CRATIP

CYBER RISK ASSESSMENT & THREAT INTELLIGENCE PLATFORM

"A CYBERATTACK HAPPENS EVERY 39 SECONDS"

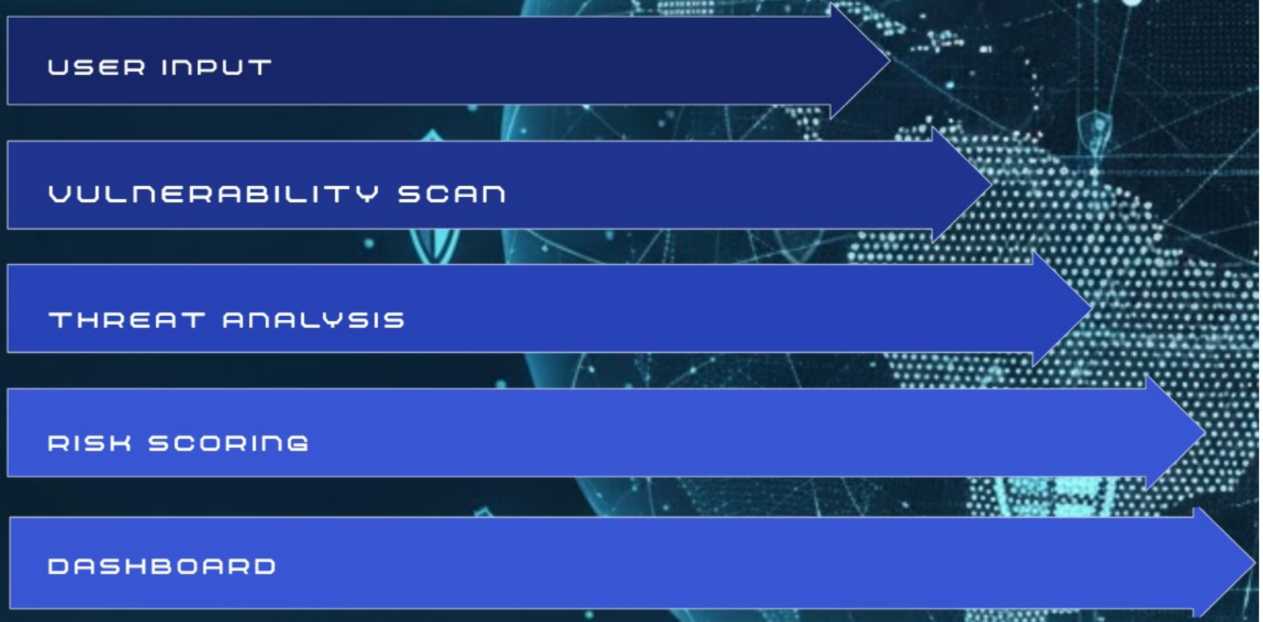
PROBLEM STATEMENT

Existing cyber security solutions generate large volumes of fragmented and highly technical data from scanning, vulnerability analysis, and threat intelligence tools. These outputs are difficult to correlate, prioritize, and interpret, and they largely focus on current or past threats. As a result, organizations struggle not only to understand present cyber risks but also to anticipate potential future risks, leading to reactive and delayed security decisions.

SOLUTION STATEMENT

This project proposes a multi-layered Cyber Risk Assessment and Threat Intelligence system developed in Python that integrates network scanning, threat intelligence scanning, threat intelligence enrichment, risk scoring, predictive analysis, AI-based summarization, and visualization into a unified platform. The system correlates data from multiple trusted sources, prioritizes risks based on real-world exploitability, predicts potential risk trends, and explains security insights in simple natural language through an interactive dashboard.

SOLUTION FLOWCHART



USER INPUT

VULNERABILITY SCAN

THREAT ANALYSIS

RISK SCORING

DASHBOARD

Vulnerbability Scanning Engine
Live Hosts
Open Ports
Running Services & Versions
Uses Nmap for Scanning
Detects Hosts, Open Ports & Versions
Initial Vulnerbablity Indicators
IP Address: 192 188 1.1
Domain: ezample.com
CIDR Range
192 188 0.0.0/16

VULNERABILITY SCANNING ENGINE

WHAT IS VULNERABILITY SCANNING ENGINE?

