A Model Recommendation For The Use Of Cloud Technologies And Individual Pension System

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ABSTRACT: *It is essential to benefit from the modern information and communication technologies in financial sector like in many sectors.Cloud Computing Technologies is the most popular one among these technologies which is easily accessible independently from location and time. Cloud computing aims at enabling the connection of distributed systems to a single center and creating a system for common use. The Individual Pension System is one of the examples that can be addressed in this context. There are many independent companies providing this service.It is important to note that the potential customers,which are important to all companies, are also the participants who may be involved in the individual pension system. There isn't any system showing whether an individual is included in an individual pension system in any pension company or the rate of that individual if included in a pension system. At this point, there is a need for cloud computing which can provide a common pool that can be connected independently from time and place. Therefore, the Individual Pension System (BES Ortak) was developed for this requirement based on cloud computing architecture.*
KEYWORDS -*Cloud Computing, Distributed Structure,Individual Pension System, BESOrtak*

• INTRODUCTION

Accessing the use of technlogies independently from location and time and the development level of these technologies together with the widespread of internet infrastucture in today's world play an important role in the increase of cloud service in Turkey and benefitting from these technologies in line with the increasing needs.

One of the biggest advantages offered by cloud computing providing the enterprises to have the information technologies infrastructure that they need without making any initial investment is that it enables enterprises to benefit from the cloud technologies in the same and equal way with the larger-scale enterprises [1].

Enterprises benefit from the information and communication technologies in order to meet their needs and increase their productivity. Remote accesses enabled by running applications through the user computers and keeping the information on local computer disks have been used since the beginning of 2000s with centralized computer and terminal structure connected to it [2].Cloud computing technologies are one of the most popular and prominent technologies of today's world and they become widespread in our lives and their usage areas increase. Information technologies are increasingly developing and becoming widespread in Turkey and in the world.

The developments in the field of information technologies affect many areas of life and enterprises need to keep up with these developments. Cloud computing facilitates the administrative processes of enterprises related to IT and increases the productivity by enabling its supply through the use of external sources. In addition, sources are more accurately used, processes are developed and business operations are improved with less cost thanks to cloud computing [3].

It is observed that the development of cloud computing is in parallel with the development of financial institutions. With the development of computer technology and centralized data banks, states began to transfer the personal data belonging to their citizens to computers and digital networks in order to appease "data hunger" after the 1950s [4].Not being able to create secure environments to make investments, secure environment uncertainty of the information on cloud computing and deficiencies about legal foundations at the beginning create an unstable environment. Issues such as protecting, transporting and saving the personal information affect the attitude of individuals on cloud computing.

Institutions and organizations make significant investments with an aim to benefit from the gained financial and corporate information in the most effective way. These institutions and organizations are obliged to make investment to various information systems (networks, computers, servers, software, hardware etc.) in order to protect the data [5].

While web interface has made the information available for everyone in all locations; cloud computing has made the processing power available for everyone in all locations (European Commission, 2012a) [6].

Cloud computing is a model requiring very slight administration effort or service provider interaction. Cloud computing can be prepared and launched in a fast way as well as providing an appropriate, optional network access to the pool of configurable computing sources (networks, servers, storage, applications and services) in any location [7].

Many banks and pension companies have difficulty in revealing the participation potential and following the participants from a common system in Individual Pension System offering service in a distributed structure. With the use of cloud computing that can provide the management from a common system independently from location and time, this distributed structure can offer service from a single system. In this way, it will become easier to reveal the potential of the participant that can be included in the Individual Pension System, make an offer to that participant and create a common system that is necessary for enterprises.

- **BES CLOUD SYSTEM - EXPERIMENTAL STUDIES**

BES common cloud architecture ("BES Ortak") consists of two parts. The first part is the pension companies addressed as data providers and BES common cloud structure creating a common database by collecting these data in a single pool.

The data on BES common cloud structure is always up-to-date. This up-to-dateness is enabled with the synchronization made in line with certain benchmarks among pension companies. This synchronization is made by the BES Windows Service created for this purpose.

