

# SecureLens: Intelligent Insider Threat Detection

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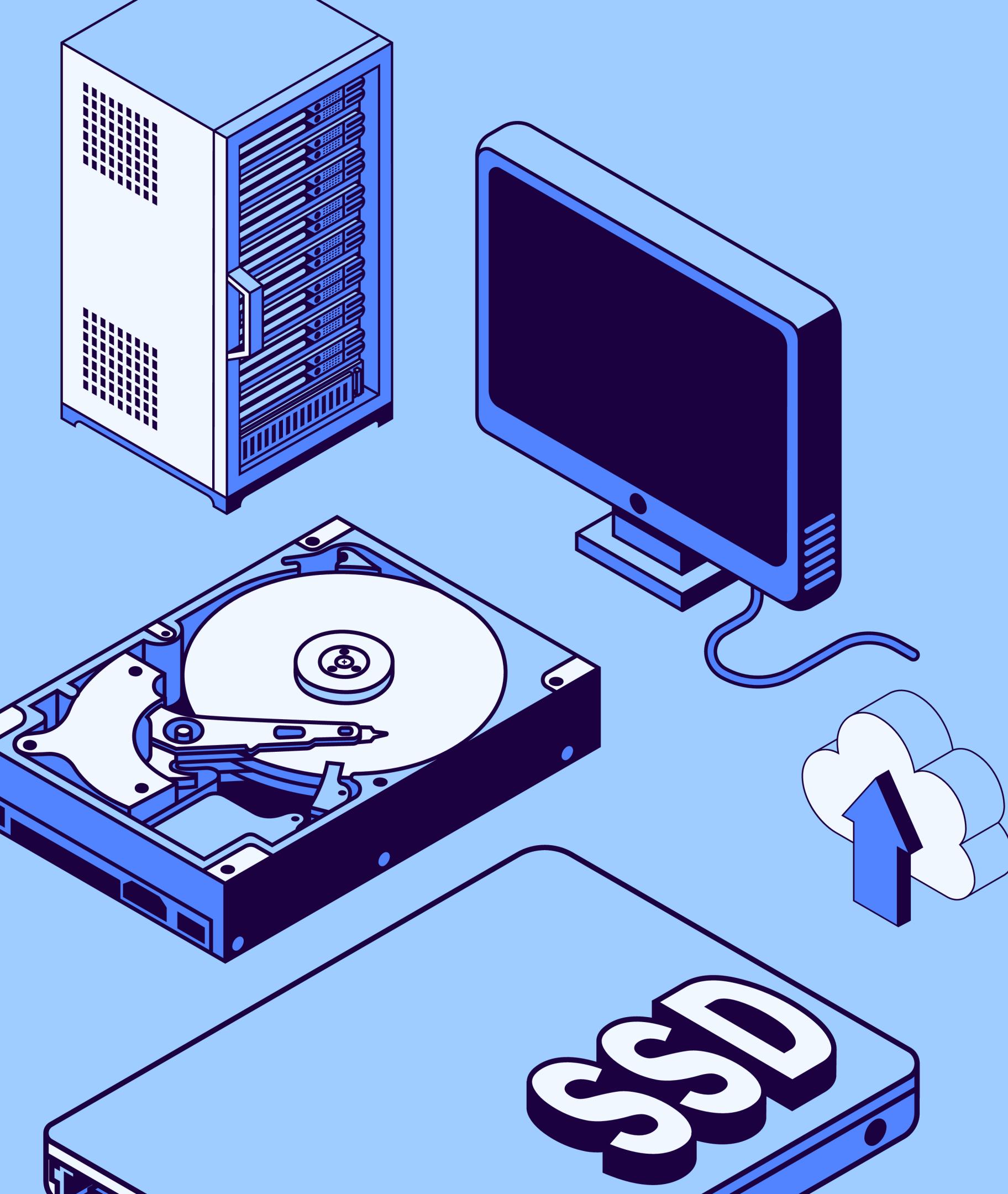
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# Introduction



- Insider threats are one of the most critical cybersecurity risks, as they originate from trusted users within an organization.
- Traditional anomaly detection methods often fail to capture temporal patterns, lack privacy preservation, and operate as black-box models with little interpretability.
- Our project proposes an AI-powered Insider Threat Detection System that integrates:
- AI-driven anomaly detection (**Isolation Forest + Autoencoder**).
- **GRU Autoencoder** for detecting anomalies in sequential user activity.
- **Federated Learning** to ensure privacy-preserving, distributed model training.
- This approach enhances accuracy, privacy and trust in insider threat detection making it both practical and innovative.

