CLOUD COMPUTING: A Practical Guide to Software Hosting

The cloud computing revolution is changing the way people and companies use software. With more software moving to the cloud – including full-featured business software – more companies face the technical and business decisions that surround the topic of software hosting.

BY JOHN B. CHANEY
This guide provides practical advice on how to choose the best way to make cloud applications available to all users within a company.

**Cloud Computing Environments**

A “cloud” is a collection of connected computing resources that serves up applications for use by anyone with access to the collection. (For more information, read “Cloud Computing Benefits for Construction Accounting” by Brian J. Thomas.)

In order to make informed decisions about delivering and accessing cloud-based applications, it is important to understand a few technical terms that exist under the umbrella of cloud computing.

**Public & Private Clouds**

Applications in the public cloud use the Internet as the technology platform for transporting and presenting data. Examples include most Google applications, including Gmail, Google Maps, and Google Apps for Business. Access to public cloud applications can be restricted or open, and can cost money or be free.

In a private cloud, computing resources are dedicated for a single organization and may be managed by either the company or a contracted hosting service. Applications in private clouds can be deployed in a number of ways, and may be practically indistinguishable from public cloud applications. The key difference between public and private clouds is the increased control over access and technology with private cloud services.

**Virtual Environments & Browser-Based Applications**

Business software that is designed for use in the cloud will fall into one of two general hardware and IT infrastructure categories.

*Virtual environments* use the Internet’s transport capabilities to provide a virtualized version of the same experience customers have when using their software at work. Software delivered this way does not need to evolve to support new design standards; traditional Windows-based client-server systems are simply placed into a Remote Access WAN Wrapper.

*Browser-based applications* have been designed specifically for delivery over the web, so users simply launch a browser to access their software just as they would launch any other application. Browser-based applications deliver a user experience based on web protocols, which means that in order to become web-based, traditional Windows-based applications typically must be redesigned to be compliant with more intuitive web environments.

**Hosting Decisions**

With software that can be deployed in a private cloud environment, the first and most important decision to make is whether to self-host or use an external hosting service. (Public cloud applications are hosted by the provider.) As there is no one-size-fits-all answer, here are some guidelines to help make this decision.

**Cost**

Regardless of how cloud-based software is hosted, it should not involve installation or maintenance of any client software or require specific client hardware. The cost component of the hosting decision is centered on the server-oriented costs.

With self-hosting, the main costs to consider are:

- Server hardware
- Server software
- Data storage (including onsite/off-site backup)
- Facilities (space, racks and cabling, power, cooling)
- Labor

Depending on a company's size and existing IT infrastructure and staff, economies of scale may effectively reduce the cost burden of self-hosting. For example, a company may have unused server hardware, unused server software licenses,
and a staff with the time and capability to perform the work involved.

If you choose to self-host, be sure to account for the need to regularly upgrade server hardware and software to stay current with new technologies. Expect to replace hardware and purchase new operating software every 3-5 years. And, as a general rule, you can expect that the initial capital investment in server hardware and software will only account for about 15-25% of the total cost of ownership.

**Infrastructure**

Companies with limited network capacity or many users must consider how their hosting decision will affect network performance. Using externally hosted software generally means more demands on a company’s Internet services. However, this increased demand is offset when there are a number of users who work outside the office, since their connection to the external hosting service does not burden the company’s internal network.

How do you know how much bandwidth is sufficient? Measuring peak and average bandwidth usage patterns is the only reliable way to tell, given the many variables involved in infrastructure deployment and application usage. Measurements should be made over time, both internally and through your company’s external Internet connections. There are a number of free or very affordable software tools available to help determine if your company’s bandwidth needs are being met, regardless of hosting strategy.

**Technology**

The business of a hosting provider is to compete on the quality and affordability of its hosting services in order to provide access to high-power, modern hardware and sophisticated software services that, in most cases, clients cannot provide or implement on their own for the same cost.

How much your company is willing and able to pay its hosting service provider generally determines what it will receive. For example, for less than $100 per month, your company can lease shared hosting services, where multiple companies share the same processing and memory resources.

