



Credit Cards Data Warehouse

1 OVERVIEW:

In this project you will be using the PowerCenter to create a more complex project that would align closely to the demands of a real-world business.

In Banking systems for example, client data and their privacy is set to the highest priority, any leakage or damage to the data would affect the data integrity and would cause devastating results to the structure as a whole, this is why techniques like **Data masking** is utilized to insure the privacy of data, and techniques in data warehousing insure that the data being backed up for redundancy against data loss.

Data archiving is also as important as data backups as it allows the business to store information that is not currently needed for any future reference or regulatory compliance reasons.

2 SCENARIO:

You are asked to create 2 target tables **CREDIT_CARDS_ARCHIVE** and **CREDIT_CARDS_CURRENT** in an Excel File both tables should contain:

- *CC_SUR (Tf)*
- *CC_NUMBER*
- *CC_NUMBER_MASKED (Tf)*
- *CC_BAL*
- *CC_LIMIT*
- *CC_OPEN_DATE*
- *ACCT_OPEN_DATE*
- *EMP_NAME*
- *EMP_EMAIL*
- *EMP_DEPT_NAME*

And according to below logic:

- **CREDIT_CARDS_ARCHIVE** contains all credit cards that are created **before** a (specific date)
- **CREDIT_CARDS_CURRENT** contains all credit cards are created on or **after** a (specific date)
- *CC_NUMBER_MASKED* should contain *CC_NUMBER* masked (allow 3 digits left, 3 digits right, and mask the rest with 'X', example: 111XXXXXXXXXX111)
- *CC_SUR* field is a surrogate key that is incremented with each new record and should preserve the value for subsequent executions (not to be reset)
- Any record with *CC_NUMBER* not equal to 16 digits should not be loaded and should be forwarded to an error file called "REJECTED_DATA.csv"

Points to consider:

- The date is to configurable as a parameter (use **parameter file**)
- Execution should not start unless a 'ready' file is available at the server indicating execution is permitted (**EventWait**)
- Target tables should insert new data, update existing data based on *CC_NUMBER*, data truncation is not allowed

3 GOAL:

To create a more complex project that would requires a more logical approach and a more comprehensive error handling. Aiming to get more fluent with the PowerCenter functionalities and features. The increased complexity would assist into developing more into the research of things and testing different approaches to achieve the desired business needs.

4 RESOURCES:

Source Table(s): DEMO_ACCOUNT, DEMO_CREDIT_CARD, DEMO_DEPT, DEMO_EMPLOYEE

Source System Schema: SRC_SYS @ ORCLDB

Login: SRC_SYS/ SRC_SYS

Target Table(s): FLAT FILE (CREDIT_CARDS_ARCHIVE and CREDIT_CARDS_CURRENT)

SCENARIO OVERVIEW: END-TO-END CREDIT CARD DATA PROCESSING WORKFLOW

This scenario documents the complete flow of credit card data from various source systems through transformation and validation processes to final storage in target databases, including handling of rejected records.