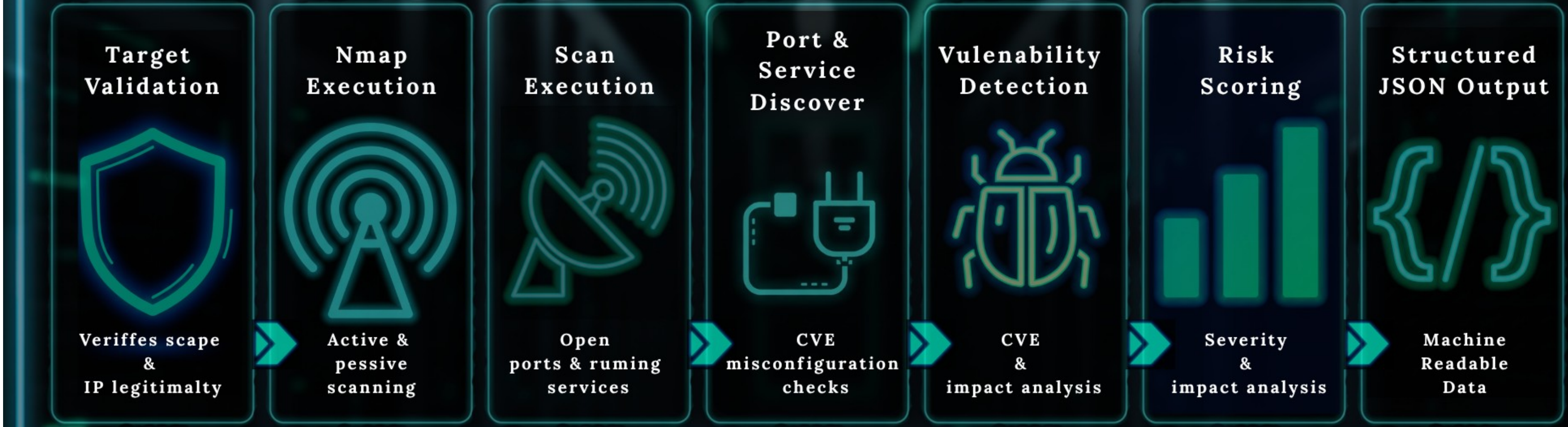
The Vulnerability Scanning Engine acts as the critical entry point of our system. Its primary role is to actively scan designated targets – whether an IP address, a domain, a range, or a CIDR block – to identify what's exposed.

WHY DO WE NEED IT?

Without a robust scanning mechanism, a vulnerability assessment cannot begin. This engine is crucial for the following:

- Discovering live hosts within a specified network segment.
- Identifying open ports, which often indicate active services.
- Pinpointing running services and their specific versions, which are key to identifying known vulnerabilities.

SCANNING ENGINE WORK FLOW



Target Validation
Veriffes scape
&
IP legitimalty

Nmap Execution
Active &
pessive
scanning

Scan Execution
Open
ports & ruming
services

Port & Service Discover
CVE
misconfiguration
checks

Vulenability Detection
CVE
&
impact analysis

Risk Scoring
Severity
&
impact analysis

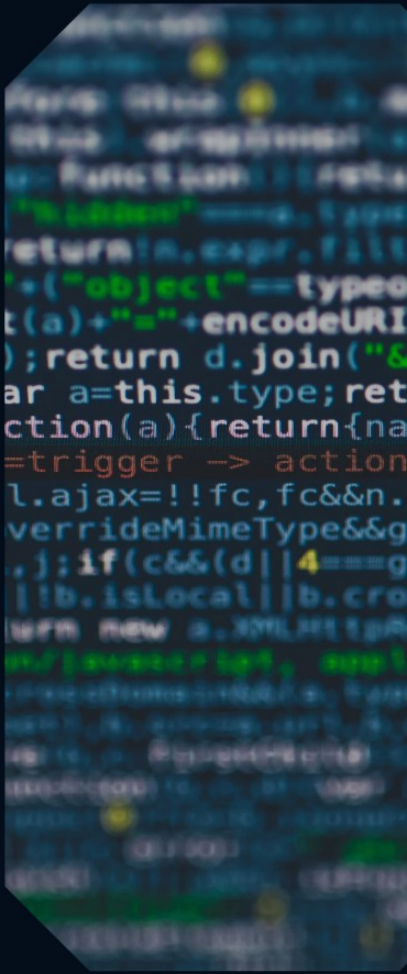
Structured JSON Output
Machine
Readable
Data

"AUTOMATES VULNERABILITY DETECTION AND RISK SCORING BY TRANSFORMING RAW SCAN DATA INTO STRUCTURED SECURITY INTELLIGENCE."

THREAT INTELLIGENCE

WHY THREAT INTELLIGENCE ?

- Converts raw scan data into actionable intelligence.
- Interprets scan results for informed decision-making.
- Bridges scanning output and risk analysis layers.
- Prevents alert overload from raw vulnerability data.



