Be prepared for the cultural shifts that accompany moving to the cloud.

“Cloud computing has the potential to lead significant cultural changes in an organization, but in and of itself does not have to have any change in the way the organization operates. However, if change does not follow, then costs and benefits will not be realized. Some cultural changes that cloud can bring about include:

Cloud computing has the potential to lead significant cultural changes in an organization.

- Better communications between engineering and operations (DevOps)
- Greater emphasis on sharing and collaboration
- Reduction in redundancy
- Greater focus on continuity of business in face of disaster
- Greater operational efficiency
- Less reliance on internal IT
- More agility”

(JP Morgenthal, Principal, Ranger, Cloud & VDC Services, EMC Consulting)

“Today, there are a whole host of good ideas and initiatives that can be dreamed up by business units that cannot be realized quickly because IT cannot move fast enough. How many times has a product manager thought to himself, ‘You know, we should take advantage of this market opportunity,’ only to dismiss the idea a few seconds later with, ‘Never mind. We could never move fast enough.’ The biggest impact that cloud computing has on the whole organization is that it lowers the bar for the execution of ideas. More things get tried because the cost to execute them is lower (where cost = time, hassle, energy, etc.—not just money). Now, many of those ideas will be failures. But many will be successes. By lowering the cost of failures (you tried it, it didn’t work out, but so what because it was so easy to do), you end up with more successes. And those successes will translate into higher profit, greater market share, and more passionate customers.”

(Dave Roberts, Vice President, Strategy, ServiceMesh)

“With more orgs allowing people to work from home and also employing remote teams as part of their workforce (local or international), true cloud computing (i.e. with IaaS and SaaS) will allow flexibility, around-the-clock development and support, and more productivity.”

The business impact that cloud computing has on the whole organization is that it lowers the bar for the execution of ideas.

(Raj Menon, Program Manager, Healthcare IT Services Company)

4. Migrate to the cloud as you would to a larger on-premises server.

“For the most part, the same underlying deployment and migration processes should be employed for migration into the cloud as would be used to upgrade to a larger server on premises (or in a traditional hosting situation). The cloud doesn’t make this initial migration any easier or harder than other types of migrations, although it will lower the cost, and is easier to practice beforehand.” (Baker)

5. Purchase high-quality monitoring software for your virtual environment.

“Virtual/cloud environments have monitoring needs that differ greatly from traditional deployments. A good monitoring system will alert you to issues before they become problems and allow you to focus on your core business and not reacting to IT issues. ” (Heusser)

Choosing a Cloud Computing Partner

Migrating your company to the cloud can be a perplexing proposition. You've predicated your success on being a nimble upstart, not a bulging behemoth. Without a bevy of skilled staffers and deep pockets, getting a piece of the cloud action is a bit trickier for a smaller organization than it is for a large enterprise. While the proposition of adopting cloud computing seems daunting at first, rest assured that you don't need to go it alone. A well-selected provider can answer questions, provide guidance, and help shoulder the burden of cloud migration. Find your perfect match by following these best practices, and you'll begin your search for a trustworthy partner on the right foot.

Checklist

1. Ask yourself the tough questions before selecting a partner.
2. Be ready to ask potential vendors tough questions.

1. Ask yourself the tough questions before selecting a partner.

Making the business case

- How will this move help me reach my business goals?
- Is the cloud actually going to be more cost effective and/or provide an advantage over a traditional/current model? Some cost/benefit analysis would be needed.
- Are there cloud-based resources I can leverage right now that don't require going to an additional vendor? (You'd be surprised.)

Making the move

- What changes do I need to make in my organization to support this service?
- If the cloud provider is down, how will my business handle the outage? An alternate cloud provider? High availability and disaster recovery scenarios?
- Are there low risk functions that could be moved to a cloud platform in order to test how the organization adjusts/supports their applications/services on the cloud?
- What impact will this have on my industry or regulatory compliance obligations?
- Does my technology-before-the-cloud (on-premise workstation hardware, Internet provider, telecom/phone/PBX solution, Web/database servers/hosting company) meet the demands a SaaS solution will require?

Data

- How much control will I have over the vendor's upgrade schedules, and what will it mean for the integration with the other portions of my business?
- What are the security/privacy implications of using this technology?
- What contingencies do I have for my business if this technology is unavailable for a day or a week?

Resources and backup

- Who do I have on staff that can manage this process?
- Will this free up personnel resources to work on more business-critical projects?
- Am I prepared to accept that there's going to be a learning curve? Just because it's in the cloud, doesn't mean I can 'flip the switch' and everything's exactly what I want/need.
- Have I really taken a hard look at the long-term impact and costs over the life of usage? This includes training, implementation, data backup and retrieval, management, and licensing.

2. Be ready to ask potential vendors tough questions.

Background

- How stable is your organization?
- What is your product roadmap?
- Can you provide references that reflect my particular business?
- Can you address industry-specific compliance requirements; encryption levels and authentication protocol details?

Product

- What does the interface look like?
- Do you offer a Service Level Agreement (SLA)?
- Is there financial compensation for breaking your SLA?
- Do you have a public site listing issues and outages?
- How do you schedule maintenance and handle upgrades?
- What are the support options?

Data

- How do I get my data back out in a way that is useful to me, beyond simply reporting?
- How long will you retain my data, even if I am done with you?
- How can I be assured my data will be protected?
- How do I get my data if I decide to leave?

In case of emergency

- What is your security policy and related insurance coverage in the event of a breach?
- If you are breached, are you liable for customer/user data loss?

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