Şekil4.1: BES BULUT SistemiÇalışmaPrensibi
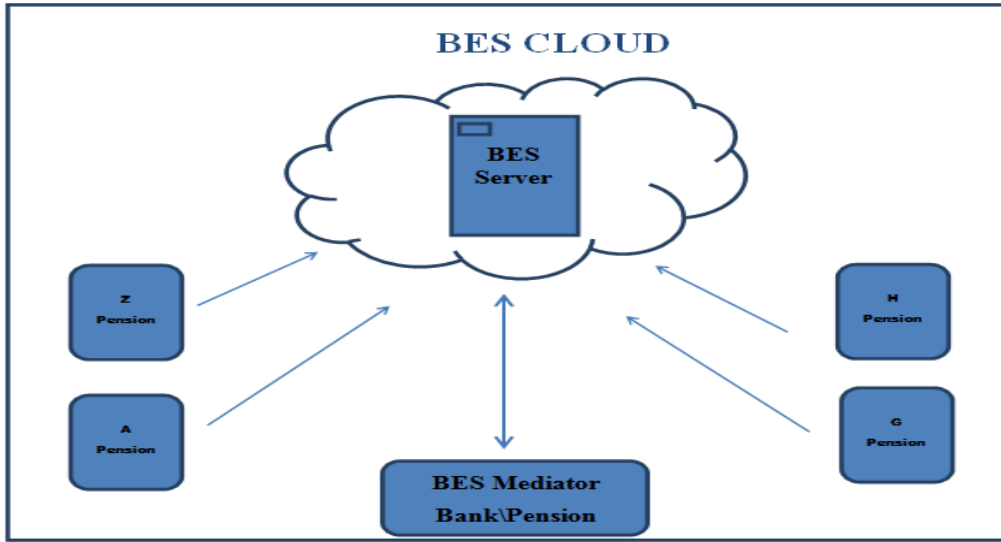
Figure 1. BES Cloud System Structure

When we look at therunning of the structure in general;
Participant customer data entered by the pension companies are written on both Pension Company database and BES Degisen database on the side of the Pension Company which will reflect the change on BES Ortak through the API specially written for BES Sirket. This change includes the following updates;

- New Participant (Post)
- Changing Participant (Put)
- Deleting Participant (Delete)

REST APIs use unified interface which helps to separate the client from service applications. HTTP includes unified interface by using the standard HTTP verbs for carrying out transactions on sources for resident REST APIs. The most common transactions are GET, POST, PUT, PATCH and DELETE[8][9].
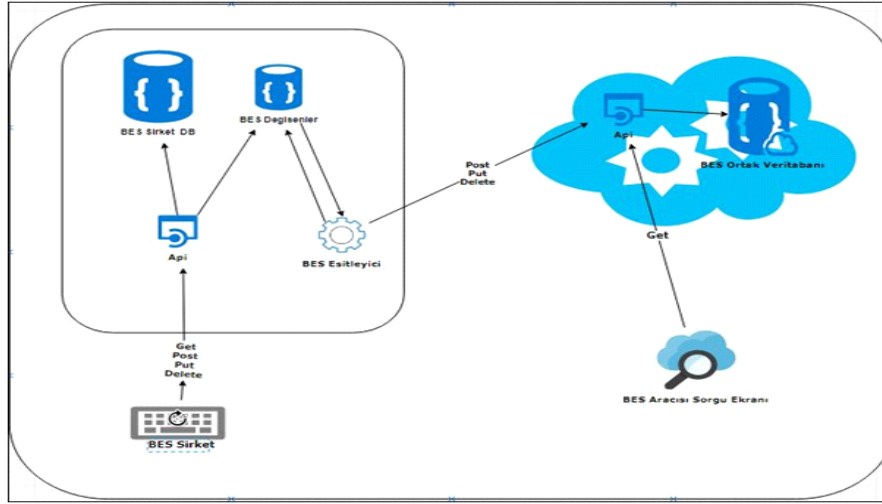
Figure 2.BES Common Cloud Architecture

After these transactions are written on BES Degisen database through API, the status is hosted as unsynchronized data with "0" code.

This "0" code is perceived through the Windows Service written for BES Degisen and it is determined that there is the data needed to be synchronized. It communicates with the API in BES Ortak and changed, deleted or added data are synchronized with BES Ortak database. In this way, the data becomes updated. When this process is completed, the status is marked as "1". This means that the data on BES Degisen is synchronized with BES Ortak. It is thought that databases are synchronized until a new transaction is perceived. In the architecture, APIs (BES Sirket and BES Ortak) play an important role in updating the data and synchronizing the data via the written service.

BES Sirket API feeds data sources by keeping BES Degisen database information to be benefitted by the services in updates to be provided for both BES Ortak and company database found within the body of companies.

