POSSIBILITIES OF USING MICROSOFT AZURE IN THE CONTENT OF HIGHER EDUCATION

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Abstract

In this paper presented one of the possibilities of using information technology to improve the quality of education. It examines approaches of using cloud resource in the content of high education, the capabilities of the Microsoft Azure cloud resource and it's applying in educational programs of informatics,. Ways to implement in client-server technologies course, the issues of server deployment and administration in the cloud; development, organization remote connections via different environments; creation web and mobile applications and their publishing in Azure. The proposed cloud resource can be a working tool in the process of training future informatics teachers and IT specialists.

Keywords:
higher education
Microsoft Azure
client-server
cloud resource

1   Introduction

Innovations in education result from new ideas, inventions, and scientific and technical research. Important properties of innovation are not only their scientific and technological innovations, but also the pedagogical significance of the educational process. Educational innovations are possible through some measures, such as the introduction of meaningful training courses and resources (Zimniyakova, Kultan & Aleksandrova, 2012). The pedagogical significance of the educational process is due to the training of competitive personnel that correspond to the labor market.

Factors affecting student learning experience based on cloud applications include the frequency of interaction and the online experience of students. It also offers suggestions for solving problems related to their use in higher education, including technical problems (Wang, 2017).

The purpose of the study is to explore the capabilities of cloud resources and their use in the educational process, to realize the ways of their implementation in the training course on client-server technology.

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2   Approaches of using cloud in education

The cloud approach refers to the evolution of Internet hosting, in which providers (such as Microsoft, Google, Amazon and others) offer services. When using cloud computing, the Internet is used as a way to connect clients to various infrastructures, platform and application services with a much greater degree of vocabulary and abstraction than previous hosting schemes could offer (Lobel & Boyd, 2014).

Cloud computing features have many advanced computing functions that would benefit users. Services offered by the cloud include data processing, storage, software, technical components, or a full platform. The user can select the type of service he needs. The cloud service provider will provide and manage the cloud, such as data centers, virtualization techniques, hardware, and storage (Murah, 2011).

"Cloud computing is already used extensively in education. Free or low-cost cloud-based services are used daily by learners and educators to support learning, social interaction, content creation, publishing and collaboration. Examples of cloud-based services include Google Apps, YouTube, Twitter and Drop box."
(Yadav, 2014, p. 3109) :

Area of applying cloud is growing every year. Our study focuses on its use in the organization of the educational process for informatics students by a course of client-server technology.

Difficulties in training client-server technology are the requirements for hardware and software, setting up the network and server, the definition of protocols, the organization of remote connections. High requirements for the technical part, highlights the relevance of the study of distributed data in the educational process. The educational programs of informatics specialties encompass a number of such subjects that are required by the powerful organization of training laboratories.

In preparing future specialists, educational institutions should provide the necessary laboratory classes and equipment that are equipped with modern hardware and software. However, when analyzing the contents of training courses and educational platforms teaching of client-server technology, can be noticed such moments when applications are created locally and remote connections are not sufficiently organized and educational platforms of older versions are used.

When students need to perform complex calculations on a powerful system and with the required specifications, this capability is not provided for them or they must perform the operation in weaker environments. But using cloud computing to provide special services for students, they can create this system by requesting a virtual machine with the required specifications, as well as the necessary software, and can use it in their projects (Jalali, Bouyer, Arasteh & Moloudi, 2013).

The use of cloud resources frees organizations from learning laboratories, as it provides the necessary tools, and students can choose the necessary resources in the classroom and beyond. Regardless of geographic location, any user, including a student, can work with complex technical software if his computer is connected to the Internet. There is no need to install, license, or upgrade the program, and there are no maintenance costs, because all the programs and services are accessible through a web browser.

In the following figure, we showed the possibility of using facilities IT exchange of tools in the cloud to improve the organization of the educational process.

When teaching courses database client-server and distributed technologies, you can use the Microsoft Azure SQL Database. Using this resource, students can deploy a SQL server as soon as possible and not waste time installing and configuring hardware and software.

For business users, cloud resources offer different rates as they are used. But for academic purposes, students can use free accounts by affirming their student status.

