

Payright Performance and Fraud detection Analysis

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DATA ANALYST

Problem Statement

This analysis aims to uncover the root causes and provide a clear Performance & Risk Dashboard for decision-making due to recent customer complaints and risk alerts

- ✓ **Significant drop in approval rates** is causing legitimate customer transactions to fail.
- ✓ **Fraud mitigation is underperforming**, as flagged fraudulent transactions are still being completed, which indicates a gap between fraud detection and real-time transaction blocking.
- ✓ **High-cost 5G Network Slicing investments lack justification**, with uncertainty about whether premium network slices are actually improving transaction success rates or system reliability.
- ✓ **Platform performance across Mobile vs Desktop remains unclear**, making it difficult to determine the optimal allocation of limited app development resources for the next quarter.
- ✓ **Urgent need for a unified Performance & Risk Dashboard** to reveal trends, root causes, and financial security risks for executive decision-making.

Objectives

The following objectives guide the analysis of platform performance and fraud detection to identify key issues and actionable insights.

Performance Objectives

- ▶ Identify the root causes of declining approval rates.
- ▶ Assess Mobile vs Desktop performance to guide improvements.
- ▶ Evaluate the effectiveness of 5G Network Slicing on transaction success.
- ▶ Detect key performance bottlenecks across the platform.

Fraud Detection Objectives

- ▶ Determine if flagged fraud is being blocked in real time.
- ▶ Analyze fraud trends and chargebacks to quantify risk.
- ▶ Identify gaps in the upgraded fraud system's accuracy and response.

Overview of data

- The data consist of 40,000 rows and 14 columns which is clean without duplicates and empty spaces except for creating new conditional columns
- Dataset main columns include: Transaction ID, Sender Account ID, Receiver Account ID, Transaction Amount, Transaction Type, Timestamp, Transaction Status, Fraud Flag, PIN Code, Geolocation, Device Used, Network Slice ID, Latency (ms), and Slice Bandwidth (Mbps)
- I extracted the Hour, Day, Month from the date with Power query

Implementation Outline

- ▶ To analyze this dataset, I followed the **PMAVM** process (Prepare, Model, Analyze, Visualize, Manage). Each step is discussed below.
- ▶ The tool I used for the entire analysis process is Microsoft Excel

Data Preparation

- ▶ I deployed the **OMG-C** method in the data preparation step. Objectives, Measures, Get and Clean the data.
 - ▶ Objectives
 - ▶ Measures
 - ▶ Get
 - ▶ Clean

Data Preparation

- I also grouped the hour into four (4) different day time category
 - ✓ Morning
 - ✓ Afternoon
 - ✓ Evening
 - ✓ Night
- I created the Latency Group column to identify which network latency is associated with failed transaction

Get and Clean Data.

