NATIONAL ASSOCIATION OF ELECTRICAL DISTRIBUTORS

Executive Guide #17

Cloud-Based Computing for Distributor Executives

Developed by the NAED Strategic Technology Committee

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The "Cloud" is a figure of speech for computing over the Internet

Just what is cloud computing, anyway? An online search for a definition of cloud-based computing will likely produce millions of possibilities—*a recent Google search produced 8.75 million results.* But the "Cloud" is a figure of speech for computing over the Internet.

NAED's Strategic Technology Committee recommends this generic definition: ***"Cloud-based computing is a means for companies to gain access to secure, shared, standard computing resources on-demand over the Internet."***

The time for electrical distributors to investigate cloud-based computing is now

NAED's Strategic Technology Committee created this white paper to assist distributor executives in understanding how cloud-based computing can be used to focus on core competencies, conserve capital, try out new technology, and gain access to specialized information technology (IT) talent.

Please use this information to stimulate conversations with your information technology (IT) personnel about how cloud-based computing can be used as a competitive advantage in your business.

5 THINGS DISTRIBUTOR EXECUTIVES NEED TO KNOW ABOUT CLOUD-BASED COMPUTING

- ***What cloud-based computing is.***
- ***How it differs from traditional IT operations.***
- ***Adopting it is a strategic business decision.***
- ***Information about cloud service models — SaaS, PaaS, & IaaS.***
- ***Potential upsides, downsides, & risks for electrical distributors.***

"The Cloud is just another name for using someone else's computer"

Use Apple's iCloud, Amazon's Cloud Drive, Dropbox, Google Drive for file storage and back-up? You're already *"computing in the cloud."*

Technological innovation is electrical distributors' new, constant reality. A recent International Data Corporation (IDC) study conducted for Verizon Enterprise Solutions reports cloud computing is second only to cyber security (43% vs. 47%) in IT investments. Closer to home, respondents to NAED's latest IT Expense Benchmarking Survey *(click here)* report 23.3% of their company's non-ERP hardware and software were cloud-based in 2015. Most importantly, cloud-based computing allows electrical distributors of all sizes access to computing power previously available only to behemoths such as Amazon, Grainger, Home Depot, and Walmart.

How Traditional Electrical Distributor IT Operations Differs from Cloud–Based IT

The implementation of cloud-based computing will change the role IT plays in the company. Rather than buying, maintaining, securing, and updating computer equipment, IT will be responsible for the selection and management of cloud-based service vendors. While this will free up IT manpower to focus on critical, differentiating, value adding business processes, it will also require different skill sets for IT personnel.

Exhibit 1 highlights the major differences between traditional IT and cloud-based computing for electrical distributors.[1]

1) Comparison based on the National Institute of Standards and Technology's (NIST) 5 essential cloud computing characteristics @ http://www.nist.gov/itl/csd/cloud-102511.cfm

EXHIBIT 1 TRADITIONAL ELECTRICAL DISTRIBUTOR IT OPERATIONS COMPARED TO CLOUD-BASED IT

POINT OF DIFFERENCE	"TYPICAL" NAED DISTRIBUTOR'S IT PROCESS	CLOUD COMPUTING
Who buys, configures, and secures computing resources such as applications, software, networks, storage, servers, etc.?	Distributor provides manpower to provision new equipment	Cloud service provider provisions equipment
How much lead time is required to provision new equipment?	Days, weeks, or even months depending on the equipment vendor	Typically sign-up and begin using the "cloud" in as a little as a few minutes
Is Internet access required for access?	Not always	Yes
Is data automatically backed up?	Some distributors automatically back-up and synchronize information stored on individual computing devices to a network drive; others do not	The data is automatically backed up and often synchronized across devices
Is the data stored on local devices such as desktops, laptops, Smartphones, tablets?	Yes	Depending on the cloud service, data may or may not be stored on local devices
What manpower is required to maintain, manage, secure, and update computing resources?	Varies by distributor size and system sophistication	Cloud service provider handles
How flexible is the computing system?	Typically customized to the company's exact specifications	Customization is not as easy since standard computing resources are shared with other companies
What is the computing systems' capability to handle usage fluctuations?	Usually designed for peak demand	Can usually be quickly scaled up or down as needed, based on a particular cloud service provider's capabilities
What are the financial considerations?	Your company may be paying for unused capacity	You may pay for only the computing resources actually used, similar to electricity. NOTE: Sometimes monthly access fees are incurred.
	Besides manpower, computing resources incur many fixed and variable expenditures	Some cloud computing solutions may be more expensive than doing-it-yourself. Take strategic considerations into account too as there are no assets owned.