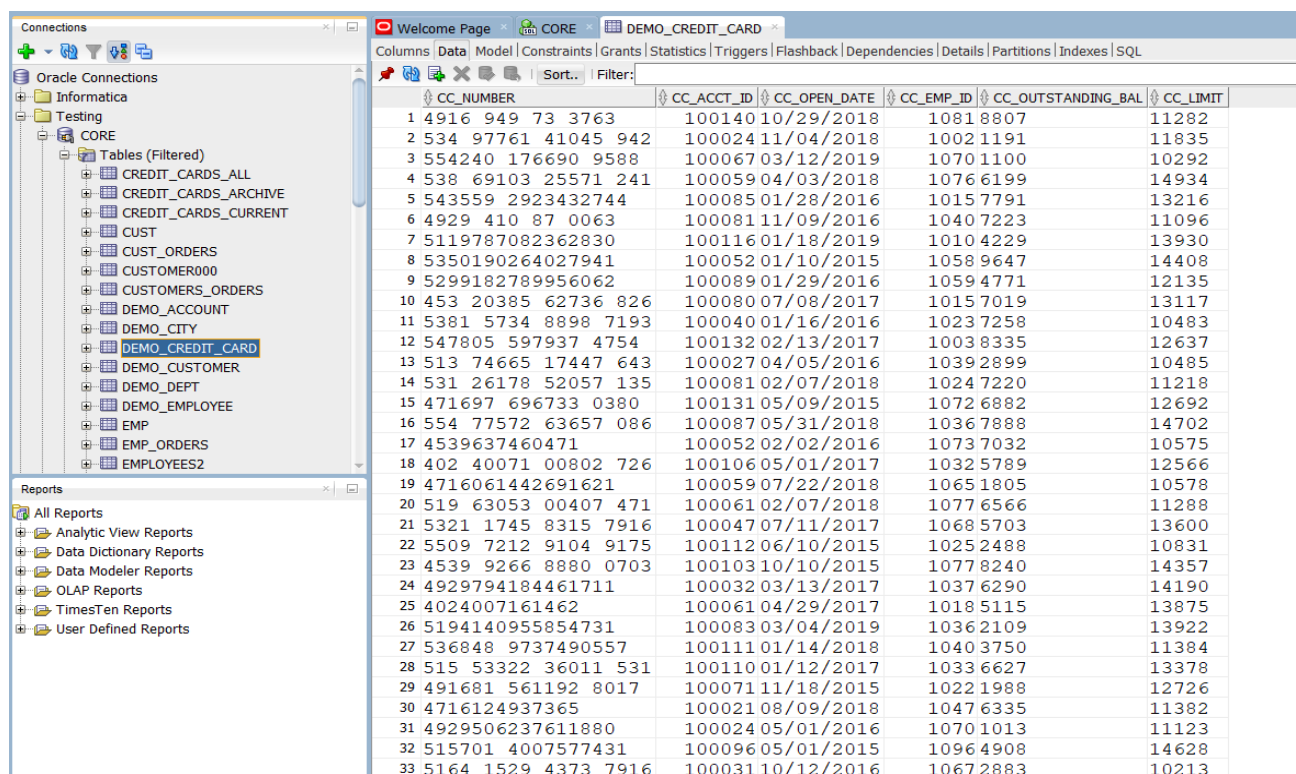
DETAILED WORKFLOW

1. Data Extraction Phase

Source Systems:

Oracle Databases: Data is extracted from multiple Oracle database tables including:

- DEMO_CREDIT_CARD (contains raw credit card information)
- DEMO_CUSTOMER (customer details associated with cards)
- DEMO_EMPLOYEE (employee records for card issuers)
- DEMO_ACCOUNT (account information)
- DEMO_DEPT (department details)
- DEMO_CITY(city details)



The screenshot displays the Oracle SQL Developer interface. On the left, the 'Connections' pane shows the 'CORE' schema with a tree of tables, including 'DEMO_CREDIT_CARD'. The main window shows the 'DEMO_CREDIT_CARD' table with columns: CC_NUMBER, CC_ACCT_ID, CC_OPEN_DATE, CC_EMP_ID, CC_OUTSTANDING_BAL, and CC_LIMIT. The table contains 33 rows of data, showing credit card details such as account numbers, opening dates, employee IDs, outstanding balances, and limits.

	CC_NUMBER	CC_ACCT_ID	CC_OPEN_DATE	CC_EMP_ID	CC_OUTSTANDING_BAL	CC_LIMIT
1	4916 949 73 3763	100140	10/29/2018	1081 8807	11282	
2	534 97761 41045 942	100024	11/04/2018	1002 1191	11835	
3	554240 176690 9588	100067	03/12/2019	1070 1100	10292	
4	538 69103 25571 241	100059	04/03/2018	1076 6199	14934	
5	543559 2923432744	100085	01/28/2016	1015 7791	13216	
6	4929 410 87 0063	100081	11/09/2016	1040 7223	11096	
7	5119787082362830	100116	01/18/2019	1010 4229	13930	
8	5350190264027941	100052	01/10/2015	1058 9647	14408	
9	5299182789956062	100089	01/29/2016	1059 4771	12135	
10	453 20385 62736 826	100080	07/08/2017	1015 7019	13117	
11	5381 5734 8898 7193	100040	01/16/2016	1023 7258	10483	
12	547805 597937 4754	100132	02/13/2017	1003 8335	12637	
13	513 74665 17447 643	100027	04/05/2016	1039 2899	10485	
14	531 26178 52057 135	100081	02/07/2018	1024 7220	11218	
15	471697 696733 0380	100131	05/09/2015	1072 6882	12692	
16	554 77572 63657 086	100087	05/31/2018	1036 7888	14702	
17	4539637460471	100052	02/02/2016	1073 7032	10575	
18	402 40071 00802 726	100106	05/01/2017	1032 5789	12566	
19	4716061442691621	100059	07/22/2018	1065 1805	10578	
20	519 63053 00407 471	100061	02/07/2018	1077 6566	11288	
21	5321 1745 8315 7916	100047	07/11/2017	1068 5703	13600	
22	5509 7212 9104 9175	100112	06/10/2015	1025 2488	10831	
23	4539 9266 8880 0703	100103	10/10/2015	1077 8240	14357	
24	4929794184461711	100032	03/13/2017	1037 6290	14190	
25	4024007161462	100061	04/29/2017	1018 5115	13875	
26	5194140955854731	100083	03/04/2019	1036 2109	13922	
27	536848 9737490557	100111	01/14/2018	1040 3750	11384	
28	515 53322 36011 531	100110	01/12/2017	1033 6627	13378	
29	491681 561192 8017	100071	11/18/2015	1022 1988	12726	
30	4716124937365	100021	08/09/2018	1047 6335	11382	
31	4929506237611880	100024	05/01/2016	1070 1013	11123	
32	515701 4007577431	100096	05/01/2015	1096 4908	14628	
33	5164 1529 4373 7916	100031	10/12/2016	1067 2883	10213	

