

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	Sender Account	Receiver Account	Transaction Amount	Transaction Type	Timestamp	Transaction Status	Fraud Flag	Location (Latitude/Longitude)	Device Used	Network Slice	Latency (ms)	Slice Bandwidth (Mbps)	PIN Code
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	1099	6273
TXN5225615196	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
TXN59957284	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
TXN276279319	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	8692
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
TXN103618723	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
TXN981687167	ACC96947	ACC75914	1365.32	Deposit	#####	Success	FALSE	35.6895 N, -118.2437 W	Desktop	Slice3	16	1884	1287
TXN301716754	ACC97380	ACC18705	3434.72	Transfer	#####	Success	FALSE	35.6895 N, -118.2437 W	Mobile	Slice2	128	2529	7587
TXN248814798	ACC30506	ACC51450	1989.05	Withdrawal	#####	Success	FALSE	55.7558 N, 37.6173 W	Desktop	Slice1	114	1725	4718
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
TXN643766585	ACC74502	ACC89183	326.01	Withdrawal	#####	Success	FALSE	34.0522 N, -74.006 W	Mobile	Slice1	41	1837	8657
TXN840260435	ACC53273	ACC17597	715.69	Withdrawal	#####	Success	TRUE	55.7558 N, 37.6173 W	Mobile	Slice1	100	345	1264
TXN274680605	ACC43571	ACC31271	1651.61	Deposit	#####	Success	FALSE	34.0522 N, -74.006 W	Mobile	Slice1	51	2297	2275
TXN693961653	ACC64496	ACC61597	4277.85	Transfer	#####	Success	FALSE	51.5074 N, 0.1278 W	Desktop	Slice3	123	2400	3128
TXN1871165772	ACC30426	ACC36557	4446.47	Withdrawal	#####	Failed	FALSE	34.0522 N, -74.006 W	Mobile	Slice1	142	424	5395
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
TXN829624217	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	241.13	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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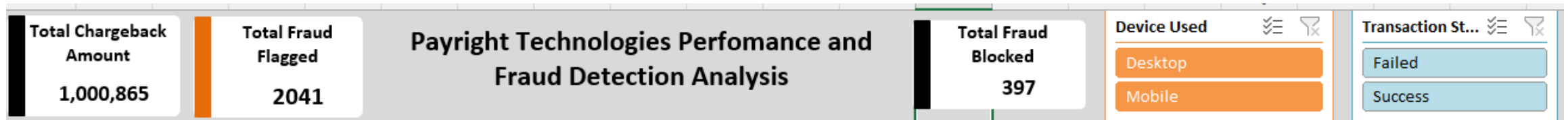
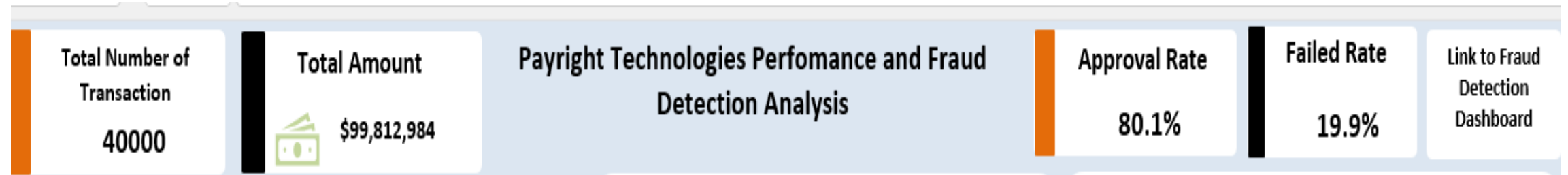
Dirty Data

Get and Clean Data.