Transaction ID	Sender Account	Receiver Account	Transaction Amount	Transaction Type	Timestamp	Transaction Status	Fraud Flag	Colocation (Latitude/Longitude)	Device Usage	Network Slice	Latency (ms)	slice Bandwidth (Mbps)	PIN Count
TXN436320543	ACC83609	ACC14505	4106.87	Deposit	#####	Success	FALSE	51.5074 N, 0.1278 W	Mobile	Slice1	89	486	6445
TXN339151052	ACC68952	ACC80170	1977.3	Withdrawal	#####	Success	FALSE	34.0522 N, -74.006 W	Desktop	Slice1	64	554	4888
TXN6911591624	ACC90406	ACC37430	2256.67	Transfer	#####	Success	FALSE	55.7558 N, 37.6173 W	Mobile	Slice3	90	1979	7010
TXN466252604	ACC60425	ACC74426	4636.06	Withdrawal	#####	Success	FALSE	51.5074 N, 0.1278 W	Desktop	Slice1	20	1832	3834
TXN349037256	ACC23270	ACC29470	3125.88	Withdrawal	#####	Success	FALSE	51.5074 N, 0.1278 W	Mobile	Slice1	41	548	2317
TXN396990253	ACC39732	ACC73871	2969.6	Withdrawal	#####	Success	FALSE	51.5074 N, 0.1278 W	Mobile	Slice3	34	1540	2948
TXN437124539	ACC74596	ACC63257	3455.08	Withdrawal	#####	Failed	FALSE	51.5074 N, 0.1278 W	Desktop	Slice2	105	1039	6273
TXN522561519	ACC42622	ACC12092	2057.71	Transfer	#####	Success	FALSE	35.6895 N, -118.2437 W	Desktop	Slice2	41	2645	6314
TXN438410817	ACC58194	ACC70836	2499.99	Deposit	#####	Success	FALSE	34.0522 N, -74.006 W	Desktop	Slice1	114	154	1176
TXN460082712	ACC61276	ACC30240	4887.9	Deposit	#####	Success	FALSE	48.8566 N, 2.3522 W	Desktop	Slice1	147	2507	4632
TXN599957284	ACC84969	ACC69796	4371.06	Withdrawal	#####	Success	FALSE	40.7128 N, -74.006 W	Desktop	Slice1	14	1100	2883
TXN364113893	ACC77646	ACC11804	3454.75	Transfer	#####	Failed	FALSE	34.0522 N, -74.006 W	Mobile	Slice2	7	1608	4772
TXN276273931	ACC44275	ACC83197	3701.45	Withdrawal	#####	Success	FALSE	51.5074 N, 0.1278 W	Mobile	Slice3	35	2143	6574
TXN543536254	ACC91612	ACC95148	2776.84	Withdrawal	#####	Success	FALSE	35.6895 N, -118.2437 W	Desktop	Slice1	86	1754	8632
TXN597374055	ACC58442	ACC65015	3891.85	Withdrawal	#####	Success	FALSE	51.5074 N, 0.1278 W	Mobile	Slice2	98	1381	8154
TXN819484962	ACC24907	ACC69223	4913.84	Deposit	#####	Success	FALSE	55.7558 N, 37.6173 W	Desktop	Slice1	29	476	9381