Figure 1. DEMO_CREDIT_CARD table

CUST_ID	CUST_FNAME	CUST_LNAME	CUST_BIRTH_DATE	CUST_STREET_ADDR	CUST_CITY	CUST_PHONE	CUST_EMAIL
1	1000	Clarke	Russell	07/31/1985	3880 Non, St.	Gonnosfanadiga	075-206-4771
2	1001	Illiana	Nita	06/02/1993	P.O. Box 974, 7918 Mi Road	Goteborg	024-991-9221
3	1002	Priscilla	Lilby	01/14/1995	2547 Neque - Ave	Buddeck	064-316-8405
4	1003	Ashton	Davis	06/06/1973	P.O. Box 413, 5530 Non Rd.	Williams Lake	049-387-5264
5	1004	Ulysses	Griffin	06/25/1999	P.O. Box 466, 9343 Mauris Avenue	Ranst	039-601-2250
6	1005	Rashad	Caryn	08/16/1991	1854 Amet Avenue	Termini Imerese	020-489-6968
7	1006	Len	Quinlan	01/01/1976	Ap #578-5870 Est Rd.	San Pietro Avellana	099-777-3541
8	1007	Mufutau	Craig	12/13/1995	P.O. Box 653, 1888 Eggestas Ave	Kelowna	086-787-3438
9	1008	Aubrey	Wesley	01/07/1972	P.O. Box 667, 9482 Orci Avenue	New Glasgow	029-598-3168
10	1009	Cameron	Miriam	12/25/1996	Ap #774-6059 Mi. St.	Palermo	063-765-0248
11	1010	Ouillen	Jonah	04/02/2001	Ap #505-915 Cras Road	Udaipur	014-695-0467
12	1011	Kyllynn	May	09/25/1992	7494 Vulputate, Street	Trognée	044-123-0675
13	1012	Inga	Slade	02/23/1993	5817 Pede, Road	Cimolais	083-017-1717
14	1013	Seth	August	10/14/1982	Ap #639-4152 Tincidunt, Road	Zutphen	095-648-6540
15	1014	Tara	Mufutau	10/19/1992	886-9212 Semper Av.	Duisburg	056-511-8416
16	1015	Quinn	Dean	02/09/1987	7642 Pharetra Ave	Kapuskasing	040-498-1536
17	1016	Linda	Hedley	09/30/1996	P.O. Box 860, 9882 Eget Ave	Fabianice	031-732-4269
18	1017	John	Louis	12/24/1998	6628 Libero Ave	White Rock	056-032-9184
19	1018	Laurel	Kerry	10/25/1999	630-117 Fusce Av.	San Carlos	011-460-0620
20	1019	Zeph	Deacon	12/09/1976	Ap #595-735 Nibh Avenue	Gjoa Haven	004-840-5175
21	1020	Sheila	Alexa	11/30/1981	8686 Lobortis. Av.	Montbéliard	018-786-8244
22	1021	Rinah	Odysseus	11/09/1981	Ap #849-9903 Utna. Ave	Evere	051-703-5962
23	1022	Melodie	Orl	08/21/1982	158-5938 Elementum Rd.	Petrópolis	035-090-3816
24	1023	Eagan	Mason	04/01/1997	427-5822 Id Rd.	Lithgow	023-717-0899
25	1024	Yoshio	Holmes	07/27/1975	P.O. Box 205, 4005 Consequat Ave	San Leucio del Sannio	090-118-4334
26	1025	Yoshio	Kane	12/05/1998	888-1244 Metus. Rd.	La Reina	088-970-8785
27	1026	Jared	Yoshio	05/16/1975	Ap #915-1584 Eget Rd.	Beverley	040-431-2977
28	1027	Lila	Armando	02/16/2000	199-1458 Auctor Road	Valkenburg aan de Geul	055-236-5660
29	1028	Octavia	Zenaida	07/13/1995	7101 Orci, Rd.	Watermaal-Bosvoorde	073-851-2964
30	1029	Evelyn	John	09/15/1975	Ap #470-3176 Pharetra Road	Porirua	072-241-2945
31	1030	Angela	Edison	03/16/1979	343-5534 Nunc St.	Flawinne	026-000-4044
32	1031	Macy	Howard	10/24/1996	P.O. Box 307, 717 Nec Road	Lanco	002-602-7517
33	1032	Patricia	Curran	10/28/1971	P.O. Box 395, 3007 Vulputate Road	Stirling	044-236-3419