Transaction	Sender Acco	Receiver Acco	Transaction A	Transaction	Date	Transaction	Fraud F	Geolocation (Latitude/L	Device U	Network Sli	Latency	Slice Bandwidth (PIN C	Time	Month N	Day Na	Ho	Time
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
TXN6911591624	ACC90406	ACC37430	2256.67	Transfer	1/1/2025	Success	FALSE	55.7558 N, 37.6173 W	Mobile	Slice3	90	1979	7010	12:12:54 AM	January	Wednesday	0	Night
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	12:14:29 AM	January	Wednesday	0	Night
TXN396990253	ACC39732	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
TXN4384108177	ACC58194	ACC70836	2499.99	Deposit	1/1/2025	Success	FALSE	34.0522 N, -74.006 W	Desktop	Slice1	114	154	1176	12:59:20 AM	January	Wednesday	0	Night
TXN460082712	ACC61276	ACC30240	4887.9	Deposit	1/1/2025	Success	FALSE	48.8566 N, 2.3522 W	Desktop	Slice1	147	2507	4632	1:00:32 AM	January	Wednesday	1	Night
TXN599957284	ACC84969	ACC69796	4371.06	Withdrawal	1/1/2025	Success	FALSE	40.7128 N, -74.006 W	Desktop	Slice1	14	1100	2883	1:18:34 AM	January	Wednesday	1	Night
TXN3641138937	ACC77646	ACC11804	3454.75	Transfer	1/1/2025	Failed	FALSE	34.0522 N, -74.006 W	Mobile	Slice2	7	1608	4772	1:19:57 AM	January	Wednesday	1	Night
TXN276279319	ACC44275	ACC83197	3701.45	Withdrawal	1/1/2025	Success	FALSE	51.5074 N, 0.1278 W	Mobile	Slice3	35	2143	6574	1:28:28 AM	January	Wednesday	1	Night
TXN543536254	ACC91612	ACC95148	2776.84	Withdrawal	1/1/2025	Success	FALSE	35.6895 N, -118.2437 W	Desktop	Slice1	86	1754	8692	1:30:01 AM	January	Wednesday	1	Night
TXN5973774055	ACC58442	ACC65015	3891.85	Withdrawal	1/1/2025	Success	FALSE	51.5074 N, 0.1278 W	Mobile	Slice2	98	1381	8154	1:35:09 AM	January	Wednesday	1	Night
TXN8194849621	ACC24907	ACC69223	4913.84	Deposit	1/1/2025	Success	FALSE	55.7558 N, 37.6173 W	Desktop	Slice1	29	476	9381	1:38:02 AM	January	Wednesday	1	Night
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TXN2488147981	ACC30506	ACC51450	1989.05	Withdrawal	1/1/2025	Success	FALSE	55.7558 N, 37.6173 W	Desktop	Slice1	114	1725	4718	3:13:36 AM	January	Wednesday	3	Night
TXN396986816	ACC72296	ACC35830	3391.77	Withdrawal	1/1/2025	Failed	FALSE	55.7558 N, 37.6173 W	Desktop	Slice3	50	2700	5375	3:22:12 AM	January	Wednesday	3	Night
TXN895627515	ACC76341	ACC90278	2616.59	Transfer	1/1/2025	Success	FALSE	35.6895 N, -118.2437 W	Desktop	Slice1	61	1671	1226	3:26:56 AM	January	Wednesday	3	Night
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
