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Cloud based Secure Employee Review Management System

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Abstract: Cloud computing is gradually and slowly becoming accepted in different sectors and the businesses are beginning to adopt the cloud's shared infrastructures and applications. Most of the companies like Amazon, Google, Microsoft and Netflix all rely on cloud computing in order to deliver their services with countless untapped benefits that are yet to be discovered, the future is bright for cloud computing. Cloud is like an infinite resource pool which is a virtualization concept. Both hardware, software resources are packaged to work as services, users can access it and use it according to their needs using the Internet. Users typically pay only for cloud services they use, helping lower their operating costs, run infrastructure more efficiently and scale as their business needs change. Cloud computing provides the following benefits - Cost saving, Faster deployment, Reliability, Easy mobility, Unlimited Storage capacity, Easy collaboration, Web based control, Security and many more. The need for cloud based secure Employee Review Management System (ERMS) is due to the fact that one of the basic challenges of Enterprises is human resource management and how to effectively manage employee information. The main motive of our cloud-based solution for employee management system is to adapt cloud infrastructure to achieve scalability, performance and efficient resource sharing. We are proposing a solution using Service Oriented Architecture with NoSQL databases. The modules that will be implemented are Authentication, Role Management, Profile manager, Scheduler, MIS(Report generation). Technologies that will be used for this project are MongoDB databases that will be used to store the data which is given as input by the user and for the front-end React and JavaScript will be used. The service layer will be made using Jersey (JAVA JAX-RS) API's.

Keywords: ERMS, Cloud, Virtualization, Authentication, Deployment, Profile management, Scheduler, Report generation.

I. INTRODUCTION:

For any organisation to run smoothly, it's necessary that it has some sort of record for its staff to manage their details. These records may contain details to calculate the pay, manage the workforce and review performance of each employee. Since the management of the whole staff is not an easy or time saving task, an EMS or Employee Management System can be used here for all these tasks.

An ERMS can be a big help for the HR (Human Resources) of the organisation, since it plays an important part in the success of any organisation. Organisations often highly invest on the management of employees, such an example could be the HRIS, which is nothing but a Human Resources Information System that is used to manage the inventory control and accounting.

The Performance Review is a formally regulated assessment of different employees, whose purpose is to learn more about their strengths and weakness and in turn offer constructive feedback for skill development in the future.

ISRO, the Indian Space Research Organisation is the national space agency of India, the headquarter of which is in Bangalore.

It operates under the Department of Space which is directly overseen by the Prime Minister of India, while the Chairman of ISRO acts as the executive of DOS as well. There are 37 ISRO centres across the country. Review system for employees is a must in every organization and also in ISRO.

There is a review system to maintain the employee information of the technical staff. This review software has 4 different types of user roles.

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II. PROPOSED METHODOLOGY:

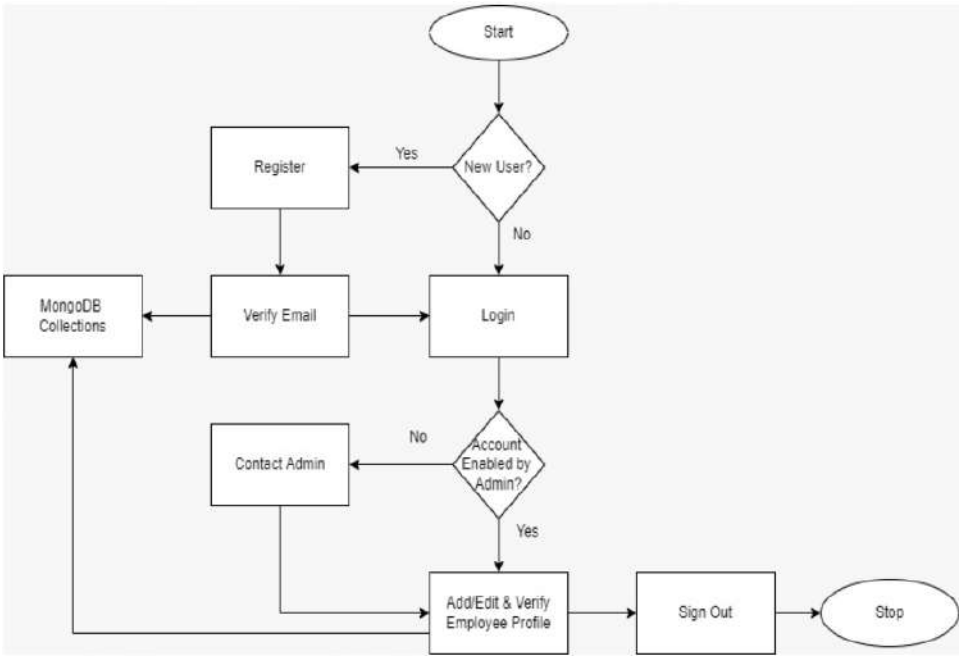

Figure 1: Flow diagram

Server Oriented Architecture:

SOA architecture stands for Service-oriented architecture and it is a phase of the evolution of application development. Reusability of a software component can be determined by the help of some of the interfaces. It is more or less a design process where services are shared among different components by application components through a network. SOA architecture usually maintains the procedural call model which is most commonly used in structured programming, which ultimately builds a standard in which way business processes are automated and used, which, if done properly maintains security and governance. Since all the services are independent in the SOA architecture, they can be easily modified and updated without affecting any other services. All this in turn helps makes the services much easier and faster to assemble the applications without having to build the application from the scratch, and since it's easier to debug these services, the resultant applications are much more reliable.

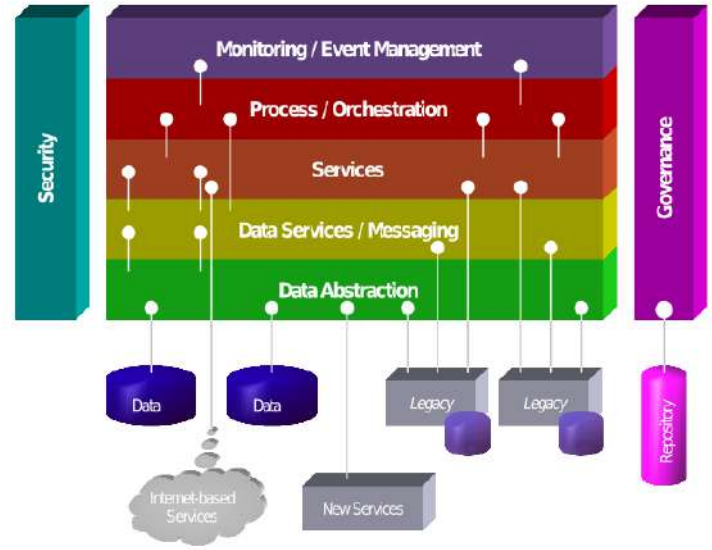

Figure 2: SOA (Service Oriented Architecture)

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Web Services:

The client and server applications need a medium to communicate with each other on the World Wide web(www) and web services act as that medium . Web services are software modules that are designed in order to perform set of tasks requested by the user/client.

Whenever a web service in a cloud is required, it can be easily searched and invoked over the network. An invoked web service can provide the user/client a platform to perform different functions/operations. As we see almost all the modern businesses use applications to wide spread themselves with help of the e-market. These applications are made using various programming platforms and developed in different languages like Java, .Net, Node JS Angular JS etc. These apps, heterogeneous in nature need to communicate with each other at times and it becomes quite a difficult job due to their different developing languages and other such differences

Here is when web services come into picture, web services provide the required platform which allows these apps to communicate with ease.