Cloud-Based Computing is a Strategic Business Decision

Technology is intimately intertwined with every company's business processes. Each electrical distributor must determine how the implementation of cloud-based computing fits within its company culture, core competencies, and key business strategies.

Technology can be used to differentiate an electrical distributor from its competitors

CONSIDER THESE QUESTIONS TO DETERMINE THE STRATEGIC IMPACT OF CLOUD-BASED COMPUTING

- ***Is information technology viewed as a core competency or as an expense?***
  - *What IT services provide a strategic advantage over our competitors?*
- ***Does IT make us unique, differentiate us from competitors, or set us apart in any way?***
- ***How well does our company leverage currently available technology?***
  - *What IT services add value to our company by allowing us to focus on business imperatives?*
  - *What IT services are critical to our company?*
  - *What specialized IT skills and systems do we need that are not core to what we do as a company?*

There are 3 Cloud Service Models

Cloud-based computing is not an all or nothing decision for electrical distributors. There are three general service models for cloud computing— Software as a Service (SaaS), Platform as a Service (PaaS), and Infrastructure as a Service (Iaas).

Software as a Service (SaaS)—Internet-based, on demand software "leased" to users on a subscription basis.

EXAMPLES: Content management, customer relationship management (CRM), database administration, ecommerce, email, ERP, human resources, logistics, maintenance, marketing automation, payroll, productivity, project management, sales force automation, security, etc.

Subscription-based software, also known as Software as a Service (SaaS), allows distributor associates to establish an Internet connection and sign-in to the latest version of the software from all authorized computing devices—*desktop computers, laptop computers and mobile devices*[2].

Software as a Service (SaaS) is widely available for many tasks—*content management, customer relationship management (CRM), database administration, ecommerce, email, ERP, human resources, logistics, maintenance, marketing automation, payroll, productivity, project management, sales force automation, security, etc.*

Software as a Service (SaaS) saves electrical distributors time since IT personnel no longer need to install, configure, secure, and administer software after the initial enrollment process. As long as there is an Internet connection, the latest version of the software and any documents created by users are typically available for editing across all authorized computing devices.[3]

VARNING!

ome software companies continue to sell conventional software while attempting to migrate users to subscription-based, online software.

Examples of cloud-based and conventional software offerings currently available include Adobe Creative Cloud as a replacement for various Adobe products; Intuit QBO as a replacement for QuickBooks; and Microsoft Office 365 as a replacement for Microsoft Office. In such instances, it behooves individual electrical distributors to evaluate if the subscription-based offering results in a higher long-term cost than purchase of a software license.

2) Mobile devices are defined as smartphones, tablet computers, etc.
3) Some software offered as a service is available for off-line editing. In such cases, off-line editing is usually automatically synchronized at the next Internet connection.

Platform as a Service

Distributor app developers (if any) build on PaaS

Platform as a Service (PaaS)—Internet-based, on demand, scalable, metered access to standard web app development tools.

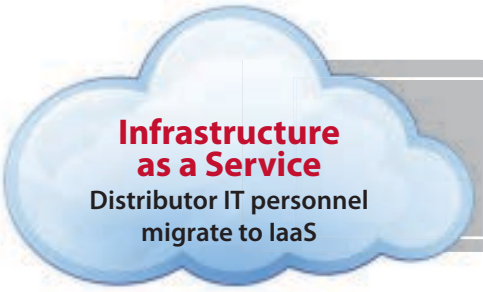
Platform as a Service (PaaS) is similar to a tool kit for web app development. Electrical distributors with in-house web developers are most likely already using PaaS to gain access to an array of tools and databases.