TXN840260433	ACC53273	ACC17597	715.69	Withdrawal	1/1/2025	Success	TRUE	55.7558 N, 37.6173 W	Mobile	Slice1	100	345	1264	3:50:51 AM	January	Wednesday	3	Night
TXN274680605	ACC43571	ACC31271	1651.61	Deposit	1/1/2025	Success	FALSE	34.0522 N, -74.006 W	Mobile	Slice1	51	2297	2275	4:08:09 AM	January	Wednesday	4	Night
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
TXN4282172981	ACC82264	ACC48911	1133.02	Withdrawal	1/1/2025	Success	FALSE	40.7128 N, -74.006 W	Mobile	Slice3	98	755	7474	4:45:19 AM	January	Wednesday	4	Night
TXN422832485	ACC76747	ACC46031	2779.75	Withdrawal	1/1/2025	Success	FALSE	40.7128 N, -74.006 W	Mobile	Slice3	134	986	2973	4:45:48 AM	January	Wednesday	4	Night
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TXN829624217	ACC79319	ACC98420	3478.8	Deposit	1/1/2025	Success	FALSE	35.6895 N, -118.2437 W	Desktop	Slice2	146	973	6018	5:21:57 AM	January	Wednesday	5	Mornin
TXN800437794	ACC56743	ACC41085	693.17	Transfer	1/1/2025	Success	FALSE	55.7558 N, 37.6173 W	Mobile	Slice1	62	718	1921	5:23:07 AM	January	Wednesday	5	Mornin
TXN440891897	ACC27846	ACC91462	4152.25	Deposit	1/1/2025	Failed	FALSE	34.0522 N, -74.006 W	Mobile	Slice1	103	534	6564	5:48:59 AM	January	Wednesday	5	Mornin
TXN427826473	ACC81967	ACC51512	3886.32	Deposit	1/1/2025	Failed	FALSE	35.6895 N, -118.2437 W	Desktop	Slice3	108	1887	2922	6:04:31 AM	January	Wednesday	6	Mornin
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TXN649583210	ACC29185	ACC23420	167.23	Transfer	1/1/2025	Success	FALSE	48.8566 N, 2.3522 W	Mobile	Slice1	137	2446	8011	6:10:24 AM	January	Wednesday	6	Mornin
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TXN561573654	ACC49093	ACC22868	1531.83	Transfer	1/1/2025	Success	FALSE	55.7558 N, 37.6173 W	Desktop	Slice3	104	867	6816	6:26:42 AM	January	Wednesday	6	Mornin
TXN9251676961	ACC68843	ACC34013	3487.03	Deposit	1/1/2025	Success	FALSE	34.0522 N, -74.006 W	Mobile	Slice1	79	2409	6442	6:26:43 AM	January	Wednesday	6	Mornin
TXN6094646114	ACC67325	ACC75117	4563.91	Transfer	1/1/2025	Success	FALSE	34.0522 N, -74.006 W	Mobile	Slice1	132	2349	4469	6:29:09 AM	January	Wednesday	6	Mornin
TXN713609865	ACC99585	ACC28007	4084.64	Withdrawal	1/1/2025	Success	FALSE	51.5074 N, 0.1278 W	Mobile	Slice3	111	763	3121	7:14:34 AM	January	Wednesday	7	Mornin
TXN2501152002	ACC11154	ACC41785	3317.22	Withdrawal	1/1/2025	Success	FALSE	55.7558 N, 37.6173 W	Mobile	Slice1	59	2852	5537	7:28:57 AM	January	Wednesday	7	Mornin