TXN103618729	ACC47244	ACC55416	4023.72	Withdrawal	#####	Success	FALSE	51.5074 N, 0.1278 W	Desktop	Slice3	34	2908	1175
TXN180287185	ACC43780	ACC86637	1268.72	Deposit	#####	Success	FALSE	55.7558 N, 37.6173 W	Mobile	Slice2	66	2227	3155
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TXN396986816	ACC72296	ACC35830	3391.77	Withdrawal	#####	Failed	FALSE	55.7558 N, 37.6173 W	Desktop	Slice3	50	2700	5375
TXN895627515	ACC76341	ACC90278	2616.59	Transfer	#####	Success	FALSE	35.6895 N, -118.2437 W	Desktop	Slice1	61	1671	1226
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TXN840260433	ACC53273	ACC17597	715.69	Withdrawal	#####	Success	TRUE	55.7558 N, 37.6173 W	Mobile	Slice1	100	345	1264
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TXN1871165772	ACC30426	ACC36557	4446.47	Withdrawal	#####	Failed	FALSE	34.0522 N, -74.006 W	Mobile	Slice1	142	424	5935
TXN428217298	ACC82264	ACC48911	1133.02	Withdrawal	#####	Success	FALSE	40.7128 N, -74.006 W	Mobile	Slice3	98	755	7474
TXN422832485	ACC76747	ACC46031	2779.75	Withdrawal	#####	Success	FALSE	40.7128 N, -74.006 W	Mobile	Slice3	134	986	2973
TXN668262621	ACC88308	ACC86348	1507.34	Withdrawal	#####	Success	FALSE	35.6895 N, -118.2437 W	Mobile	Slice2	37	1503	7830
TXN823624217	ACC79319	ACC98420	3478.8	Deposit	#####	Success	FALSE	35.6895 N, -118.2437 W	Desktop	Slice2	146	973	6018
TXN800437794	ACC56743	ACC41085	693.17	Transfer	#####	Success	FALSE	55.7558 N, 37.6173 W	Mobile	Slice1	62	718	1921
TXN440891897	ACC27846	ACC91462	4152.25	Deposit	#####	Failed	FALSE	34.0522 N, -74.006 W	Mobile	Slice1	103	534	6564
TXN427826473	ACC81967	ACC51512	3886.32	Deposit	#####	Failed	FALSE	35.6895 N, -118.2437 W	Desktop	Slice3	108	1887	2922
TXN377139917	ACC45420	ACC53764	24113	Withdrawal	#####	Success	FALSE	34.0522 N, -74.006 W	Mobile	Slice1	17	992	8899
TXN649583210	ACC29185	ACC23420	167.23	Transfer	#####	Success	FALSE	48.8566 N, 2.3522 W	Mobile	Slice1	137	2446	8011
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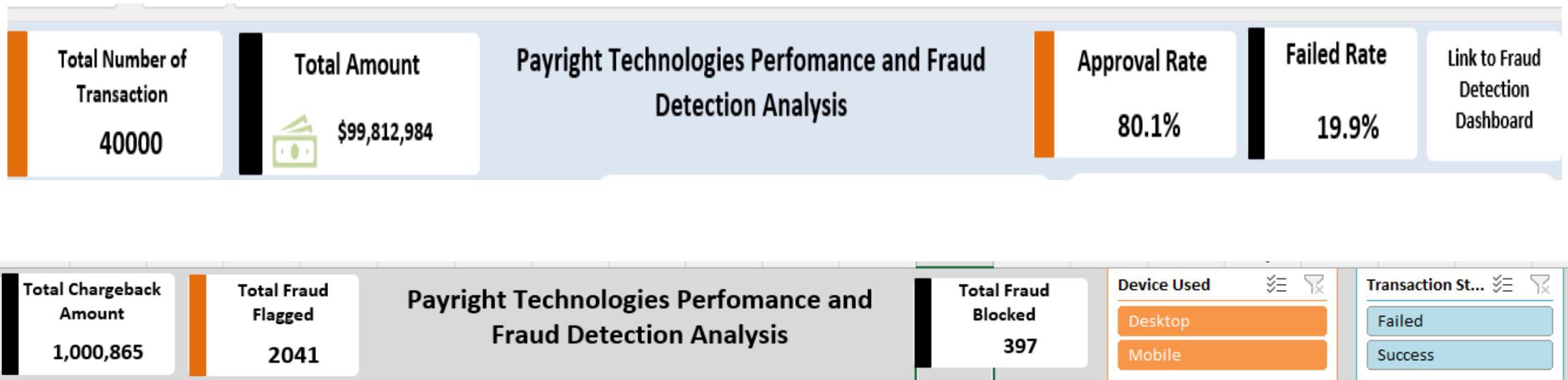
Dirty Data

