CHAPTER 9

Cloud solutions as a platform for building advanced learning platform, that stimulate the real work environment for project managers

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1. Introduction

Improving skills of managers and executives require, that during the transfer of knowledge (in different ways: during studies, trainings, workshops and other forms of education) it is necessary to use tools and solutions that are (or will be) used in real world environments, where people being educated are working or will work. Cloud solutions allow educational entities (universities, training companies, trainers, etc.) to provide advanced IT solutions, which reflect actual or future work environment of trained managers, regardless of the level of complexity of the environment. It is alternative for on-premise installation.

The purpose of this chapter, is to analyze the capabilities of cloud solutions, their suitability for building workshop environment (reflecting real, business IT environments), and the ability to use these solutions in distributed environments (geographically spread and international groups). It will be made on example of two cloud services: Project Online and Office 365, which could provide a platform for build workshop to develop competencies related to the management of projects and programs for future project, program and portfolio managers.

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2. Aim, sources of data and information

Observing the growing popularity of cloud services (i.e. providing software as a service), the author of this chapter will examine whether they permit to solve the all mentioned in this chapter challenges. The author will be peeling on their own practical experience under about 10 years of practice in the implementation of project management systems. Data in this chapter come from about 10 implementations of Microsoft Project Server and Microsoft Project, in which author had participated.

The author of this chapter lectures on project management and computer laboratories in the field of project management support, using Microsoft Project Server and Microsoft Project. In addition, he has about 10 years of experience in implementing project management methodologies and IT systems for project, portfolio and program management. Therefore, searching for answers to given questions, the author will be focusing on providing expertise in project management and IT systems relating to this area of knowledge.

3. Applied research methods

Researches will be carried out on the example of Microsoft Project Server and its counterpart shared as a service (Project Online). In the first place resources necessary to implement these solutions will be identified. Specific software licenses are required (both – for the server software and client) hardware resources (only for servers), and competence, as well as the time needed for projects implementation. Then analogous estimate will be made in the event of solution delivered as a service (Online Project and Project Pro for Office 365). Both deployment scenarios will be compared. Their advantages and disadvantages not only in implementation, but also in the field of maintenance will be shown. This will allow assessing which of the solutions (on-premise or software as a service) can be used at universities and in what situations they can be used. Alternative method of delivering IT systems will also be described.

4. Problem statement

Typical methods of delivering theoretical knowledge for managers are lectures, classes, workshops, etc. They allow lecturers to provide the necessary theoretical knowledge and information to trainees (students). Typical resources required for this type of activity are (apart from the person and knowledge of the lecturers, which are obviously a key element) lecture hall, equipped with presentation tools (including multimedia resources), and teaching aids. They can help to provide essential knowledge and facilitate its memorization. These resources allow you to conduct lectures and provide knowledge (lessons) in different areas (including knowledge about project management). They can be repeatedly used for many types of training. Their lifespan is also long. For example, one well- prepared lecture hall allows conducting lectures in

various fields for several years (after a possible retrofit in new media resources - if necessary). So this resource is universal and relatively durable.

However, conducting computer workshops (laboratories) require additional key resources. These are computer rooms (with the appropriate software installed) with access to information systems, the use of which students will be trained. The author of this chapter while his professional and scientific work and teaching provides knowledge for current and future managers who want to improve their skills in project, program and portfolio management. He noted that in addition to theoretical knowledge (in the appropriate area), the trainees must acquire the ability to use computer systems and applications that they will use in their future careers. Educational service providers (including universities) should, therefore, be equipped with training environments, allowing carrying out activities, in the form of computer labs. In these laboratories, IT solution (which [in the future] will be used by students - both full-time study, part-time and postgraduate - during work), should be installed. IT systems mean applications and server solutions.

The level of complexity of these systems (e.g. systems for project management, systems for customer relationship management, document management system) increases, and the qualifications needed for their implementation are getting higher too. The number of systems which are used in business organizations is also increasing. There is a challenge behind organizations providing knowledge, how to provide (with limited resources - money, personnel, competency, computer equipment, etc.) the trainees with knowledge, how to use most advanced systems and solutions. However, universities do not have extensive IT staffs and budgets that may take care about the implementation and maintenance of a number of complex and elaborate systems.

