

BUILD A PHP & MySQL APPLICATION FOR TEXT SECURE ON AZURE CLOUD

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Abstract

Cloud Technology is astronomically used by business companies. It offers an on-request service, substantial network connectivity, flexibility, and other benefits. The use of cloud services is hampered by several security issues. When a user processes and uploads confidential data to the cloud platform, it must be sent and stored securely.

Transferring sensitive or classified texts, the encryption technique is applied to hide private information, the Affine Cipher method is used, a type of mono-alphabetic substitution encryption, where each letter of the English alphabet is mapped to its numerical equivalent, encoded using a mathematical function and returned in letters.

What this system does is that it allows users with accounts authorized by the cloud owner to log into the system with a username and password, to preserve the encryption and decryption of the text that they previously exchanged publicly.

The encryption of the text is done by generating two keys, while the receiver of the encrypted text must send two keys to decrypt the text.

If the encrypted text is sent publicly, others will not know what it is, and it will be received by the recipient.

This algorithm makes it possible to make sure that the encrypted text is sent secretly without interference from Internet abusers.

The system for coding uses PHP 8.0 and the online MySQL database to store all related information. Finally, the encrypted and decrypted texts are stored in the database of the Azure Cloud, the project will be accessed in the web browser through the link generated.

Keywords: Azure Cloud, PHP MySQL, Affine Cipher, Encryption, Decryption.

1. Introduction

Azure Cloud has a marked popularity in the field of computer science and networks. As a single machine with different clients, the cloud has three levels of services which are: Infrastructure as a service (IaaS). Platform as a service (PaaS). Software as a service (SaaS).

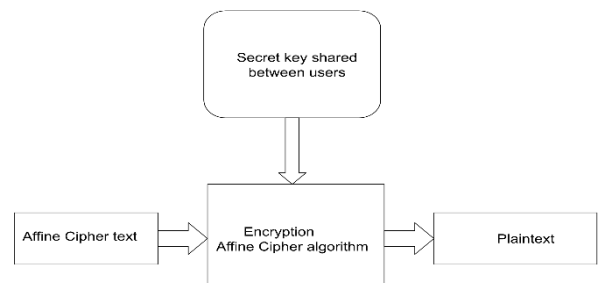


Figure 11. Encryption

Security in the Cloud is a challenge for time, also encrypted messages require a high level of privacy, security storage of data, as well as a powerful algorithm for encryption.

The system enables the secret messages transmitted in public networks by the user to the application authorized by the cloud owner. To be encrypted, decrypted and the same to be recorded in the cloud database.

To achieve this encryption security goal, the Affine cipher method is used using two secret keys, where the first key must be an inverse number while the second key must be a full number. For each letter of the English alphabet there is an equivalent number, then mathematically calculated with key1 and key2 to do the encryption and decryption.

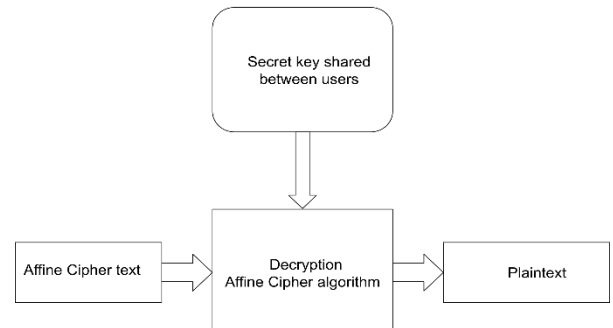


Figure 2. Decryption

2. Literature of Survey

PHP application to Azure App Service and integrate it with Azure Database for MySQL - Flexible Server on the back end. Here you'll use public access connectivity (allowed IP addresses) in the flexible server to connect to the App Service app.

