Case Study

CLOUD COMPUTING IN INDUSTRY 4.0 – A CASE OF EEUU

Keywords: *Cloud Computing, Big Data, Industry 4.0, Database.*

Background to Case Study

Cloud Computing is one of the technologies that are part of the fourth industrial revolution, Industry 4.0. This technology allows companies to offer services over the network (usually the Internet). To do this, cloud computing stores our files and information in the network (cloud), so that both the entity and the users can have access from anywhere, without the need for a large infrastructure. Cloud computing in industry has managed to separate hardware from software, allowing many of the large organizations in the industrial sector to have remote and on-demand access to many of the main services they need to carry out their processes.

According to the report published by the consulting firm Quint Wellington Redwood, investment in cloud computing by the top 100 Spanish companies will increase from the 280 million euros invested in 2017 to the 1,600 million that could be reached in 2020. For its part, the consulting firm Gartner predicts that by 2025, 80% of companies worldwide will have migrated all local data centers to cloud computing.

Introduction to the Case Study and it's growth within Industry 4.0

The Cloud is an innovative technology that has facilitated the introduction of new technologies and ways of working within large companies in the industrial sector. One of the differentiating elements of this "before and after" of the Cloud in the industry has been the way in which the service is offered by the main providers in the sector. Cloud Computing can be offered through different formulas, depending on the utility to be given to the service or the end user's control of the cloud solution provided. The main Cloud Computing service models in the industry are:

- Iaas (Infrastructure as a Service): one of the most popular ways for companies in the industrial sector to provide Cloud services is IaaS. This is the provision of physical systems, better known as hardware. This service model covers different dimensions, such as access to certain servers or computing capacity when analyzing certain large-scale data. One of the main characteristics of this way of contracting Cloud Computing in the industry is that end users have total control over the infrastructure that is contracted. A perfect example to illustrate this type of business model is Amazon, which has become a Cloud giant in just a few years.

- PaaS (Platform as a Service): this other Cloud Computing service model in Industry 4.0 refers to the development environments from which programmers create, analyze and implement software applications.

- SaaS (Software as a Service): finally, one of the most common ways of offering Cloud in Industry is through Software as a Service. This involves providing end applications to companies that contract them over the Internet, since they are hosted on the provider's infrastructure. This formula has become very popular in recent years, even among end users. In fact, the vast majority of desktop software has been provided in SaaS for some time now. SaaS programs are usually accessed via web browsers.

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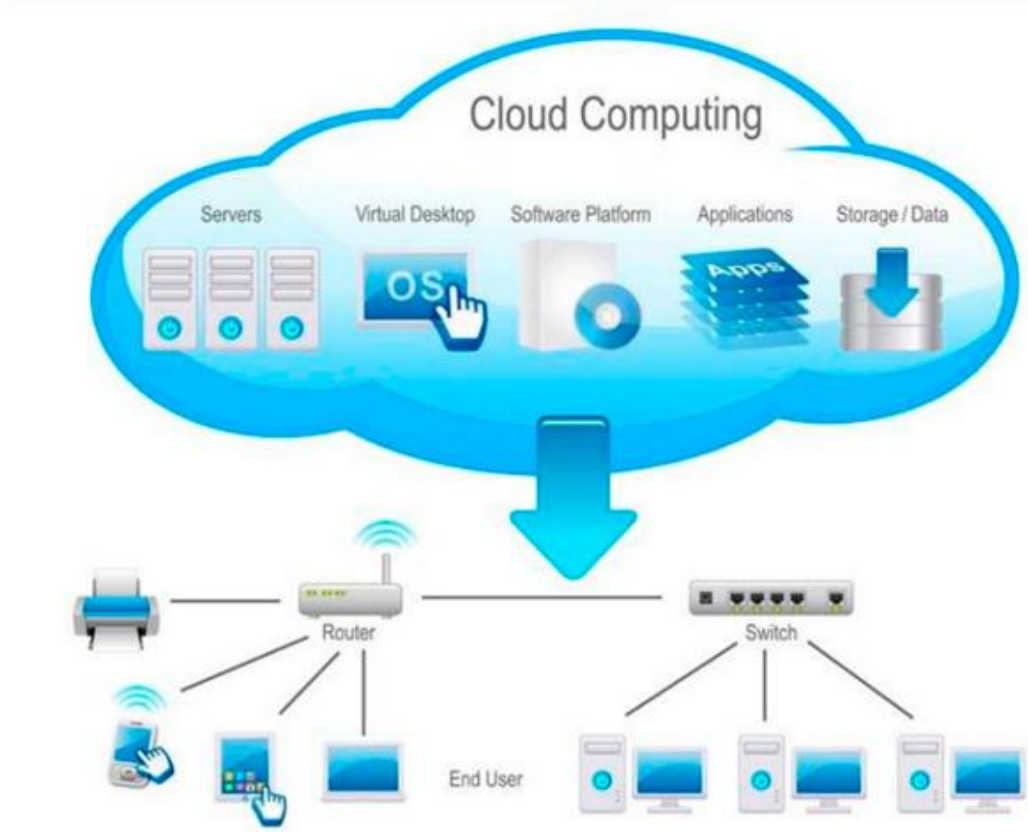
The Case Study and Industry 4.0 Elements: A Pictorial Overview



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The Element Explored within Industry 4.0 Application. Microsoft	*The current digital transformation implies that companies change their work model focused on local solutions to an external environment in the cloud. Among the existing solutions on the market, Microsoft Azure cloud stands out for offering the right infrastructure and tools for any company to start working in the cloud.* *Azure is a set of cloud services from Microsoft. With Azure it is possible to store information and create, manage and deploy cloud applications. To use Azure it is necessary to pay a fee for the contracted services.* *Some of the uses that companies can make with Microsoft Azure are:* *- Storing their data in the cloud, with outsourced backup system.* *- Creating virtual machines to run business applications such as SQL Server, SAP and Oracle.* *- Creation of virtual desktops for teleworking.* *- Creating web applications and APIs in the cloud.* *- Working with containers and managing them with Kubernetes.* *-Manage IoT devices from the cloud.* *- Adapting a business to the DevOps work model.* *There are many services included within Microsoft Azure, allowing you to work with artificial intelligence, databases, storage, virtual desktops, mixed reality, internet of things, DevOps, developer tools, containers and many other options. Azure offers the three service models IaaS, PaaS and SaaS so, depending on the services you choose for Azure, you can take advantage of IaaS, PaaS and SaaS on Microsoft's cloud platform.*

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Application Target Audience	*The results of the case-study are intended for use by SMEs, Enterprises and Entrepreneurs.*
Resources Used:	*- "Cloud Computing, Big Data and the Industry 4.0 Reference Architectures" by N. Velásquez, E. Estevez, & P Pesado (2018). Available here.* *- "Industry 4.0: Pros & Cons of Cloud Computing in Smart Manufacturing" by A. Wogawa (2020). Available here.* *- "How Cloud Computing is Driving the Industrial Revolution 4.0" by The Banking Finance (2020). Available here.* *- "Microsoft Azure" by S. Bigelow. Available here.*
Further Reading:	*- "Cloud Computing" by Google. Available here.*

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