According to these considerations we can give some statements:

- IT systems dedicated to support business decisions are now more complicated than they were 10 years ago and effort needed to implement is much higher than it was
- you need to have specialized IT stuff to install, configure, maintain and customize this kind of specialized systems
- buying and maintaining of IT systems (implemented on premise) can be expensive - especially looking at initial costs.

After this we can identify following (common issues):

- how to get enough employees who are able to install, configure, and maintain unique IT solution?
- how much they will cost?
- is it profitable, if we are using software for half a year, but we are paying full price?
- are we ready to maintain so wide range of software (with reasonable SLA)?

There is the main question: how institutions providing knowledge (including universities) can deploy and maintain complex systems used by business organizations to be able to train students in the field of using these systems.
The author of this chapter will look for answer for this question below.

5. Research results

Seeking answers to the main question, the author has identified that implementing systems you can opt for one of following four scenarios:

- **On-premise installation** – in this scenario, an educational institution decides to install software on their own servers. With this solution, it is necessary to purchase software licenses (also in the case when you get a new version). The effort associated with installation, configuration, adapting and maintaining the solution is directly on the educational entity.* .
- **Infrastructure as a Service (IaaS)** – in this case, the institution decides to lease the equipment (from the service provider), on which implemented software will be installed. The service provider will be responsible for hardware maintenance. However, the complete process of installation, configuration and adjustment of all software will execute the educational institution itself. Educational entity will also be responsible for software maintenance and should ensure an appropriate level of service for the software (not hardware). In this approach university, can reduce the initial costs associated with purchasing the equipment, but in the long run it may turn out that the total costs associated with the lease will be higher than the total cost of purchase and maintenance of hardware.
- **Platform as a service (PaaS)** – here the operator decides not to lease only hardware, but also the basic software (such as a server operating system – Windows Server for example). On these leased items entity will install the main business system (which may be for example Microsoft Project Server). Licenses for the main system, the educational entity acquires itself. Just like Infrastructure as a Service, Platform as a Service allows you to reduce initial costs and replace them with spread payments. The longer the period of use of software, the solution may be less cost-effective.
- **Software as a Service (SaaS) and cloud solutions** – in this scenario, an educational entity buys a comprehensive service (software as a service), under which it receives access to specialized software (installed in the cloud, and hosted by service providers), which can be used as long as you pay for it. Responsibility for maintenance of the system, and delivering services on appropriate level lies on the service provider, however, adapting the software to business require-

* Installation, configuration, customization and maintenance solutions can be delegated to other entities, but does not substantially alter the effect on the analyzed issue.

ments must be performed by the customer, on his own. Project Online is an example of solutions in the computer cloud delivered by Microsoft. It supports management of projects, programs and portfolios of projects (it is the equivalent of Microsoft Project Server, implemented in the on-premise model). This cloud can be used by educational entities wishing to teach students to use project management software, but not having own IT staff, which will be able to install, configure, and maintain the appropriate software. Hiring Project Server in the cloud computing by Microsoft (Project Online solution) is not the only possibility. Some service providers supply this software under SPLA (Service Provider License Agreement) licensing model, which is cloud solutions to. But in this situation solution in the cloud is provided by a different provider than Microsoft. Licensing models and fees associated with the cloud delivered by Microsoft and other suppliers may be different.

Summary, which is comparing models described above is showed in the table 1.