Create a MySQL flexible server, Connect a PHP app to the MySQL flexible server, Deploy the app to Azure App Service, and Update and redeploy the app. [5]

Client-side encryption involves encrypting data on the client (user's device) before uploading it to Azure Storage. This ensures that the data is encrypted during transit and while at rest on the server. The encryption keys are managed by the user, ensuring complete control and enhanced security.[6]

- In 2020 alone, 61% of businesses migrated their workloads to the cloud.
- 48% of businesses choose to store their most important data in the cloud.[7]
- While according to author Duncan MacRae in 2022; As many as 81% of organizations have experienced a cloud-related security incident over the last 12 months, with almost half (45%) suffering at least four incidents.[8]

And now we can see the results of this approach: incidents of people in the cloud are increasing rapidly. We need to put security on cloud companies and create such services, which are monitored and controllable in cloud and application. We chose Affine Cipher for encryption and how to use them, implement and learn about more of the existing ways.

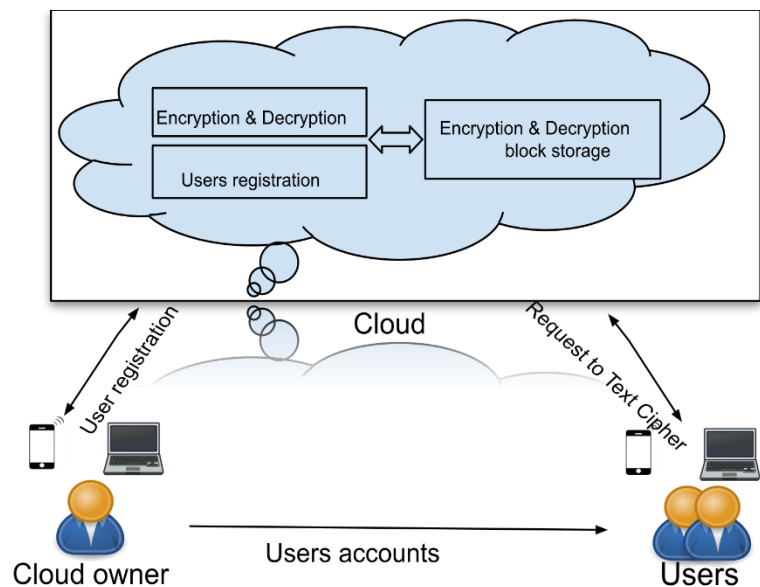


Figure 3. Architecture of the System

This paper Journal “Secure File Storage on Cloud Computing Using Cryptographic Algorithm” [11]. Explains the method in this paper implementing and transferring secret information on cloud.

3. Proposed System

The proposed system has as its primary purpose the security of the text inserted into the cloud server, as well as the method of implementing the Affine Cipher algorithm in the code and database.

The system through the table displays and reflects the results of how the encryption process was developed, how much memory it consumed, and for how long the code block was executed by the server. The whole process is saved in the database of the Cloud server.

First, after connecting to the system, users authorized by the Cloud owner can encrypt and decrypt messages and this process will be saved in the cloud, then the encrypted messages will be able to be transmitted publicly via the Internet from different communication platforms. Each user has a secure username and password and privacy in the application using their user ID.

- **Cloud Owner:** registers accounts for authorized users.
- **Users:** Every user has access to the system from anywhere and anytime.