Get and Clean Data.

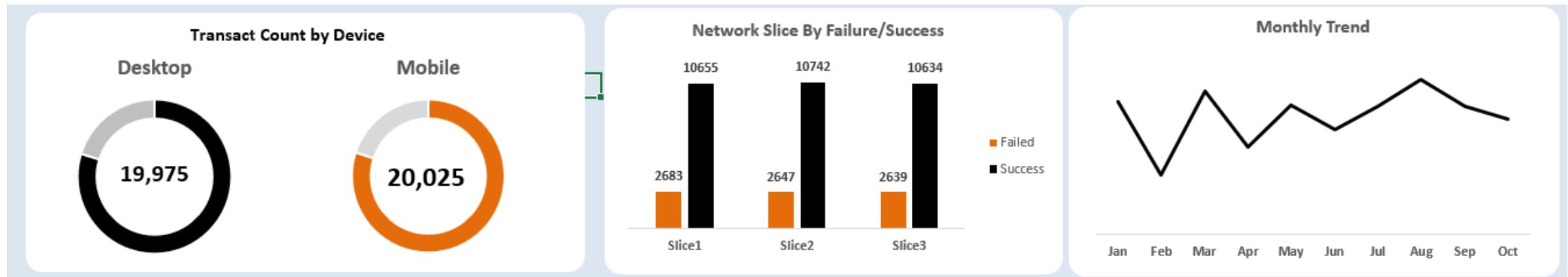
Transaction ID	Sender Account	Receiver Account	Transaction Amount	Transaction Type	Date	Transaction Status	Fraud Flag	Geolocation (Latitude/Longitude)	Device Used	Network Slice	Latency	Slice Bandwidth	PIN Code	Time	Month Number	Day Number	Hour	Timezone
TXN436320543	ACC83609	ACC14505	4106.87	Deposit	1/1/2025	Success	FALSE	51.5074 N, -0.1278 W	Mobile	Slice1	89	486	6445	12:04:49 AM	January	Wednesday	0	Night
TXN3391510523	ACC68952	ACC80170	1977.3	Withdrawal	1/1/2025	Success	FALSE	34.0522 N, -74.006 W	Desktop	Slice1	64	554	4888	12:08:44 AM	January	Wednesday	0	Night
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TXN466252604	ACC60425	ACC74426	4636.06	Withdrawal	1/1/2025	Success	FALSE	51.5074 N, -0.1278 W	Desktop	Slice1	20	1832	3834	12:13:12 AM	January	Wednesday	0	Night
TXN349037258	ACC23270	ACC29470	3125.88	Withdrawal	1/1/2025	Success	FALSE	51.5074 N, -0.1278 W	Mobile	Slice1	41	548	2317	12:14:23 AM	January	Wednesday	0	Night
TXN396990253	ACC38732	ACC73871	2969.6	Withdrawal	1/1/2025	Success	FALSE	51.5074 N, -0.1278 W	Mobile	Slice3	34	1540	2948	12:17:40 AM	January	Wednesday	0	Night
TXN4371245391	ACC74596	ACC63257	3455.08	Withdrawal	1/1/2025	Failed	FALSE	51.5074 N, -0.1278 W	Desktop	Slice2	105	1099	6273	12:17:42 AM	January	Wednesday	0	Night
TXN5225615196	ACC42622	ACC12092	2057.71	Transfer	1/1/2025	Success	FALSE	35.6895 N, -118.2437 W	Desktop	Slice2	41	2645	6314	12:32:21 AM	January	Wednesday	0	Night
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TXN643766585	ACC74502	ACC89183	326.01	Withdrawal	1/1/2025	Success	FALSE	34.0522 N, -74.006 W	Mobile	Slice1	41	1837	8657	3:43:58 AM	January	Wednesday	3	Night
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TXN693961653	ACC64496	ACC61597	4277.85	Transfer	1/1/2025	Success	FALSE	51.5074 N, -0.1278 W	Desktop	Slice3	123	2400	3128	4:21:32 AM	January	Wednesday	4	Night
TXN1871165772	ACC30426	ACC36557	4446.47	Withdrawal	1/1/2025	Failed	FALSE	34.0522 N, -74.006 W	Mobile	Slice1	142	424	5995	4:31:05 AM	January	Wednesday	4	Night
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Cleaned Data

