

# Maintenance Data Analysis Report

This report provides a comprehensive analysis of server maintenance data, including predictive modeling, scheduling optimization, and integration of Power BI visuals. The following steps are covered:

## 1. Data Extraction:

Data was extracted from an SQLite database. The dataset includes various maintenance records, which were loaded into a pandas DataFrame for further analysis.

## 2. Data Analysis:

The extracted data was analyzed to compute summary statistics and identify trends. The date columns were converted to datetime format to facilitate time-based analysis.

Summary statistics of the dataset:

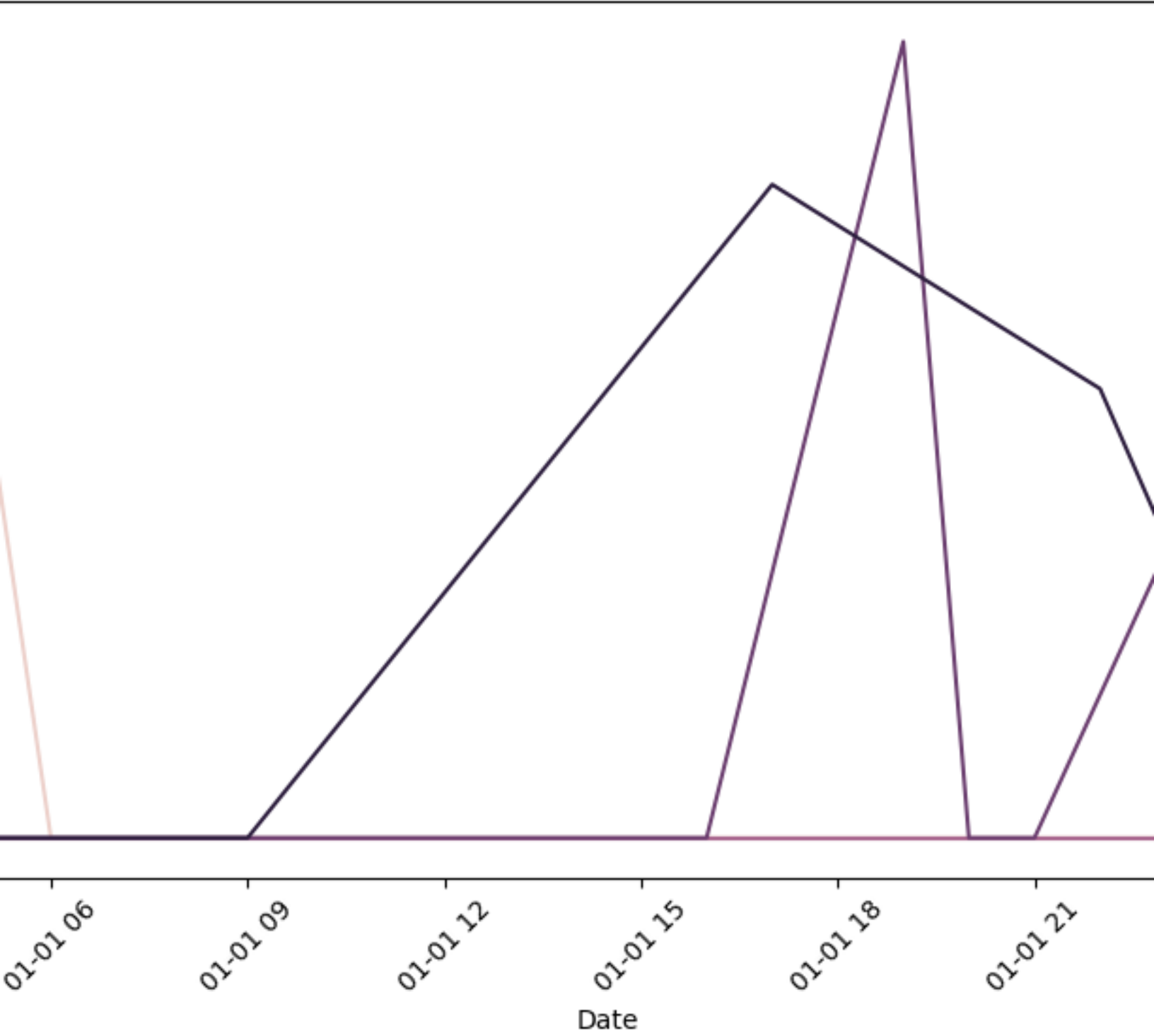
Server_ID	Timestamp	CPU_Usage	Memory_Usage	Disk_Usage	Network_Usage	Downtime_Duration	Maintenance_Cost
count	27.000000	27.000000	27.000000	27.000000	27.000000	27.000000	27.000000
mean	3.222222	2024-01-01 15:17:46.666666	752.544444	63.037037	56.962963	107.888889	5.555556
min	1.000000	2024-01-01 00:00:00	20.000000	24.000000	22.000000	50.000000	0.000000
25%	2.000000	2024-01-01 08:30:00	33.500000	42.500000	41.500000	80.000000	0.000000
50%	3.000000	2024-01-01 16:00:00	44.000000	65.000000	54.000000	116.000000	0.000000
75%	4.000000	2024-01-01 22:30:00	73.000000	81.500000	79.500000	135.000000	0.000000
max	5.000000	2024-01-02 05:00:00	99.000000	99.000000	99.000000	93.000000	196.000000
std	1.339728	NaN	26.301994	24.719163	21.423354	35.911572	12.254774
							340.662807