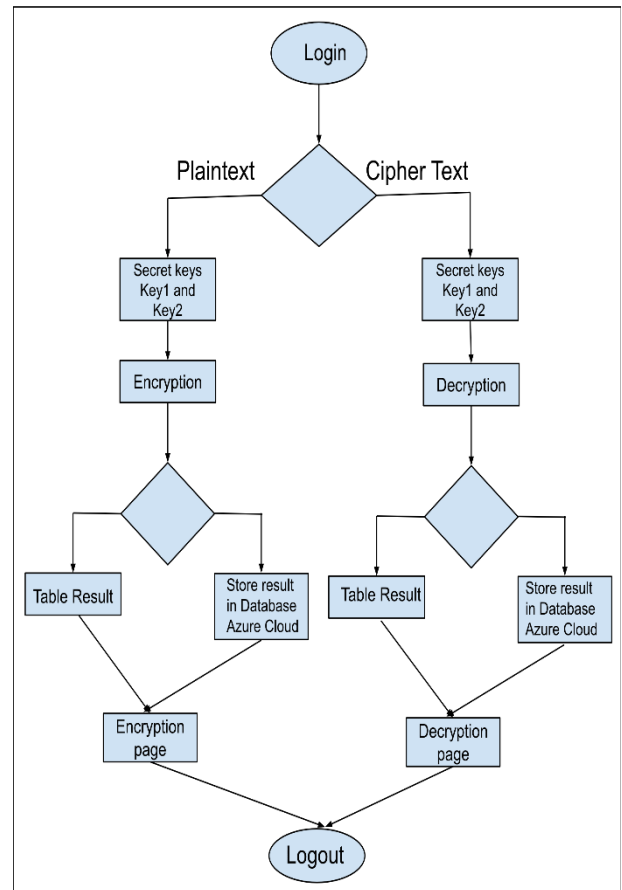


Figure 4. Activity diagram

- **Encryption and Decryption.** After users in the system do the encryption of the text, they can exchange encrypted messages in a public and secure way, possessing the keys secretly.
- **Cloud:** It is used to store the data which can be accessed anywhere and at any time whenever the user requires.

4. Methodology and Results

Working and Storing process to the cloud, the below figures are the screenshots of the proposed system.

- To choose a text.
- Choose the two secret keys.
- Encrypt Plain text or Decrypt Cipher.
- Submit button for inserting process to the database.

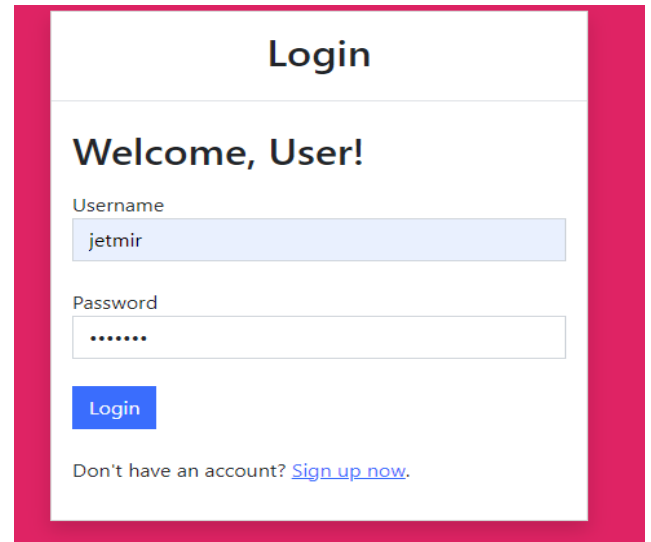


Figure 5. Login Page for Users

Starting, the users get login with an authorized username and password generated by Clod Owner.

Page generated in 0.2987 seconds..

The script is now using: **405KB** of memory
Peak usage: **409KB** of memory..

Array ([0] => A [1] => B [2] => C [3] => D [4] => E [5] => F [6] => G [7] => H [8] => I [9] => J [10] => K [11] => L [12] => M [13] => N [14] => O [15] => P [16] => Q [17] => R [18] => S [19] => T [20] => U [21] => V [22] => W [23] => X [24] => Y [25] => Z)

Tabela alfa numerike per enkyptim Affine Cipher

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21

Entry text for encryption

INFORMATIKA

Key1 x Key2 +

Action	Number	User ID	Key1	Key2	Mod	Text without encrypted	Without encryptet number	Text encrypted	Encrypted number	Count text	Currently memory usage.	After memory usage.	Total time
Delete	1	1	7	5	26	INFORMATIKA	8.13.5.14.17.12.0.19.8.10.0	JSOZULFIJXF	9.18.14.25.20.11.5.8.9.23.5	11	405	409	0.2987

Figure 6. Encryption Page

In figure 6, the user opening encryption page, Plain text in text area for encryption, input secret Key1, Key2

and submit for inserting and results are showing in the table.

Page generated in 0.2653 seconds..