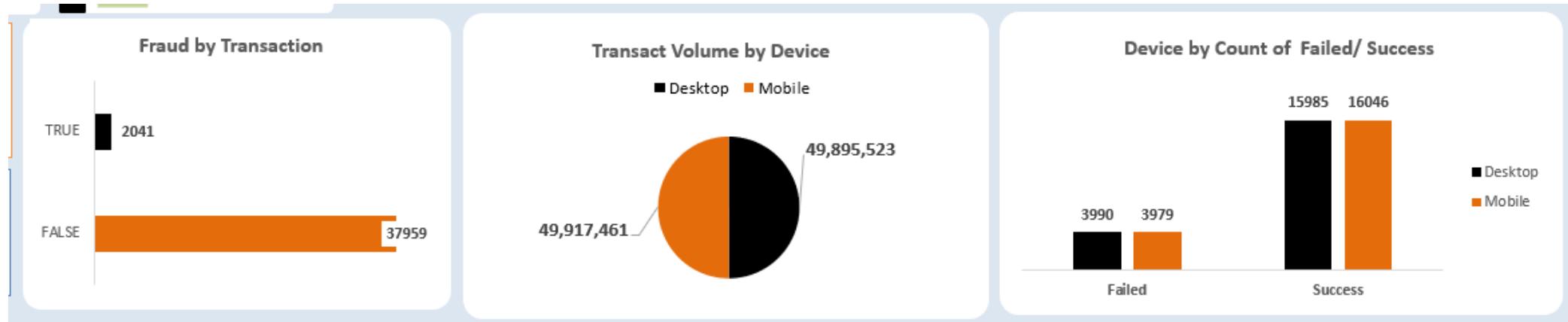
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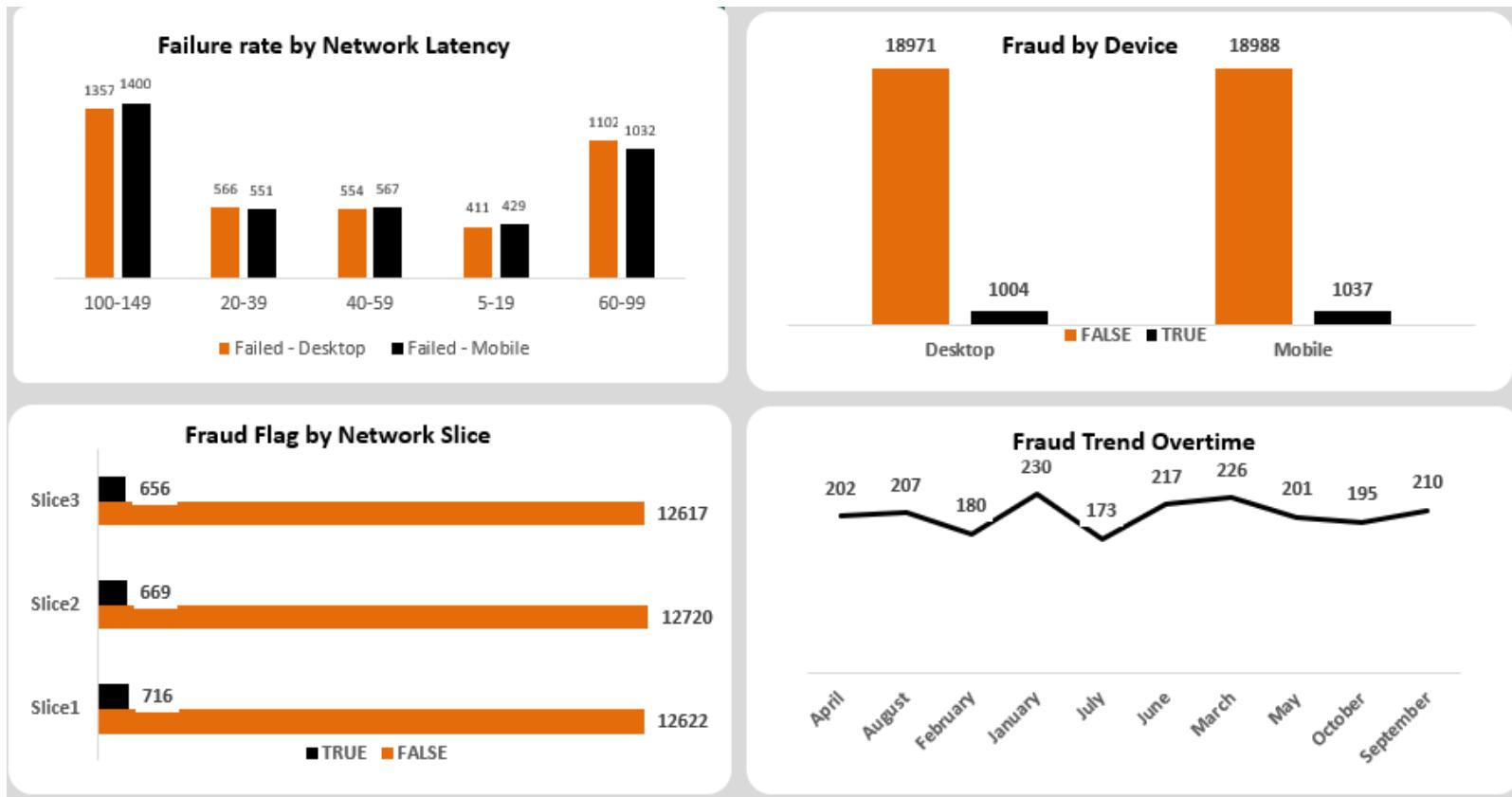
ANALYSIS AND VISUALS