Cleaned Data

KPI

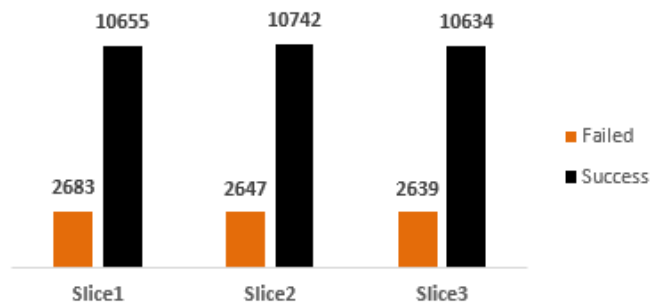


ANALYSIS AND VISUALS

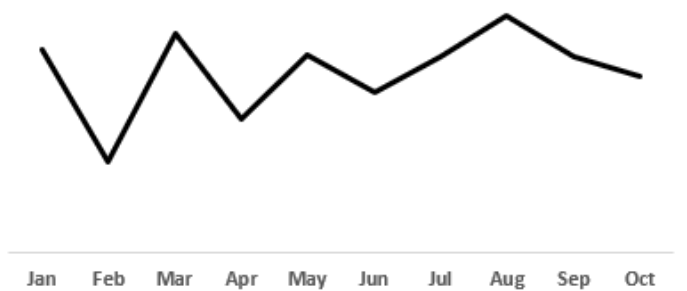
Transact Count by Device



Network Slice By Failure/Success



Monthly Trend

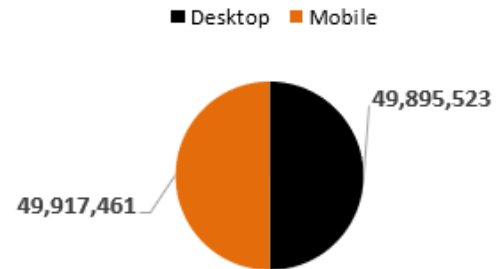


ANALYSIS AND VISUALS

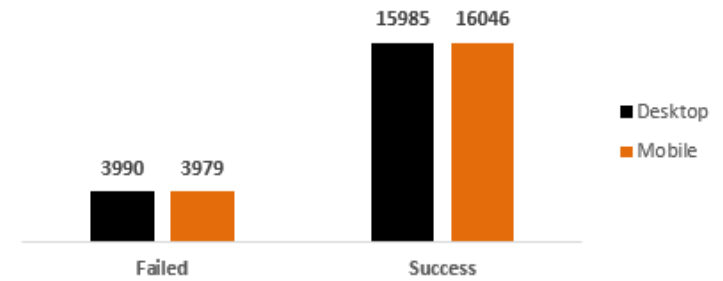
Fraud by Transaction



Transact Volume by Device

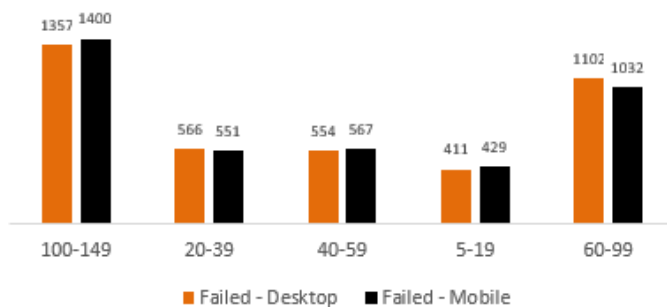


Device by Count of Failed/ Success