# Problem Statement

Insider threats are difficult to detect as they originate from trusted employees or contractors with legitimate access to systems. The goal is to develop an AI-powered system that continuously monitors user activities, including file access, login times, and application usage, to detect abnormal patterns indicating malicious intent or policy violations, and to alert security teams in real time.



# Dataset

## Sources Used:

- File Access Logs → suspicious or excessive file interactions.
- Login Records → unusual login times or multiple failed attempts.
- USB Usage → unauthorized device connections.

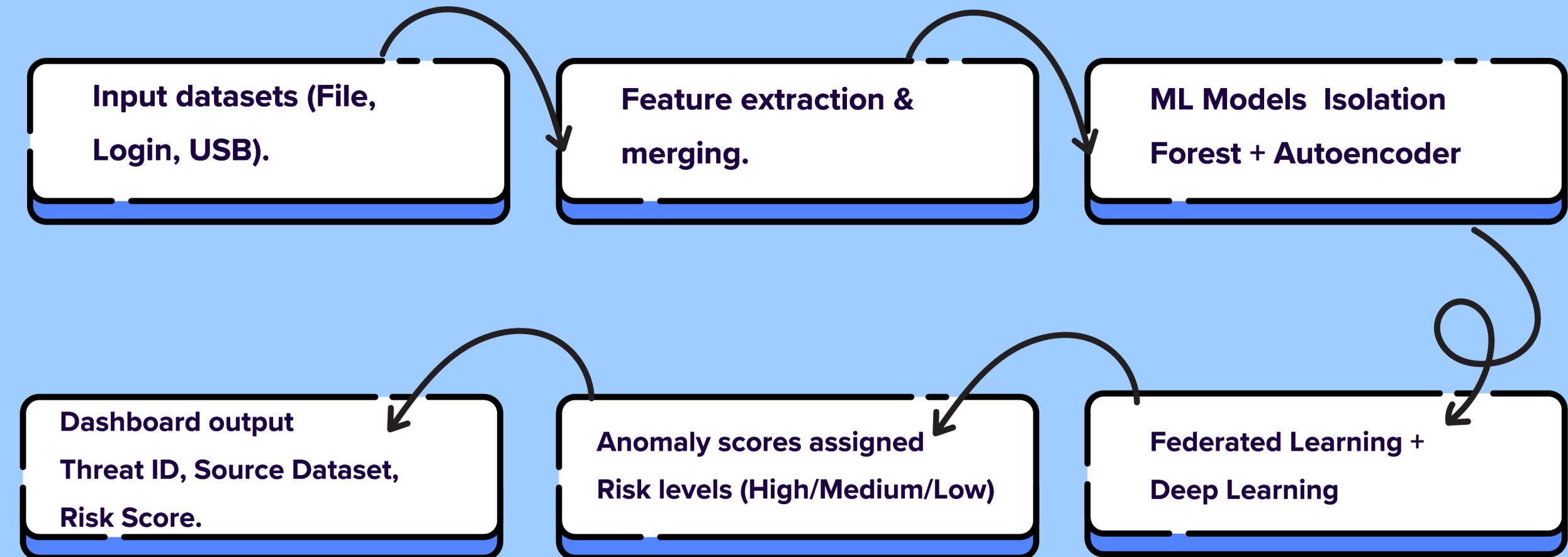
## Features Extracted:

- Login hours, file access frequency, USB events.

Merged dataset built for anomaly detection.



# Flowchart



# Dashboard Design

 **Login to Insider Threat Detection**

Username

Password

**Login**



# Dashboard Design

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 **Insider Threat Detection Dashboard**

Total Users: 10 | Total Records: 300 | Avg. Logins/Day: 6.6 | Threats Detected: Loading...