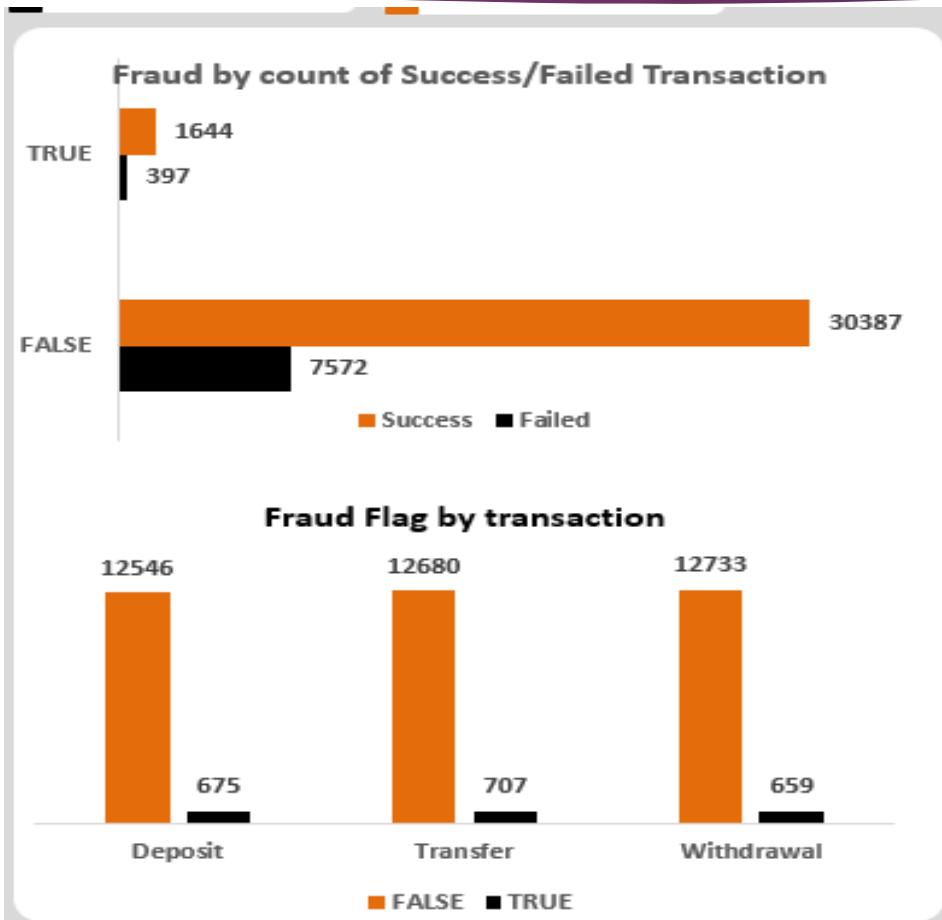
ANALYSIS AND VISUALS



ANALYSIS AND VISUALS



ANALYSIS AND VISUALS



Key Finding of Performance Dashboard

- ▶ Mobile and Desktop transactions have almost equal volume, but Desktop shows a slightly higher failure count.
- ▶ Network Slice 2 records the highest overall transaction count, but Slice 1 shows the highest failed transactions, signaling uneven performance.
- ▶ Monthly trend reveals inconsistent performance, with visible dips in several months, indicating unstable system reliability.
- ▶ Approval rate is around 80%, meaning 1 in every 5 transactions fails this is quite high for a financial service.
- ▶ Latency categories show rising failures as latency increases, especially within the 100–149 ms and 60–99 ms ranges.

Key Finding of Fraud Dashboard

- ▶ Fraud flagged cases (2,041) are significantly lower than total transactions, yet 397 fraudulent transactions were blocked, showing system gaps.
- ▶ Mobile and Desktop have almost identical fraud distribution, meaning fraud is not device-dependent.
- ▶ Fraud attempts are highest in Transfer and Withdrawal transactions, indicating targeted exploitation.
- ▶ Network Slice analysis shows fraud flags distributed evenly across slices, suggesting fraudsters are not favoring any particular network route.
- ▶ Fraud trend over time shows spikes in specific months, indicating seasonal or campaign-driven fraud attacks.

