Driving Change through Walmart's Data

04/30/2021

Walmart Global Tech

University of Texas at Austin MSBA Capstone Team 15

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The UT MSBA Capstone Consulting Team

"We have the answers."

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The Business Problem

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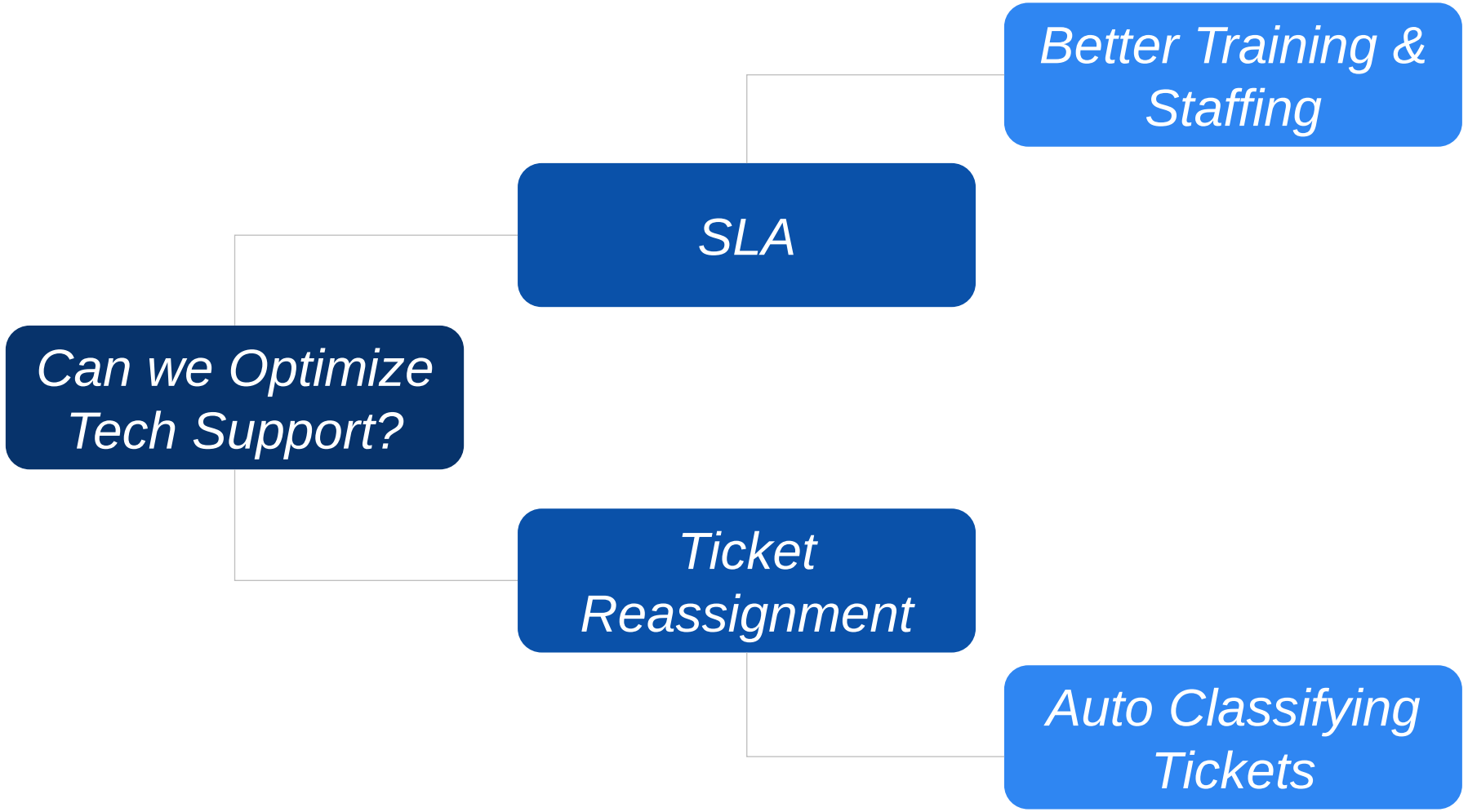
Overview



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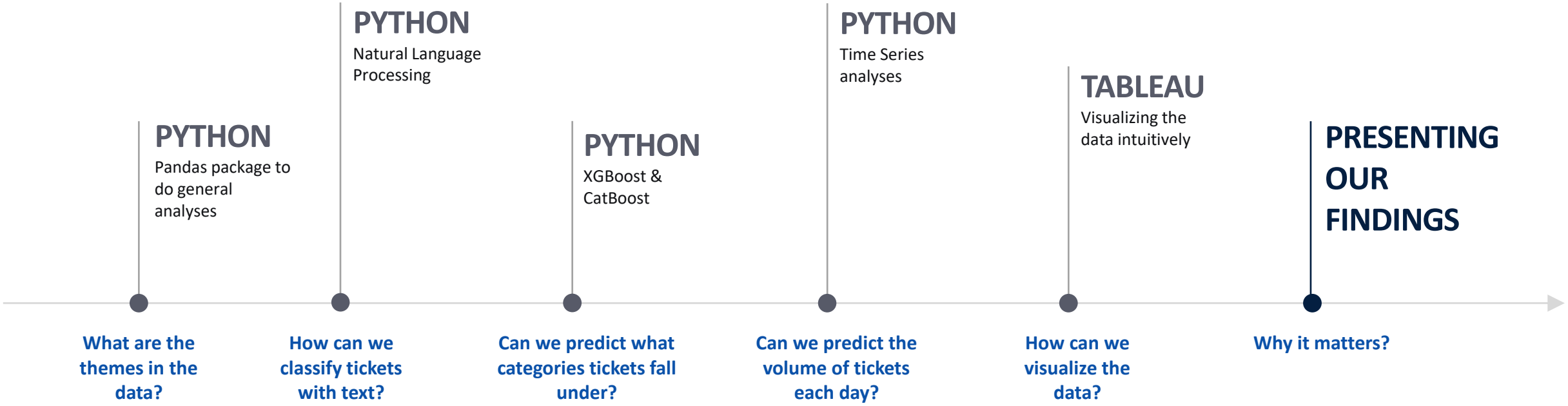
Technical Timeline



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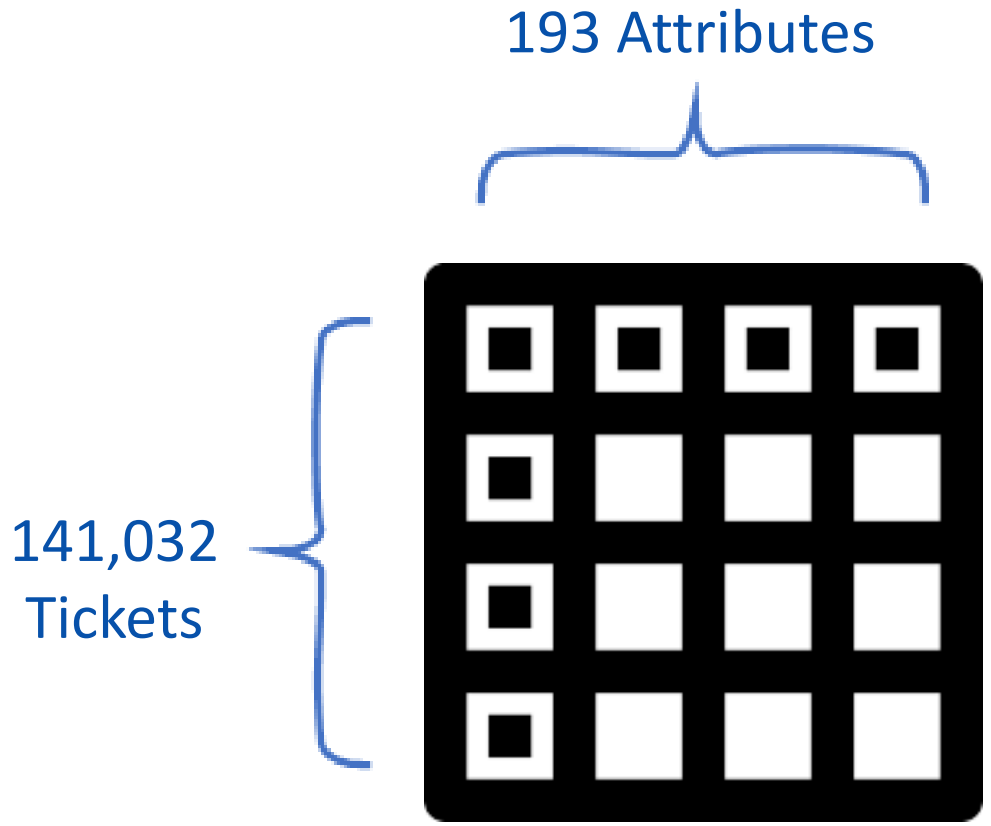
A Collaboration Between Giants

About The Data

- Walmart's Global Tech Team
- United State Only
- Jan 2020 - Feb 2021



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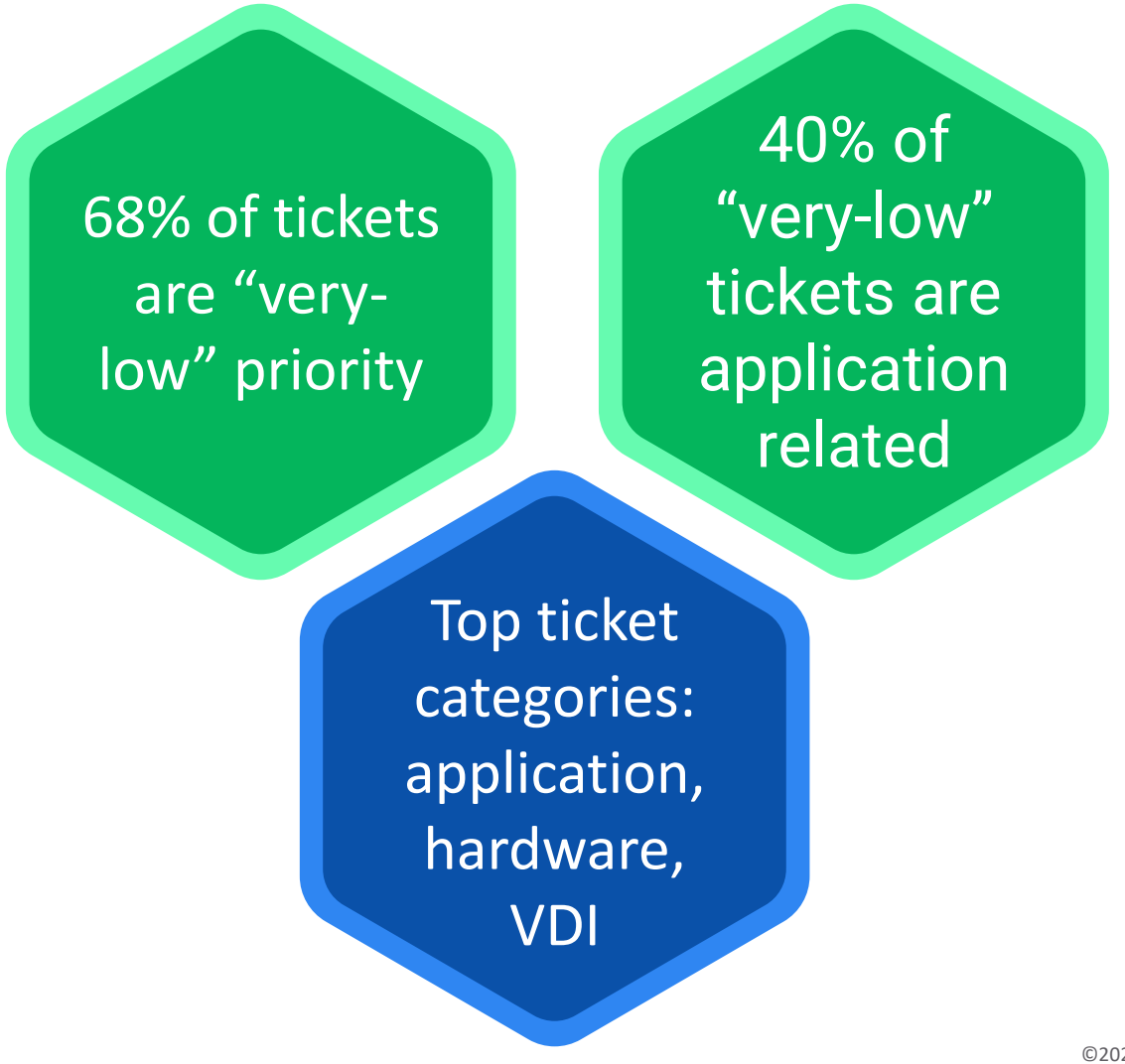
What the Data Shows



