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# Demystifying the Cloud

## A CMAA Emerging Technologies Committee Article

By Sergio Aranda, *e-Builder*, and Marty Turner, CCM, *CH2M*

You've probably heard a lot about the cloud and how it is revolutionizing the way "everyone" does business these days. But what is the cloud and why is it important to you and your business as a CM practitioner? The CMAA Emerging Technologies Committee is here to help take away the mystery and provide you with a starting point to understanding what cloud computing is, and how you can make it work for you.

So what is the cloud?

Let's begin with definitions.

**The cloud** is a term used to describe a host network server (or group of servers) that provide immediate individual access to programs and applications that would typically require large capacity memory storage or significant capital investment (in terms of equipment or IT professional staff).

**Cloud computing** is simply a system or model of computing that relies on connecting a user device (i.e. smartphone, tablet or laptop) to a host network server to access capacity, storage and processing power necessary to run a program or application instead of from the users device hard drive.

### *Different Types of Cloud*

You should also understand the different types of cloud based options. The three most common include:

- Software as a Service (SaaS) – an application that is run and maintained on a remote server and is accessed through the web.
- Infrastructure as a Service (IaaS) – a platform on which one can build an application (software) and immediately deploy it for accessibility by others with access to the network where the software is hosted.
- Data as a Service (DaaS) – data warehousing and access through a remote server.

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## *The Cloud: An Abridged Evolution and the Aha! Moment*

To appreciate the concept revelation that the cloud brings to our tech savvy world, let's review how we "used" to do things. The traditional business computing model relied on a corporate system network to support the multitude of individual internal Personal Computers (PCs). Most work was saved, accessed and performed on the individual PC and backed up to the system network for archiving and secured storage. As software evolved, greater demands were placed on the individual computer to open and run these applications, which in the CM world meant Primavera scheduling software and Access databases (circa 1990-2000).

This created demand for faster processing and greater PC memory, which in turn forced mainframes and system networks to grow and advance to support the larger software applications and also to back up the mountains of company data being produced. This growth cycle eventually led to a significant capital investment in powerful mega computer network systems that had nearly infinite capacity. Oddly enough, these network systems became so efficient that they ultimately were underutilized and a capacity surplus was created.

The epiphany (i.e. the aha! moment) came when businesses like Amazon and IBM started to realize that their high speed, high capacity servers and system networks could be partitioned. This then allowed them to put these networks to work to meet the computing needs for other businesses or individuals. This available capacity, storage and processing power could then be sold as marketable commodities. Thus the cloud was born.

The term "the cloud" has been in use since about 2006 but it is when IBM started branding this concept as the IBM SmartCloud in 2011 that the concept of the cloud went mainstream. We all remember the slogan "IBM SmartCloud, business for a smarter planet." Since 2011, the cloud has really gained momentum, as the business and consumer market has almost completely shifted to business "on-the- go" and mobility has now become a way of life.

Desktops have been replaced by laptops, tablets and smartphones. Smartphones have led the way and are major drivers of cloud technology because this was where the synergies and advancements really started to take shape. As cell phones have gone from being just phones to "smartphones" capable of accessing the internet, people stopped wanting to have to use their old computers to access information and preferred the freedom of being untethered. Consumers also fell in love with the iPad and tablets and as a result, people started to accumulate multiple devices, which in turn led to the need for linking devices so that they could share and access the same information. The sharing of the same information between multiple devices is commonly referred to as "virtualization" and this is the most basic function or

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technology provided by the cloud. So if you are using a smartphone, tablet, app, etc. you are already using the cloud! Mind blown, right?!

### *The Cloud – Its Use for CMs*

Now if you've paid attention so far, you can probably start to see how cloud computing can provide you and your business with easy access to more storage and power than previously ever imagined, all available without requiring your own IT department or having to make a significant capital investment in the powerful processing equipment previously needed to run these functions. So for the CM practitioner, this means you can now access and utilize really amazing applications ("apps") that perform all sorts of vital tasks and functions needed to manage a project and support your client, including estimating, contract document preparation, document control, CAD, BIM, project management, schedule management, cost control, and finance.

One of the benefits of "as a Service" is that you usually pay as you use it. Amazon Web Services, one of the best-known providers of cloud computing, describes it as:

"The ultimate benefit of cloud computing ... is the ability to leverage a new business model and turn capital infrastructure expenses into variable costs. Businesses no longer need to plan and procure servers and other IT resources weeks or months in advance. Businesses can take advantage of Amazon's expertise and economies of scale to access resources when their business needs them, delivering results faster and at a lower cost."

This means that a smart, tech savvy small company is now on a level playing field (from a technology standpoint) with those at the top of the ENR Top 100 firms. It also means you can be anywhere in the world and have access to the tools you need to do your job...better, faster, cheaper. And who doesn't want that?!

### A Paradigm Shift – From Integrity to Security

Ten years ago, the questions vendors faced related to SaaS were around performance, data integrity and availability. In other words, people wanted assurance that their data would be available when needed, backed up (not be lost), and in one piece (uncorrupted). System redundancy was a major question.

Fast forward to today and while these are still important considerations the top issue on people's minds is security.

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Consider the following story from the FBI website:

**GameOver Zeus Botnet Disrupted**  
Collaborative Effort Among International Partners

06/02/14

On June 2, 2014, the Department of Justice and the FBI announced a multinational effort to disrupt the GameOver Zeus botnet, believed to be responsible for the theft of millions of dollars from businesses and consumers in the U.S. and around the world.