Table 2. Responsibility for different aspects of implementations IT system in different implementations scenarios

<table>
<tr><th></th><th>On-premise</th><th>Infrastructure as a Service (IaaS)</th><th>Platform as a service (PaaS)</th><th>Software as a Service (SaaS) and cloud solutions</th></tr>
<tr><td>Hardware (servers) and hardware maintenance</td><td>University (or different educational entity)</td><td colspan="3">Service Provider</td></tr>
<tr><td>Hardware (clients hardware – workstations, tablets, thin clients, etc.) and hardware maintenance</td><td colspan="4">University (or different educational entity)</td></tr>
<tr><td>Software licenses (operating systems and core systems)</td><td colspan="2">University (or different educational entity)</td><td colspan="2">Service Provider</td></tr>
<tr><td>Software licenses (main server applications)</td><td colspan="3">University (or different educational entity)</td><td>Service Provider</td></tr>
<tr><td>Installations and configurations (operating systems and core systems)</td><td colspan="2">University (or different educational entity)</td><td colspan="2">Service Provider</td></tr>
<tr><td>Installations and configurations (main server applications)</td><td colspan="3">University (or different educational entity)</td><td>Service Provider</td></tr>
</table>

Maintenance (operating systems and core systems)	University (or different educational entity)	Service Provider
Maintenance(main server applications)	University (or different educational entity)	Service Provider
Customization	University (or different educational entity)	
Service level agreement (SLA) - (operating systems and core systems)	University (or different educational entity)	Service Provider
Service level agreement (SLA) - (main server applications)	University (or different educational entity)	Service Provider

Further analysis will be done only on two deployment scenarios: On-premise and Software as a Service (SaaS) -cloud solutions.

At the begging it is necessary to identified licenses needed to implemented solutions in both scenarios. Self-made implementation of the Microsoft Project Server requires the installation and purchase of licenses for the following software:

- **Windows Server** - a server operating system, allowing the installation of other software, required for implementation. It should be installed on as many servers (of physical or virtual), on how many whole solution will work. The author of this work, on the basis of their experience, claim that the environment used simultaneously by 50 project managers require one or two such servers.
- **SQL Server (with SQL Reporting Services)** - is a database solution, in which analyzed server stores data about the projects and related items (such as documents, issues and risks). In environment in which works simultaneously 50 project managers, one such server is usually required.
- **SharePoint Server** (with the functionality available in the Enterprise version) - this is a server application for managing workflows, document workflow and connectivity with other applications. It is required to properly install and configure before you may install Microsoft Project Server. In environments that support up to 50 trained project managers, the solution is typically installed on a single server.
- **Project Server** - a solution implemented on a stack of all the previously mentioned server solutions. Similarly, as previously defined solution, for the implementation of 50 project managers requires only one server.

- **Project Professional** - is a client application used by project managers and installed on their workstations. It generally requires the installation of as many as there are project managers.
- **Client Access License** - those software requires the purchase of appropriate client access licenses to be able to use the software specified above

For using software in software as a service model, it is required to purchase the following services:

- **Project Online** - this service allows you to use the capabilities of Microsoft Project Server. As part of the purchased service the client is also able to use all the systems necessary for the operation of platform (including Windows Server, SQL Server, SharePoint Server and appropriate client access licenses)
- **Project Pro for Office 365** – this service allows you to install Microsoft Project Professional on a workstation and use it as long as the service is paid. Cessation of payment of services implies the need to uninstall the related software.

Cost categories:

- **Cost of software** – these costs include the price to be paid for the licenses for servers. These costs are only for on-premise model, as in the case of cloud computing software there is no payment for licenses
- **Cost of hardware (only servers)** – included here is the price of the servers (hardware). This costs are not applicable for software in the cloud, as it is available on the servers of the service providers
- **Costs of maintenance** – these costs represent the costs of systems maintenance (e.g. backup, install, update the costs of the personnel responsible for maintenance of the system). They occur only in the case of software implemented in the on-premise model. They should be analyzed in a given unit of time. They do not occur in Software as a Service mode, because they are directly included in the price of the service.
- **Cost of service (per year)** – this cost is only paid in Software as a Service mode. This is main component of the implementation in the Software as a Service model. The longer the company is using the software, the cumulative cost of the service is greater. After specific period, they may exceed the one-time costs associated with the implementation of on-premise software.
- **Cost of customizations** – These costs are related to the necessity to adapt the software to the requirements of the organization. They take place in both models (SaaS and on-premise).

Estimated prices, based on knowledge and experience of the author of this chapter are listed below. They may vary depending on the discounts which can be given by the supplier. They also depend on the manufacturer's licensing policy. The estimated here are licensing costs and services dedicated to educational institutions.