Figure 2. DEMO_CUSTOMER table

EMP_ID	EMP_FULL_NAME	EMP_PHONE	EMP_EMAIL	EMP_DEPT_ID	CREATED_DATE	UPDATED_DATE
1	1000Oscar Hurley	019-125-1103	Aliquam@Sedid.co.uk	1	08/15/2019 10/04/2018	
2	1001Mikayla Robinson	043-403-9472	in.aliquet.lobortis@fermentum.co.uk	3	12/19/2019 04/20/2019	
3	1002Hop McLaughlin	032-862-3062	amet.Luctus@mattisornarelectus.co.uk	4	06/13/2018 07/13/2018	
4	1003Kirsten Guerra	048-918-8343	diam@pellentesquea.co.uk	2	03/11/2020 10/21/2019	
5	1004Armand Mullins	099-669-4799	Morbi.neque@odioauctorvitae.co.uk	2	03/13/2020 07/16/2018	
6	1005Christopher Charles	064-141-8283	dis.parturiend@interdumliberodui.co.uk	3	01/30/2019 09/03/2018	
7	1006Luke Witt	027-897-7145	luctus@facilismagna.co.uk	5	05/15/2018 07/29/2019	
8	1007Hedwig Fox	083-425-9761	sed@nunc.edu	3	06/19/2018 04/05/2018	
9	1008Cyrus Ayers	023-911-8933	molestie.pharetra@pharetra.net	1	03/15/2019 08/09/2018	
10	1009Malik Moss	052-739-0484	auctor@laciniaat.net	1	07/27/2019 06/21/2018	
11	1010Azalia Holden	007-358-4134	Sed.auctor.odio@commodotincidunt nibh.co.uk	4	09/26/2018 11/14/2019	
12	1011Priscilla Simpson	009-692-8972	sollicitudin.orci@ligula.ca	5	06/14/2018 10/17/2018	
13	1012Reese Hall	071-891-3005	Nulla.tempor.augue@sociisnatoquepenatibus.com	5	02/08/2020 06/16/2019	
14	1013Karyn Delaney	007-102-1977	mauris.blandit@augueu.co.uk	1	06/16/2019 05/09/2018	
15	1014Ronan Dejesus	050-965-1089	aliquet.molestie.tellus@odivolest.org	3	08/25/2018 03/28/2019	
16	1015Noble Watkins	027-719-8563	vel.arcu.eu@ipsum.co.uk	1	12/01/2019 04/22/2018	
17	1016Harrison Suarez	055-705-1683	molestie.orci.tincidunt@sed.com	4	10/31/2018 04/19/2019	
18	1017Herman Clayton	022-702-5176	sollicitudin.adipiscing.ligula@nec.ca	5	01/03/2019 07/17/2019	
19	1018Armando Mcfadden	027-140-4915	Aliquam.auctor@lobortisquam.org	2	06/04/2019 03/21/2019	
20	1019Rebecca Ortega	065-060-1283	sociis.natoque@eget.edu	1	03/07/2020 02/02/2020	
21	1020Asher Blackburn	018-042-7655	ultrices@Integer.ca	5	11/14/2018 12/18/2018	
22	1021Joel Rutledge	057-088-7172	nibh.sit@quam.com	2	05/01/2018 10/18/2018	
23	1022Leo Vasquez	038-027-3921	Mauris.non@tempuslorem.edu	2	04/21/2018 07/16/2019	
24	1023Ima Parks	007-739-2042	nibh.lacinia.orci@commodotincidunt nibh.ca	5	10/29/2018 05/10/2018	
25	1024Marvin Wood	046-641-4761	justo.eu.arcu@AliquamNulla.co.uk	4	11/24/2019 04/30/2018	
26	1025Abbot Townsend	047-600-3695	urna.Vivamus@elementumdui.com	3	02/08/2019 04/15/2019	
27	1026Martin Boyer	072-381-4189	et.ipsun@dignissimMaecenas.co.uk	5	01/16/2019 10/15/2018	
28	1027Caleb Day	070-836-8818	bibendum@nibhsitamet.com	5	08/24/2019 02/05/2020	
29	1028Jada Hawkins	096-301-7764	libero@blandit.com	5	11/03/2018 05/25/2018	
30	1029Ray Gutierrez	062-511-8797	massa.Integer@pedePraesent.ca	5	08/26/2019 01/20/2019	
31	1030Marsden Jacobs	093-105-7953	vestibulum@accusancanvallis.com	1	06/10/2019 01/11/2020	
32	1031Dorothy Moon	002-562-9258	Duis.dignissim@eunibh.co.uk	2	07/19/2018 08/31/2019	
33	1032Robin Johnston	051-095-0353	non.quam.Pellentesque@eratsemperutrum.org	3	04/20/2018 11/22/2019	

Figure 3. DEMO_EMPLOYEE table

DEPT_ID	DEPT_NAME	DEPT_CATEG	DEPT_LOC
1	1 Management	A	Alexandria
2	2 Accounting	A	Alexandria
3	3 Sales	B	Cairo
4	4 HR	A	Alexandria
5	5 Customer Support	B	Cairo

Figure 4. DEMO_DEPT table

Flat Files: Additional credit card data is extracted from:

CREDIT_CARD_ALL.out (comprehensive card data flat file)

2. Initial Processing and Routing

Extracted data flows into the RTRTRANS (routing transformation) system which acts as a hub:

- Determines appropriate processing path based on record type and content
- Routes data to either current processing or archival streams

3. Data Transformation

Masking Operations:

- Sensitive credit card numbers are masked (EXP_CC_NUM_MASKED)
- Original numbers are preserved in encrypted format to remove white spaces (EXP_REM_CC_NUM)