## 3. Visualization:

Visualizations were created to depict downtime duration over time and average monthly downtime duration.

Downtime Duration Over Time:

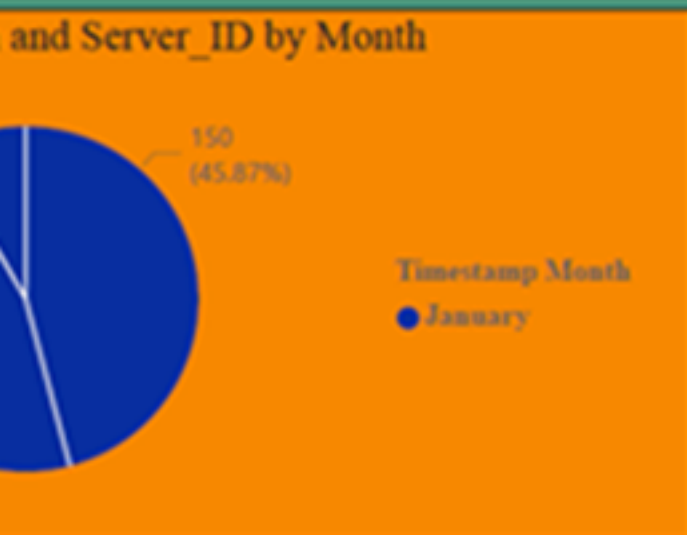
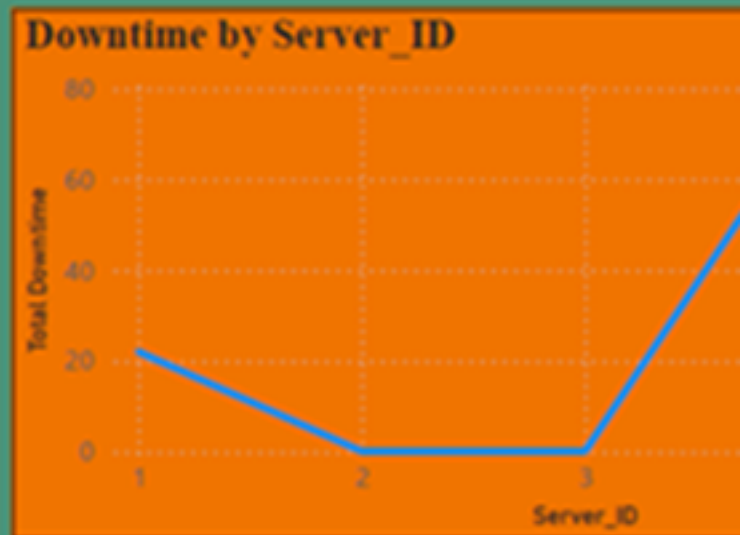
## Downtime Duration Over Time



Average Monthly Downtime Duration:

## Trends

age	Network_Usage	CPU_Usage	Count of Server_ID
50	91	44	4
88	196	76	5
91	138	98	2
35	117	43	3
84	146	99	4
54	109	22	5
50	146	29	2
80	119	22	3
42	62	20	4



Total Downtime	Year	Quarter	Month	Day	Maint
83	2024	Qtr 1	January	1	0
35	2024	Qtr 1	January	2	0
0	2024	Qtr 1	January	1	Hardw
32	2024	Qtr 1	January	1	Routin
0	2024	Qtr 1	January	1	Softw
150					

## 4. Predictive Maintenance Model:

A predictive model was developed to forecast downtime based on historical data. The model used features such as the number of days since the last maintenance and server type.  
Model Mean Squared Error: 68.73

## **5. Maintenance Scheduling Optimization:**

An optimization model was used to determine the best schedule for maintenance activities to minimize downtime and costs.