CONCLUSION

Overall system performance shows strong transaction volumes but notable failure spikes in high-latency ranges and on specific network slices. Fraud detection is effective but still allows some fraudulent transactions to pass, requiring tighter controls. Mobile and Desktop perform similarly, but Desktop shows slightly higher failure counts, indicating it should be prioritized for optimization. Strengthening fraud rules and improving Desktop performance will significantly enhance overall system reliability.

Recommendation

- ▶ Implement targeted device-specific improvements, especially for Desktop.
- ▶ Increase approval rate through backend process optimization and faster validation checks.
- ▶ Enhance fraud-scoring algorithms to reduce the number of **fraud flagged = TRUE** transactions that still succeeded.
- ▶ Deploy transaction-type-specific fraud rules, especially for **Transfers and Withdrawals**.
- ▶ Implement an early-warning system for months with historically high fraud peaks.
- ▶ Strengthen behavioral analytics to detect bot-based or repeated fraud attempts across both devices.
- ▶ Introduce multi-layer verification for high-risk transactions with high amounts or unusual patterns.

Dashboard 1

Total Number of Transaction
40000

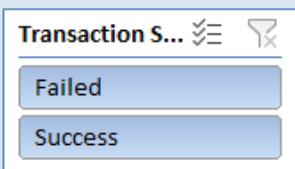
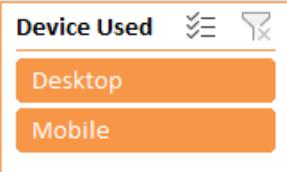
Total Amount
\$99,812,984

Payright Technologies Performance and Fraud Detection Analysis

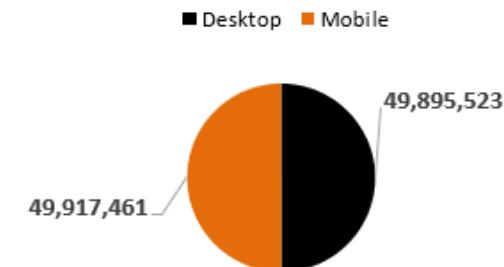
Approval Rate
80.1%

Failed Rate
19.9%

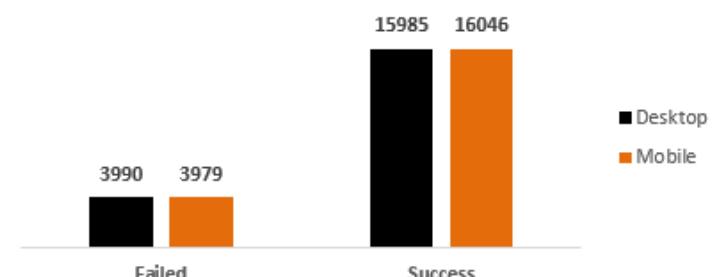
[Link to Fraud Detection Dashboard](#)