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What Should Walmart Do?

High ticket volume

Automating lower priority tickets

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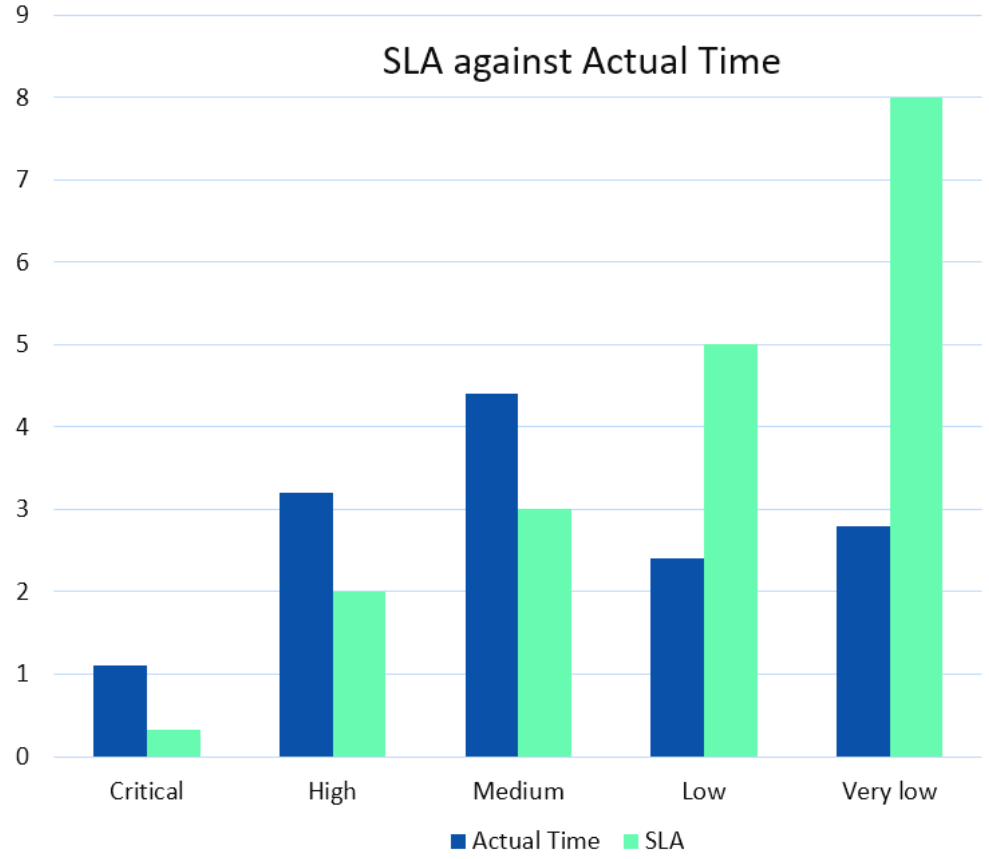
Slow Ticket Solving Time

Priority	Actual	Standard
Critical	***1.1 days***	***8 hours***
High	***3.2 days***	***2 days***
Medium	***4.4 days***	***3 days***
Low	2.4 days	5 days
Very Low	2.8 days	8 days



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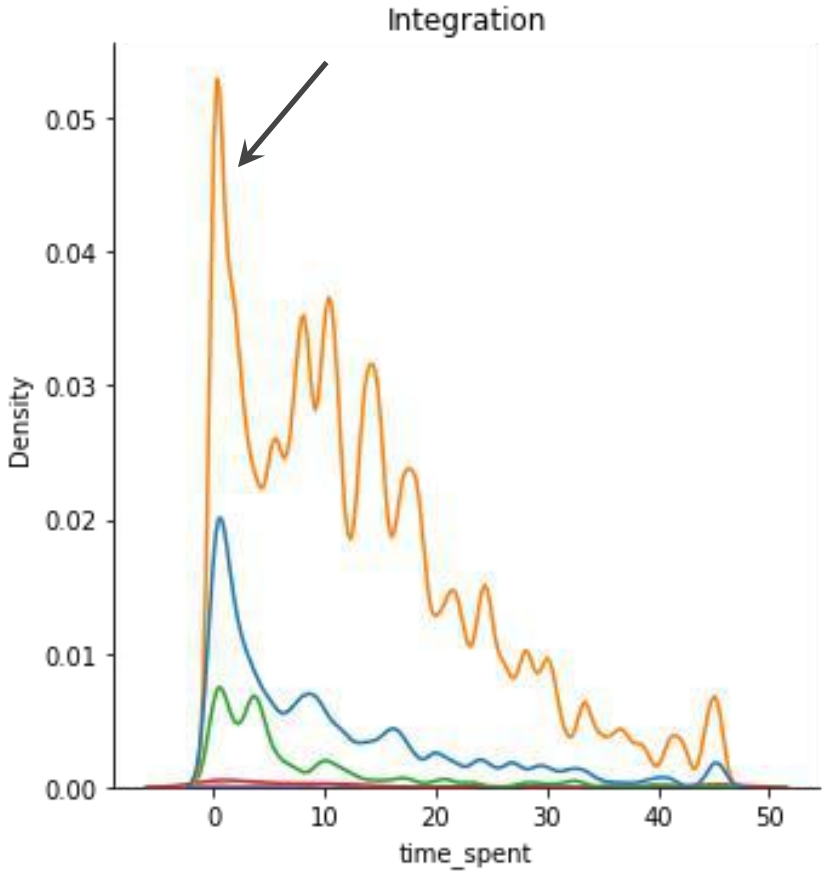
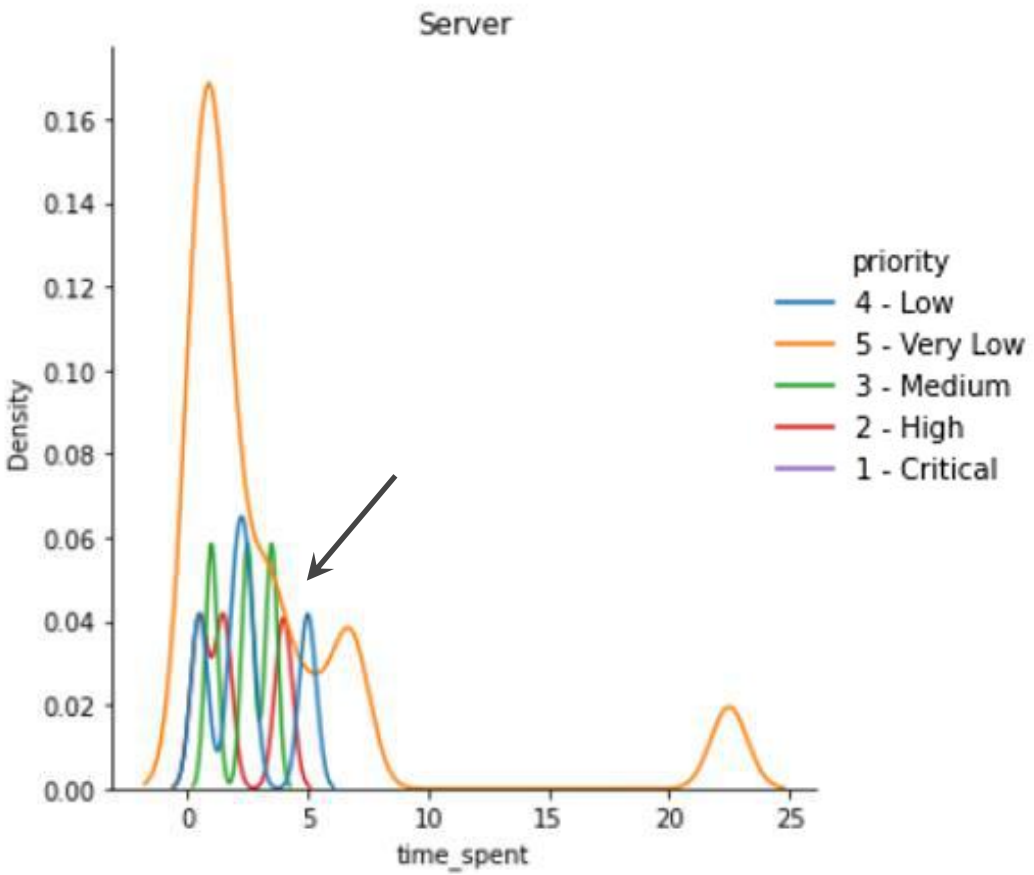
Prioritized Ticket Processing