Also announced was the unsealing of criminal charges in Pittsburgh and Omaha against alleged botnet administrator Evgeniy Mikhailovich Bogachev of Anapa, Russian Federation.

Ask 10 people who are considering moving data or computing to the cloud about their top concern, and all will cite security as their top concern. However, stories like the one cited above should not cause you to dismiss the cloud and its advantages, but instead to question how your vendor security systems and protocols stack up against yours, or vice versa.

The following should provide you with a starting point and different ways to ask about and research the question of security. A decision to stay away from the cloud should not be based on inaccuracies about security risks, particularly risks that may already exist in your current environment.

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## What is Your Core Services Offering – Consider the Obvious

### Cloud security standards in the works (ComputerWorld Magazine)

The federal government is getting involved. The [Federal Risk and Authorization Management Program](#) (FedRAMP) seeks to publish a set of standards that any company can use for evaluating third-party external vendors. The standards have not been released yet, and the program seems to be tied up in constant discussion and bureaucracy in Washington, observers note.

A second initiative, called [Common Assurance Maturity Model](#) (CAMP), intends to develop a scoring system not unlike the PUE (power usage effectiveness) rating used for data centers. Jay Heiser, a Gartner analyst, says this third-party evaluation process holds promise but has been on hold for over six months.

If you've been around this industry long enough you've seen trends related to CMs attempting to become software developers, only to abandon these efforts after realizing there are more benefits to be had by focusing funds and resources on their core strengths – engineering, design, project controls, program management, construction management, but not software.

The same is true for trying to hold on to responsibilities that provide little strategic value, and can be had for a better ROI by outsourcing to the cloud. Organizations whose core business is providing cloud computing services spend a lot of time and energy in meeting security requirements. If you were to compare their budget, expertise and focus to your own, where do you think you would rank?

### *Understanding Security Requirements*

There are many questions to ask yourself and your staff on how you compare with a reputable service provider on the security scale. These range from basics on internal protocols and governance on your team's

approach to managing information, to existing documentation that outlines these protocols and your enforcement approach, to your ability to meet external audits. With answers to these questions in place, you can move to the next phase: questioning your potential vendor(s).

It is very easy to base this conversation on facts vs. marketing hype. In a *ComputerWorld* article on cloud security, Jay Heiser, an analyst at Gartner who studies risk in the enterprise and regulatory compliance commented, "It would be nice to think the vendors are doing a great job [of protecting the data and that they are building a highly robust application framework that provides a high level of security. The biggest frustration is determining whether they did that -- if a provider cannot give you definitive evidence [through testing and data verifications] that their product is [as] secure as they say it is, you have no ability to make a business decision to use it".

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The good news is that there are industry-accepted standards you can look to and request from vendors. For instance, you can request formal documentation on the different audits they have completed – specifically external audits. Vendors auditing themselves won't do you much good. Some of the more well-known include SOC2 and ISO27001.

### *Positive Peer Pressure*

You have probably heard “I don't want to be the first.” But then you probably also don't want to be the last. Being a late entrant will result in losing years of cost and productivity savings that your competitors, those who have been at the forefront of adoption, have gained.

While the construction industry is unfortunately known for its latency in terms of technology adoption, it does not have to lag behind in reaping the benefits that cloud computing provides. Just look around at other industries that have similar or even more stringent requirements as it relates to data and application hosting (e.g., the federal government, health systems managing sensitive and private patient information). At this point the question maybe becomes “what is so sensitive about our data vs. the federal government's that our company is not willing to leverage the cloud?”

### *Understanding Your Limitations as a Basis for ROI*

Once you understand the amount of resources, time, and commitment that goes into creating a well-functioning cloud operation, you can then compare and understand your limitations, and what quantifiable benefits you stand to gain by moving to the cloud.

The following are questions to ask your team:

1. What performance gaps exist in our organization that we could more quickly mitigate by turning to the cloud?
2. Are these gaps resulting in lost revenue? How much?
3. What competitive advantage could we achieve by moving to the cloud? Can we at least level the playing field?
4. How much time are we currently spending to maintain our documentation and processes to ensure compliance?
5. How effective are these efforts, i.e., how are we performing on both internal and external audits?
6. If we could reduce that time by 20, 30, or 50 percent, what are the most important activities our IT group could work on?

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7. How will this shift translate into time and cost savings, or increased revenue?
  8. Implementation considerations

If you are considering a cloud-based solution, look to your network of peers for advice. This process can be as easy as starting a conversation at this year's national conference, using CMAA's message board, or engaging with the Emerging Technologies Committee members. If you tap your AEC professional network, you may not have to look very far, especially if your firm provides services to corporate clients (i.e., large healthcare systems) that have already made investments in the cloud.

### *Final Thoughts – What's Next?*

The authors hope that this article has provided you with a starting point from which to build your knowledge, use and understanding of the cloud and the myriad of CM apps available to effectively manage your business and projects. CMAA is committed to advancing the effective use of technology within the CM industry. If you'd like to learn even more, we encourage you to attend the CMAA National Conference this fall. The CMAA Emerging Technologies Committee will be sponsoring a panel discussion on the cloud, where you will hear from some of the leading users, providers and customers of cloud based technologies and apps and what this wondrous revolution in computing can do for you! We hope to see you in San Francisco!

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