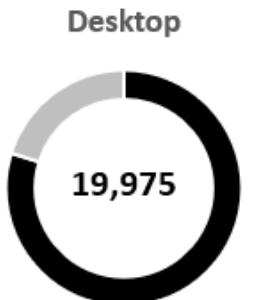
Transact Volume by Device



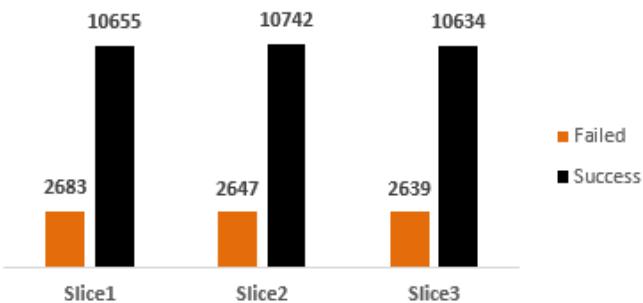
Device by Count of Failed/ Success



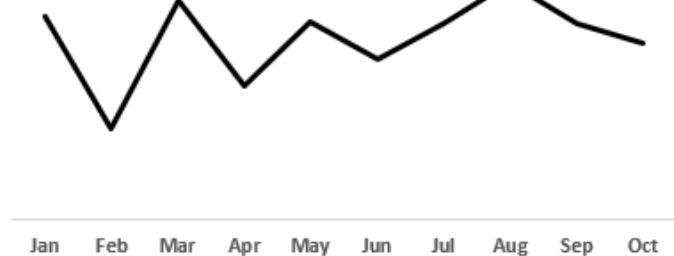
Transact Count by Device



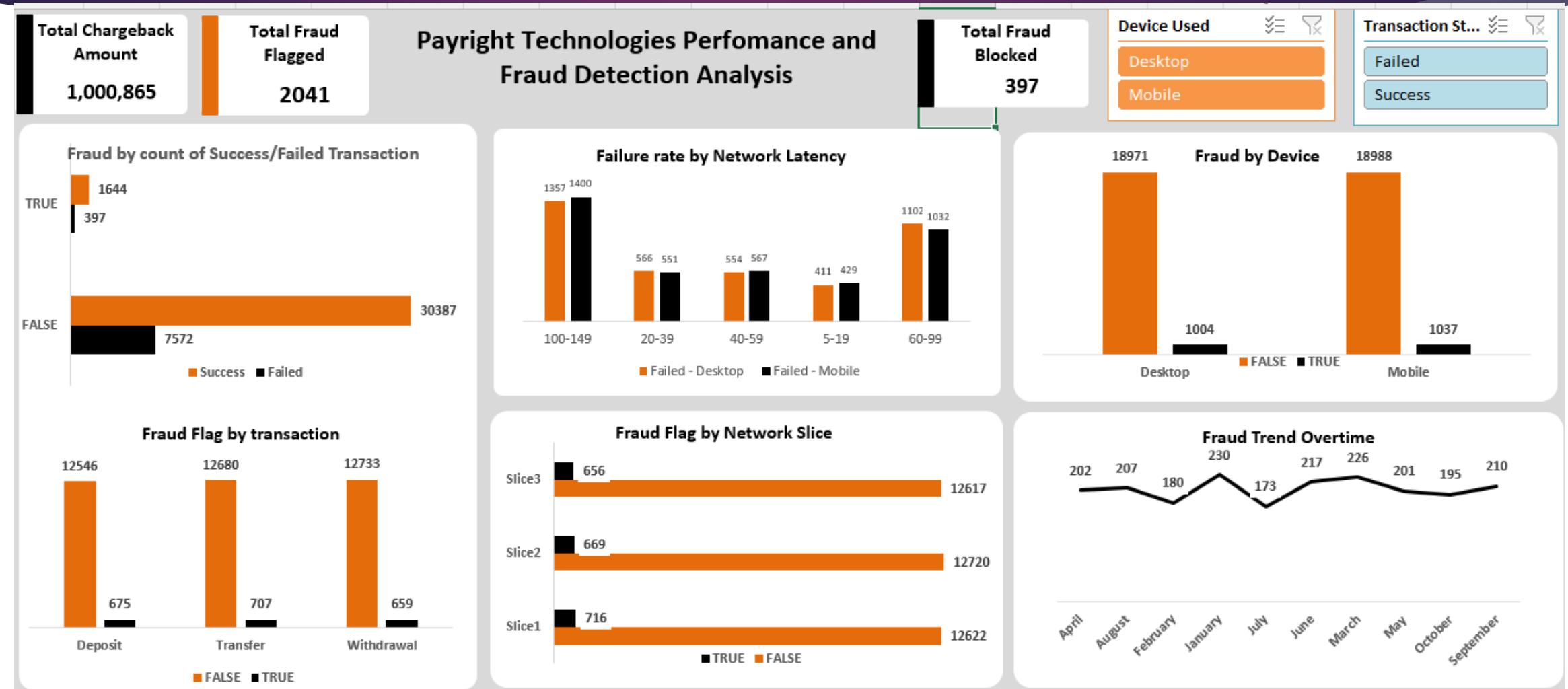
Network Slice By Failure/Success



Monthly Trend



Dashboard 2



**THANK
YOU**