3 - TIER INTEL

The approach is a three-tier intelligence model designed to provide 360° threat visibility.

EXPOSURE INTELLIGENCE

- Identifies internet-exposed assets using Shodan
- Highlights potential attack surfaces

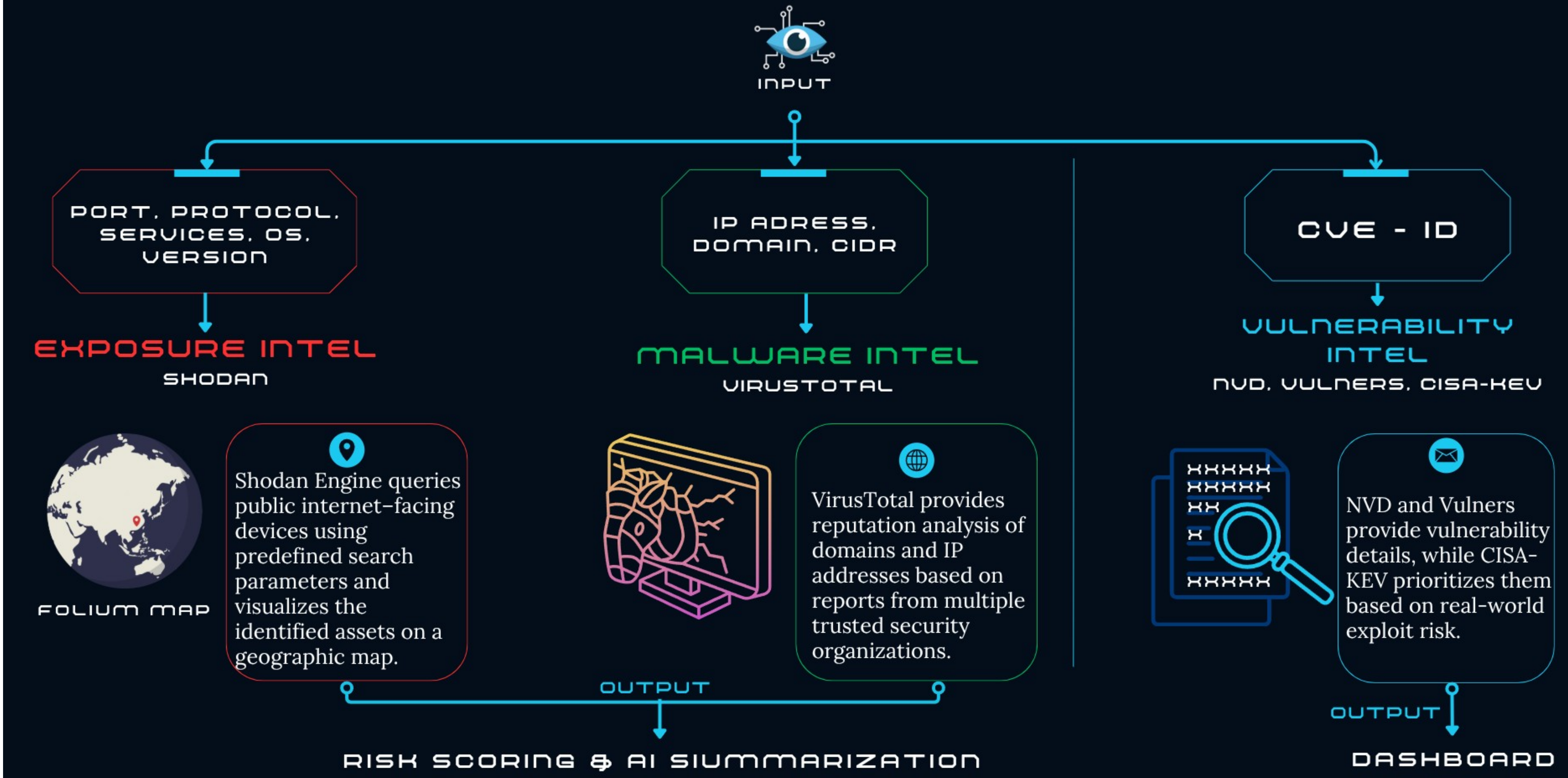
MALWARE INTELLIGENCE

- Evaluates IPs and domains using VirusTotal
- Detects malicious history and trust level

VULNERABILITY INTELLIGENCE

- Enriches detected CVEs using NVD & Vulners
- Prioritizes critical risks using CISA-KEV

INTERNAL WORKFLOW



INPUT

PORT, PROTOCOL, SERVICES, OS, VERSION

EXPOSURE INTEL

SHODAN

FOLIUM MAP

Shodan Engine queries public internet–facing devices using predefined search parameters and visualizes the identified assets on a geographic map.

