

Learning Resource

Implementing a SaaS Solution

Differentiating Between Commercial Off-the-Shelf Software (COTS) and SaaS Solutions

Up to this point, we have been using the term **commercial off-the-shelf (COTS)** to include **software-as-a-service (SaaS)** solutions. COTS is most-often used to refer to applications that are purchased and installed at the user location, either on a personal computer or on a server for multiple individuals to use. This includes such familiar purchased software as word processing or spreadsheet applications. Some COTS solutions come with vendor maintenance and updates, while others require an additional payment to be made for an upgraded version. Once the organization purchases a COTS solution, the vendor's involvement in the day-to-day operation is nonexistent.

A SaaS solution, on the other hand, is usually leased or subscribed to by the customer, and the software is owned by the vendor, runs on the vendor's hardware, and is accessed via the internet as a "service." Microsoft is now providing its office applications as a service via Office 365 for Business, which is provided as a subscription service rather than a purchased download. In that instance, it becomes a SaaS application. Even though it is a COTS product, the way it is delivered to the end user via the internet, along with ongoing service and maintenance from the vendor, makes it a SaaS solution. Other well-known SaaS products are Salesforce (customer relationships management system), Amazon Web Services (eCommerce platform), and DocuSign (electronic signature services). For SaaS solutions, the vendor is responsible for the day-to-day operation of the system, for the ongoing operation and maintenance of the system, for protecting the sensitive business data housed in the system, for upgrading and enhancing the system, and for providing training and support. Usually all that is required at the customer location is an internet connection and end-user devices to connect to the system.

Unique Considerations for Selecting a SaaS Solution

When a SaaS solution is being considered, a primary aspect is that the relationship with the vendor is very different from a solution that is hosted on-site at the organization. A long-term relationship is established with the vendor beginning with the lease or subscription to

the system. The customer becomes reliant upon the vendor for all the services listed above.

Since the system is not purchased (instead, the customers are "renting" or "leasing" the software and services), the customer will make monthly or annual payments for its use; these can either be a set amount or can fluctuate depending on the actual use of the system. A Service Level Agreement (SLA) is used to document the responsibilities and commitments of the vendor and the customer. Most vendors of SaaS solutions have an SLA already developed for their customers; this should be studied thoroughly, and changes negotiated if necessary, prior to the customer signing up for the services.

One big consideration is that the system is operated at the vendor's location. It is much more likely that a vendor supporting multiple customers can achieve a higher level of security for the system than an individual organization. The vendor has the combined resources to hire and retain security experts to manage the system, the hardware, the network, and the facility. Many SaaS vendors have implemented a distributed system so that hardware, software, and databases are housed at multiple locations; many vendors provide "hot backup" meaning that the database is replicated elsewhere so that if one database or system is unavailable, there is an automatic switch to the replicated database. SaaS vendors also can afford to offer quick recovery at a much lower cost than is available to an individual organization. They are also much more likely to have physical security measures in place to protect the data center, including fire suppression, surveillance, access security, and guards.

Since SaaS solutions depend on use of the internet to connect users to the application or system, the following should also be considered:

- the availability and speed of the internet connection;
- protection of proprietary or personal information transmitted via the internet; and
- location of the system. Some government systems are required to be hosted within the United States, and not overseas.

Identifying COTS/SaaS Solutions

Over the past decades, COTS and SaaS solutions have proven to be viable models for acquiring software. SaaS is now a mature model that can be relied upon if a vendor is selected based on a deliberate evaluation and selection process. There are many sources for locating a vendor, including technical journals, industry survey, vendor advertisements, advisory or consultancy services, and even internet searches. An organization would be wise to identify a few solutions that appear to meet their needs and then conduct a detailed evaluation of each one. It is important to identify solutions that align with achieving the business strategy, improve the process(es), and meet the requirements.

Evaluating COTS/SaaS Solutions

In evaluating a COTS or SaaS solution, four major factors are involved: user requirements, system performance requirements (system quality and security requirements), the vendor, and cost. The method for evaluating each of these is discussed below.