This approach can be used not only in face-to-face classes, but also in distance learning, to carry out independent projects and research works.
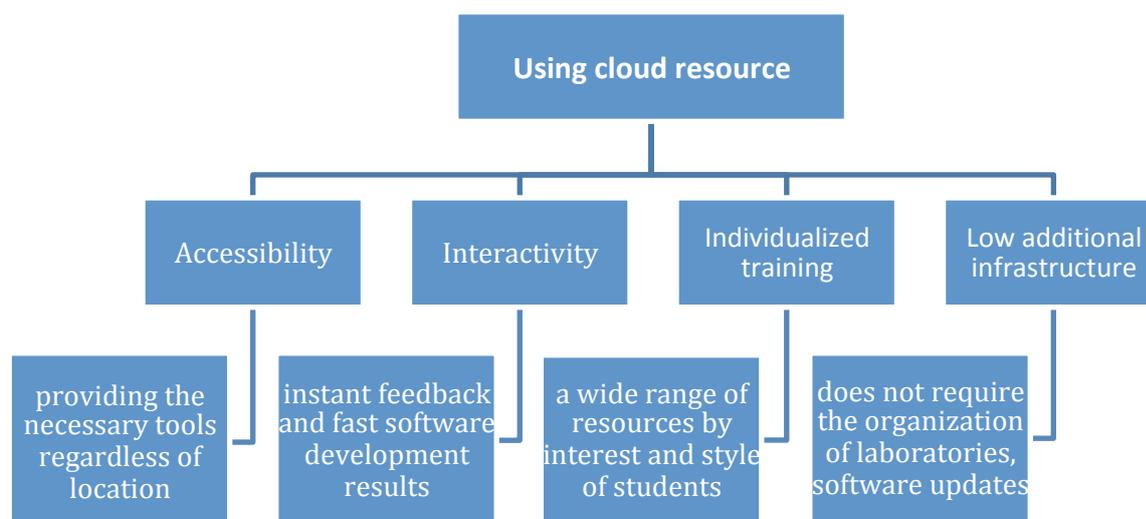
Fig.1: The possibilities of using cloud resources in the educational process

The following section describes how to use the Microsoft Azure cloud service for client-server technologies course.

3   Ways to use Microsoft Azure cloud service

The content of the training course on client-server technologies was supplemented with the module "Deployment of a remote server in the cloud". The goal of this module is to form students' knowledge and skills of deploying a server in the cloud, to learn optimum practices for creating various remote client-server applications.
The content of the module addresses the issues of server deployment and administration in the cloud; network configuration and protocols, using Azure App Service, programming applications in Node.js and C # using Visual Studio 2017, as well as the development of cross-platform applications.

3.1   Deployment and configuration a server in the Microsoft Azure SQL Database

With the help of Microsoft Azure SQL Database, students will learn how to run a flexible and mobile remote server, which is distinguished by its scalability and wide availability. Figure 2 shows the deployment window of a remote server and database in the cloud.
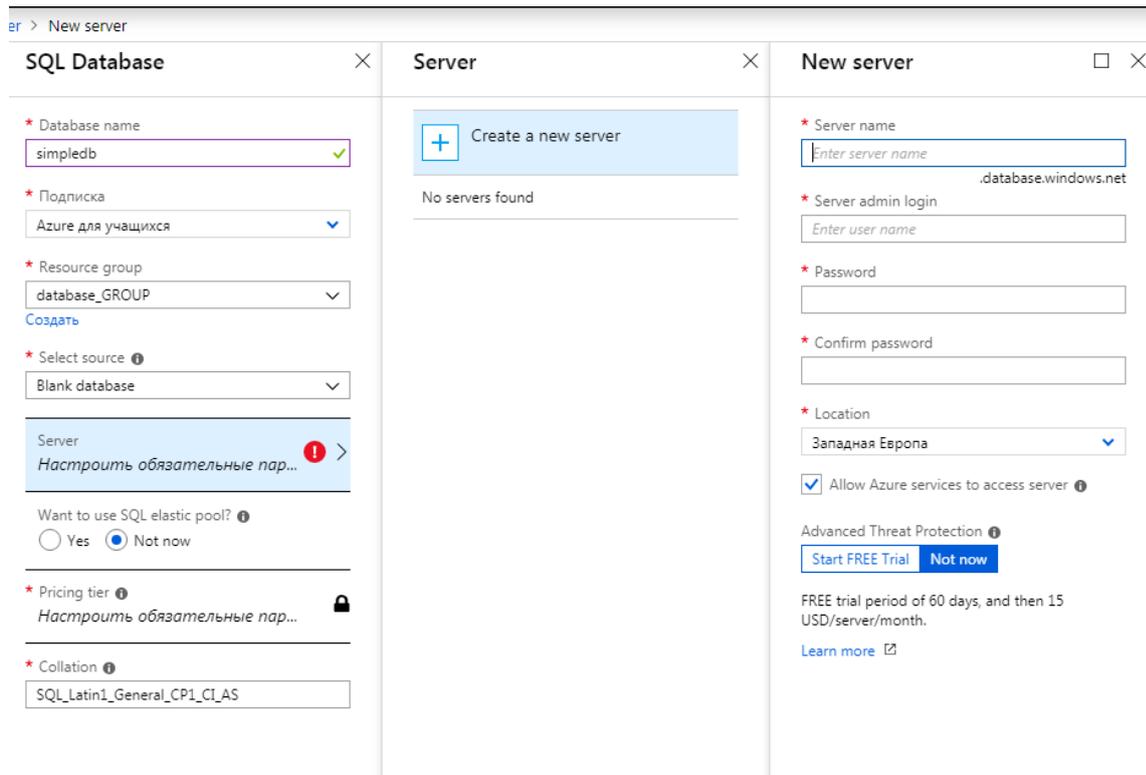
Fig.2: Deployment window for remote server and database in the cloud