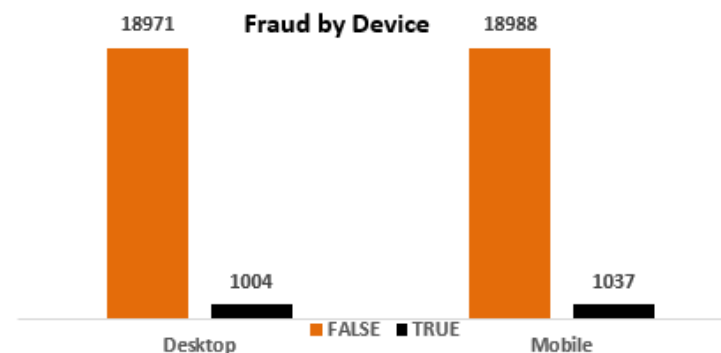


ANALYSIS AND VISUALS

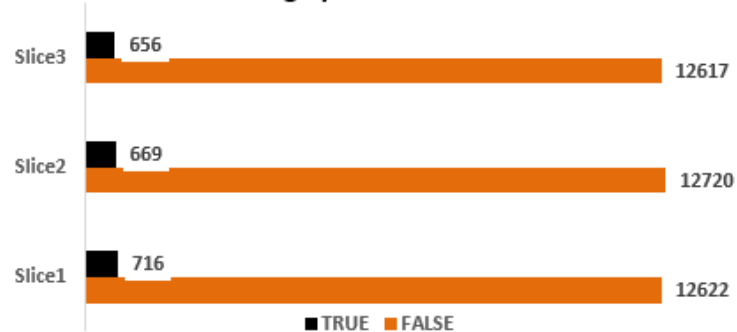
Failure rate by Network Latency



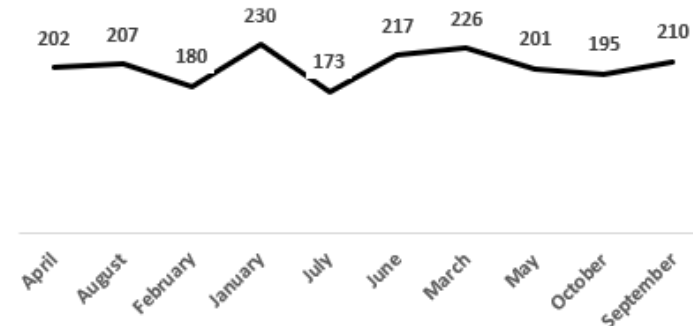
Fraud by Device



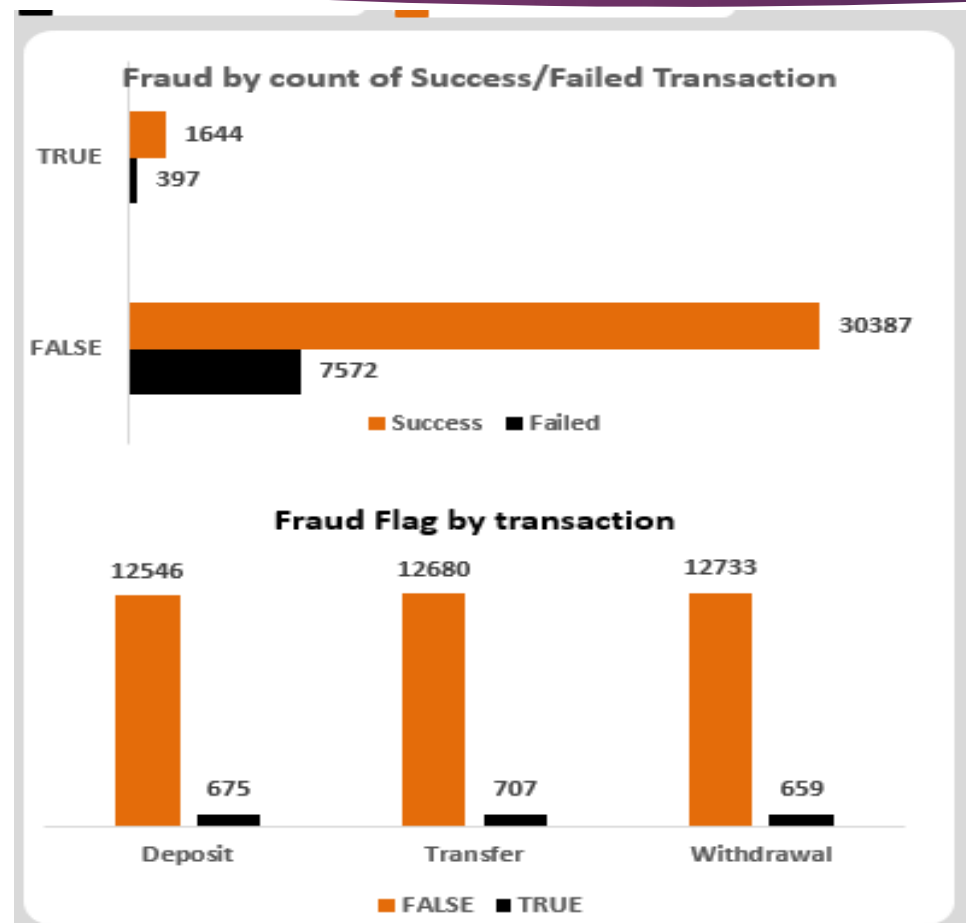
Fraud Flag by Network Slice



Fraud Trend Overtime



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](#)

Device Used



Desktop

Mobile

Transaction S...