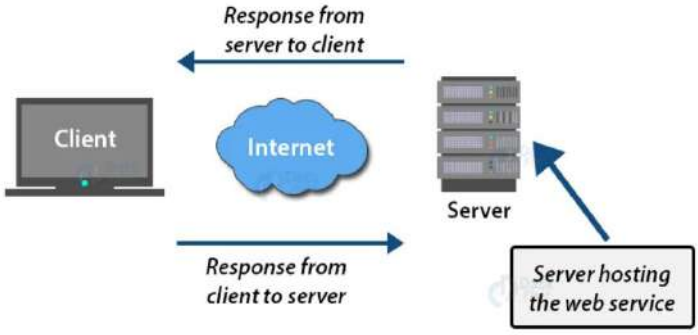

Figure: 3 Web Services

JAX-RS:

JAX-RX is a specification, a set of interfaces and annotations offered by Java EE. The goals of the JAX-RX API are primarily based on POJO (plain old Java objects), that is, they are used to provide collection of classes and interfaces and their respective annotations which can be used with POJOs so as to expose them as Web Resources. It's independent of the format it uses so as it can be applicable to aa wide Variety of HTTP entity body and provide necessary insertion techniques to allow additional types to be added.

Annotations in the JAX-RX API are used to provide meta-data around the Web resource. Let's take an example of @GET annotation which can be used with @PATH annotation to identify the method that should handle a GET request to the specified URI in the @Path annotation.

Figure: 4 JAX-RS

MongoDB:

MongoDB is open source as well as a NoSQL database management system . As the name suggests, NoSQL stands for No structured query language which is used as an alternative to traditional relational databases/SQL.

When working with a large set of data which are in different formats, using tables and rows as in relational databases doesn't works. For these NoSQL is the best data storage system .MongoDB is a tool to store, retrieve data and it manages it in a document-oriented form. The architecture of MongoDB is made up of documents and collections .

Many organizations use Mongo DB for implementation of different features like indexing, load balancing, ad-hoc queries, aggregation, server-side JS execution and many more.

In MongoDB Documents are the basic unit for data and has namely 2 parts, field and value pairs . The Documents use BSON (Binary JS Object Notation) which can accommodate many more data types then JSON. The Fields part of

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Documents is similar to columns in a Relational DB while the Values consists of variety of data types, other Documents, arrays of Documents.
Document also consists of a primary key which is used as a unique identifier when required.