Table 3. Estimated costs of Cloud Solution vs on premise installation

	Cloud solution (Software as a Services) – Project online	**On-premise installation (Project Server)**
Cost of software	0	17 000 Euro
Cost of hardware (only servers)	0	5 000 Euro
Costs of maintenance	0	May vary
Cost of service (per year)	6 600 Euro (Estimated)	0
Cost of customizations	This same or similar	

Analyzing costs listed above, you may notice that in the case of software in the cloud, you will pay only charge for the service. They are distributed in time. There are no large, one-time payments. In the case of software implemented in on-premise model, there are brought large one-time payments (at the beginning) and minimum costs paid periodically. In both cases, it is required to pay cost of adapting the software to suit your needs. The main factors influencing the choice of a particular model are thus:

- the willingness and capacity to pay one-time fee vs. spread payments
- having qualified IT staff vs. ensuring maintenance by the service provider,
- the desire to have the software and hardware vs. using the service for specific period of time.

It should be also noted that there is no significant functional differences between the software deployed in the cloud and accessible software on their own servers.

6. Conclusions

Referring to the main question (given at the beginning), and basing on the analysis of available deployment scenarios, it is possible to identify the reasons for selecting appropriate implementations model (on-premise or cloud solutions). Those reasons are discussed below.

Implementation of solutions in on-premise model is supported by the following evidence:

- the organization has or is able to quickly acquire and maintain the servers on which the systems will be implemented,
- the entity is able to pay one-time large expenses related to the acquisition of software licenses,
- the entity has competent resources (in the right amount), which are able to install, configure, customize and maintain implemented solutions (or possibly is able to hire them)
- the solution does not need to be started immediately,
- implemented solution will be used for a long time

Implementation of solutions in Software as a Service (SaaS) and cloud solutions model is supported by the following evidence:

- classes (using implemented software) are sporadic (are executed for a small number of people or a small frequency),
- it is necessary to start solutions quickly,
- organization does not have adequate human resources and does not intend to invest in them,
- competencies required to implement the solutions are rare or are expensive,
- organization prefers to incur predictable, low and staggered expenditure rather than one-off large investments.

In the case where it is difficult to identify the fulfilment of specific conditions, consider the implementation of solutions in models of transition: Infrastructure as a Service (IaaS) or Platform as a Service (PaaS).

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Summary

The author of this chapter noticed that it is necessary to deliver theoretical knowledge about management and also practical knowledge about using IT tools (for business management) in practice, to develop whole management skills. For example student should not learn only about Project Management methodologies, but they should learn how to use IT systems to support project and portfolio management.

The author of this chapter noticed that the level of complexity of IT systems increases, and the qualifications needed for their implementation are getting higher too. The number of systems which are used in business organizations is also increasing. There is a challenge behind organizations providing knowledge, how to provide (with limited resources - money, personnel, competency, computer equipment, etc.) the

trainees with knowledge, how to use most advanced systems and solutions. However, universities do not have extensive IT staffs and budgets, that may take care about the implementation and maintenance of a number of complex and elaborate systems.

The main question was given: how institutions providing knowledge (including universities) can deploy and maintain complex systems used by business organizations to be able to train students in the field of using these systems.

Based on their own, more than 10 years of experience in the implementation of systems supporting project management and analysis of trends in the IT market, the author of this work has identified different possible deployment scenarios. There are: on-premise, Infrastructure as a Service (IaaS), Platform as a Service (PaaS) and Software as a Service (SaaS) and cloud solutions. These studies were focused on two scenarios: on-premise and Software as a Service (SaaS) and cloud solutions.

Comparing this two solutions it is possible to say, that cloud solution are alternative for on-premise installations, and can help to deliver advanced learning platform, that simulate the real work environment. Educational entities can choose on-premise or cloud based scenarios, and intermediate solutions as PaaS and SaaS – as needed. They can help educational institutions with small IT staff, in delivering complex IT systems, needed to start training about using professional and complicated business management systems. Large educational institutions are probably able to implement, configure and maintain on-premise solutions.

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