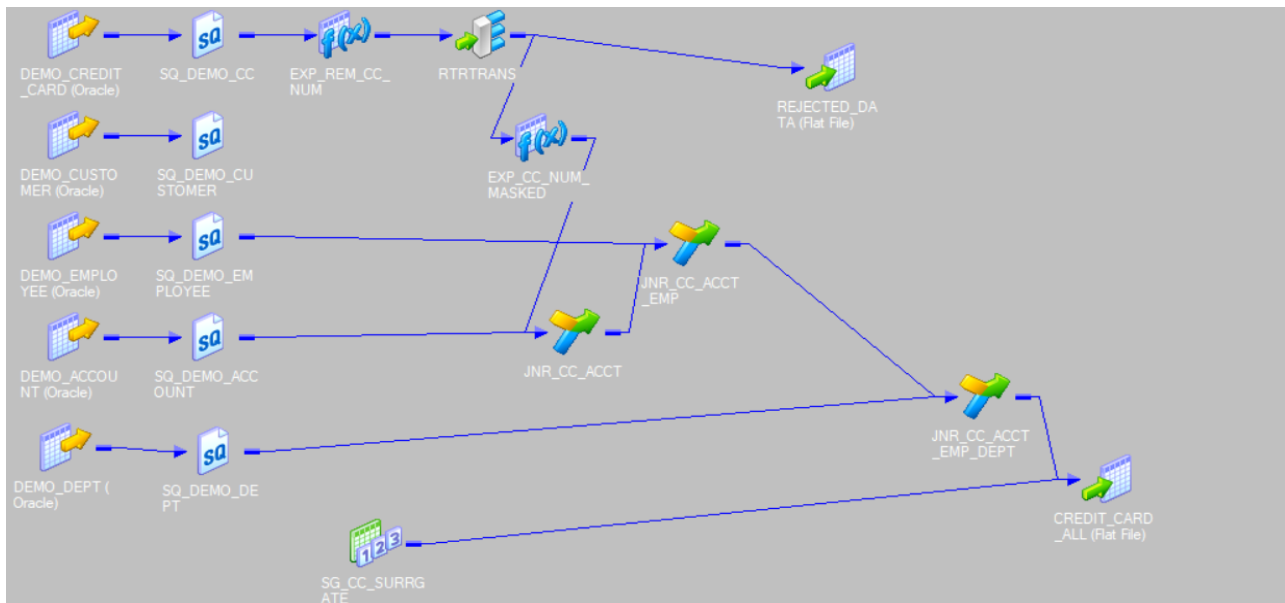


Figure 5. "M_CC_DWH" ALL CREDIT CARDS DWH MAPPING

Data Enrichment:

- Customer records from DEMO_CUSTOMER are joined with card data
- Employee information from DEMO_EMPLOYEE is linked to card records
- Department details from DEMO_DEPT are added to provide organizational context

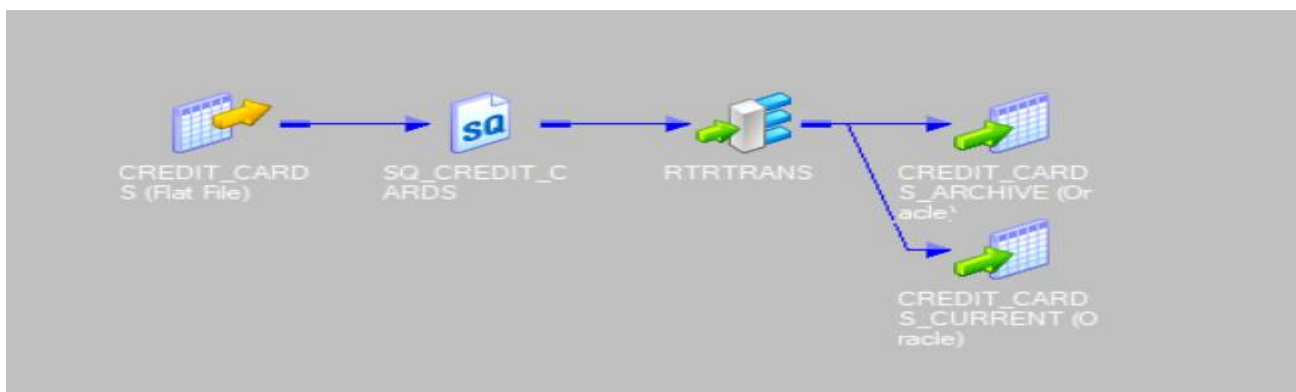


Figure 6. "M_CC_ARCHIVING" ARCHIVED AND CURRENT CREDIT CARDS MAPPING

4. Validation and Quality Checks

Active Records Processing:

Complete records are stored in ALL_CREDIT_CARDS (flat file)