The script is now using: **404KB** of memory
Peak usage: **408KB** of memory..

Array ([0] => A [1] => B [2] => C [3] => D [4] => E [5] => F [6] => G [7] => H [8] => I [9] => J [10] => K [11] => L [12] => M [13] => N [14] => O [15] => P [16] => Q [17] => R [18] => S [19] => T [20] => U [21] => V [22] => W [23] => X [24] => Y [25] => Z)

Tabela alfa numerike per dekriptim Affine Cipher

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21

Entry text for decryption

JSOZULFIJXF

Key1 x Key2 +

Action	Number	User ID	Key1	Key2	Mod	Text encrypted	Without encryptet number	Text decrypted	Encrypted number	Count text	Currently memory usage.	After memory usage.	Total time
<input type="button" value="Delete"/>	1	1	7	5	26	JSOZULFIJXF	9.18.14.25.20.11.5.8.9.23.5	INFORMATIKA	8.13.5.14.17.12.0.19.8.10.0	11	404	408	0.2653

Figure 7. Decryption Page

In figure 7 the user opening decryption page, Cipher text in text area for encryption, input secret Key1, Key2 and submit for inserting and results are showing in the table.

5. Code deploy or code edit & Database upload or Database management System

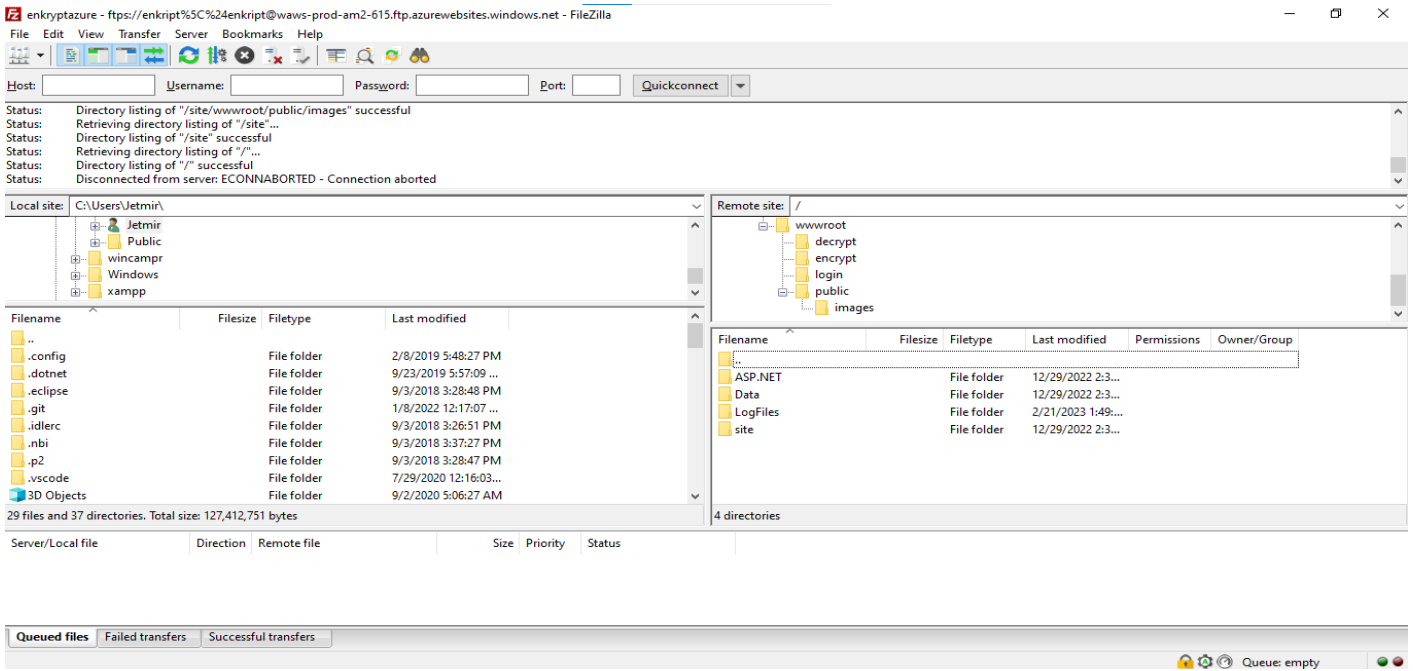


Figure 8. FileZilla software for deploy and edit code in Azure Server

In figure 8 deploying code, editing files in server cloud, is used FTP application FileZilla.