Mixed Ticket Processing



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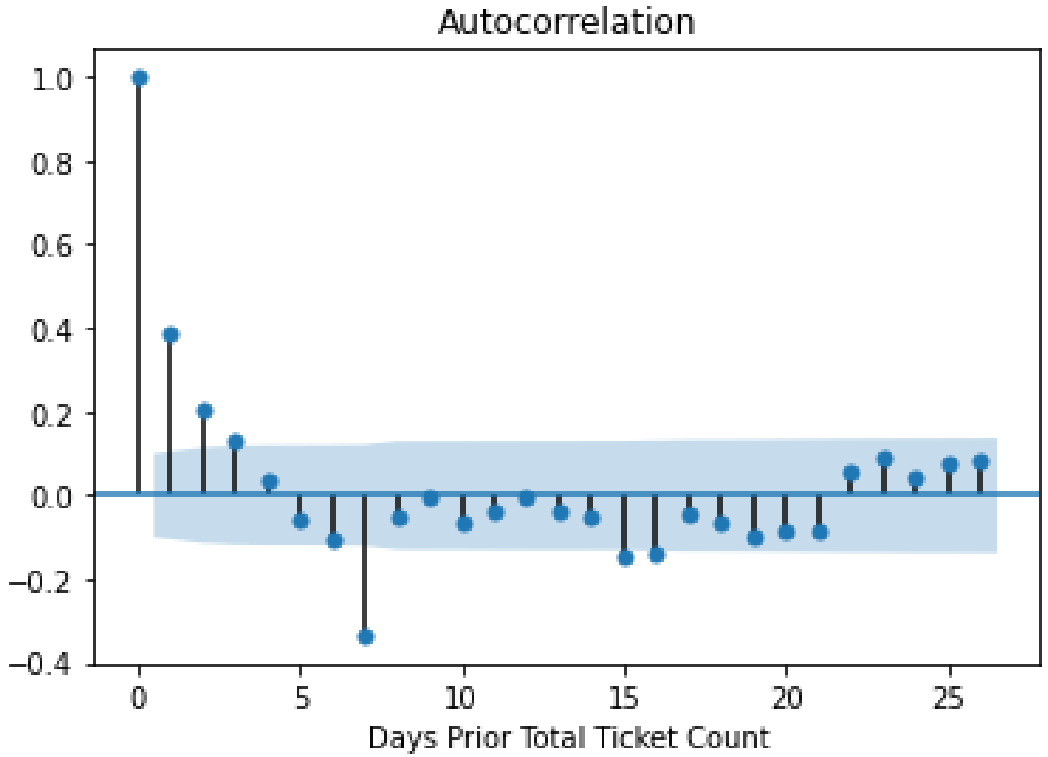
Hourly Ticket Volume Prediction

Goal:

Adjust Staffing Solution based on ticket prediction

Predictors:

- ✓ Hour of Day,
- ✓ Day of Week,
- ✓ Prior Hour(s) Ticket Counts,
- ✓ Prior Daily Total Counts



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What the Data is Showing

50,464 Tickets were **reassigned at least once**

22 Different Categories

Categories with *highest* reassignment count:
Application
Hardware
Telephony

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Potential Reason for Inefficiency

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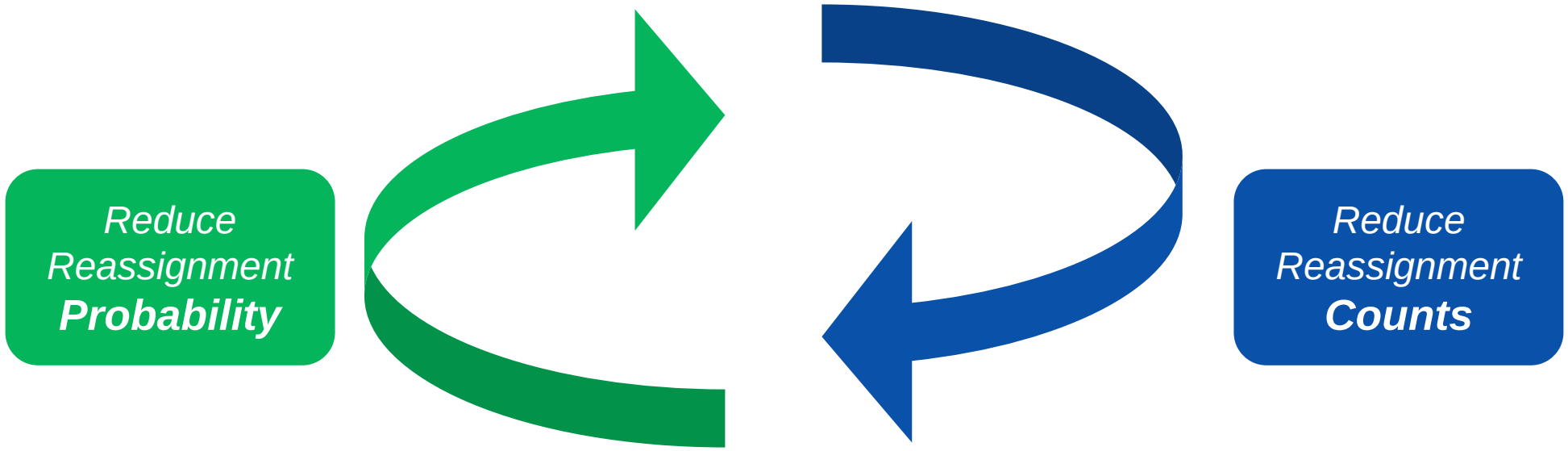
How Walmart Can Address this



We built a classification Model that builds upon improving efficiency

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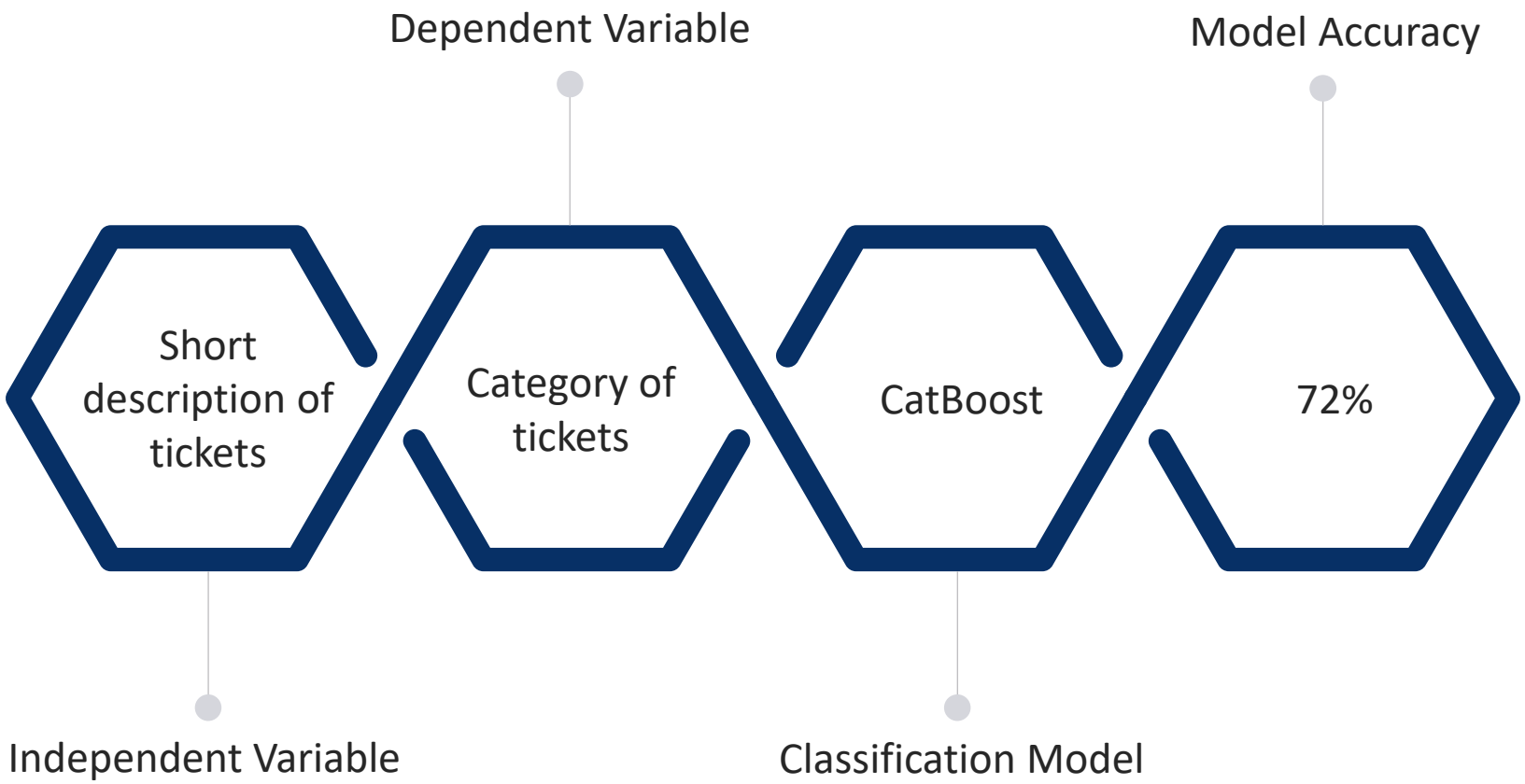
How The Models Works at a High Level



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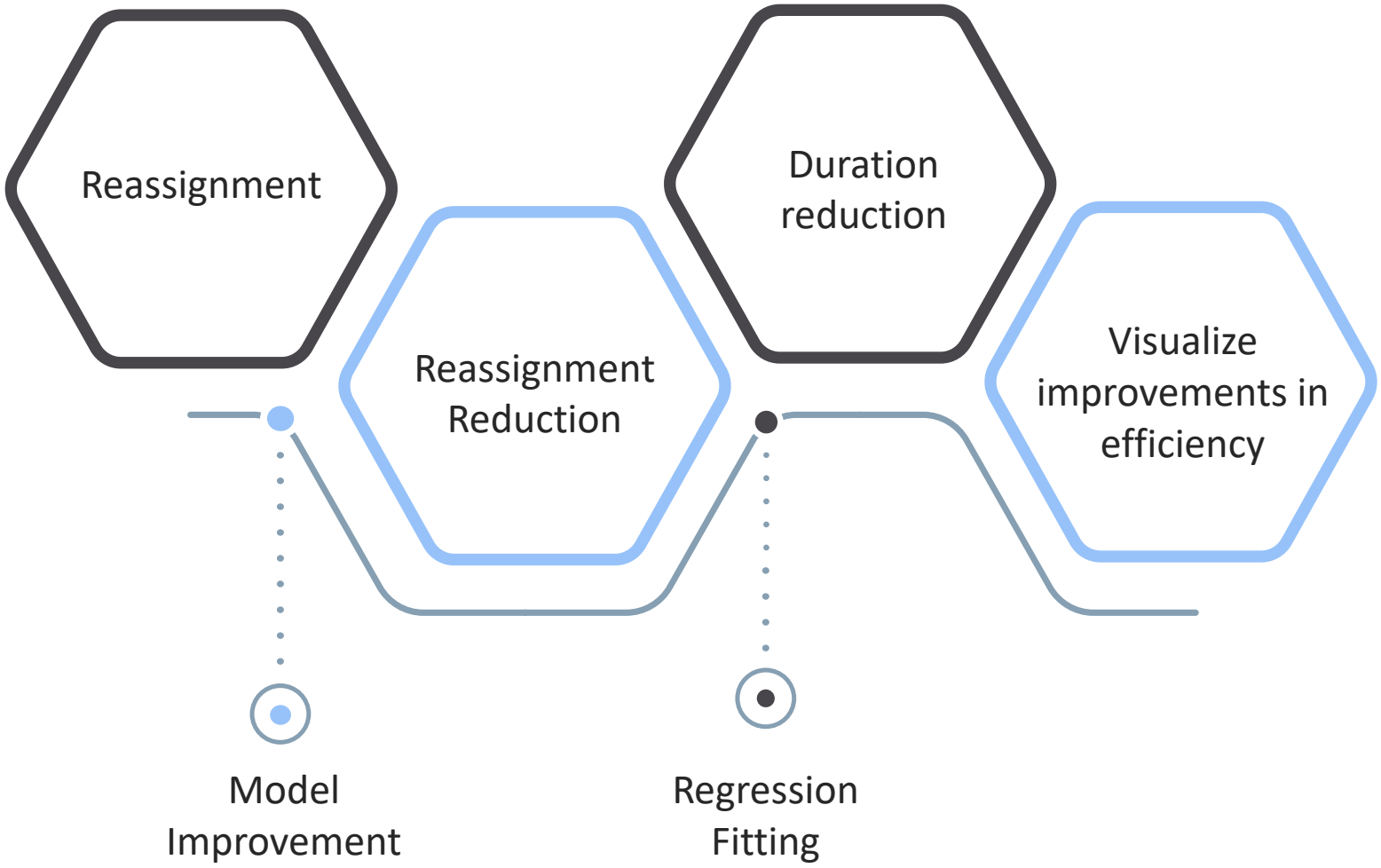
Applications and Benefits of Model



