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# The Basics of Cloud Computing

Cloud computing isn't a new technology or a new architecture. It is simply a different way to deliver computing power.

To meet the state's goal of providing a mobile, efficient, responsive, open and secure government for the citizens of Washington, cloud services must be part of the overall technology strategy. As agencies make the decision to move services to the cloud, they should consider the advantages cloud computing delivers:

- **Organizational focus**— Agencies focus less on managing technology infrastructure and more on delivering better services more efficiently.
- **Improved service delivery**—Cloud-based tools allow agencies to respond to customer needs and technology changes quickly in days—not years.
- **Flexible vendor choices**—Cloud services do not lock an agency into a particular IT infrastructure.
- **Scalable computing power**—Computing resources, especially network access, can be scaled up and down easily by cloud providers and agencies pay only for services used.
- **Improved security**—Cloud-based services can increase an agency's access and security. Plus, cloud services backup agency data to virtual services where it can be restored in a matter of minutes.
- **Lower capital costs**—Cloud computing lowers hardware, software and electricity costs. However, cost is more than the total cost of ownership. Hard dollars, while important, are not the only concern. Agencies need to look at the opportunity costs of not implementing a more agile and flexible computing solution.

## Understanding the cloud

Cloud computing isn't a new technology or a new architecture. It is simply a different way to deliver computing power. There are three main service models—SaaS, PaaS and IaaS—that determine the amount and type of services a cloud service provider delivers (Figure 1).

- **SaaS** (*Software as a Service*). SaaS is software deployed over a network instead of installed on an individual computer. For example, instead of buying and installing Microsoft Office products on every agency PC, Microsoft's Windows Live service provides Web versions of Microsoft Office programs for a fraction of the cost.
- **PaaS** (*Platform as a Service*). PaaS is a framework on which developers develop or customize business applications. The PaaS vendor manages operating systems, virtualization, servers, storage, networking, and the PaaS software. Developers



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create applications using software components that are built into the PaaS. For example, a tool like SalesForce.com is used to manage customer relationships. An agency can customize the tool to meet their specific business processes and then run it on a vendor’s platform.

- **IaaS (Infrastructure as a Service).** With IaaS, the service provider owns the equipment that supports operations, including storage, hardware, servers and networking components and is responsible for housing, running and maintaining it. An agency does not have to make large investments in hardware components and provide staff to maintain the components. Examples are Amazon EC2, Windows Azure and Google Compute Engine.



Figure 1. Cloud service models

## Considerations

Tradeoffs are inherent in cloud computing. There is no “one size fits” all solution. Neither is it an “all or nothing” proposition. There are considerations agencies must explore as they choose if, how, and when to move computing capabilities into the cloud.

- **Flexibility:** If an agency hasn’t updated their business process or has a unique business process, the cloud solution may only support 80% of an agencies current business process. Agencies may need to change their business processes to make a cloud solution work for them.
- **Security:** There are some cloud providers that invest heavily in security and others that do not. Agencies need to be clear about the level of security data sets need and ensure there are proper controls to create, manage, access, and retire data.
- **Legacy integration:** Legacy IT systems continue to be used because of cost issues surrounding redesign, replacement, or data migration to a modern equivalent. While integration technology has gotten significantly better, agencies still need to understand integration issues and a cloud vendor’s integration capabilities.

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- **Staffing:** Current IT staff may need to develop new skills and approaches to development. Cloud implementation and integration skills are in high demand. As state employees develop these skills, retention issues may get worse and bringing in new staff with the necessary skills may be difficult at current state compensations levels. Also, service providers may assume some of the responsibilities of current employees. This means union-related issues will need to be addressed at some level.

## Steps for moving business processes to the cloud

While it is ultimately, up to an agency to determine when it is appropriate to use cloud-based solutions, the agency should consider cloud-based services first.

If the state wants to meet the goal of providing a mobile, efficient, responsive, open and secure government for the citizens of Washington, cloud services must be part of the overall technology strategy. While it is ultimately, up to an agency to determine when it is appropriate to use cloud-based solutions, the agency should consider cloud-based services first. Table 1 is a high-level view of the steps an agency will need to take as they decide what to move to the cloud.

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1. Complete a definitive and thorough assessment of current applications and systems assessment.
  2. Perform a security design review with CTS.
  3. Identify best products fit.
  4. Implement solution.
  5. Provide necessary training for staff to ensure operational sustainability.
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### Complete a definitive assessment

Many vendors offer a services called “application rationalization” which inventories all agency applications and identifies which applications are best suited for available SaaS products. Cloud solution are not a “one size fits all.” For some agencies, the 80% business process solution a SaaS offers may be too limiting. Yet, other agencies can reengineer business processes to map to a SaaS and reap the business value of a cloud solution.

In addition to applications, agencies should identify IaaS and PaaS solutions that accelerate their ability to build and implement new solutions. Agencies will probably be able to look to IaaS providers to supply commodity items like storage space. And, all agencies can benefit from disaster recovery inherent in the cloud.

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## Perform a security design review with CTS

The very first step in selecting a cloud solution is understanding the data, or more specifically, the classification of the data that will be in the cloud solution. The data classification is key to picking the right solution. If an agency classifies data unnecessarily high, the available cloud options will be limited. If an agency classifies data too low, the right security controls won't be in place to protect the data.

Data classifications are articulated in the OCIO Security Policy. Data security for cloud services is managed in what is referred to as a “shared security model” which means that securing the solution is a partnership between the vendor and the customer. The demarcation of that shared responsibility is largely a function of the type of cloud service you're purchasing; IaaS will have a different demarcation than a SaaS solution. Be clear on where the demarcation is for your business solution. CTS provides security design reviews and a list of vendors capable of meeting an agency's security requirements.

## Identify best product fit

After identifying business applications that are candidates for cloud-sourced solutions, agencies need to identify the best products that meet their business needs. The OCIO and DES can provide guidance on determining which products on the market are most suitable for meeting an agencies business processes requirements.

## Available resources

The OCIO, CTS and DES can provide information and resources on everything from contracts, security assessments, project planning and agile development. If you are interesting in talking through whether a cloud approach is the right solution for your specific business problem the OCIO is available to help. Contact the OCIO office or the OCIO Consultants to start the conversation (<https://ocio.wa.gov/it-consultants>).