On BES Sirket side, data entry personnel (BES Sirket employees) is responsible for updating the information related to the participants through the interfaces they have. At this point, three fundamental transactions are carried out;

ID	Ad	Soyad	SözleşmeD...	TC	durum	islem	Şirket
1	Ali	Demir	Pasif	11223344556	True	POST	Zemeklilik
3	Ali	Demir	Pasif	11223344556	True	PUT	Zemeklilik
4	Ali	Demir	Pasif	11223344556	False	PUT	Zemeklilik
10	Ali	Demir	Pasif	11223344556	False	DELETE	Zemeklilik

Figure 3.BES Degisen Data Table

Adding New Data

BES Sirket employees add the data to the system by receiving the data from the participant which is necessary for the participant who does not have any record in their own structures and transfer these data to the system by determining the participant's preferred participation rate (Salary percentage), payment method (Salary, Instruction, Credit Card etc.), payment period (Monthly, 3-month etc.). In this way, the participant will be involved in the BES system. While the employee enters the data, and saves them on company database, he processes the data on BES Degisen database thanks to the opportunity offered by the API used simultaneously and in this way, the database that will be sent to the BES Ortak database is created. These data are sufficient information to be used for questioning whether the participant has a record who does not include much details such as Name, Surname, Identity Number, Pension Company or Activity status.

Updating Information

BES Sirket employee updates the data of the participant, who has a record in their own systems, in situations requiring changes on issues like participant rate or activity status. Since the change made through the update screen is performed with the written API, while the company database is updated, BES Degisen database,

which hosts information like Name, Surname, Identity Number, Pension Company and Activity status of the individual within the body of the company to which data will be provided for BES Ortak, is also updated. The transaction status of the updated data will be controlled by the service and the data will be synchronized to the BES Ortak database by being triggered if there is no synchronization.

Synchronization is performed by looking at the transaction status value on BES Degisen database. If the transaction value is "0", it means that the data hasn't been synchronized and the process is initiated with the service. If the status is "1", it means that the data on the table has been synchronized. In this way, it is controlled whether the data updated on company side is also updated in BES Ortak pool.

Deleting Record

The BES participants are removed from the system by archiving their records in the Private Pension Company databases when they complete their progress periods or when they want to leave the system. The company employee deletes the participant information recorded in their own systems at this point.

While the change made by the employee from the participant update screen of the company is updated on the company database through the written API, the transaction status will also appear in BES Degisen database, which hosts information like Name, Surname, Identity Number, Pension Company and Activity status of the individual within the body of the company to which data will be provided for BES Ortak. The transaction here is the "DELETE" information meaning that the record has been archived. The transaction status of the updated data will be controlled by the service and a request will be created for the deletion of the participant data on BES Ortak database by being triggered if there is no synchronization.

Synchronization is performed by looking at the transaction status value on BES Degisen database. If the transaction value is "0" i.e. "FALSE", it means that the data hasn't been synchronized and the process is initiated with the service. If the status is "1" i.e. "TRUE", it means that the data on the table has been synchronized. In this way, it is controlled whether the data updated on company side is also updated in BES Ortak pool.

As seen in Figure 5, the data of the companies providing Individual Pension service is stored on BESSirket database. These areas are organized with data adding, updating and deleting transactions by BES employees. These are named as POST (Add), PUT (Change) and DELETE transactions.

BES Ortaklar

BESSirket

BESSirket Tablosunda arama yapabilir ve düzenleyebilirsiniz.

id	tc	ad	soyad	sirket	sözlesmeDurumu
1	12345678900	Muhammed	Yılmaz	Ziraat Emeklilik	Aktif
3	12345678901	Eyüp	Karlık	Ziraat Emeklilik	Aktif
1002	13579000	Mehmet	Elibol	AEmeklilik	Aktif
1003	11223344556	Aykut	Gökdemir	AEmeklilik	Aktif

Figure 4.BES Common Query Table

From the BES Query screen, information like the identity numbers, names, surnames, pension company and agreement status of the participants can be reached. In this way, the participant information is not synchronized in detail and the work load is reduced. In addition, the detailed information that can cause the participant victimization in the BES Ortak system will not be stored in a common area outside the company.

Furthermore, it is possible to mention many benefits. Query can be made in a faster way in case of data shortage. Synchronizations can be made faster and data update is enabled momentarily. One of the biggest factors is that the use of a common structure is in question in all Individual Pension companies.

BESSirket

BESSirket Tablosunda arama yapabilir ve düzenleyebilirsiniz.

Search..

id	tc	ad	soyad	sirket	sözlesmeDurumu	katkıYapan	katkıPayıTutarı	odemePeriyodu	odemeAracı	sozlesme_No	besGirisTarihi	musteriNumarası
1	12345678900	Muhammed	Yılmaz	Ziraat Emeklilik	Aktif	Muhammed	150	AYLIK	MAAŞ	123456	2018-04-27T00:00:00	123456
3	12345678901	Eyüp	Karlık	Ziraat Emeklilik	Aktif	Eyüp	150	AYLIK	MAAŞ	123457	2018-04-27T00:00:00	123457
1002	13579000	Mehmet	Elibol	AEmeklilik	Aktif	Mehmet Elibol	200	AYLIK	EFT	13579	2018-05-01T00:00:00	13579
1003	11223344556	Aykut	Gökdemir	AEmeklilik	Aktif	Aykut Gökdemir	200	AYLIK	Kredi Kartı	11223	2018-05-01T00:00:00	13579
2002	11223344556	ali	demir	Zemeklilik	Pasif	Ali Demir	200	AYLIK	Kredi Kartı	13333	2018-05-01T00:00:00	123458