Figure: 5 MongoDB

III. RESULTS:

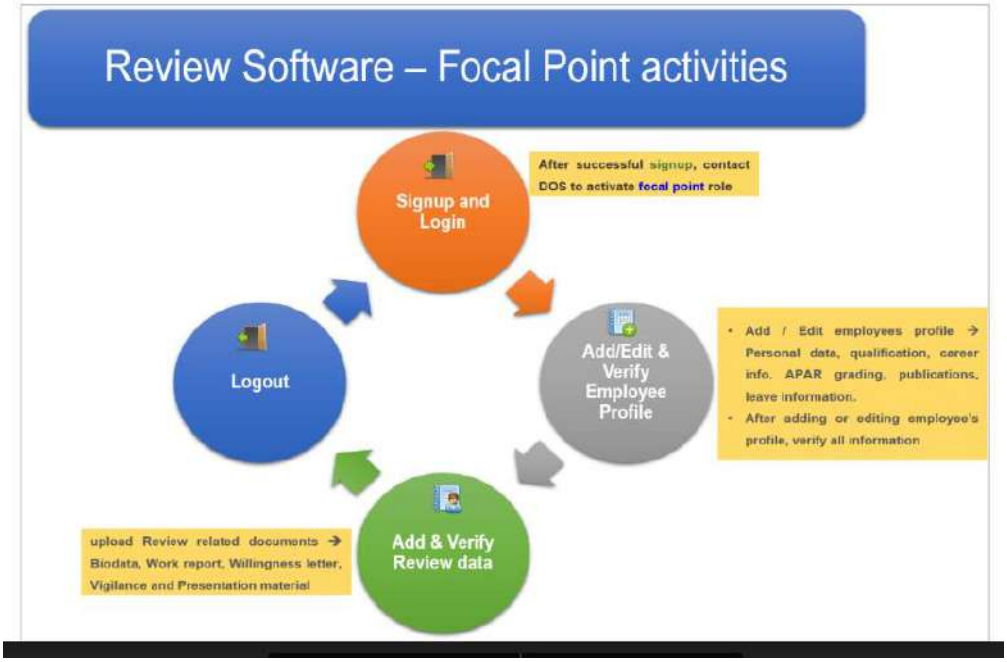

Figure: 6 Review software instructions

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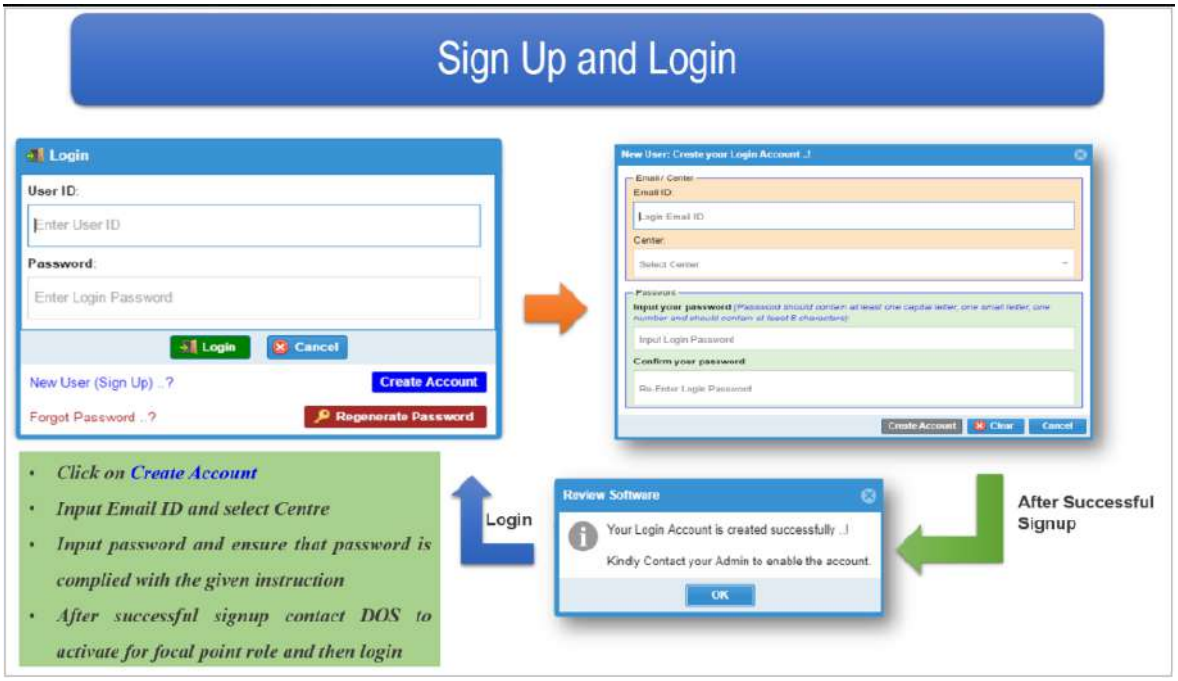