Platform as a Service (PaaS) can save electrical distributors time and money since there is no app development software or special hardware for IT personnel to buy, install, configure, manage, secure, and/or keep updated. After initial sign-up, web developers just establish an Internet connection and sign-in to the platform to access the latest version of standard tools and hardware to develop test, deploy, host, and maintain web applications.

ARNING!

e care in selecting app development platforms. Some PaaS are designed for compatibility and eroperability across a variety of sources, such as Gigaspace's Cloudify, etc. Other platforms re vendor specific—i.e., they may not be compatible—such as Apache Stratos, Google App Engine, Microsoft Azure,[4] etc.

4) Microsoft offers both a Platform as a Service (PaaS) and Infrastructure as a Service (IaaS) under the Microsoft Azure brand.



***Infrastructure as a Service (IaaS)**—Internet-based, on demand, scalable, metered access to shared standard machine capacity ---servers, storage, networks, operating systems, VOIP, etc.*

Infrastructure as a Service (IaaS) provides standardized computing capacity—*networks, servers, storage, and virtualization*—on a subscription basis over the Internet. In return for sharing computing resources with other companies, electrical distributors have access to the latest technology, are able to quickly scale computing up or down when needed, and usually only pay for the computing power needed.

HALLMARKS OF INFRASTRUCTURE AS A SERVICE (IAAS)

- ✓ *Standard Equipment & Configurations*
- ✓ *Computing resources are often shared with other companies*
- ✓ *Quickly scale computing resources up or down as needed*
- ✓ *Flexible subscriptions*
- ✓ *Usually pay only for the computing power needed*

Infrastructure as a Service: *Responsibilities*

Applications Data Desktop Computers, Laptops, Mobile Devices, Telephones, etc. Firewall Local Area Network Middleware Operating System Redundancy Runtime	**Electrical distributor buys, configures, maintains, manages, secures, and updates.**
Networking Servers Storage Virtualization	**IaaS provider buys, configures, maintains, manages, secures, and updates.**

Infrastructure as a Service (IaaS) may save electrical distributors time and money since there is no hardware—*networks, servers, storage, or virtualization*—for IT personnel to buy, install, configure, manage, secure, and/or keep updated. However, electrical distributor's IT personnel are still responsible for applications, data, local networks, middleware, operating systems, and the length of time it takes a program to run *(aka run time).*

Examples of Infrastructure as a Service (IaaS) include Amazon's Web Services' EC2 *(Elastic Compute Cloud)*, Microsoft Azure, Virtustream, etc.[5]

WARNING!

Larger electrical distributors may find Infrastructure as a Service more expensive out-of-pocket than doing-it-themselves due to economies of scale. However, strategic considerations may outweigh any additional cost.

5) VOIP infrastructure providers include landline telephone companies, cable companies, and various new market entrants.

Potential Upsides & Downsides of Cloud-Based Computing

NAED's Strategic Technology Committee identified 6 potential upsides of cloud-based computing for electrical distributors—*the economics; data security; disaster recovery; flexible capacity; innovation; and can enhance competitiveness. These potential upsides are counter-balanced by 5 potential downsides*—the economics; data security; Internet connection may be required; limited customization options; and data governance. However, individual electrical distributors can minimize many potential downsides and risks through due diligence and planning.

POTENTIAL UPSIDES & DOWNSIDES OF CLOUD-BASED COMPUTING

1. *The Economics*
2. *Data Security*
3. *Enables Disaster Recovery, but Internet connection may be required*
4. *Easy to scale capacity may limit options for customization*
5. *Innovation must be balanced with data governance*
6. *Levels the playing field*

1 THE ECONOMICS OF CLOUD-BASED COMPUTING

Cloud-based computing is often advertised as a good investment—*allowing electrical distributors to conserve capital, pay only for the computing resources used, and requires fewer IT resources to obtain and configure solutions locally.* However, cloud-based computing may not always result in lower costs, particularly for electrical distributors large enough to benefit from economies of scale. In such instances, strategic considerations may override economics.

Exhibit 2 compares the potential economic upsides and downsides of cloud-based computing.