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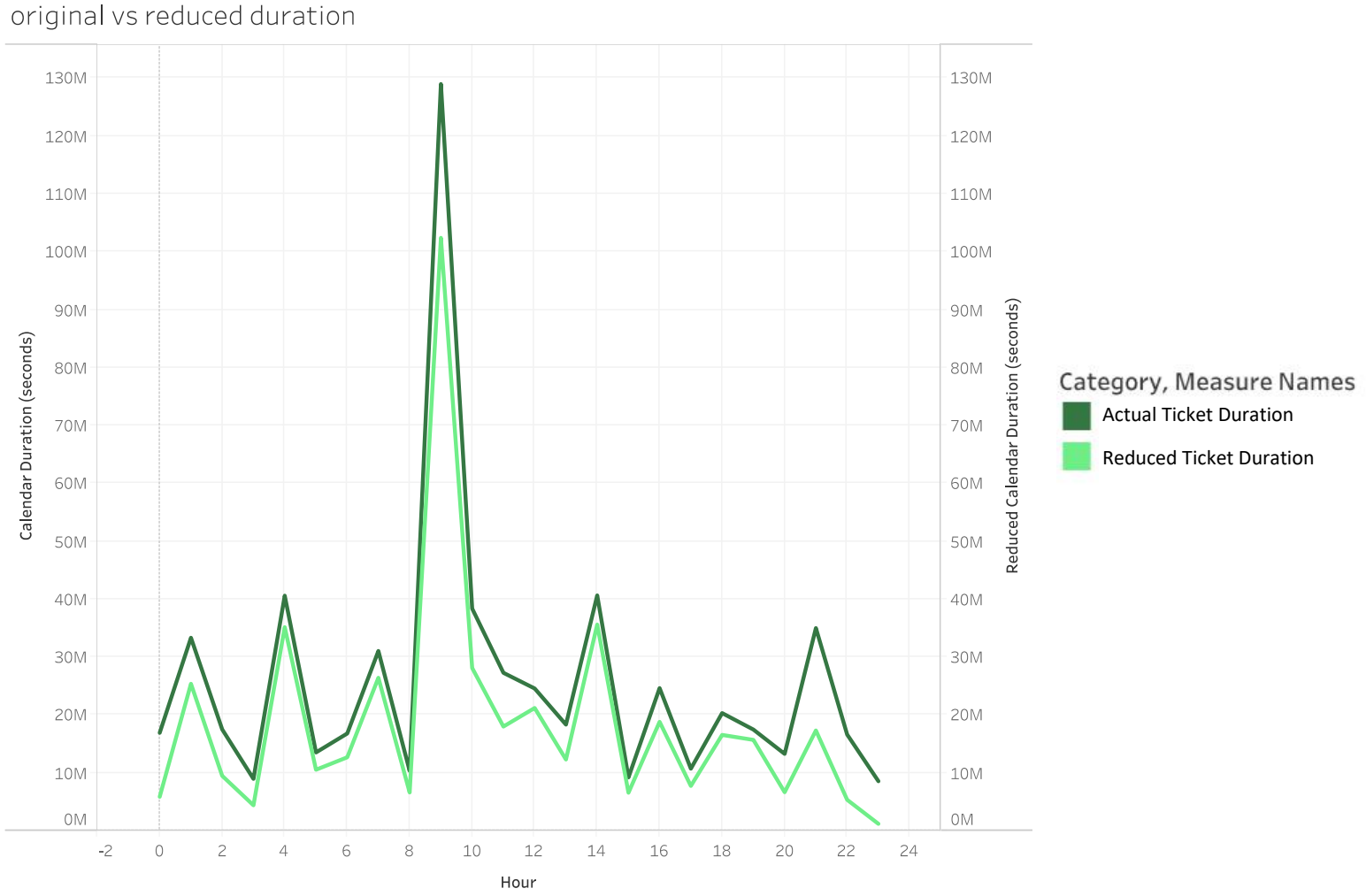
Ticket Processing Time Reduction



The trends of Calendar Duration and reduced calendar_duration for Hour. Color shows details about Category, Calendar Duration and reduced calendar_duration. The view is filtered on Category, which keeps Monitoring.

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Reduce Ticket Duration Saves Time

Category	Decrease in Ticket Time Duration (Years)
AV / Conference Room	5.5% (0.36 years)
Access	5.9% (**12.56 years**)
Data / Reporting	8.3% (0.26 years)
Database	14.7% (0.67 years)
End User Equipment	3.7% (**5.07 years**)
Middleware	1.3% (0.01 years)
Monitoring	27.8% (**5.48 years**)
Network	4.8% (3.14 years)
Overall	***6.1% (27.57 years)***

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Walmart's Potential Cost Savings

$$\frac{\textbf{Salary}}{\textbf{Year}} * \frac{\textbf{1 Year}}{\textbf{2080 Work Hours}} * \textbf{27.57 years} * \frac{\textbf{8760 hours}}{\textbf{year}}$$

Low ($20k Salary) = > $2.3 Million

Medium ($35k Salary) = > $4.0 Million

High ($50k Salary) = > $5.8 Million

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Recap

Tickets

Low priority tickets can be automated

SLA

Important tickets need to be resolved faster

Reassignment

~ 50% of tickets are reassigned once, this can be reduced

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Appendix

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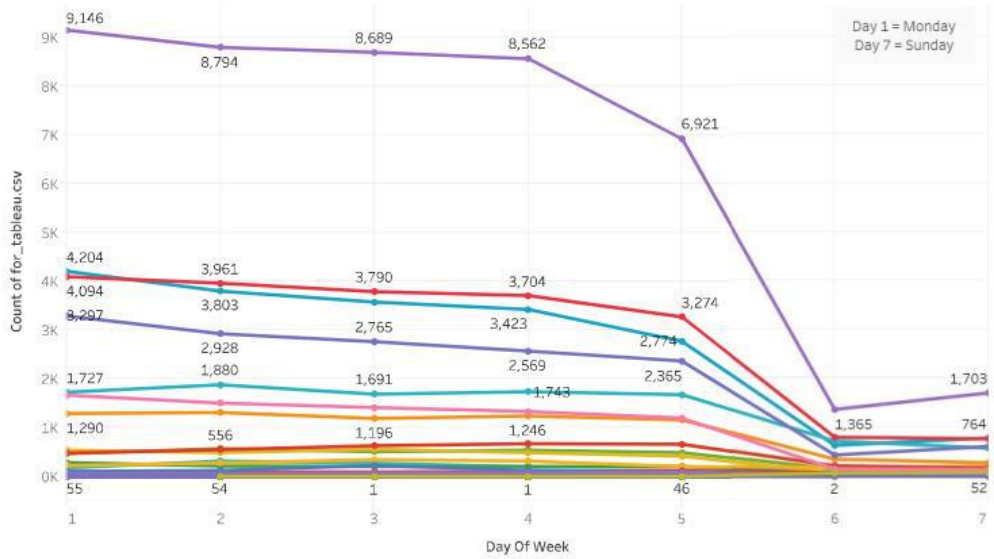
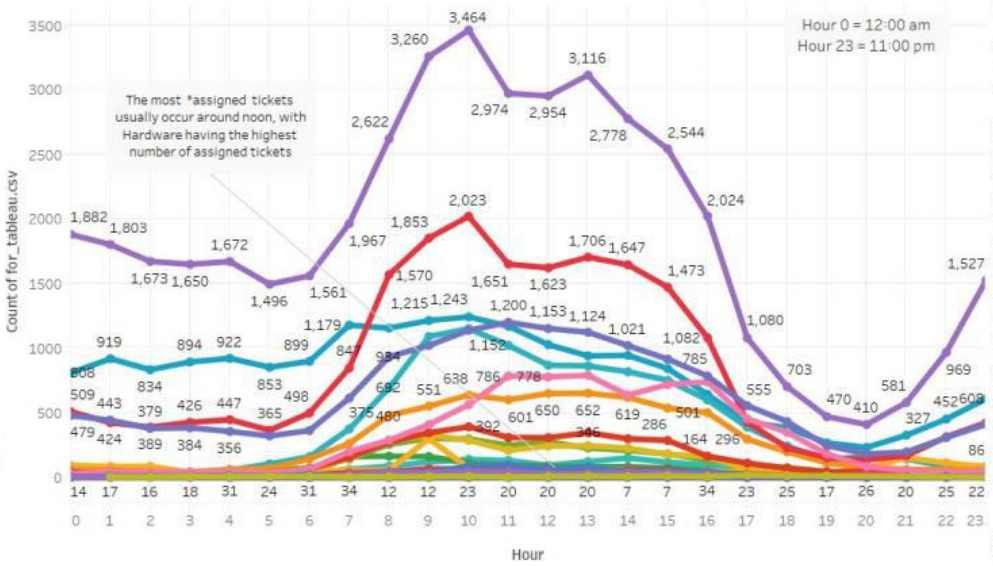
Day of the Week vs Ticket Category & State