Figure: 7 Login & Sign-up pages

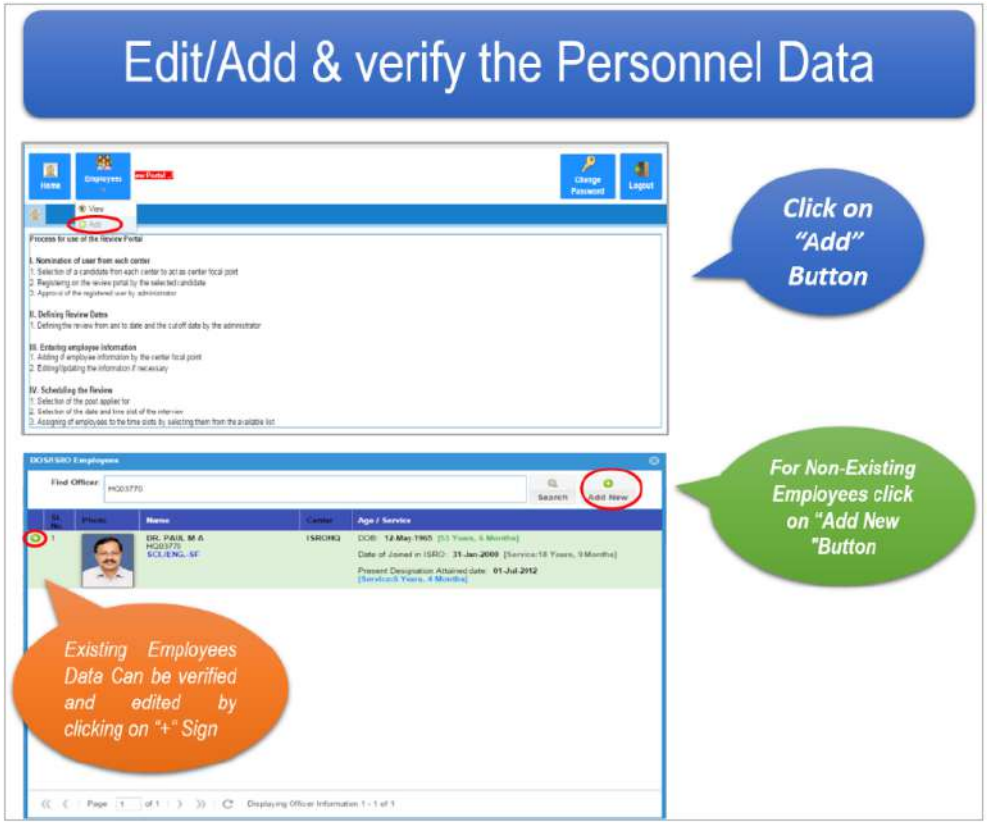

Figure: 8.1 Add/Edit personnel data

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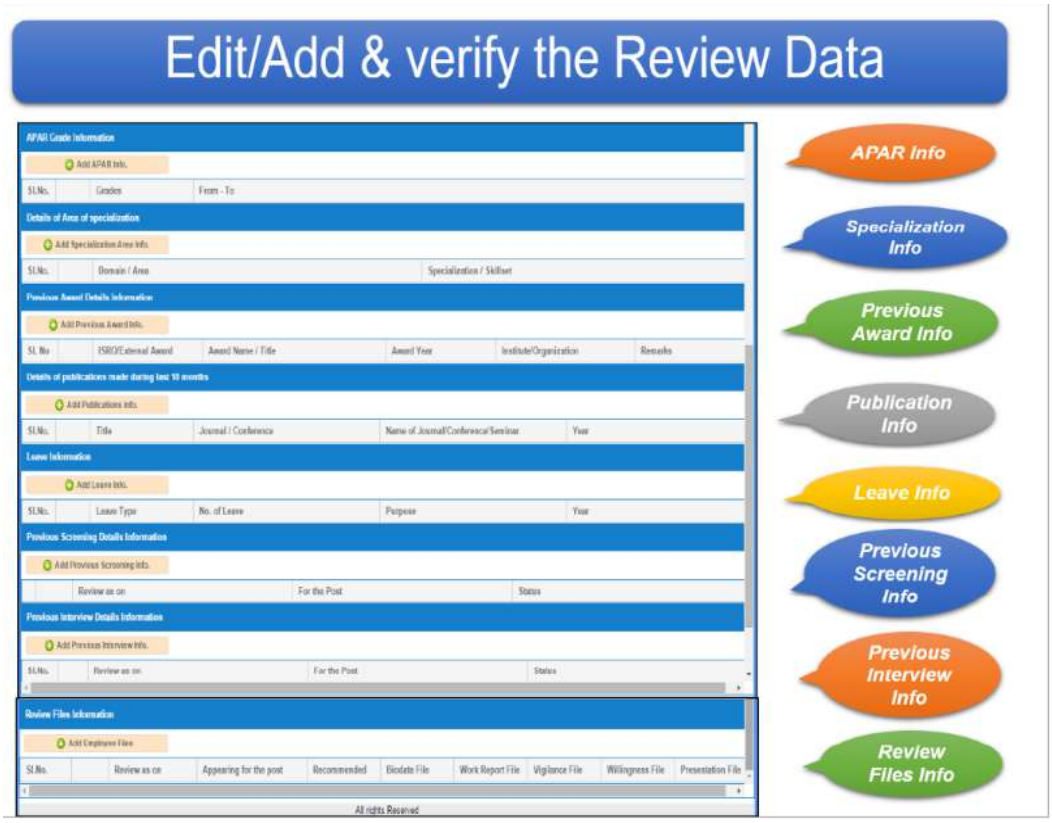