To connect from different client computers to a server in the cloud, a server-level firewall rule is configured on the Azure portal.

3.2 Connecting to the server through other tools

Microsoft Azure SQL Database supports connecting clients using its own Tabular Data Stream (TDS) protocol, and we can connect to the server in the cloud using the SQL Server Management Studio (SSMS) GUI.
To open the server, be should the name of the server and the administrator are indicated Figure 3 shows a window for connecting to a server in the cloud via SSMS.
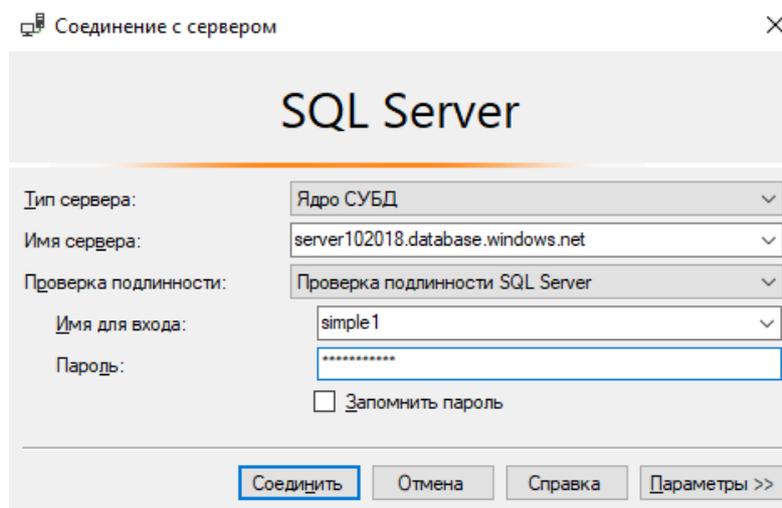

Fig.3: Window to connect to the server in the cloud via SSM

In the SSMS environment, associated tables are created, as well as other database objects, queries can be performed through the cloud.

3.3   Create an ASP.NET Core web application in Azure

Azure Web application service allows you to create and deploy Web applications in any programming language without having to manage the infrastructure. This service supports Windows and Linux, as well as provides automatic scaling, high availability and automatic deployment of GitHub, Visual Studio Team Services or any repository Git. Students can complete web app content, test and publish their apps using the server in Azure. The figure shows the web application page running on a server in Azure, at http://webappazure111.azurewebsites.net/
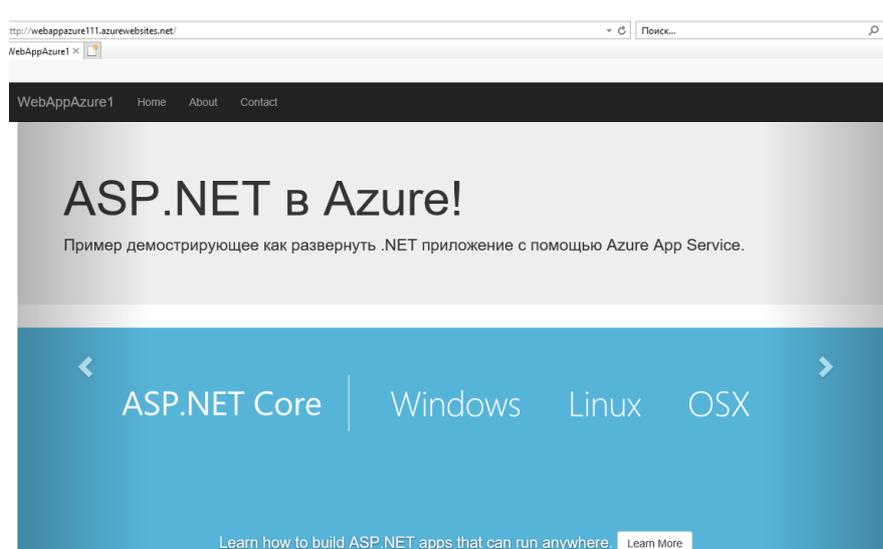