Hour of the Day vs Ticket Category & State



Granular Ticket Count Slider
1 to 38,307
and Null values

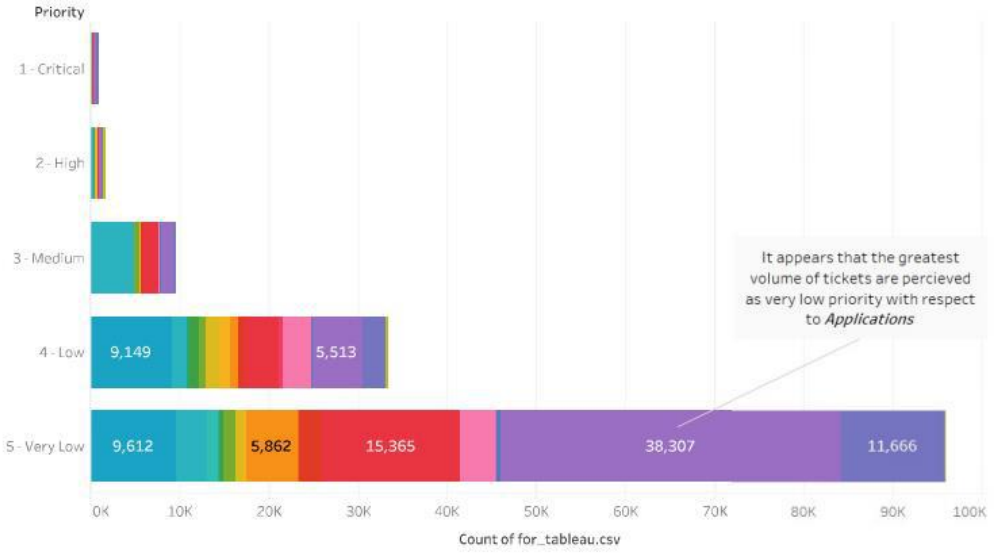
Maximum Ticket Count Slider
1 to 38,307
and Null values

Select Categories to Hide
- Null
- Access
- Application
- AV / Conf room
- Data / Reporting
- Database
- End user equipment
- Enterprise Application
- Facilities
- Hardware
- Integration

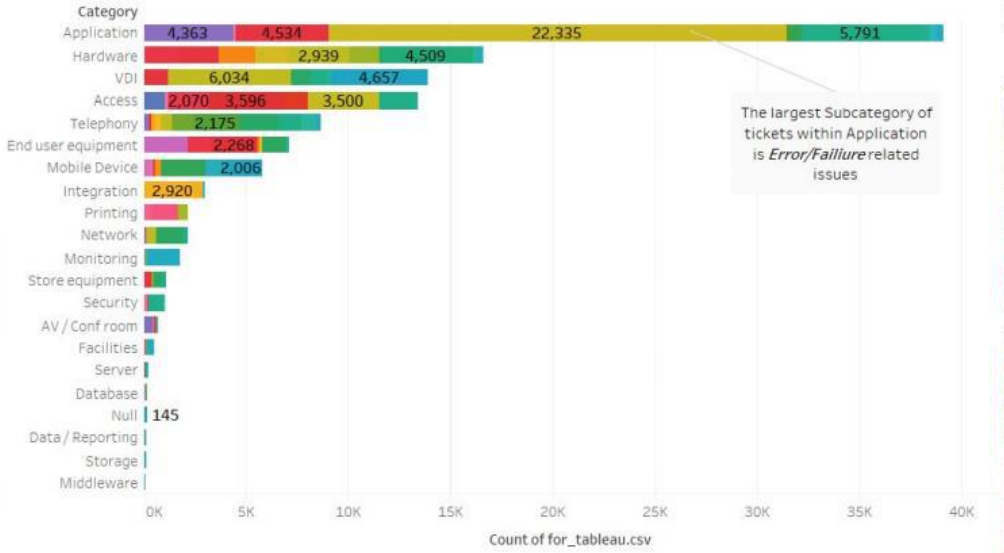
Select Ticket State
- Assigned
- Closed
- Pending
- Resolved
- Work in Progress

Select Ticket Priority
- 1 - Critical
- 2 - High
- 3 - Medium
- 4 - Low
- 5 - Very Low

Ticket Priority vs Ticket Category



Ticket Category vs Ticket Subcategory



Category
- Null
- Access
- Application
- AV / Conf room
- Data / Reporting
- Database
- End user equipment
- Enterprise Application
- Facilities

Subcategory
- Abuse
- Access
- Activation / Enrollment
- Alert
- Application
- Backup / Restore
- Backup failure
- Batch error
- Battery

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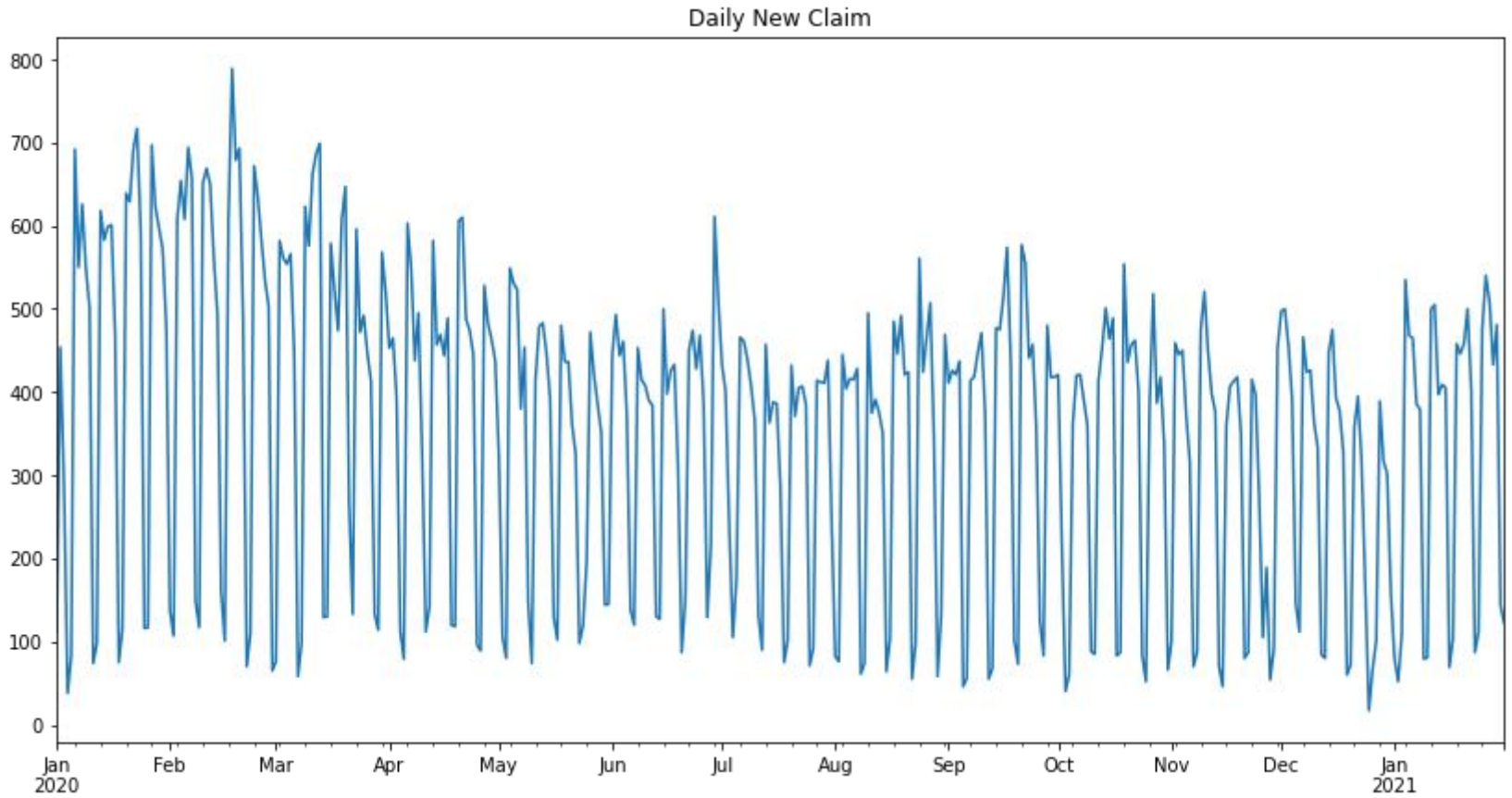

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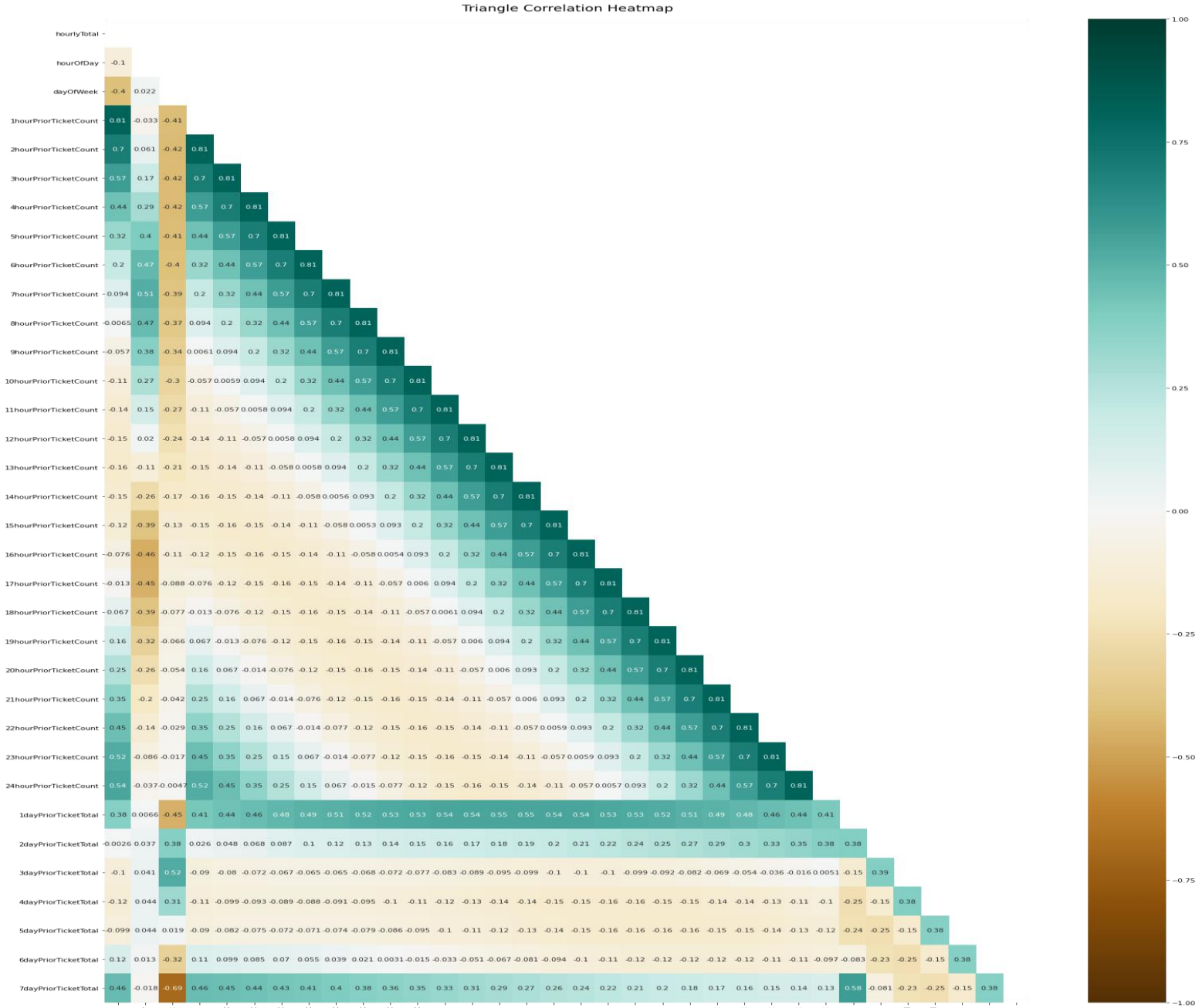