CC_SUR	CC_NUMBER	CC_NUMBER_MASKED	CC_BALANCE	CC_LIMIT	CC_OPEN_DATE	ACCT_OPEN_DATE	EMP_NAME	EMP_EMAIL	EMP_DEPT_NAME
173	5349776141045940	534xxxxxxxxxx942	1191	11835	11/4/2018	8/1/2016	Hop McLaughlin	amet.luctus@mattisornarelectus.edu	HR
174	5542401766909580	554xxxxxxxxxx588	1100	10292	3/12/2019	12/26/2016	Fatima Stevens	Proin.ultrices@nascetur.edu	Customer Support
175	5386910325571240	538xxxxxxxxxx241	6199	14934	4/3/2018	8/30/2017	Winifred Mckay	sed.est.Nunc@enimcommodo.org	Sales
176	5435592923432740	543xxxxxxxxxx744	7791	13216	1/28/2016	2/21/2016	Noble Watkins	vel.arcu.eu@ipsum.co.uk	Management
177	5119787082362830	511xxxxxxxxxx830	4229	13930	1/18/2019	7/18/2015	Azalia Holden	Sed.auctor.odio@commodotinciduntibh.co.uk	HR
178	5350190264027940	535xxxxxxxxxx941	9647	14408	1/10/2015	1/5/2016	Cara Tucker	justo.Proin@FuscefeugiatLorem.org	Management
179	5299182789956060	529xxxxxxxxxx062	4771	12135	1/29/2016	3/9/2018	Forrest Frye	Donec.tempus@ipsum.edu	Sales
180	4532038562736820	453xxxxxxxxxx826	7019	13117	7/8/2017	3/29/2017	Noble Watkins	vel.arcu.eu@ipsum.co.uk	Management
181	5381573488987190	538xxxxxxxxxx193	7258	10483	1/16/2016	11/1/2015	Ima Parks	nibh.lacinia.orci@commodotinciduntibh.ca	Customer Support
182	5478055979374750	547xxxxxxxxxx754	8335	12637	2/13/2017	10/13/2015	Kirsten Guerra	diam@pellentesquea.co.uk	Accounting
183	5137466517447640	513xxxxxxxxxx643	2899	10485	4/5/2016	8/16/2017	Craig Skinner	eu.euismod.ac@euague.org	Sales
184	5312617852057130	531xxxxxxxxxx135	7220	12118	2/7/2018	5/23/2018	Marvin Wood	justo.eu.arcu@AliquamisNulla.co.uk	HR
185	4716976967330380	471xxxxxxxxxx380	6882	12692	5/9/2015	5/30/2018	Sophia Cohen	id.mollis@estvitasdales.com	Management
186	5547757263657080	554xxxxxxxxxx086	7888	14702	5/31/2018	7/2/2015	Alika Farley	id@velarcurabitur.com	HR
187	4024007100802720	402xxxxxxxxxx726	5789	12566	5/1/2017	1/4/2019	Robin Johnston	non.quam.Pellentesque@eratsemperrutrum.org	Sales
188	4716061442691620	471xxxxxxxxxx621	1805	10578	7/22/2018	8/30/2017	Liberty Reeves	lacus.Etiam@eusem.co.uk	Sales
189	5196305300407470	519xxxxxxxxxx471	6566	11288	2/7/2018	4/29/2015	Vielka Potter	suscipit@lacinia.co.uk	Accounting
190	5321174583157910	532xxxxxxxxxx916	5703	13600	7/11/2017	5/11/2017	Ocean Walter	at@nisi.org	HR
191	5509721291049170	550xxxxxxxxxx175	2488	10831	6/10/2015	7/7/2015	Abbot Townsend	urna.Vivamus@elementumdui.com	Sales
192	453992668800700	453xxxxxxxxxx703	8240	14357	10/10/2015	2/25/2015	Vielka Potter	suscipit@lacinia.co.uk	Accounting
193	4929794184461710	492xxxxxxxxxx711	6290	14190	3/13/2017	11/30/2017	Tanek Stark	diam.nunc.ullamcorper@dictum.co.uk	Customer Support
194	5194140955854730	519xxxxxxxxxx731	2109	13922	3/4/2019	9/22/2017	Alika Farley	id@velarcurabitur.com	HR
195	5368489737490550	536xxxxxxxxxx557	3750	11384	1/14/2018	1/16/2017	Jemima Fernandez	orci@Etiam.com	HR
196	515533236011530	515xxxxxxxxxx531	6627	13378	1/12/2017	8/19/2015	Germane Owens	Integer@vitaeealiquet.net	Customer Support
197	4916815611928010	491xxxxxxxxxx017	1988	12726	11/18/2015	4/4/2015	Leo Vasquez	Mauris.non@tempuslorem.edu	Accounting
198	4929506237611880	492xxxxxxxxxx880	1013	11123	5/1/2016	8/1/2016	Fatima Stevens	Proin.ultrices@nascetur.edu	Customer Support

Figure 7. ALL CREDIT CARDS table in DWH before ARCHIVING

Rejected Data Handling:

Invalid or incomplete records are routed to REJECTED_DATA (flat file)

Problematic records from any card is less than 16 numbers operations are specifically handled.