Most SaaS vendors provide access to a "free" trial version of their system. During the product evaluation period, the trial version can be used to determine the basic functionality and performance of the system. This version of the software is used for marketing purposes and may not exactly represent how the software would function in a specific situation. Some vendors may offer to provide access to a more robust version of their system in order to allow further testing and evaluation. An organization should try out the software for itself and not rely on vendor demonstrations, which can be set up to appear to provide functionality and ease of use that is actually not part of the system.

User Requirements

The first step in evaluating a COTS/SaaS solution is to address the **user requirements** and answer the following questions:

- How closely do the capabilities and functions of the solution meet the requirements?
- Conversely, are there a lot of extra "bells and whistles" that the organization does not need or would not use, but add to the cost and complexity of the system?
- How closely does the application package fit the process used by the organization? If the solution is implemented, would the organization be able to use it for their process? Will the business process need to change significantly, requiring additional training and other organizational changes? Would the changes in the process used by the vendor's solution actually help improve the business process? The more the business process has to adapt to the system, the less likely the system is to be accepted by the users. If significant differences exist between the system and the process in use, and major changes are required to the off-the-shelf system, the cost, complexity, and risk may well outweigh any benefits of the COTS solution. However, if the organization is seeking to improve its business processes, COTS/SaaS solutions often implement optimized business processes in the software, a benefit for the organizations that implement them.
- How much configuration or customization will be needed to put the COTS system into use? Some COTS products allow or require extensive configuration or customization in order to make the system useful to any organization. Others require minimal configuration to set the system up for use in a specific organization. These activities are major determinants of initial cost and implementation time, and add to the ongoing maintenance costs.

- *Configuration* is functionality that can be created using built-in workflow tools and templates that come with the product.
- *Customization* is functionality that is added to or replaces functionality as provided by the vendor. There is no guarantee that customizations will be compatible with future upgrades, and they can be extremely costly to maintain over time.
- How much and what data will need to be migrated to the new application/system? How easily can that be accomplished and at what cost? The organization likely has information that supports the process for which a system is being sought, and that information will most likely need to be imported into the new system. If the data is already in electronic form (in a spreadsheet or database), the migration of that data should be accommodated. However, if data is in paper form, decisions will need to be made about how much of the existing data is to be manually entered into the system, and in what form it will be entered.

Migrating data into a new system can be very time consuming and costly, so these are important considerations for the organization.

System Performance Requirements

Next, the quality of the COTS/SaaS solution is evaluated answering the following types of questions regarding the attributes of the system (which are specified as **system performance requirements**):

- **Usability**—Can new users quickly adapt to the software? How easy is the system to use, and how is help provided for the users? Does the vendor provide training? Is online help provided in the system? Is user support provided (e.g., a help desk or documentation)?
- **Scalability**—Can the system accommodate the anticipated number of eventual users and/or records/transactions? Can it be scaled back if there are actually fewer users or transactions?
- **Availability**—Will the system be available for use when needed? If there is any anticipated maintenance downtime, is that compatible with the organization's needs?
- **Reliability**—Does the system create and maintain the data correctly?
- **Maintainability**—What is the vendor's approach to maintenance and how often are updates applied? How quickly can corrections be implemented?
- **Performance**—Is the system able to meet response time requirements? Is it able to handle the volume of the expected workload (or number of transactions)?
- **Portability**—Does the system run or operate on the types of end-user devices and operating systems that the organization uses or anticipates using?

- **Interoperability**—Is the system capable of exchanging data with any required legacy (existing) system?
- **Security**—What security protections are provided by the vendor? What security steps are needed within the organization? How is the system protected from malicious or accidental actions? How will users authenticate to the system and be authorized to perform functions and/or access data? Does the system effectively prevent unauthorized access and prevent unauthorized ability to change data? How is data protected as it is transmitted and when it is stored? Does the system keep a log of who logged in, when they logged in, what information they accessed and what changes they made? What data backup and recovery is provided by the vendor? The answers to these questions will help determine whether the system provides adequate security.

