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Automation of PL/SQL-based ETL Process Using Shell Script

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Abstract: ***This paper presents an automated ETL (Extract, Transform, Load) framework using SQL, PL/SQL, and Bash scripting to process structured data files and insert them into an Oracle database. The system is enhanced with a critical notification mechanism via SMS alerts using public SMS APIs. The primary focus is on database automation, error logging, and alert integration, providing a lightweight yet scalable solution for ETL operations in academic and real-world settings.***

Keywords: ETL, PL/SQL, Shell Script, Oracle, Alert Notification, Automation

1. Introduction

In modern data-driven environments, automating ETL tasks is crucial to maintain consistency and accuracy. This paper demonstrates an efficient, low-cost automation method using Oracle PL/SQL and Bash scripting. The novelty lies in integrating conditional alerting through SMS APIs, allowing administrators to respond to critical job failures in real-time.

2. Related Work

Existing ETL tools like Apache Nifi, Talend, and Informatica offer powerful features but are resource-intensive. This research focuses on lightweight scripting-based automation for small-scale systems in academic or low-infrastructure environments.

3. System Architecture

The updated system architecture is designed for lightweight ETL automation using shell scripts, PL/SQL, and Oracle. An optional SMS alert module is included for future integration but is currently disabled due to connectivity/API issues.

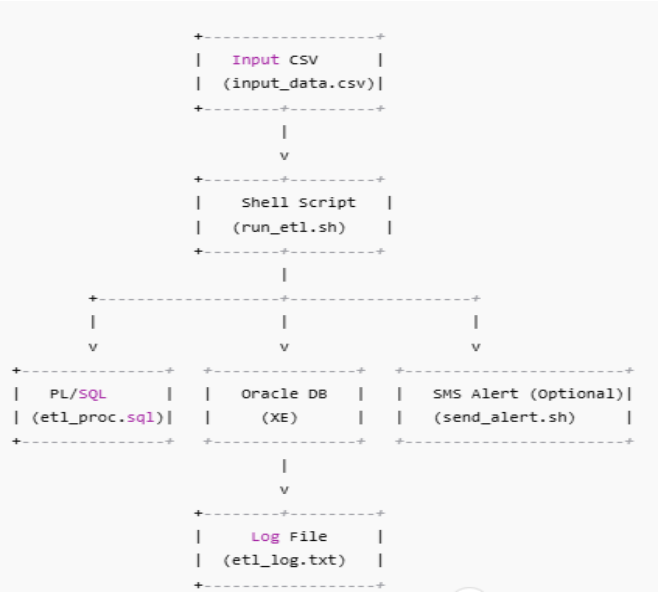


Figure 1: System Architecture

3.1 Implementation

Project Folder Structure

```
etl_alert_project/
├── data/
│   └── input_data.csv
├── scripts/
│   ├── run_etl.sh
│   ├── etl_proc.sql
│   └── send_alert.sh
├── logs/
└── etl_log.txt
```

- run_etl.sh: Bash script to check the input file, trigger PL/SQL, and optionally send SMS.
- etl_proc.sql: Script that creates a table and inserts data into Oracle DB.
- send_alert.sh: (Optional) Sends SMS using Fast2SMS API

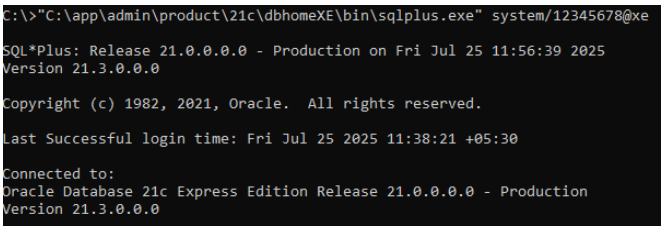
3.2 Sample Input File Format

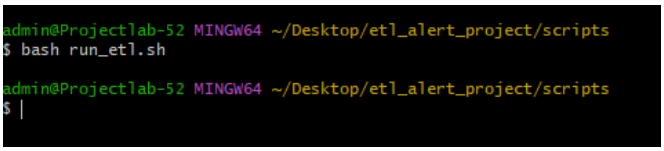
studentid	studentna	departme	mobilenumber	email	attendanc	status	enteredby
1001	Aarthi R	CSE	9876543210	aarthi@ex	7/1/2024	Present	admin
1002	Karthik M	ECE	9876543211	karthik@e	7/1/2024	Absent	hodcse
1003	Kavya S	CSE	9876543212	kavya@ex	7/1/2024	Present	hodcse
1004	Deva L	MECH	9876543213	deva@exa	7/1/2024	Late	faculty01
1005	Shalini V	IT	9876543214	shalini@e	7/1/2024	Present	faculty02
1006	Naren D	CSE	9876543215	naren@ex	7/1/2024	Absent	hodcse
1007	Bhuvana F	ECE	9876543216	bhuvana@	7/1/2024	Present	faculty01

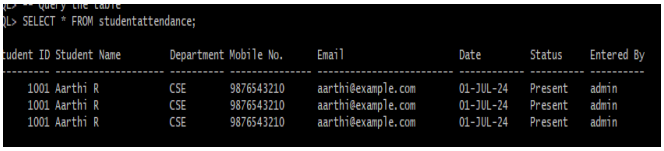
3.3 Log Output

```
------ ETL Process Started ------
Timestamp: Fri Jul 25 12:07:53 IST 2025
Input file found. Running PL/SQL...

Table created.


1 row created.


Commit complete.

ETL process completed.
------ ETL Process Finished ------
```

3.4 Screenshots







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Author Profile

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