Optimized Maintenance Schedule: [1. 0. 0. 0. 0.]

## **6. Power BI Dashboard Visuals:**

The following visuals from the Power BI dashboard are included to provide additional insights:

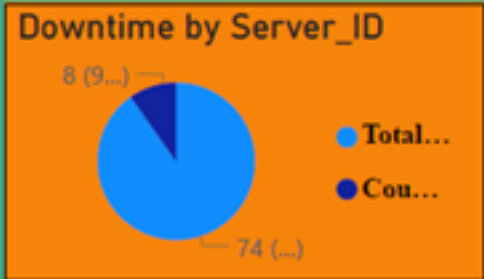
# Performance

pe

Average CPU Usage, Average Memory Usage and Average Disk Usage by Server\_ID

55.50

Goal: 56.50, 52.63



Earlier

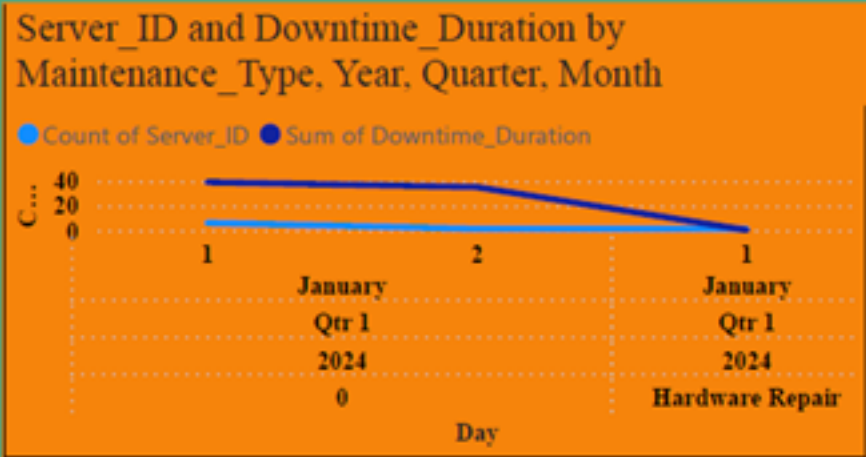
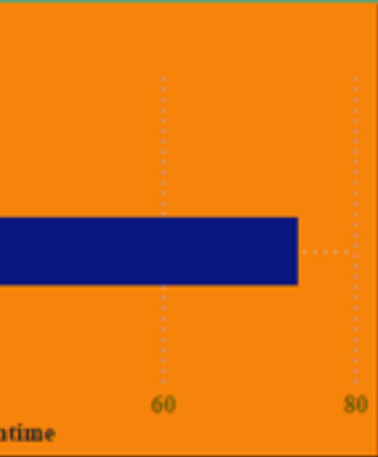
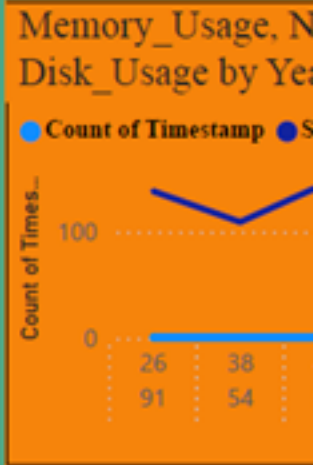
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CPU Usage, Average Memory Usage by Year and Month

Average Net... ● Average Dis...

Server_ID	22	29	33	43	54	70	95	98	Total
4	0	483	0	803	0	622	837	839	3584
Total	0	483	0	803	0	622	837	839	3584



Year	Quarter	Month
2024	Qtr 1	January
2024	Qtr 1	January
Total		

## Trends

age	Network_Usage	CPU_Usage	Count of Server_ID
50	91	44	
88	196	76	
91	138	98	
35	117	43	
84	146	99	
54	109	22	
50	146	29	
80	119	22	
42	62	20	