Vendor Ability

The vendor's ability to support the organization and provide the services needed is a third area of consideration. The organization should do its due diligence and consider the financial stability of the vendor and look at such things as how long they have been in business, how robust their customer support is, and their industry reputation. The number of paying customers and the length of time they have been with the SaaS vendor is a good indication of the quality of the software and the vendor's services. In evaluating a SaaS vendor, it is a good idea to check with some of their customers to learn about their experience with the SaaS. The organization needs to ensure the vendor will be able support it for some time to come. Keep in mind that once the organization signs up, the expectation is that there will be a long-term relationship—the organization does not want to keep changing its SaaS software and vendor, and the vendor will want to keep the organization as a long-term customer providing recurring revenue. At the end of the day, the organization is responsible for the use of the system as it impacts their employees and customers. Although the vendor owns and hosts the system, the reputation of the organization can be at risk if issues arise and are not properly addressed.

Total Cost of Ownership (TCO)

The fourth area of consideration is the cost of the COTS/SaaS solution. In determining how a system is to be acquired and/or which system is to be acquired, the organization must consider the total cost of ownership (TCO) of the solution. The TCO for each alternative can be estimated in order to make comparisons. This concept is something we are very familiar with when we are making a major purchase in our daily lives. In general terms, the **total cost of ownership (TCO)** is the sum of all costs associated with an acquisition that will accumulate over the life of the asset. One of the personal acquisitions for which we use the TCO is the purchase of a new car. Clearly, the purchase price is not the only consideration.

Today, automakers recognize the importance of the TCO to their customers; in their advertising, they talk about gas mileage, resale value, length of warranty, free servicing over some period of time, and special financing terms.

The table below identifies the cost categories of an IT TCO. Although there are several ways of categorizing and listing the costs, this list contains some of the often overlooked and crucial costs that are important to understand. The specifics of how the categories apply to a SaaS solution are also provided.

Cost Categories of an IT TCO

Cost Categories	Description	Costs as Applied to SaaS Solution
acquisition	The costs of acquiring IT assets: the lease, purchase, or subscription cost of hardware and software, including research, travel, freight, and tax; and/or the cost of developing the software from scratch.	Lease or subscription costs for software and system (SaaS vendor). Purchase or lease of end-user hardware devices (PCs, tablets, printers, etc.).
communications	The cost of all communications, including network costs, wiring, service provider fees, communications hardware, and software.	Initial setup costs of Internet Service Provider (ISP) and ongoing monthly charges.
security	The costs of ensuring security of the IT infrastructure and data, including security software, usage monitoring, and facility security costs.	Most security services provided by vendor, documented in the SLA. End-user policies and device protection are the responsibility of the customer organization.

Cost Categories	Description	Costs as Applied to SaaS Solution
installation	The costs of making IT assets operational; could include building modifications, increased cooling requirements, and increased utility capacity at the datacenter.	Responsibility of the vendor.
configuration	The costs associated with COTS or SaaS software to set it up to function correctly within the organization; using built-in tools such as workflow, report layout, terminology and/or organizational logo.	Costs to configure SaaS to function for the organization (e.g., workflow, reports, terminology, logo).
customization	The costs of making changes to the COTS or SaaS software that are unique to the organization. The ongoing cost of maintaining these changes over time and testing future upgrades must be considered as well.	Costs to make changes to the software for the specific customer; may cause additional cost for maintenance.
testing	The costs of preparing test cases and using the system to determine whether it is functioning properly and meets the requirements. Also includes the costs of recording deficiencies and re-testing when changes are made.	Costs generally are limited to the customer creating and using test cases to ensure the system works as needed. This is very different from using a demonstration or "free trial" system before selection; it is testing the actual system after it is configured and is operational for the customer.