EXHIBIT 2 THE ECONOMICS OF CLOUD-BASED COMPUTING

POTENTIAL UPSIDES	SaaS	PaaS	IaaS
Lower initial cost of ownership—*upfront costs are replaced by regular, monthly payments based on usage.*	X	X	X
Often only pay for the computing resources used, rather than buying equipment to meet peak demand.		X	X
May not need to upgrade associate's desktops, laptops, tablets, and smartphones as often as in the past. May also be able to replace associate equipment with less robust* models. **Devices with larger memory capacity typically costs more.*	X		
Can replace aging infrastructure without incurring capital expenses.			X
Space, energy, and equipment maintenance savings since computing infrastructure is located at the vendor's data center.			X
Fewer IT resources often required to obtain and configure solutions locally. (***SaaS***—*software can be installed, configured, and updated remotely.* ***IaaS***—*the platform is developed and maintained by the service provider).*	X	X	X

POTENTIAL DOWNSIDES & RISKS	SaaS	PaaS	IaaS
While software becomes an operating, rather than capital expense, in some cases monthly leasing may ultimately cost MORE than the upfront capital expense.	X		
There may be costs associated with switching cloud vendors or bringing cloud-sourced items back in-house.		X	X

CONSIDER THESE QUESTIONS TO MITIGATE ANY ECONOMIC RISKS OF CLOUD-BASED COMPUTING

- ***How does the cloud service provider charge?***
- ***What external indices does the cloud service provider use to benchmark pricing (as well as future price increases)?***
- ***What are the cloud service provider's contract terms and Service Level Agreements (SLAs)?***
- ***How many of the cloud service provider's clients have not renewed their contracts at the end of their initial contract term?***
- ***What are the associated costs of moving data in-house to the cloud service provider?***
- ***How difficult would it be to move data to a different cloud service provider or back to an in-house system if things don't work out as planned?***
- ***What escrow agreements does the cloud service provider offer in the event the cloud service provider experiences an interruption in operations, goes out of business, etc.?***

2 SECURITY AND CLOUD-BASED COMPUTING

There are 2 types of security every electrical distributor must consider—*electronic security and protection from physical damage*—in evaluating cloud-based computing.

Cloud service providers generally provide multiple levels of electronic security in real time—*i.e., 24/7/365*—through a team of highly skilled, highly paid, full-time security specialists.

Cloud service providers typically provide physical security through restricted access buildings with real-time camera surveillance in buildings rated Zone 4 for seismic activity; not located in a flood zone; protected by dry-pipe fire suppression systems; cooled by redundant HVAC systems; attached to uninterruptable power supplies and back-up generators; and the building itself often has access to several Internet service providers.

Exhibit 3 compares the potential upsides and downsides of security with cloud-based computing.

EXHIBIT 3 SECURITY IN THE "CLOUD"

POTENTIAL UPSIDES	SaaS	PaaS	IaaS	POTENTIAL DOWNSIDES & RISKS	SaaS	PaaS	IaaS
Security available from most cloud service providers often surpasses what many individual electrical distributors can reasonably provide, such as real time monitoring.	X	X	X	Data otherwise stored locally behind your firewall is now traversing the Internet and being stored in unknown—*usually multiple for redundancy*—locations.	X	X	X
Most cloud service equipment is located in PCI Compliant, SAS 70 certified data centers.	X	X	X	Being in a cloud with other companies may make you a larger target with hackers.	X	X	X

CONSIDER THESE QUESTIONS TO MITIGATE SECURITY RISKS OF CLOUD-BASED COMPUTING

- *What security measures does the cloud service provider take to ensure acceptable protections of infrastructure, systems, software, and data physically as well as from unauthorized electronic access, breaches, and thefts?*
- *From what locations does the cloud service provider primarily operate? Where else could our data be stored?*
- *How is data protected while stationary in the cloud and in motion to/from the cloud?*
- *How many electronic "attacks" does the cloud service provider's defend against each week?*
- *How does the cloud service provider keep data separate and inaccessible from its other clients? Protect my data if another client is breached?*
- *How many of the cloud service provider's clients have had data stolen, experienced breaches, or experienced Distributed Denial of Service (DDoS), etc.? Over what time frame?*
- *What are the cloud service provider's guarantees and insurance policy limits for downtime, breaches, etc.?*

3 CLOUD-BASED COMPUTING ENABLES DISASTER RECOVERY, BUT INTERNET CONNECTION MAY BE REQUIRED

In today's age of electronics, data loss from IT equipment failure—*including hard drives and servers*—is almost guaranteed. Furthermore, natural and man-made disasters can occur anytime, anywhere. Cloud-based computing helps electrical distributors prepare for the inevitable by offering automatic back-ups and redundancy offsite.

