

► Is Your Application Cloud-Worthy?

Tech Tip
by Philip Cox

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The cloud offers the promise of inexpensive flexible computing that can be created, dismantled, reconfigured, grown, and shrunk on demand. This has many companies considering how they can use this powerful tool in lowering cost and providing better more scalable services. It is important that you understand some of the characteristics of an application's design that will have a critical impact on a successful deployment or migration to the Cloud. A proper design can mean the difference between a successful project, and one that never meets its intended purpose. We'll discuss which characteristics of an application's design can determine whether it is well-suited for the Cloud or not.

For the purposes of this document, we'll focus on using a Public Cloud as defined by NIST:

"The cloud infrastructure is made available to the general public or a large industry group and is owned by an organization selling cloud services."
(The NIST Definition of Cloud Computing, Version 15, 10-7-09)

What application characteristics matter most

Most companies or organizations that investigate using the Cloud are driven by the desire to reduced costs or provide dynamic scalability. Some do it for both reasons. I have found that in order to make a successful deployment or migration to the Cloud, the following five characteristics of an application are critical:

Characteristic #1: The license allows it

First, you need to think about licensing. It is likely that your application is made up of many different components, most of which have some type of licensing agreement associated with them. You will need to review each of those agreements to determine if, or how, those licenses will be affected in a Cloud deployment. For example, if your application uses a component that is licensed by CPU, and you deploy it in a Cloud environment that is designed to launch new instances and request more resources as

load increases, you could easily exceed your CPU license limit. You will need to understand how your license affects your ability to scale.

Characteristic #2: Parallel design

Second, if dynamic scalability (as opposed to cost reduction) is your main reason for looking to the Cloud, then your application should be designed to run (and take advantage) of a parallel architecture. A design that has processing requirements that can be split into small chunks is well suited for use within the Cloud. An application that is designed around a single monolithic thread design will be hard pressed to take advantage of the distributed nature of the Cloud.

How your application handles sessions and locking will be a factor in your deployment/migration as well. If your application use system centric locking or session mechanisms (i.e., memory based locks or memory based session management), then it will most likely not be able to utilize the dynamic scalability of the Cloud, since locks will be tied to an individual system, and will not be able to be shared within the Cloud components. You should use a shared locking mechanism or session management design features.

Characteristic #3: Minimal client-server bandwidth requirements

Access to the Public Cloud is over the Internet, and thus is significantly limited in bandwidth when compared to a Private Cloud (basically a current data center with LAN speeds). Given this bandwidth limitation of the Public Cloud, you should only consider applications that have moderate client bandwidth requirements. For example, if you have an application that uses extensive Microsoft File Sharing functions between the client and server, it is likely that the usability of the application from the user's standpoint will be unacceptable, as the traffic between the client and server will overwhelm the client's internet connection. It should be noted that this limitation is not the case for inter-cloud (i.e., server to server communications) within a single

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provider, as they typically use the connections within the Cloud provider (i.e., likely gigabit or better).

Characteristic #4: IP Based

The Cloud is based on the Internet Protocol (IP), thus for an application to be considered, it must (for all practical matters) use IP as its communication mechanism. Further, while there are many protocols that can be run over IP, the use of Transport Control Protocol (TCP) is would be a preferred mechanism.

Characteristic #5: Securable

I assume that you want the application to be available, provide information integrity, and provide confidentiality of sensitive data. Thus, the application will need to be able to provide security at the data storage, processing, and transmission stages. Three critical components of this to consider are:

- Data in transit needs to be protected either at the application level or the transmission level. You will find that most applications choose the transmission level for protection, and the use of SSL/TLS is pervasive.
- Data at rest must be protected by the application. The application must provide a mechanism to protect the data that is stored in the Cloud. Encrypting data at rest is the best option at this time. A future Tech Tip will delve into the specifics of this area.
- Server to Server communications are typically forgotten, because they currently exist within the data center. You will need to ensure the security of server to server (cloud instance to cloud instance) communications in addition to client to server communications.

In Closing

Moving or deploying your application to the Cloud can be a very smart business move, but you need to make sure you can do it right. We have discussed some of what I see as the most important application design aspects you'll need when considering the Cloud. To recap, here are the design attributes that will make it a good "Cloud-able" application:

- Flexible licensing
- Can be made (or is) parallel
- Moderate client-server bandwidth requirements
- IP Based networking
- Securable: Provides ability to protect data at rest and in transit

For more detailed information on this subject, I recommend the following further reading:

- Mapping Applications to the Cloud (<http://msdn.microsoft.com/en-us/library/dd430340.aspx>)
- Cloud Application Architectures by George Reese (O'Reilly, ISBN 9780596156367)

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