IP ADRESS, DOMAIN, CIDR

MALWARE INTEL

VIRUSTOTAL

VirusTotal provides reputation analysis of domains and IP addresses based on reports from multiple trusted security organizations.

OUTPUT

RISK SCORING & AI SIUMMARIZATION

CVE - ID

VULNERABILITY INTEL

NVD, VULNERS, CISA-KEV

NVD and Vulners provide vulnerability details, while CISA-KEV prioritizes them based on real-world exploit risk.

OUTPUT

DASHBOARD

RISK SCORING ENGINE

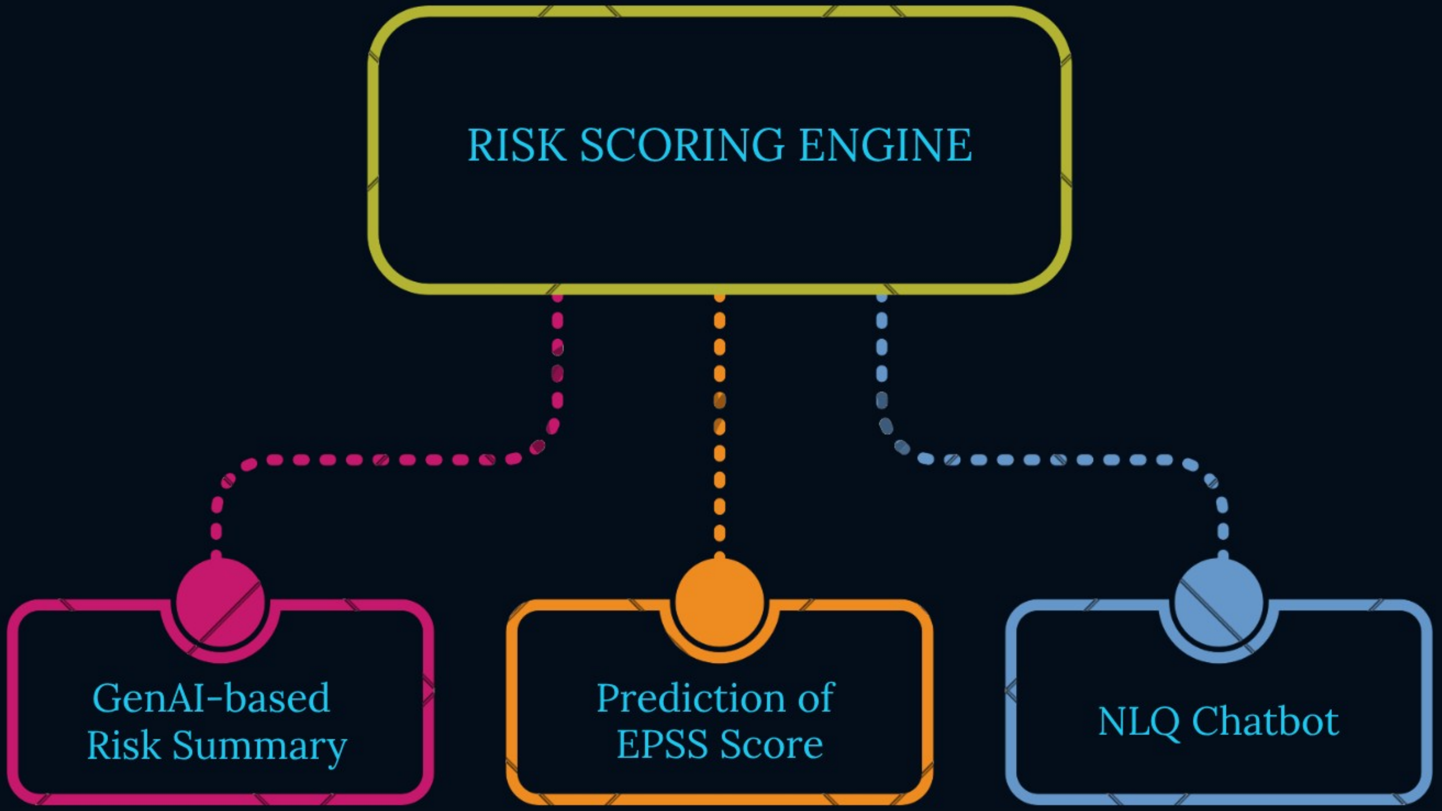
WHY RISK SCORING ENGINE ?

- Risk Scoring Engine that transforms raw vulnerability and threat intelligence data into prioritized cyber risk to support effective security decision-making.