On the flip side, Infrastructure as a Service (IaaS) requires an Internet connection to access the cloud service provider's computing equipment. And not all Software as a Service (SaaS) and Platform as a Service (PaaS) offer capabilities for offline data viewing, manipulation, and analysis.

Exhibit 4 contrasts the benefit of enabling disaster recovery against the need for an Internet connection for cloud-based computing.

EXHIBIT 4 THE CLOUD ENABLES DISASTER RECOVERY, BUT INTERNET CONNECTIVITY MAY BE REQUIRED

POTENTIAL UPSIDES	SaaS	PaaS	IaaS	POTENTIAL DOWNSIDES & RISKS	SaaS	PaaS	IaaS
Most cloud service providers offer automatic back-ups and redundancy, which can limit data loss for lost and malfunctioning equipment.	X	X	X	If cloud service provider goes down, you can't access your equipment ***or*** your information until the provider is back up and running.	X	X	X
				Unless the cloud service provider offers capabilities for offline data viewing, manipulation, and analysis, an Internet connection may be required to use your data.	X	X	

CONSIDER THESE QUESTIONS TO MITIGATE RISK

- *How reliable is the Internet connection at your main office and branches?*
- *How does the cloud service provider's service-level agreement (SLA) address archiving, back-ups, daily storage, redundancy, uninterruptable power supplies, back-up generators, etc.?*
- *How many (and which) Internet providers does the cloud service provider have access on a regular basis?*
- *What offline capabilities for data viewing, manipulation, analysis, etc. does the cloud service provider offer?*
  - *Is this sufficient for regular business needs? (For example, how often will someone need to view, manipulate, and analyze data when an Internet connection is not available?)*

4 THE CLOUD MAKES IT EASY TO SCALE CAPACITY, BUT CUSTOMIZATION MAY BE LIMITED

An often cited benefit of cloud-based computing is its flexibility ramping capacity up or down in response to immediate business needs. The trade-off for electrical distributors the flexibility of capacity comes at the price of limited customization since computing resources are shared by multiple users, as shown in Exhibit 5.

EXHIBIT 5 THE CLOUD'S SCALABILITY MAY LIMIT OPTIONS FOR CUSTOMIZATION

POTENTIAL UPSIDES	SaaS	PaaS	IaaS	POTENTIAL DOWNSIDES & RISKS	SaaS	PaaS	IaaS
Can quickly ramp computing capacity up and down in response to immediate business needs.		X	X	Customization may not be allowed since computing resources are shared by multiple users.	X	X	X

CONSIDER THESE QUESTIONS TO MITIGATE RISK

→ *What customization is available from the cloud service provider?*
- *Who can make changes and/or customize?*
- *What is the customization price schedule?*
- *How is any customization integrated into future releases?*

5 INNOVATING WITH THE CLOUD INCREASES DATA GOVERNANCE

Cloud-based computing allows electrical distributors to try out new software and technologies without investing in systems or making long-term commitments to vendors; usually makes the latest enhancements and upgrades instantly available to users; and often also allows distributor associates to work from multiple devices.

However, electrical distributors must continue to protect their information from its point of origin, through all points of transit, to its storage—*i.e., from* ***end-to-end***. Cloud-based computing adds to the complexity since data is no longer under an electrical distributor's sole control. This increases the need for data governance—i.e., *controls and rules for managing data assets.*

Exhibit 6 highlights the benefits of innovating with cloud-based computing against data governance.