CC_NUMBER	CC_ACCT_ID	CC_OPEN_DATE	CC_EMP_ID	CC_OUTSTANDING_BAL	CC_LIMIT
4916949733763	100140	10/29/2018	1081	8807	11282
4929410870063	100081	11/9/2016	1040	7223	11096
4539637460471	100052	2/2/2016	1073	7032	10575
4024007161462	100061	4/29/2017	1018	5115	13875
4716124937365	100021	8/9/2018	1047	6335	11382
4556167045332	100094	8/12/2017	1025	3729	14926
4539632804939	100109	9/9/2017	1051	8794	12097

Figure 8. REJECTED CARD NUMBERS in REJECTED_DATA.csv

5. Final Storage and Archiving

Current Records:

Before passing the data to be categorised historically, first we have to determine the parameter that will control the separation of data.

Parameter `$$date` from parameter file

```
[Credit_Cards.WF_CC_ARCHIVING.s_WF_CC_ARCHIVING]
$$date=06/13/2016
```

Figure 9. parameter `$$date` from the parameter file

after that we are going to: Clean, validated data is stored in CREDIT_CARDS_CURRENT (Oracle)

CC_SUR	CC_NUMBER	CC_NUMBER_MASKED	CC_BALANCE	CC_LIMIT	CC_OPEN_DATE	ACCT_OPEN_DATE	EMP_NAME	EMP_EMAIL	EMP_DEPT_NAME
174	5542401766909580	554xxxxxxxxx588	1100	10292	3/12/2019	12/26/2016	Fatima Stevens	Proin.ultrices@nascetur.edu	Customer Support
194	5194140955854730	519xxxxxxxxx731	2109	13922	3/4/2019	9/22/2017	Alika Farley	id@velarcuCurabitur.com	HR
201	5514639048464010	551xxxxxxxxx013	3373	13544	2/25/2019	11/20/2015	Maggy Branch	nascetur.ridiculus@in.ca	Management
177	5119787082362830	511xxxxxxxxx830	4229	13930	1/18/2019	7/18/2015	Azalia Holden	Sed.auctor.odio@commodotinciduntinibh.co.uk	HR
202	4024007109518690	402xxxxxxxxx695	3684	13098	12/7/2018	9/10/2018	Ocean Walter	at@nisi.org	HR
173	5349776141045940	534xxxxxxxxx942	1191	11835	11/4/2018	8/1/2016	Hop McLaughlin	amet.luctus@mattisornarelectus.edu	HR
188	4716061442691620	471xxxxxxxxx621	1805	10578	7/22/2018	8/30/2017	Liberty Reeves	lacus.Etiam@eusem.co.uk	Sales
209	5139609240718470	513xxxxxxxxx479	4704	10673	7/22/2018	9/17/2018	Zachary Lambert	Nullam@eleifendegestas.net	Management
186	5547757263657080	554xxxxxxxxx086	7888	14702	5/31/2018	7/2/2015	Alika Farley	id@velarcuCurabitur.com	HR
175	5386910325571240	538xxxxxxxxx241	6199	14934	4/3/2018	8/30/2017	Winifred Mckay	sed.est.Nunc@enimcommodo.org	Sales
210	5586308916693150	558xxxxxxxxx151	7049	10585	3/28/2018	5/22/2017	Abbot Townsend	urna.Vivamus@elementumdui.com	Sales
184	5312617852057130	531xxxxxxxxx135	7220	11218	2/7/2018	5/23/2017	Marvin Wood	justo.eu.arcu@AliquamNisiNulla.co.uk	HR
189	5196305300407470	519xxxxxxxxx471	6566	11288	2/7/2018	4/29/2015	Vielka Potter	suscipit@lacinia.co.uk	Accounting
204	527695009647360	527xxxxxxxxx365	1064	12375	2/5/2018	11/15/2018	Bruno Ingram	lobortis.quis@Aliquam.edu	Sales
195	5368489737490550	536xxxxxxxxx557	3750	11384	1/14/2018	1/16/2017	Jemima Fernandez	orci@Etiam.com	HR
207	5249508476639350	524xxxxxxxxx358	7474	11932	12/24/2017	1/6/2019	Illiana Mercado	Etiam.gravida.molestie@metusvitae.org	HR
212	5242955260828390	524xxxxxxxxx399	6534	13631	10/3/2017	4/4/2015	Murphy Sanchez	nulla.magna@magna.edu	Management
190	5321174583157910	532xxxxxxxxx916	5703	13600	7/11/2017	5/11/2017	Ocean Walter	at@nisi.org	HR
180	4532038562736820	453xxxxxxxxx826	7019	13117	7/8/2017	3/29/2017	Noble Watkins	vel.arcu.eu@ipsum.co.uk	Management
187	4024007100802720	402xxxxxxxxx726	5789	12566	5/1/2017	1/4/2019	Robin Johnston	non.quam.Pellentesque@eratsemperrutrum.org	Sales
193	4929794184461710	492xxxxxxxxx711	6290	14190	3/13/2017	11/30/2017	Tanek Stark	diam.nunc.ullamcorper@dictum.co.uk	Customer Support
182	5478055979374750	547xxxxxxxxx754	8335	12637	2/13/2017	10/13/2015	Kirsten Guerra	diam@pellentesquea.co.uk	Accounting
196	5155332236011530	515xxxxxxxxx531	6627	13378	1/12/2017	8/19/2015	Germane Owens	Integer@vitaealiquet.net	Customer Support
211	5131946861459220	513xxxxxxxxx225	7028	11824	11/27/2016	12/14/2018	Armando Mcfadden	Aliquam.auctor@lobortisquam.org	Accounting
215	5308209014525070	530xxxxxxxxx070	5660	11847	10/25/2016	10/13/2017	Coby Mueller	orci.quis.lectus@dignissimmagna.com	Management
200	5164152943737910	516xxxxxxxxx916	2883	10213	10/12/2016	9/24/2018	Zachary Lambert	Nullam@eleifendegestas.net	Management
208	5219690947242180	521xxxxxxxxx180	8953	14483	10/10/2016	7/7/2015	Forrest Frye	Donec.tempus@ipsum.edu	Sales
214	5136104812053820	513xxxxxxxxx821	6809	14379	9/24/2016	3/14/2017	Cyrus Ayers	molestie.pharetra@pharetra.net	Management
213	5534462721052370	553xxxxxxxxx377	8269	12784	8/31/2016	8/5/2015	Murphy Sanchez	nulla.magna@magna.edu	Management