Figure: 8.2 Add/Edit review data

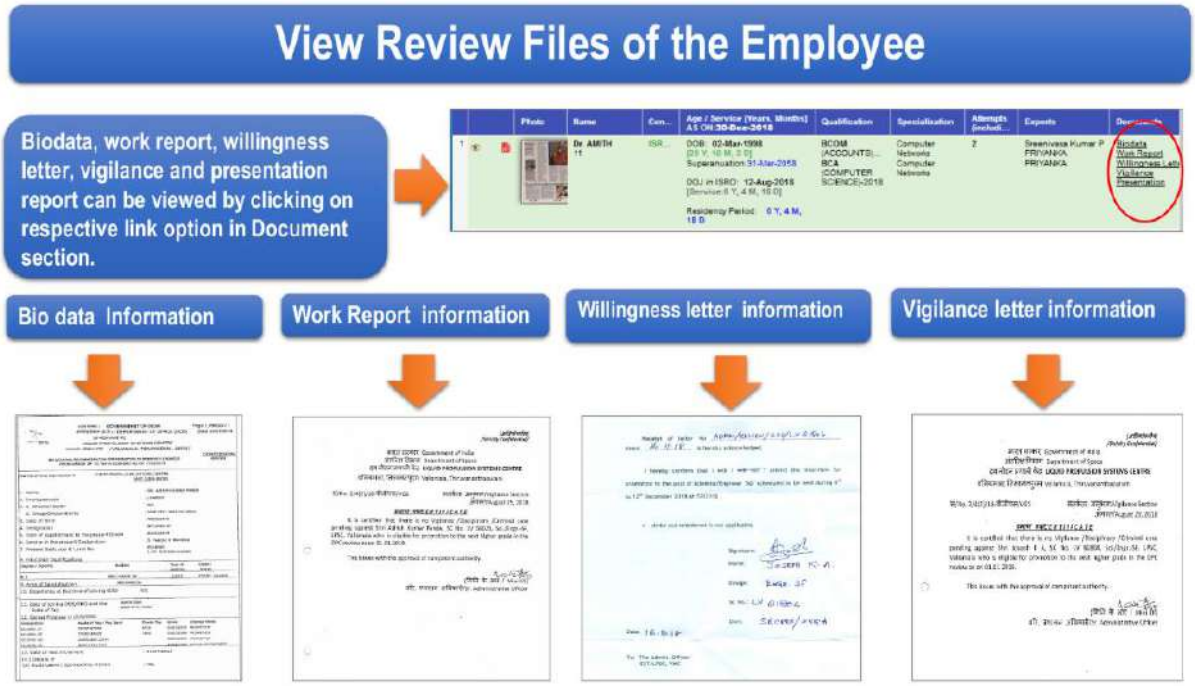

Figure: 9 View the review files

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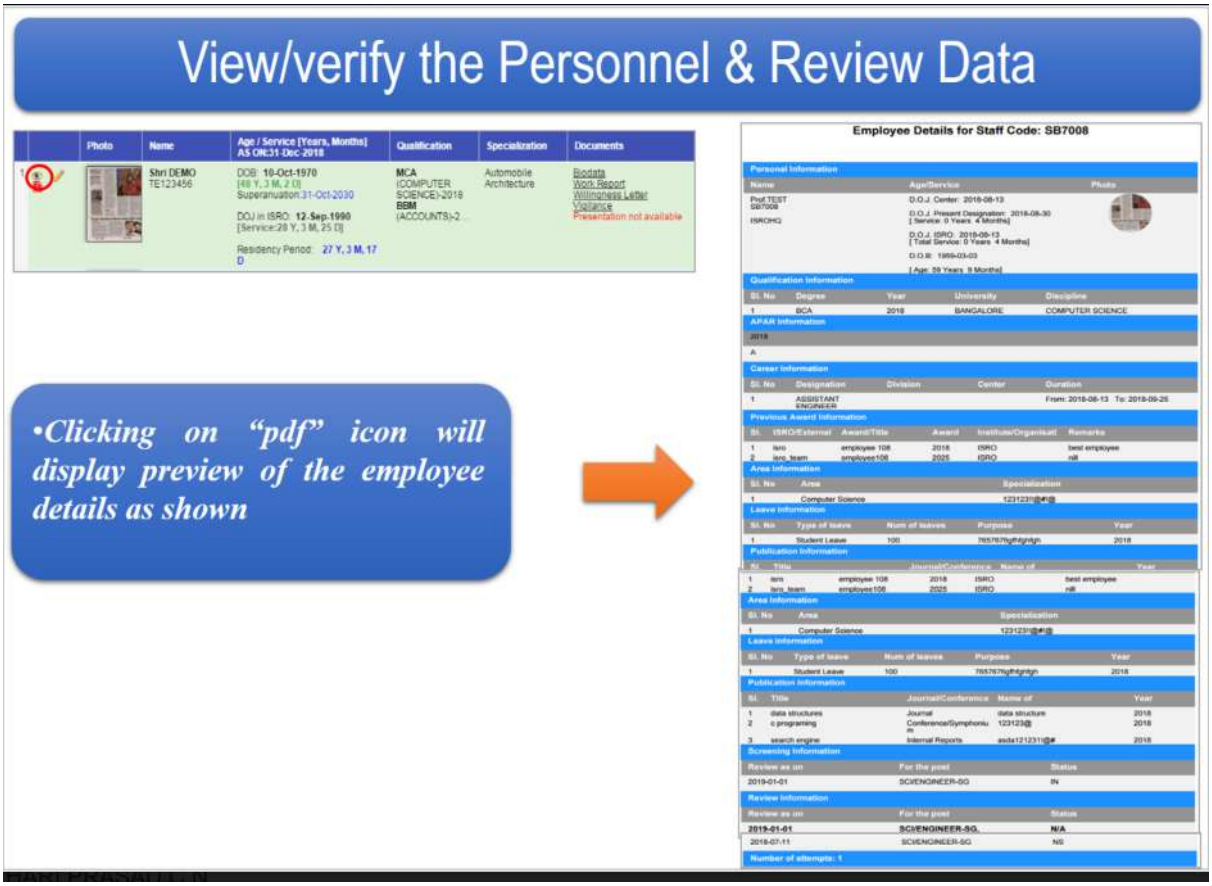

Figure: 10 Pdf generation

IV.CONCLUSION:

In this paper, we utilize JAX-RS to make the web service in Java, SOA architecture to do the application development and MongoDB to store the large information as collections. Our web service has been run and tested and is going to be used for the review which happens half yearly. The proposed solution is successfully operational and is carried out to perform the internal review process online. The software is developed using latest open-source Web technologies.
In the future implementation, we will utilize JavaScript Web Tokens and OAuth to improve the security.

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