EXHIBIT 6 INNOVATION MUST BE WEIGHED AGAINST INCREASED DATA GOVERNANCE ISSUES

POTENTIAL UPSIDES	SaaS	PaaS	IaaS	POTENTIAL DOWNSIDES & RISKS	SaaS	PaaS	IaaS
Can try out new software and technologies without investing in systems or making long-term commitments to vendors.	X	X	X	Electrical distributors must take prudent steps to protect their information from its point of origin, through all points of transit, to its storage—*i.e., from end-to-end*—including cloud-based sources.	X	X	X
Latest enhancements and upgrades are usually instantly available to users.	X	X	X				
Distributor associates can often work from multiple devices.	X	X	X				
Use of standardized user interface tools for web and ecommerce systems as well as integration with mainstream databases can reduce time-to-market for web-based and mobile application development *(If any).*		X					

CONSIDER THESE QUESTIONS TO MITIGATE DATA GOVERNANCE RISKS

- *What are the cloud service providers recommendations for data governance controls, rules, and transparency?*
  - *Who "owns" the data my company stores in the cloud?*
  - *"Who" can take "what" actions—access, delete, replicate, etc.—on my data in the cloud?*
- *What reports are provided as a matter of practice to verify agreed upon data governance controls and rules are implemented and followed?*

6 CLOUD-BASED COMPUTING LEVELS THE PLAYING FIELD

Cloud-based computing makes company size less of an issue, allowing electrical distributors of all sizes access to the newest products and systems, as well as computing power previously available only to behemoths such as Amazon, Grainger, Home Depot, and Walmart. This gives IT personnel time to focus on critical, differentiating and/or value-adding business processes and applications.

The key to enjoying the cloud's benefit of enhanced competitiveness is selecting the right partner to handle your mission critical services and data. Make sure the cloud service provider shares your priorities—*in maintaining security, privacy, reliability, redundancy, access, etc.*—and processes for monitoring, tracking, and reporting performance are in place.

EXHIBIT 7 COMPETITIVENESS ENHANCED WHEN CLOUD SERVICE PROVIDER SHARES YOUR PRIORITIES

POTENTIAL UPSIDES	SaaS	PaaS	IaaS	POTENTIAL DOWNSIDES & RISKS	SaaS	PaaS	IaaS
Cloud computing can level the playing field by giving small electrical distributors access to the same technology as the national chains.	X	X	X	The cloud service provider may have different priorities in maintaining security, privacy, reliability, redundancy, access etc. for your mission critical services and data.	X	X	X
Frees up IT to think and act more strategically about key business initiatives and business objectives.	X	X	X				

CONSIDER THESE QUESTIONS TO MITIGATE DATA GOVERNANCE RISKS

- *How will the cloud service provider's performance be tracked and monitored?*
- *What is the process for reporting and escalating concerns?*

Recommended Resources

"What Every CEO Needs to Know About the Cloud"
https://hbr.org/2011/11/what-every-ceo-needs-to-know-about-the-cloud

"Understanding the Cloud Computing Stack: SaaS, PaaS, IaaS"
https://support.rackspace.com/white-paper/understanding-the-cloud-computing-stack-saas-paas-iaas/

"50 Questions You Must Ask Before Engaging In Cloud Computing Services"
http://www.cio.com/article/2897736/cloud-computing/50-questions-you-must-ask-before-engaging-in-cloud-computing-services.html

"Roundup of Cloud Computing Forecasts and Market Estimates, 2016"
http://www.forbes.com/sites/louiscolumbus/2016/03/13/roundup-of-cloud-computing-forecasts-and-market-estimates-2016/#5e780a4874b0

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What You Can Do

This document is intended as a high level introduction to how electrical distributors can reap cloud-based computing's benefits while minimizing any downsides and risks. However, one cloud strategy will not fit all electrical distributors—*everyone has different go-to-market strategies, competitive differentiation, in-house IT skill sets, sales approaches, and geographic dispersion.*

Please use this information as a starting point for conversations with your information technology (IT) personnel.

Carefully consider how about how cloud-based computing can be used as a competitive advantage in your business by:

1. Inventorying the IT services providing a strategic advantage over competitors.

2. Determining which IT services could be performed in the cloud.

3. Weighing the potential upsides of cloud-based computing against any downsides or risks.

4. Realizing the time to get started is now.

Please share your thoughts, insight, and input with NAED's Strategic Technology Committee by calling NAED Member Services toll free at 1.888.791.2512 or emailing memberservices@naed.org.

And be on the lookout for additional tools from NAED's Strategic Technology Committee, available for download at www.naed.org/strategictechnology.