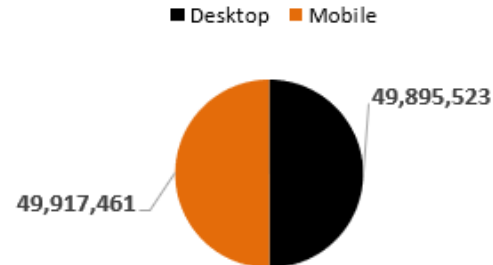
Failed

Success

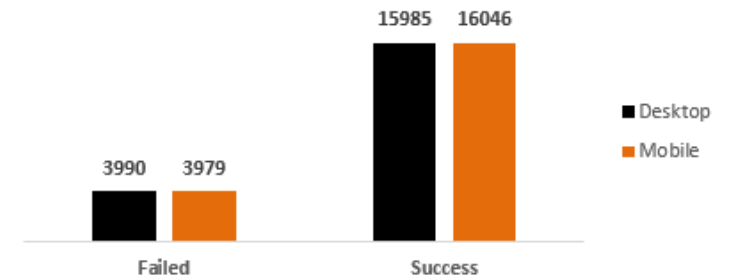
Fraud by Transaction



Transact Volume by Device

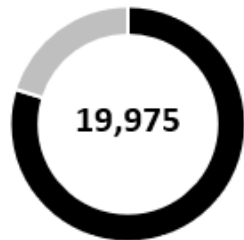


Device by Count of Failed/ Success



Transact Count by Device

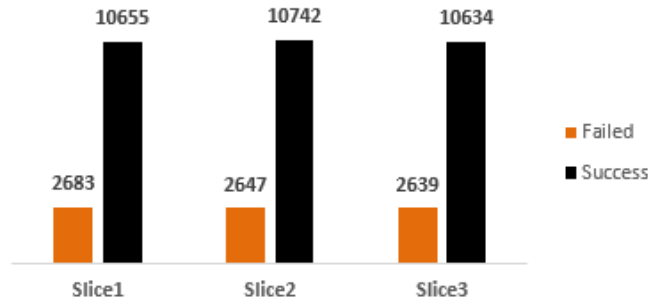
Desktop



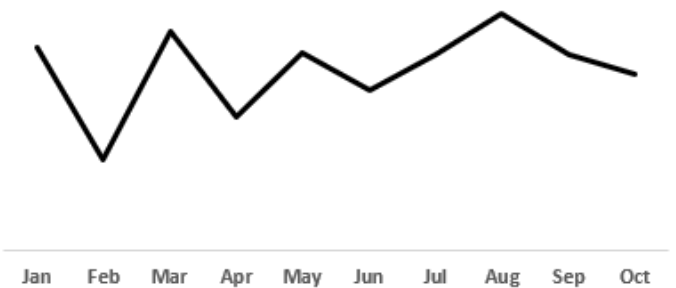
Mobile



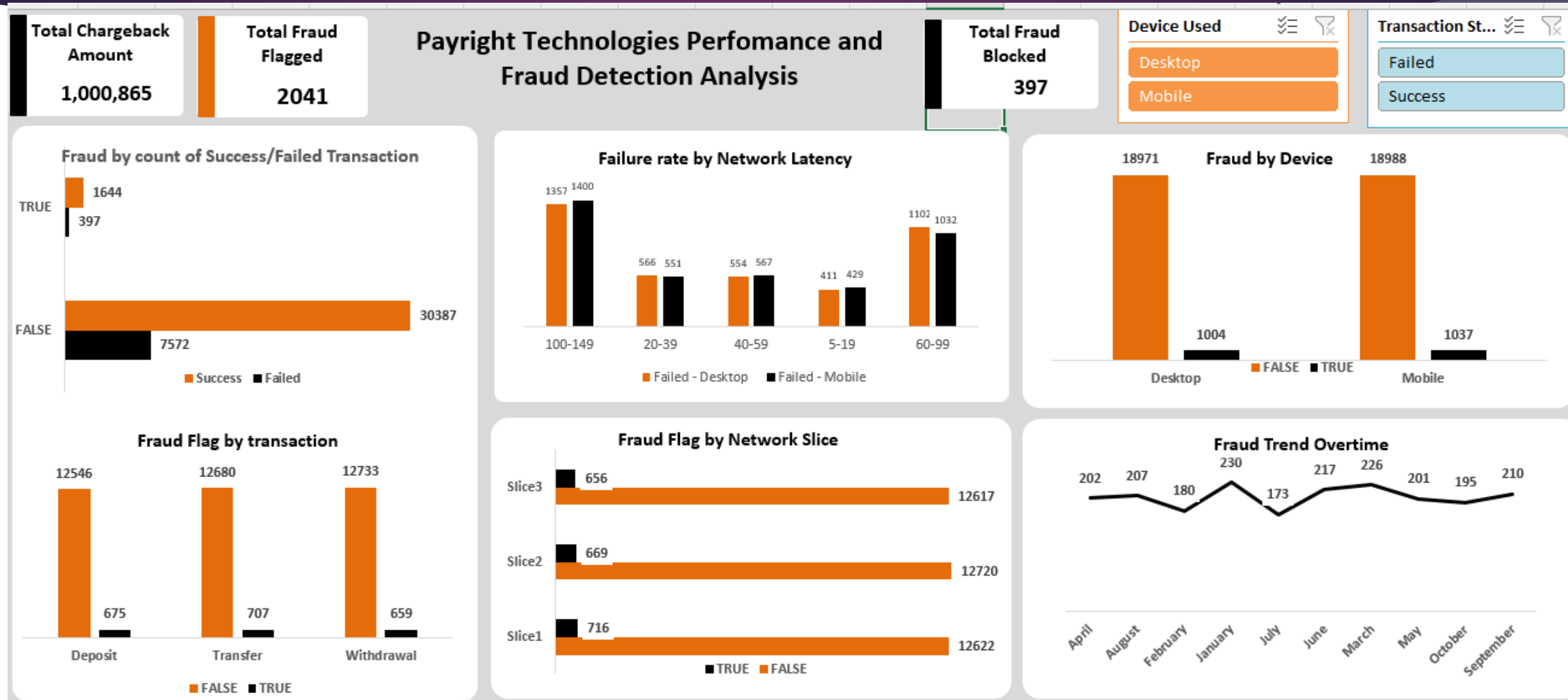
Network Slice By Failure/Success



Monthly Trend



Dashboard 2





**THANK
YOU**