**Recent Activity**

	date	user	login_count	mean_login_hour	mean_logout_hour	avg_session_min	total_session_min	unique_devices	unique_geo
299	2025-09-17 00:00:00	user_010	40	9.0935	19.796	46.8434	374.7471	1	
298	2025-09-17 00:00:00	user_009	6	6.7592	15.4903	1	6	2	
297	2025-09-17 00:00:00	user_008	7	10.4986	15.805	57.5084	402.5591	2	
296	2025-09-17 00:00:00	user_007	8	5.7195	15.9044	38.295	306.3602	1	
295	2025-09-17 00:00:00	user_006	9	10.6482	16.6717	17.5341	157.8065	1	
294	2025-09-17 00:00:00	user_005	9	8.2817	17.6043	27.3725	246.3529	2	
293	2025-09-17 00:00:00	user_004	4	10.2299	18.0194	19.4737	77.895	1	
292	2025-09-17 00:00:00	user_003	6	8.9377	15.032	9.0048	54.0287	1	
291	2025-09-17 00:00:00	user_002	5	8.1898	18.4014	41.6541	208.2703	2	
290	2025-09-17 00:00:00	user_001	9	9.8961	16.2114	28.7159	258.4429	1	

**Quick Analysis**

admin  
Administrator

**Navigation**

- Dashboard
- Threat Detection
- Data Analysis
- Settings

**Logout**

Debug Info



# Dashboard Design

**Threat Detection**

Test with New Data

Upload a CSV file for threat detection

Drag and drop file here  
Limit 200MB per file • CSV

Browse files

user\_activity.csv 15.1KB

Threat Detection Results

Potential Threats Detected

14

Top 14 Suspicious Activities

	user	date
0	user_0001	01-09-2025
63	user_0013	04-09-2025
73	user_0015	04-09-2025
72	user_0015	03-09-2025
71	user_0015	02-09-2025
70	user_0015	01-09-2025
69	user_0014	05-09-2025

# Dashboard Design

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admin  
Administrator

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**Navigation**

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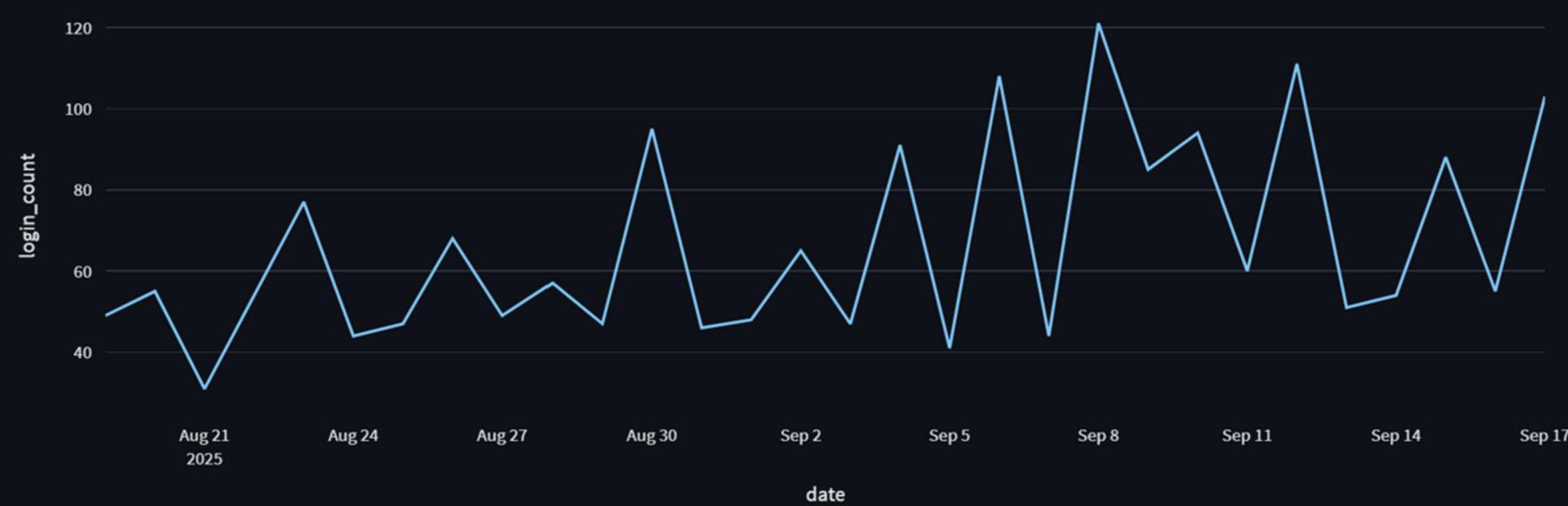
**Logout**