However, basic hosting options typically do not guarantee access speed, data protection, or data recovery; these options may be well-suited for hosting non-mission critical

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**Software Hosting CHECKLIST**

When reviewing hosting options, be sure to consider the following:

**COSTS**
- Server Hardware* $_________
- Client Maintenance* $_________
- Facilities* $_________
- Server Resource Leasing** $_________
- Data Storage $_________
- Labor $_________

**INFRASTRUCTURE**
- Bandwidth
  - Average
  - Peak
  - Max
- Redundant Connections
  - Yes
  - No

**TECHNOLOGY**
- Dedicated Computing Resources**
  - Yes
  - No
- Intelligent Routing Protocols
  - Yes
  - No
- Geo-sensitive Data Backup
  - Yes
  - No
- Data Recovery (snapshots)
  - Yes
  - No
- Disaster Recovery Capability
  - Yes
  - No
- Load Balancing
  - Yes
  - No
- DDoS Protection
  - Yes
  - No
- Traffic Compression & Encryption
  - Yes
  - No

**SECURITY**
- Certification Type ______________________
- Encryption Level ______________________
- Physical Measures ______________________

* Only applicable to self-hosting
** Only applicable to hosting services
or non-transactional services (e.g., a company website).

When it comes to business applications and data, more sophisticated and secure technology is needed. Some hosting technology considerations include:

- Dedicated hosting resources that are not shared with other companies
- Redundant high-speed (at least 1 GB) links to the Internet
- Intelligent Internet routing protocols
- Data storage that offers data protection, snapshots, backup, and disaster recovery
- Load balancing and Distributed Denial-of-Service (DDoS) protection
- Traffic compression and encryption algorithms

**Security**

One of the greatest concerns surrounding the use of outsourced hosting services is security. While these concerns are certainly legitimate, it is important to consider that data centers that provide hosting have a great deal invested in providing security for their clients, and the protections put in place typically exceed the measures employed by individual companies.

Hosting providers will often seek certification that demonstrates their compliance with stringent security standards. When asked, hosting providers should be able to provide information about their certifications through a Statement on Auditing Standards (SAS) No. 70 Service Auditor’s Type II Report or Statement on Standards for Attestation Engagements (SSAE) No. 16, *Reporting on Controls at a Service Organization*.

Even with confidence in the security of the hosting data center, data transfer to and from the hosting facility is another concern. To mitigate this issue, ensure that hosted applications use security for their data transport.

Hosting servers should provide Secure Socket Layer (SSL) or Transport Layer Security (TLS) certificates that represent 128-bit (“strong”) encryption. This is the same protection used by banking and other highly sensitive applications.

Using current computing speeds, a hacker would require roughly one trillion years to break into a session with strong encryption. If a browser-based application is accessed using Hyper Text Transfer Protocol Secure (HTTPS) (the URL for the application will begin with https://), then that hosting server is providing SSL/TLS security.

One topic often lost in the highly technical considerations of web-based security is the risk of “low-tech” security breaches. For many companies that host their own applications, their data security is limited by the access to the physical server(s) they use, which should be carefully controlled. High-end hosting service providers typically use state-of-the-art physical protection mechanisms including biometric identification protocols.

**Conclusion**

The eventual and inevitable move toward cloud computing is already occurring. The Internet is becoming the next utility, delivering not only information and entertainment but also sophisticated applications for business and personal use.

As companies adapt to this changing environment, the decisions made on such topics as software hosting will have an even more significant impact on company operations.

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**Endnote:**

JOHN B. CHANEY, CPA, is President and Co-Founder of Seattle-based construction software developer Dexter + Chaney, founded in 1981. John is involved in all aspects of development of Dexter + Chaney’s construction software, working closely with clients throughout the U.S.

A frequent author for CFMA’s Building Profits, John is also an active member of CFMA’s Puget Sound Chapter, a former member of the chapter’s Board of Directors, and a former chair of its Academic Scholarship Committee. He frequently writes about topics relevant to construction financial professionals.

John earned his MBA from the University of Washington, Seattle, WA and his BS from University of the Pacific, Stockton, CA.

Phone: 800-875-1400  
E-Mail: jchaney@dexterchaney.com  
Website: www.dexterchaney.com