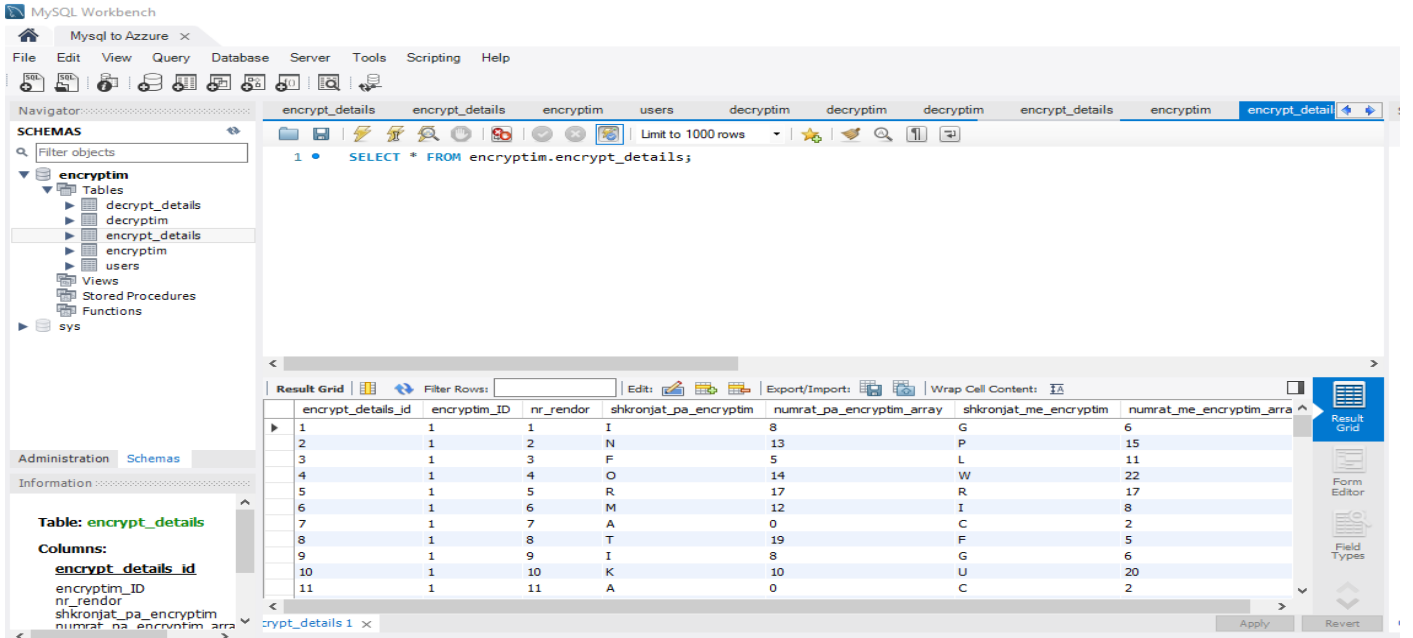


Figure 9. MySQL Workbench, software for Upload and DBM in Azure Server

In figure 9 uploading database to the cloud server cloud and DBMS is used application MySQL Workbench.

6. Conclusions

The main purpose of the system is for system users who have accounts created by the cloud owner, where they will be able to encrypt and decrypt messages that they have exchanged among themselves in a public way, and they will be able to save the same.

Encrypting and decrypting messages is done by using the Affine Cipher algorithm, where each user logs into the system performs encryption and decryption, and stores the data in the Azure cloud in a private way.

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