Debug Info ▾

## Data Analysis

### Login Activity Over Time

#### Daily Login Counts

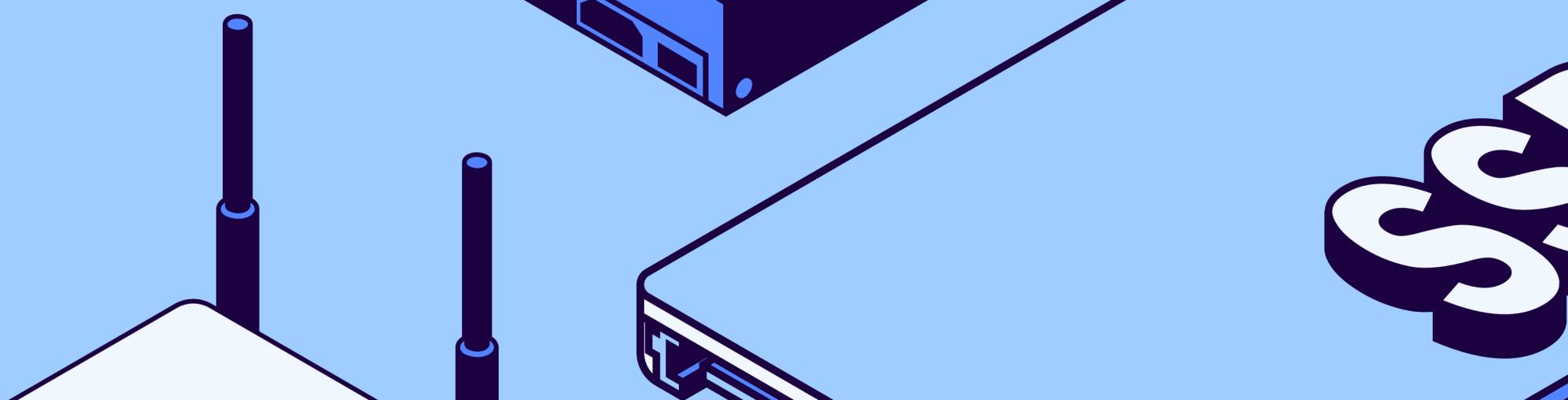
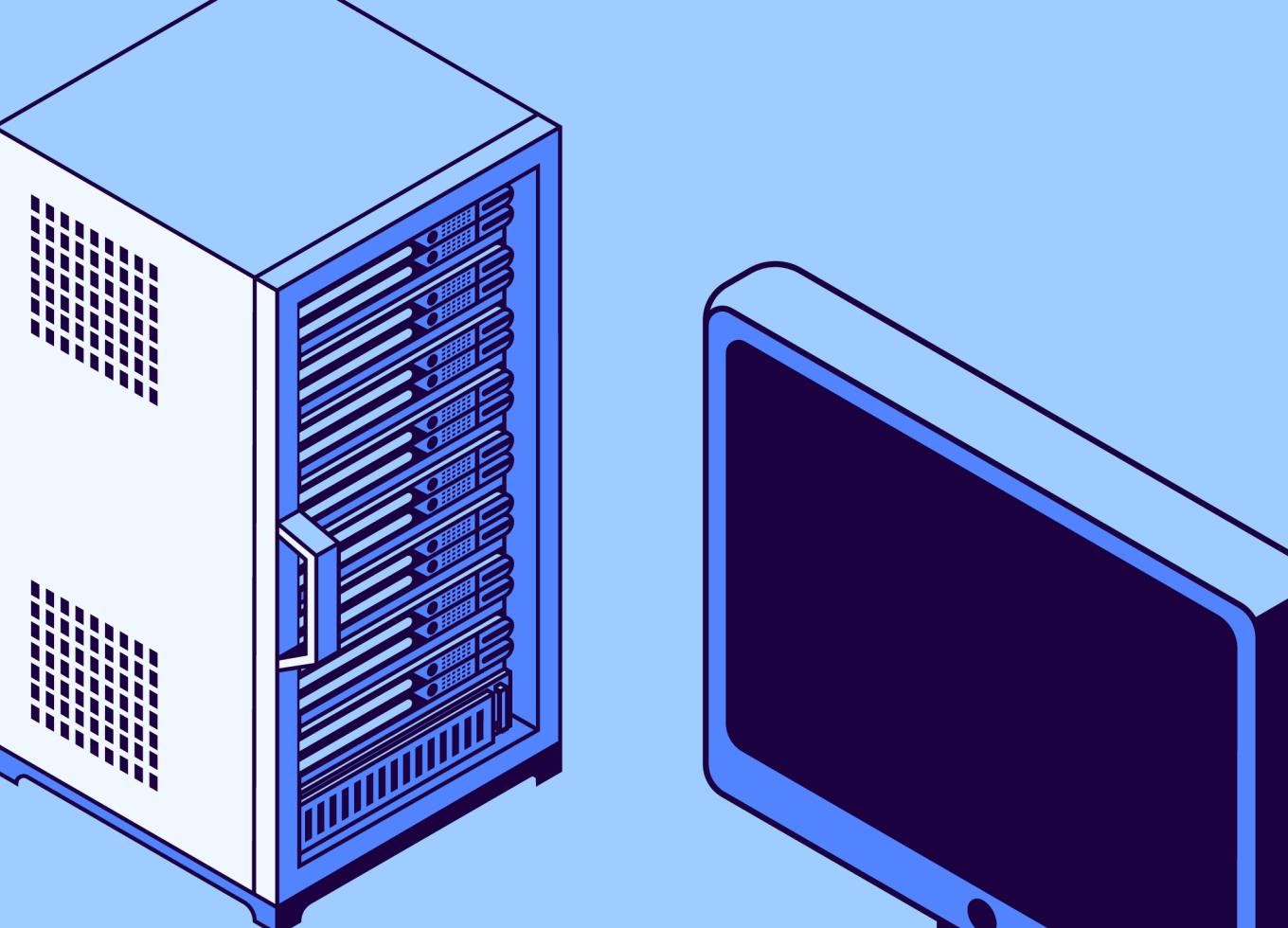