Cost Categories	Description	Costs as Applied to SaaS Solution
support	The cost of keeping the infrastructure functioning as planned; could include a help desk, hardware technicians, telecommunications specialists, programmers, and maintenance support staff.	Most costs borne by vendor. There may be an additional charge for user help-desk support or technical support, or it may be included in the monthly/annual fee.
maintenance	The cost of keeping IT assets current and in a condition that can meet their planned functions; includes updates and enhancements as well as fixes for problems; could include maintenance contracts, programmers, and telecommunications specialists.	These costs are borne by the vendor. The customer pays a monthly/annual fee for ongoing service and system maintenance.
coordination costs	The costs related to keeping the infrastructure tuned to maintain optimal performance when changes to an infrastructure element are required	These costs are borne by the vendor.
disaster recovery	The costs of ensuring continued operation of the infrastructure, including maintenance of a current plan, cost of backup sites and equipment, costs of emergency power, and costs of practice exercises.	Most of these costs are borne by the vendor (if the vendor provides disaster recovery services) since the vendor is responsible for its hardware, software and internet access; but the organization is responsible for its own infrastructure (end-user devices, internet access, local power, etc.).

Cost Categories	Description	Costs as Applied to SaaS Solution
organizational change management	Any costs associated with organizational changes resulting from implementation of the system; includes such things as consolidating departments, establishing new groups or responsibilities, reorganizing or reassigning personnel.	Always a customer cost.
data migration	The costs of determining what existing data (either in electronic or paper form) would need to be entered into the system to get started, and entering that data.	<p>The customer must bear the cost of determining what existing data (electronic or paper) is to be entered into the system.</p> <p>The cost of entering the data is borne by the customer; sometimes the vendor is willing to assist for a fee.</p>

SaaS solutions generally offer many of these categories of service as part of their initial fee and/or the ongoing maintenance fee. All must be taken into consideration when developing the TCO.

Making the Selection

In the end, a cost-benefit analysis can be used to determine which solution best meets the needs of the organization. All four factors discussed above must be considered, with the organization determining which of them is most important or which combination of the factors best suits that organization, considering any specific needs, such as security of highly sensitive data, particular functionality that must be present, controlling costs, etc.

Implementing the System

Implementation of a COTS or a SaaS solution is a major project for the organization. A system owner and a project team should be designated, and best practices for IT project management should be employed. A project plan for implementing a SaaS solution should include the following steps:

- Establish the vendor agreement, contract or SLA; a mechanism needs to be put in place to give the organization access to the system, identify responsibilities of the vendor and the customer, and lay out initial and ongoing costs.
- Acquire the end-user hardware and telecommunications, if necessary, and/or validate the capability of existing hardware and telecommunications to access and use the system.
- Configure the system for use in the organization; identify what needs to be done to implement the organization's desired workflow, reports, terminology, logo, etc.; identify who will configure the system and how it will be done, and whether there is any additional cost.
- Develop a plan for User Acceptance Testing (UAT), and test the configured system to ensure requirements are met and that it is functioning correctly, including use of any user support tools or services provided. The UAT plan explains how each requirement will be specifically tested to ensure it is working properly and the requirement is met. For example, if the requirement is that the system determine the customer's city and state based on the zip code entered, then a zip code would be entered into the system and the result would be checked to ensure the correct city and state were provided.
- Apprise the employees of what is taking place and why, and make any organizational or process changes that are needed. Leaders of the organization need to be involved as sponsors and coaches to encourage system adoption and use, and they should employ change management techniques to ensure a smooth transition.
- Train administrative personnel in their role(s) for supporting the system.
- Conduct user training.
- Migrate the data needed to operate the system; determine how this will be done (electronically, manually, etc.), who will do it, how long it will take, and what it will cost.
- Oversee operations to ensure continued end-user support and system maintenance are performed by the vendor according to the SLA; identify any need for support or maintenance by the organization itself, such as hardware and software upgrade for end-user devices, a local help desk, etc.

Using a comprehensive project plan as laid out above will help ensure a successful implementation and ongoing support for the new system.

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