and Server\_ID by Month

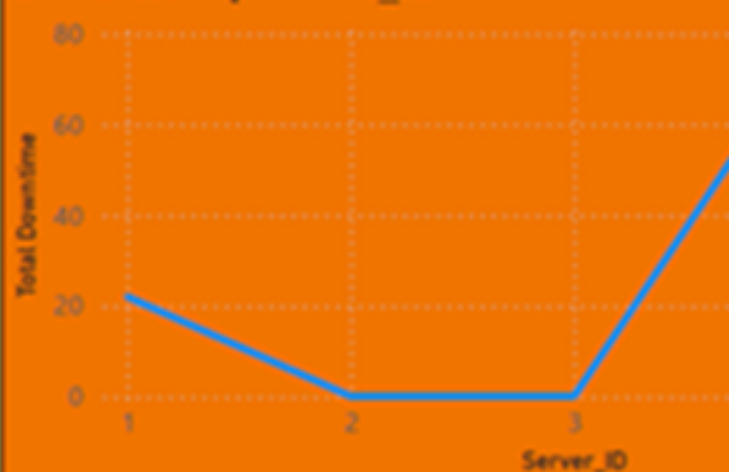


Timestamp Month  
 ● January

Downtime\_Duration by S

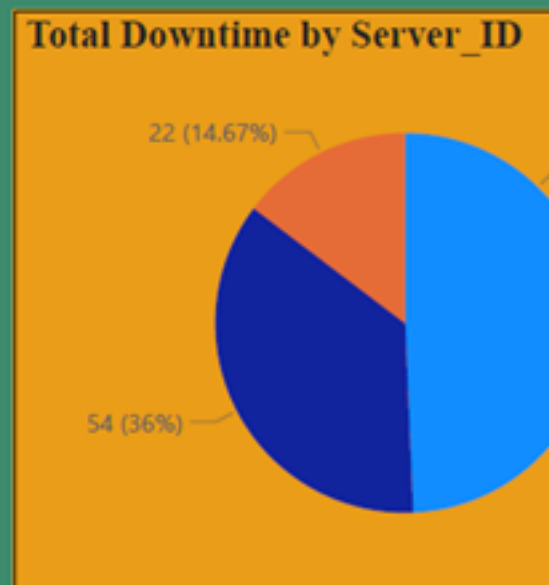
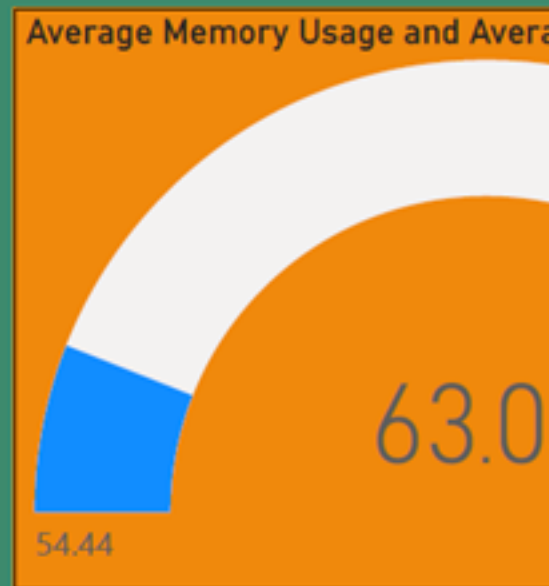
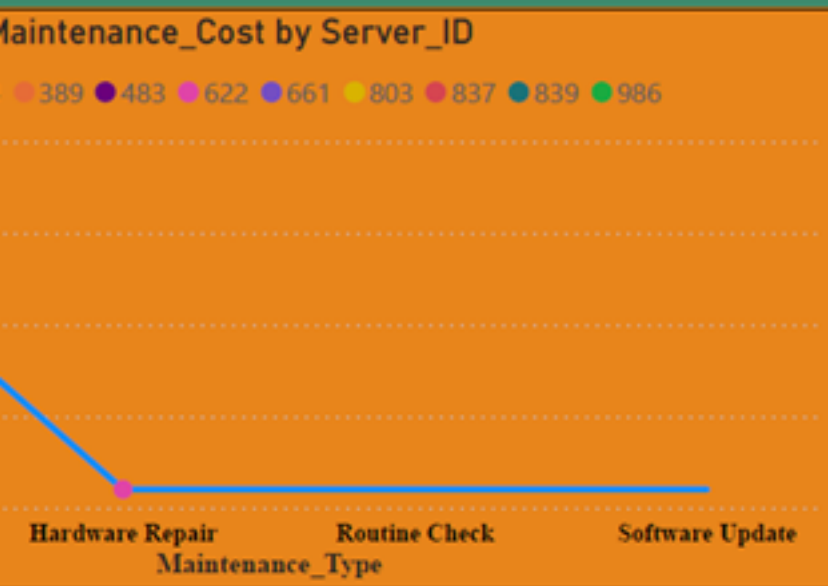
4	5
2	3

Downtime by Server\_ID



Total Downtime	Year	Quarter	Month	Day	Maint
83	2024	Qtr 1	January	1	0
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## Finance Schedule



## 7. Recommendations:

Consider increasing server maintenance frequency during peak downtime periods.  
Analyze the cause of downtime for different servers to identify recurring issues.  
Optimize maintenance schedules to reduce average downtime duration.