Date	login_count
Aug 21, 2025	55
Aug 22, 2025	38
Aug 23, 2025	78
Aug 24, 2025	45
Aug 25, 2025	68
Aug 26, 2025	52
Aug 27, 2025	55
Aug 28, 2025	48
Aug 29, 2025	95
Aug 30, 2025	48
Aug 31, 2025	50
Sep 1, 2025	65
Sep 2, 2025	50
Sep 3, 2025	90
Sep 4, 2025	45
Sep 5, 2025	35
Sep 6, 2025	110
Sep 7, 2025	45
Sep 8, 2025	120
Sep 9, 2025	85
Sep 10, 2025	92
Sep 11, 2025	60
Sep 12, 2025	110
Sep 13, 2025	55
Sep 14, 2025	88
Sep 15, 2025	55
Sep 16, 2025	100
Sep 17, 2025	95

### Session Duration Distribution

# Outcomes

- AI-driven anomaly detection from merged activity datasets.
- Risk scoring for prioritized response.
- Secure, authenticated dashboard - prevents unauthorized viewing.
- Quick insights for SOC teams: who to investigate first.
- Demo-friendly, practical solution implementable in enterprises.



# Novelty

- Uses dual ML approach (Isolation Forest + Autoencoder) for robust anomaly detection.
- **Federated learning + Deep Learning (GRU Autoencoder)**
- Secure dashboard with authentication - ensures only trusted authority sees sensitive alerts.



# Thank You

