**BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, PILANI**

**FIRST Semester 2023-23**

**SSWT ZG628T DISSERTATION**

**Dissertation Outline**

**BITS ID No: 2020WA86535 Name of Student: Jayarag A V**

**E-mail ID of the student: 2020wa86535@wilp.bits-pilani.ac.in**

**Name of Supervisor:** Dileep Vasam

**Designation of Supervisor**: Senior Administrator

**Qualification and Experience:  Bachelor of Technology with**

**E- mail ID of Supervisor:**

**Title of Dissertation**:     AWS EBS/EFS/RDS Automated encryption using Boto3 – Python SDK for AWS

**Name of  First Examiner:** Manikanta Chekka

**Designation of First Examiner**: Administrator

**Qualification and Experience: Bachelor of Technology with 5.8 years of experience.**

**E- mail ID of First Examiner:**

**Name of Second Examiner:**

**Designation of Second Examiner: Pradeep Kumar**

**Qualification and Experience: Bachelor of Technology**

**E- mail ID of Second Examiner:**

**Supervisor’s rating of the Technical Quality of this Dissertation Outline**

EXCELLENT / GOOD / FAIR/ POOR (Please specify):        \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Supervisor’s suggestions and remarks about the outline:**

(Signature of Student)                                                                                                (Signature of Supervisor)

Date:------------                                                                                                            Date:---------------

**Body of the outline**

1. **Discussion on the chosen topic**

AWS EBS/EFS/RDS Automated encryption using Boto3 – Python SDK for AWS automates the encryption of existing EC2 instances with EBS volumes, EFS file systems and RDS Database instances.

Encryption is a mandate in every organisation to secure data at rest or in transit. AWS has different storage options and EBS, EFS and RDS are different ways to store block data, file share and database. It is necessary to have them encrypted to keep the data safe from any malicious actors.

AWS has no straightforward way to encrypt existing data in EBS/EFS/RDS. Thus, we must perform series of actions to achieve the same. Some of these actions are error prone, time consuming and requires high downtime of services.

There are several ways to interact with AWS. Through AWS Management console, AWS CLI and AWS SDKs. Boto3 is python SDK for AWS, which is widely used and maintained. The easiness of use and extensive documentation makes Boto3 a go-to choice for interacting with AWS APIs with a programming language (Python).

Encrypting EBS/EFS/RDS through AWS Management console/AWS CLI is possible but is time consuming and error prone. Performing a series of repetitive tasks manually can lead to human errors. It needs continuous monitoring, which takes up lot of productive time of the administrators when done in scale.

The solution proposed in this paper automates all the necessary steps needed to encrypt these data storage solutions in AWS, making it easier and convenient. An administrator just has to use the cli tool and provide an input. Rest of the things

will be carried out by the tool.

**2. Detailed Plan of Work** (for 16 weeks)

|  |  |  |  |
| --- | --- | --- | --- |
| Serial Number of Task | **Tasks or subtasks to be done** (be precise and specific) | Planned duration in weeks | Specific Deliverable in terms of the project |
| 1 | Project Planning and Research | 2 | Define scope, identify requirements and setup AWS environment |
| 2 | Understanding EBS, EFS and RDS | 2 | Understand the architecture of EBS, EFS and RDS and learn the encryption mechanisms. Review the boto3 documentation. |
| 3 | Designing code | 2 | Design overall architecture of the encryption script. Create flow charts. Plan for testing and validation. |
| 4 | Implementation - EBS Encryption | 2 | Start coding the function for encryption of EBS. Implement it in AWS and test. |
| 5 | Implementation - EFS Encryption | 2 | Start coding the function for encryption of EFS. Implement it in AWS and test. |
| 6 | Implementation - RDS Encryption | 2 | Start coding the function for encryption of RDS. Implement it in AWS and test. |
| 7 | Creation of CLI tool, testing and debugging. | 2 | Create the CLI tool after packaging the whole code and test it in AWS environment. |
| 8 | Documentation and Reporting | 1 | Write detailed documentation for the script, including usage instructions and examples. Write the final report for the dissertation, including an introduction, methodology, results, and conclusion. |
| 9 | Final Review and Submission | 1 | Conduct a final review of the script, documentation, and report.  Submit the final version of script, documentation, and dissertation repory. |

**References :**

**[Amazon EBS encryption - AWS Documentation](https://docs.aws.amazon.com/ebs/latest/userguide/ebs-encryption.html" \l ":~:text=You%20cannot%20directly%20encrypt%20existing,KMS%20key%20for%20EBS%20encryption.)**

**[Encrypting data in Amazon EFS - Amazon Elastic File System](https://docs.aws.amazon.com/efs/latest/ug/encryption.html)**

**[Encrypting Amazon RDS resources - AWS Documentation](https://docs.aws.amazon.com/AmazonRDS/latest/UserGuide/Overview.Encryption.html)**

**[Boto3 1.34.147 documentation](https://boto3.amazonaws.com/v1/documentation/api/latest/index.html)**