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Priority	Time_spent	SLA
Critical	1.1 days	8 hours
High	3.2 days	2 days
Medium	4.4 days	3 days
Low	2.4 days	5 days
Very low	2.8 days	8 days

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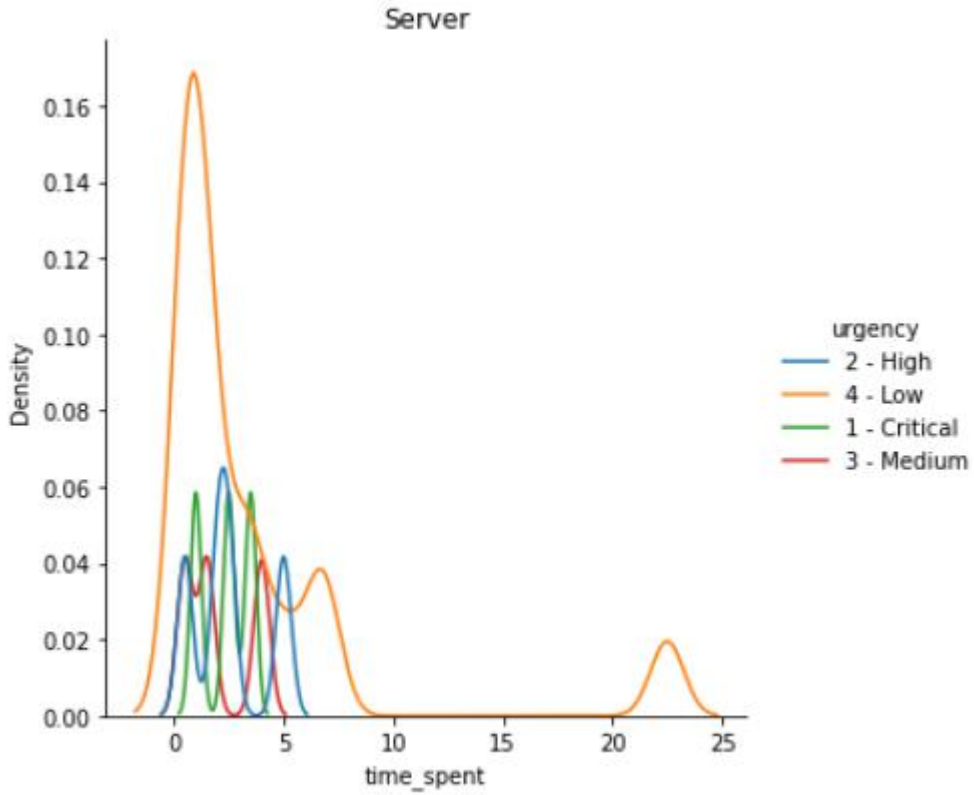

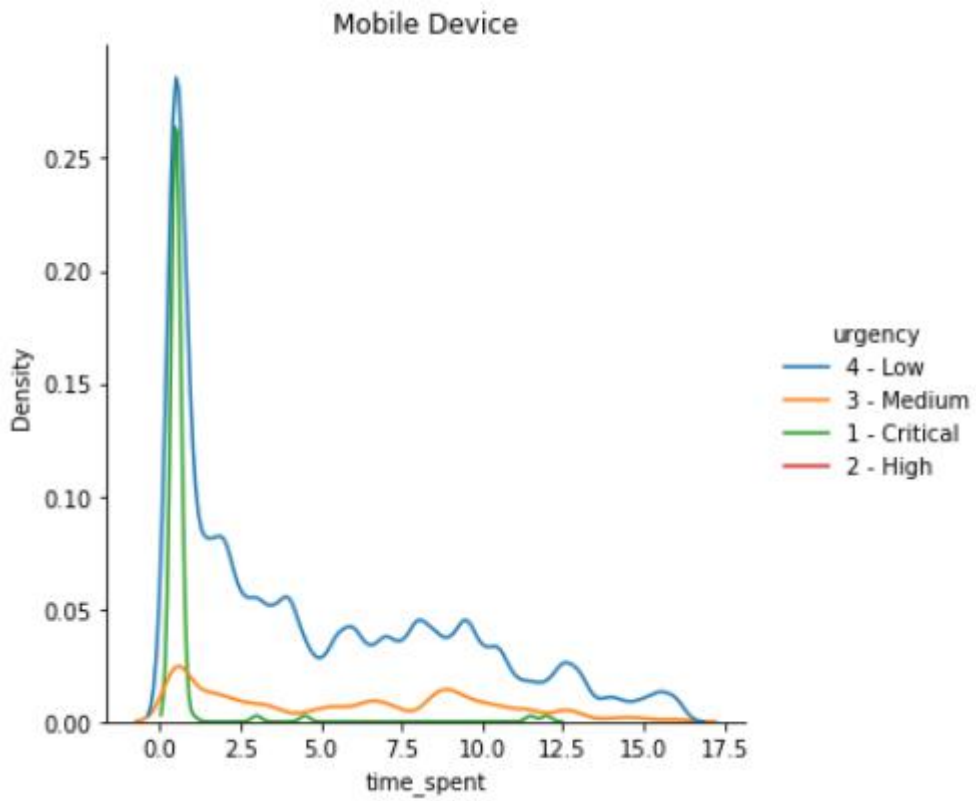

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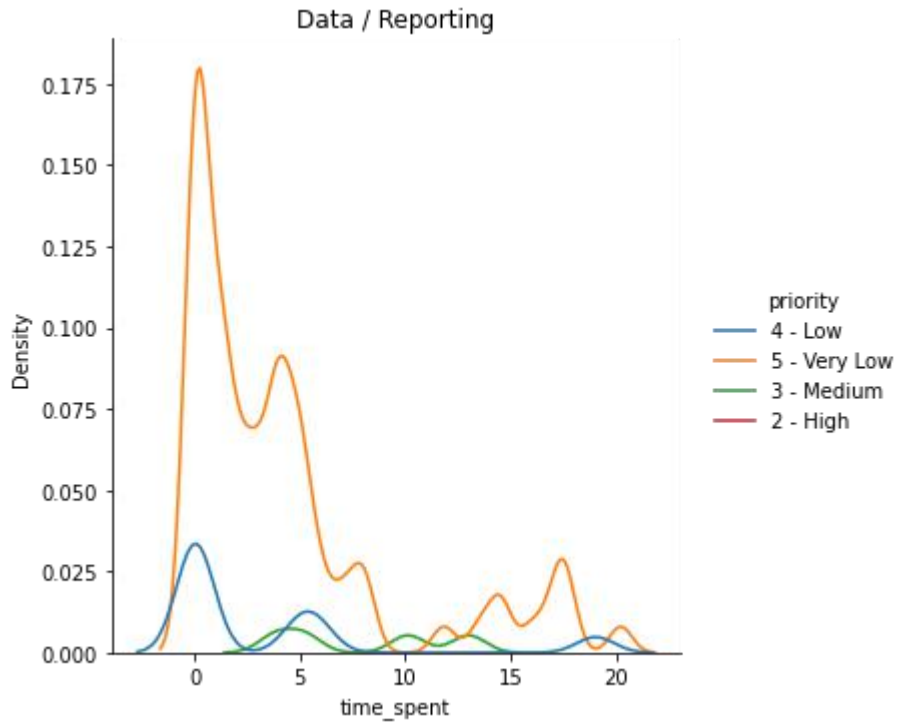

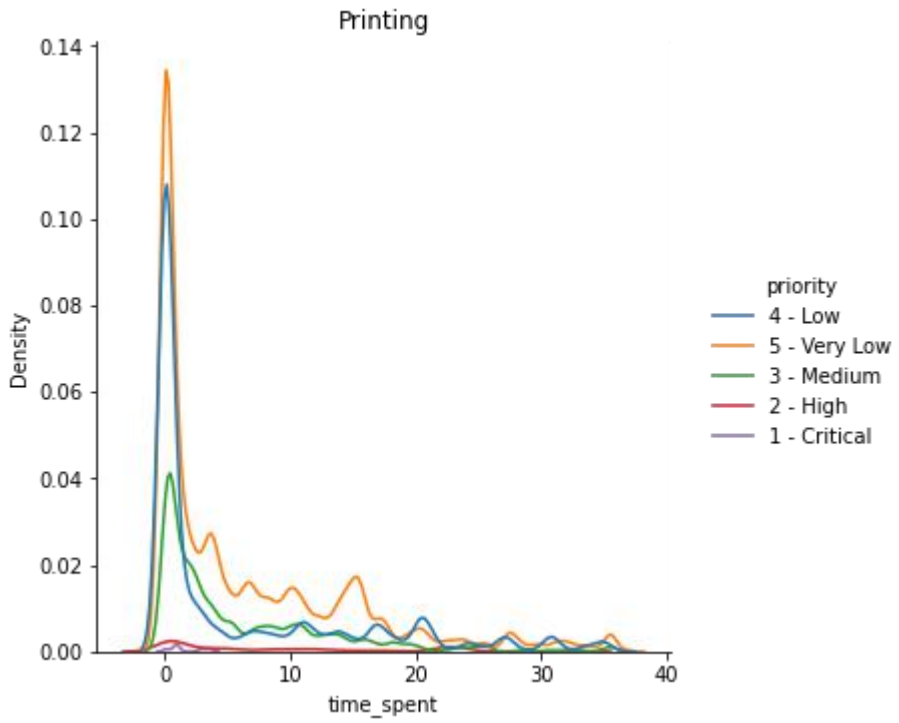

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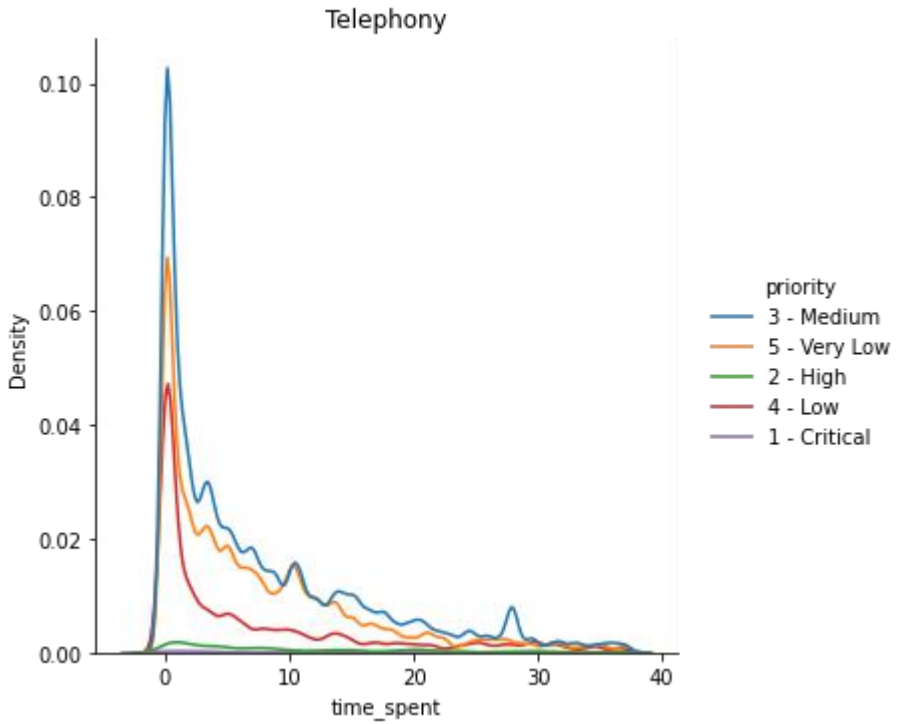