Fig.4: Publish a web app on an Azure server

3.4   Mobile apps using the Azure App Service

The mobile application feature of Azure App Service provides developers and system integrators with a platform for developing mobile applications that is highly scalable and accessible at the global level.
The structure of creating a mobile application is described in Figure 5. The development of a mobile application consists of the following steps: connecting to the database, initializing the table API, setting up services for the mobile client application and programming the client application. After setting up NuGet Microsoft.Azure.Mobile.Client, the Microsoft Azure connection gateway is automatically added to the program code.
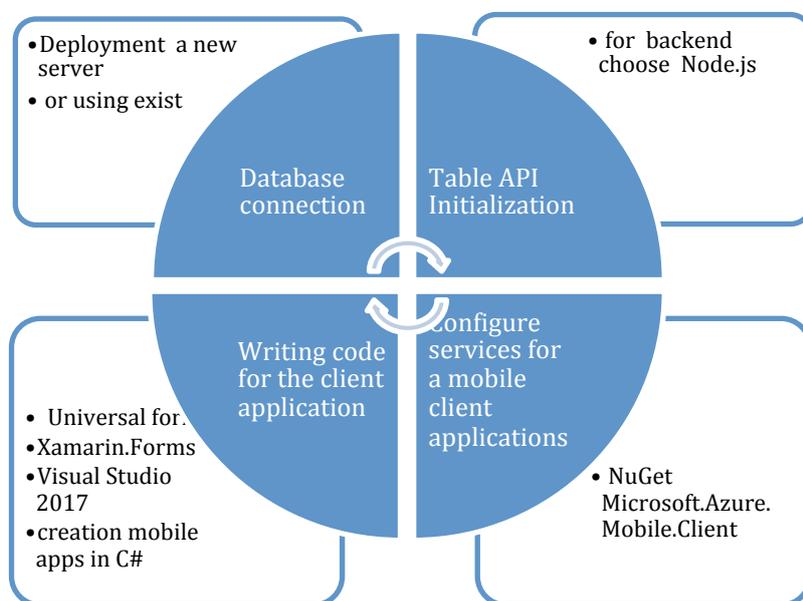
- Deployment a new server
- or using exist

Database connection

Table API Initialization

- for backend choose Node.js

Writing code for the client application

Configure services for a mobile client applications

- Universal for.
- Xamarin.Forms
- Visual Studio 2017
- creation mobile apps in C#

- NuGet Microsoft.Azure. Mobile.Client

Fig.5: Structure of creating a mobile client-server application in the cloud

4   Security Issues

When using cloud resources, you should take into account the current risks the privacy of cloud service users (Sampson, Isaias, Ifenthaler & Spector, 2013). Transferring data to a third party for placement in a remote Data Center that is not under the control of the institution and whose location cannot be known is a risk. Some cloud service providers now provide guarantees in their contracts that personal data will only be stored in certain countries (Yadav, 2014).

5   Conclusion

The use of cloud resources in a content of education allows access to modern hardware and software from anywhere in the world. When training in the majors in the specialty of informatics, it frees us from dependence on technical resources.
This approach is a priority in the field of information technology, and suppliers provide more and more opportunities to a large circle of users, including for academic organizations.
Methods of using Microsoft Azure in education, as well as other cloud resources, can be accepted as one of the modern educational tools of the digital generation, which allows you to make the educational space open and accessible to all.

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