Figure 5. BES Common QueryDetailed View Table

Before making an offer to the individuals to be included in an additional individual pension system, in order to measure the participant potential, it is possible to reach the detailed table by revealing the best offer by paying attention to the company benefits according to the potential of the participant that will enable the participant to accept the offer by putting forward information like total amount of contributions, payment period, payment method, fund preference and progress payment.

• RESULTS AND DISCUSSION

Companies operating in financial sector exhibit a distanced approach forkeeping their data location-dependent with the effect of BRSA's (Banking Regulation and Supervision Agency) sensitivity about data privacy and security. Therefore, they behave timidly about Cloud Technologies.

According to the European Union Data Protection Directive (European Council,1995) [10], companies offering cloud computing service have to ensure the required information security level determined by the EU laws in order to establish or rent their servers outside the EU countries [11].

In the agreementsconcluded with users,cloud service providers specify that the responsibility regarding the information security and protection of data integrity belongs to the user and this condition is accepted with the terms of service [12].

Individual Pension System, which we take as an example, may have certain deficiencies at some points that can cause inconveniences in the progress like not storing the date in the same formats, common data pool that is becoming more widespread in our country. At this point, it becomes inevitable to benefit from the latest technologies like in many other sectors.

Thanks to cloud computing, the distributed structure running independently of each other in pension companies can be gathered in a single center and managed from here.

Thanks to this work, the participant data, which the pension companies have, will be gathered in a pool through the BES Ortak system by selecting only the part that will meet the need (such as Name, Surname, Identity Number, Pension Status). It will become easier to reach the data through the developed system instead of reaching the pension companies one by one or any other challenging process.

The integrity of the data that will be added to this pool should be in a certain format and order. Therefore, pension companies should store the data in a certain order and provide the data in this way. In this way, a data pool that is easy to use can be created. The data can be added or deleted easily. The work load of organizing the data according to a certain format and adding them to the system in this way at every turn will be removed. As a result, the deduplication process will be supported.

Its benefits in terms of Individual Pension System;
- Making a new offer to the participants whose allowance is coming to an end
- Determining the potential of automatic participant cost
- Avoiding unrealistic participation amounts that the participant will stay away from
- Accessing the updated data of the BES participant at any time
- Accessing the updated data of the location-independent BES participant
- Measuring the participant payment habits
- Creating a centralized data in fund management
- Access through the mobile application

After communicating with the employees working on the side of individual pension, it has been concluded that there isn't any common platform hosting the information of the participants in other companies and there is also no standard about data storage and transmission while making participant transfer between pension companies. Because of these reasons, the need for creating such a system shows up by detecting the solution offers regarding this need.

In addition, systems that can meet different needs with a more developed performance can be developed with new technologies to be used in the ongoing process for the system that is being developed. The web-based application will also be able to offer service as a mobile version application. It is suitable for further developments.

Companies operating in financial sector exhibit a distanced approach for keeping their data location-dependent with the effect of BRSA's (Banking Regulation and Supervision Agency) sensitivity about data privacy and security. Therefore, they behave timidly about Cloud Technologies. This is the biggest problem experienced in the study.

Furthermore, the other important problem is that the technologies used by the pension companies for storing data are different from each other. This will impose the obligation to include different data types in the system. However, the obligation for individual pension companies to design the data on a common architecture and then to be included in the system has removed this problem and created an obligation enabling the creation of the data on a common architecture in the pension company itself.

• CONCLUSIONS

In the era of developing information technologies, every sector inevitably finds a place for itself in cloud computing architecture that is among the constantly developing technologies. In this study, it is aimed to provide an opinion regarding what to include and what method to use in cloud computing as different units in finance sector in the future through implementing the developed system on cloud computing architecture and performing practicality tests. The further development of this system is also aimed by making additions in the future.

It will be effective to benefit from the latest and common technologies in order to reveal the status of the audience, who has the potential to be an Individual Pension participant, through an environment that is easily and quickly accessible. In this context, it is necessary to benefit from the Cloud Technologies that can be accessed from many locations and that can gather many structures in a single center.

This study aims at constituting a source and leading the way for Cloud Computing providers, IT Managers, university academicians and students who want to use the Cloud Computing Technologies in Finance Sector or who want to conduct studies in this regard.

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