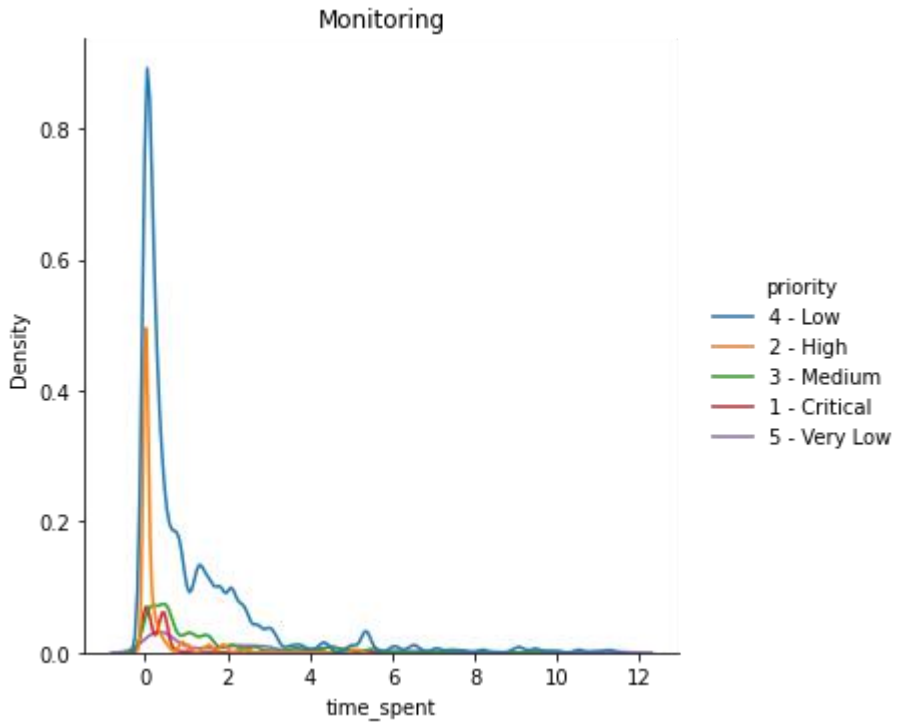

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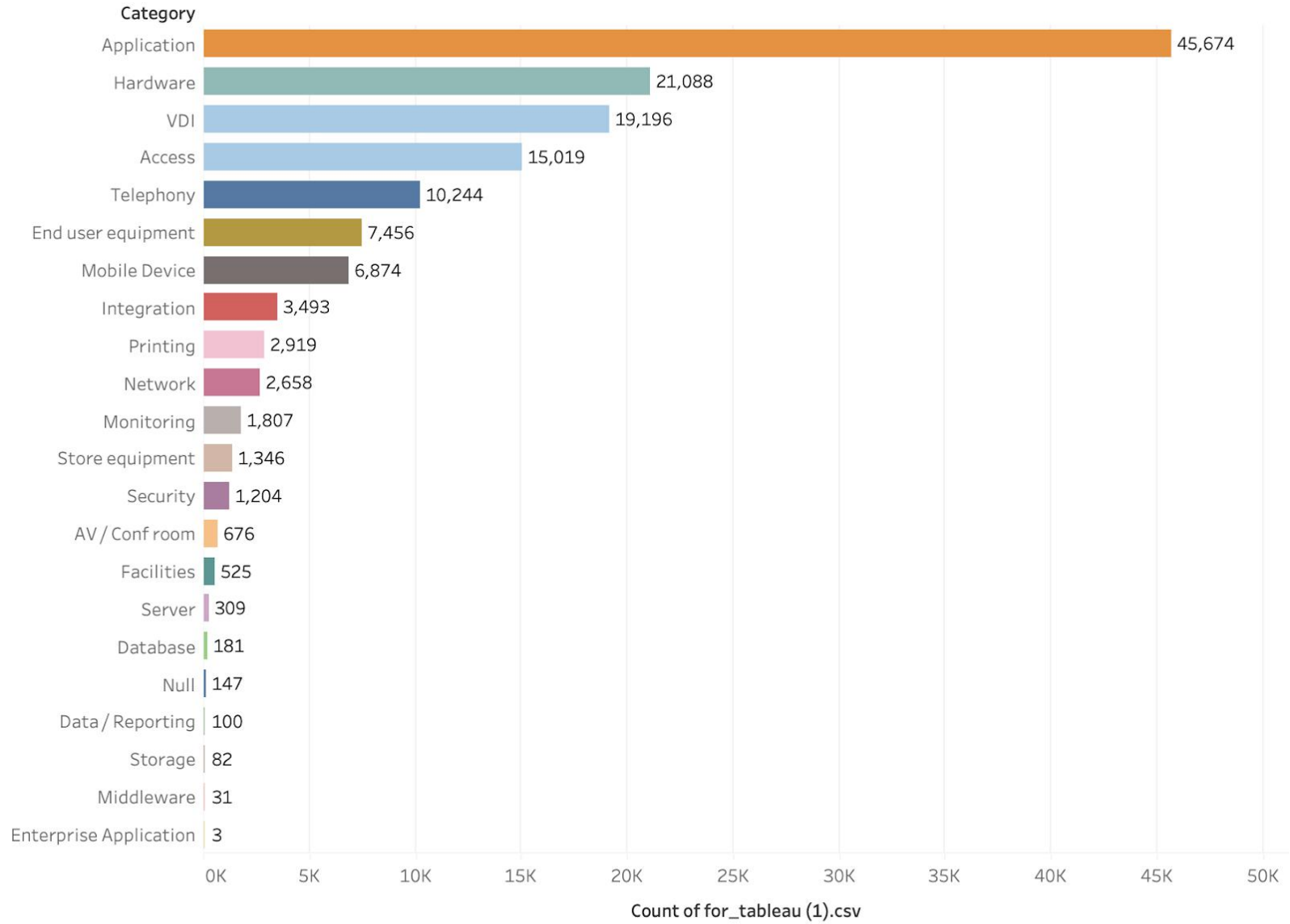

Count of for_tableau (1).csv for each Category. Color shows details about Category.

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	precision	recall	f1-score	support
AV / Conf room	0.86	0.60	0.70	220
Access	0.63	0.42	0.50	4918
Application	0.69	0.79	0.74	15107
Data / Reporting	0.00	0.00	0.00	33
Database	0.33	0.07	0.12	56
End user equipment	0.63	0.37	0.47	2452
Enterprise Application	0.00	0.00	0.00	2
Facilities	0.59	0.89	0.71	171
Hardware	0.69	0.75	0.72	6940
Integration	0.41	0.04	0.08	1128
Middleware	0.00	0.00	0.00	9
Mobile Device	0.72	0.82	0.76	2265
Monitoring	0.74	0.82	0.78	588
Network	0.56	0.51	0.54	893
Printing	0.67	0.70	0.68	955
Security	0.60	0.67	0.63	362
Server	0.55	0.11	0.19	106
Storage	0.00	0.00	0.00	28
Store equipment	0.95	0.75	0.84	445
Telephony	0.78	0.90	0.84	3394
VDI	0.88	0.91	0.90	6418
accuracy			0.72	46490
macro avg	0.54	0.48	0.48	46490
weighted avg	0.71	0.72	0.70	46490

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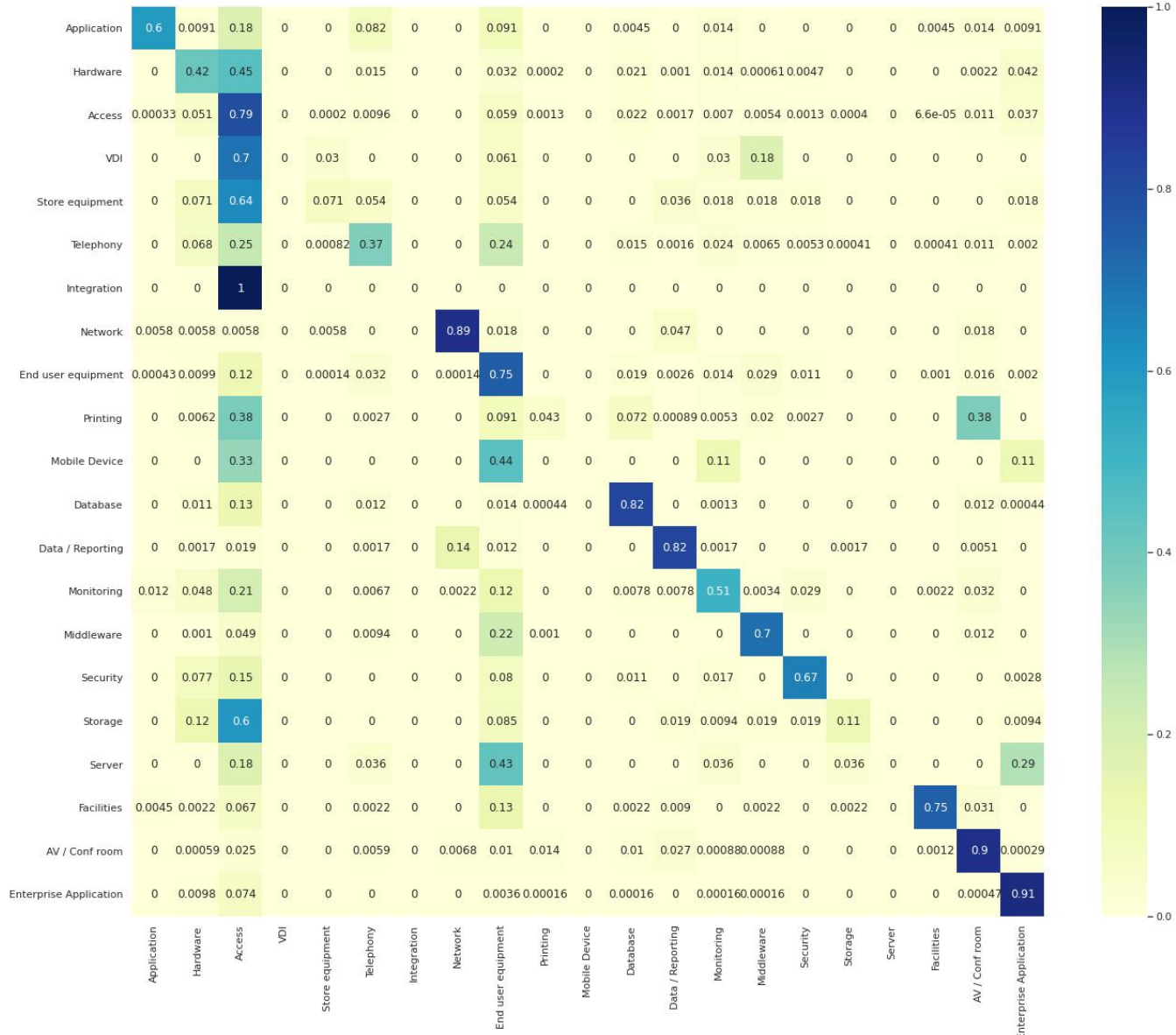