Figure 10. CURRENT CREDIT CARDS table in DWH

Historical Data:

Older records are archived in CREDIT_CARDS_ARCHIVE (Oracle)

CC_SUR	CC_NUMBER	CC_NUMBER_MASKED	CC_BALANCE	CC_LIMIT	CC_OPEN_DATE	ACCT_OPEN_DATE	EMP_NAME	EMP_EMAIL	EMP_DEPT_NAME
178	5350190264027940	535xxxxxxxxx941	9647	14408	1/10/2015	1/5/2016	Cara Tucker	justo.Proin@FuscefeugiatLorem.org	Management
199	5157014007577430	515xxxxxxxxx431	4908	14628	5/1/2015	1/4/2019	Francesca Simpson	Aenean.euismod@Fusce.ca	Sales
185	4716976967330380	471xxxxxxxxx380	6882	12692	5/9/2015	5/30/2018	Sophia Cohen	id.mollis@estvitaesodales.com	Management
191	5509721291049170	550xxxxxxxxx175	2488	10831	6/10/2015	7/7/2015	Abbot Townsend	urna.Vivamus@elementumdui.com	Sales
203	5301388182789950	530xxxxxxxxx952	8532	13066	6/24/2015	9/17/2018	Mufutau Casey	vitae.aliquet@ligulaelitpretium.org	Management
192	4539926688800700	453xxxxxxxxx703	8240	14357	10/10/2015	2/25/2015	Vielka Potter	suscipit@lacinia.co.uk	Accounting
197	4916815611928010	491xxxxxxxxx017	1988	12726	11/18/2015	4/4/2015	Leo Vasquez	Mauris.non@tempuslorem.edu	Accounting
181	5381573488987190	538xxxxxxxxx193	7258	10483	1/16/2016	11/1/2015	Ima Parks	nibh.lacinia.orci@commodotinciduntinibh.ca	Customer Support
205	4793917364771790	479xxxxxxxxx798	3940	13320	1/25/2016	3/19/2016	Maryam Perry	gravida.nunc@ipsum.ca	Sales
176	5435592923432740	543xxxxxxxxx744	7791	13216	1/28/2016	2/21/2016	Noble Watkins	vel.arcu.eu@ipsum.co.uk	Management
179	5299182789956060	529xxxxxxxxx062	4771	12135	1/29/2016	3/9/2018	Forrest Frye	Donec.tempus@ipsum.edu	Sales
206	5343414930198300	534xxxxxxxxx302	1659	14966	2/3/2016	7/31/2018	Liberty Reeves	lacus.Etiam@eusem.co.uk	Sales
183	5137466517447640	513xxxxxxxxx643	2899	10485	4/5/2016	8/16/2017	Craig Skinner	eu.euismod.ac@euague.org	Sales
198	4929506237611880	492xxxxxxxxx880	1013	11123	5/1/2016	8/1/2016	Fatima Stevens	Proin.ultrices@nascetur.edu	Customer Support

Figure 11. ARCHIVED CREDIT CARDS table in DWH

Exception Handling

Rejected records are quarantined in the REJECTED_DATA flat file

Automated alerts are generated for records failing validation

Data Work-Flow Diagram

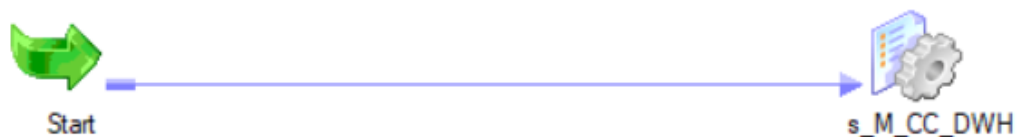


Figure 12. "WF_CC_DWH" WORKFLOW FOR LOADING ALL CREDIT CARDS DATA in DWH



Figure 13. "WF_CC_ARCHIVING" WORKFLOW FOR ARCHIVING HISTORICAL DATA

Data Orchestration

The File Watcher service actively monitors predefined directories for incoming credit card data files. Upon detection, it initiates the event wait to be ready for next step in the workflow.