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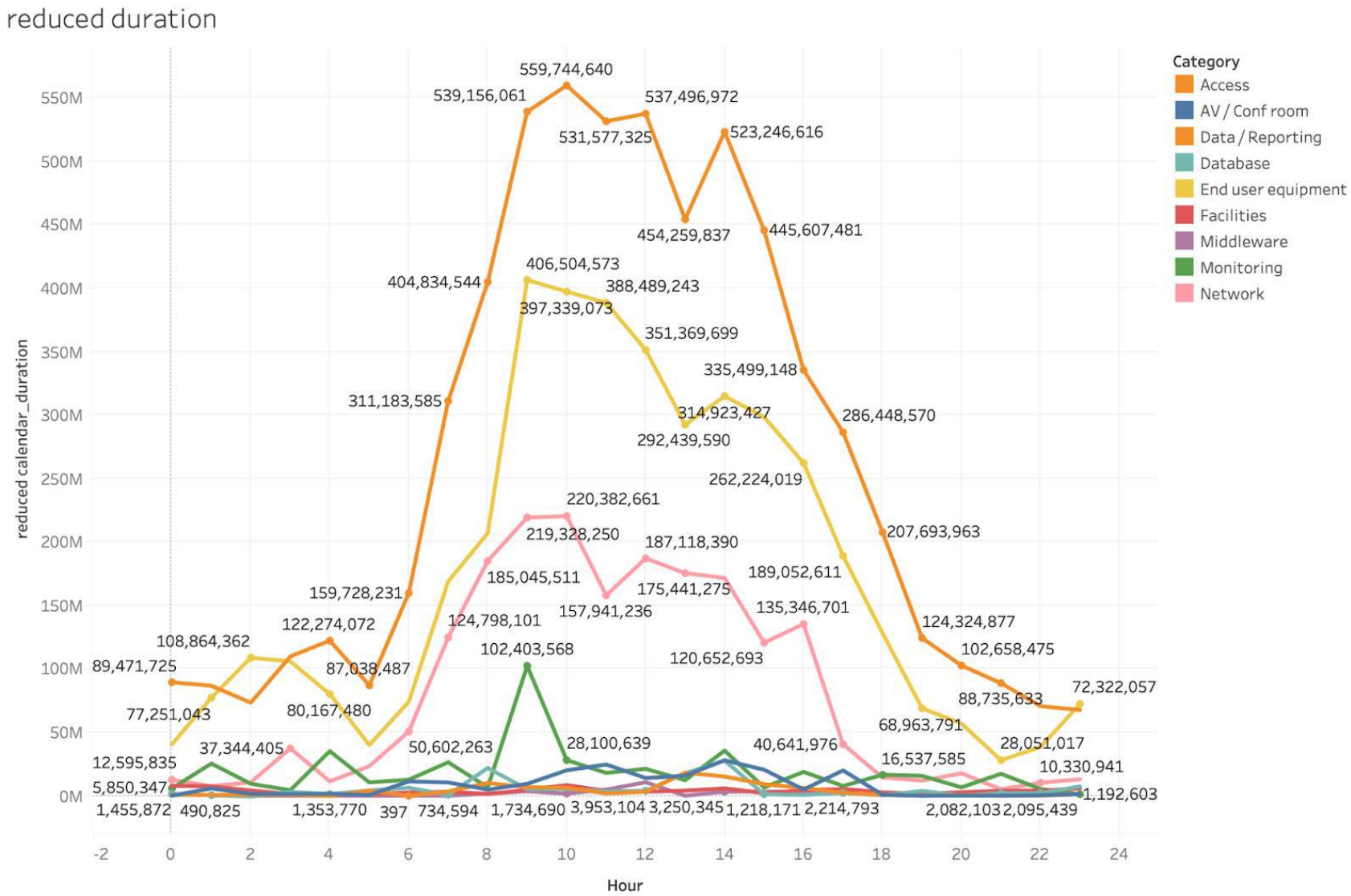

The trend of sum of reduced calendar_duration for Hour. Color shows details about Category. The marks are labeled by sum of reduced calendar_duration. The view is filtered on Category, which keeps 9 of 9 members.

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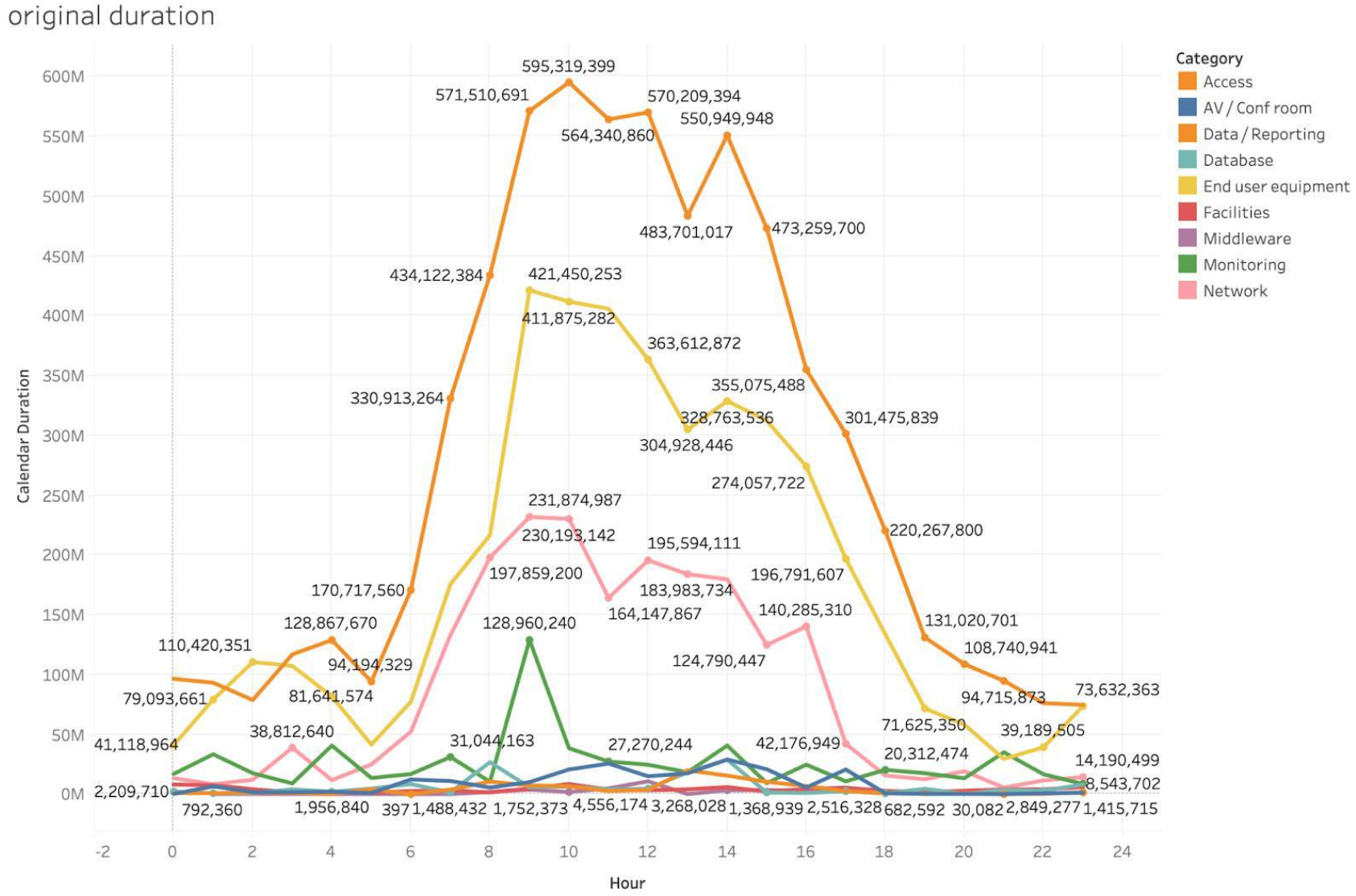

The trend of sum of Calendar Duration for Hour. Color shows details about Category. The marks are labeled by sum of Calendar Duration. The view is filtered on Category, which keeps 9 of 9 members.

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	reassignment_binary	accuracy	improvement
AV / Conf room	0.794379	0.913082	1.149429
Access	0.685332	0.782882	1.142340
Data / Reporting	0.460000	0.829932	1.804200
Database	0.580110	0.814128	1.403402
End user equipment	0.685220	0.741066	1.081501
Facilities	0.034286	0.741573	21.629213
Middleware	0.612903	0.708901	1.156627
Monitoring	0.132817	0.511758	3.853112
Network	0.657261	0.807018	1.227849

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	category	reassignment_count	hour	calendar_duration	improvement	reduced reassignment_count
8	Access	0	23	5028	1.142340	0.000000
9	Access	0	23	5149	1.142340	0.000000
12	Access	0	23	20697	1.142340	0.000000
13	Access	0	23	21293	1.142340	0.000000
16	Access	0	22	7021	1.142340	0.000000
...	...	...	...	...	...	...
141008	AV / Conf room	0	8	66	1.149429	0.000000
141009	AV / Conf room	0	8	61	1.149429	0.000000
141010	AV / Conf room	0	8	203	1.149429	0.000000
141015	Network	1	7	1733585	1.227849	0.814432
141021	Monitoring	1	4	17212	3.853112	0.259530

28453 rows × 6 columns

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