APPROACHES :

- Combines CVSS severity scores with EPSS exploit probability
- Applies risk analytics to rank vulnerabilities based on real-world impact
- Produces actionable risk insights instead of raw technical data

RISK SCORING ENGINE INTERGATION



GenAI-based
Risk Summary:

Summarize about json data from threat intelligence

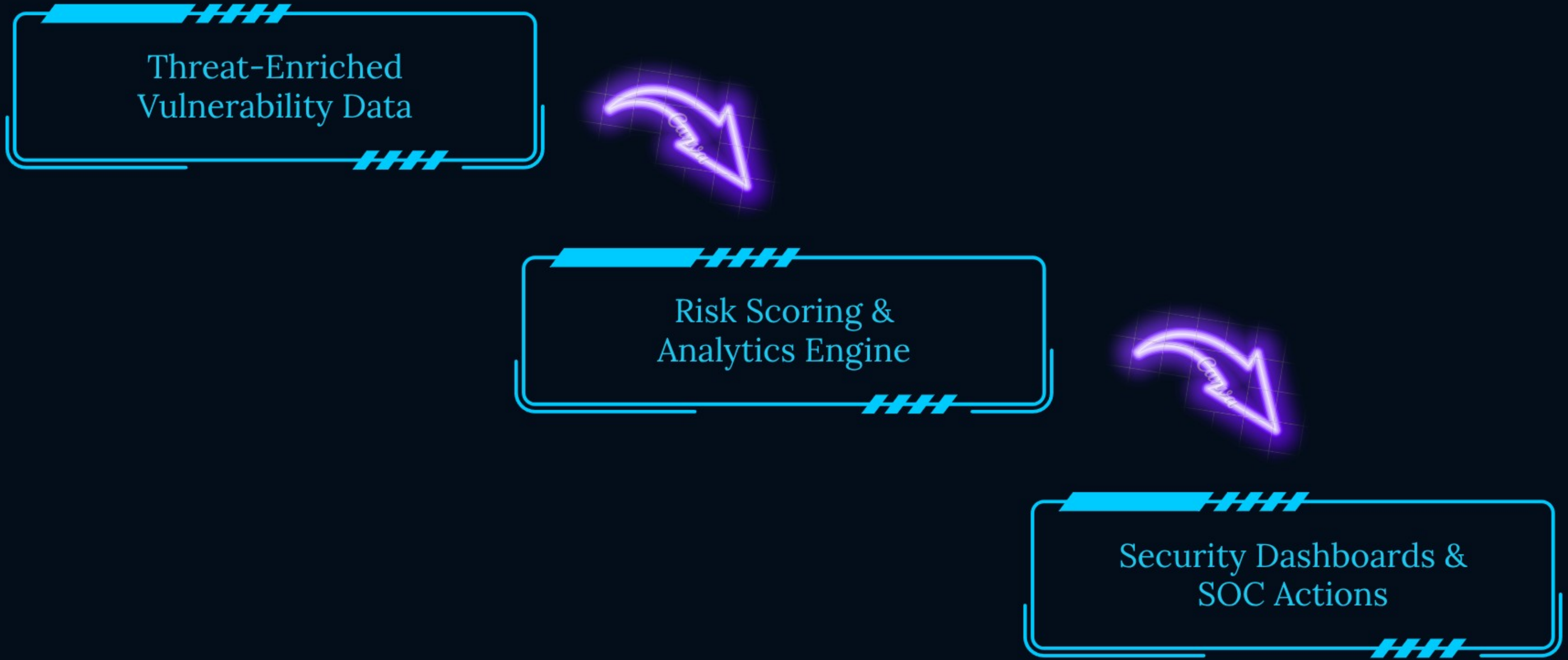
Prediction of
EPSS Score:

Exploiticity of vulnerability

NLQ (Natural Language Queries):

Chatbot interface

RISK SCORING ENGINE WORKFLOW



Threat-Enriched Vulnerability Data

Risk Scoring & Analytics Engine

Security Dashboards & SOC Actions

DASHBOARD

Interface for Visualizing Cyber Risks & Threat Insights

- **Acts as the presentation layer, consolidating insights** generated by all backend services
- **All scanning, threat processing, and risk evaluation** occur server-side; the dashboard is dedicated **to display and user interaction**

1. Dashboard Overview

- **Role:** User-facing interface of the platform.
- Consolidates outputs from backend processes
- **Enables:**
  - Scan monitoring
  - Risk & threat analysis
  - Viewing and reporting security alerts

Architecture Approach

API-Centric, Modular Dashboard Design

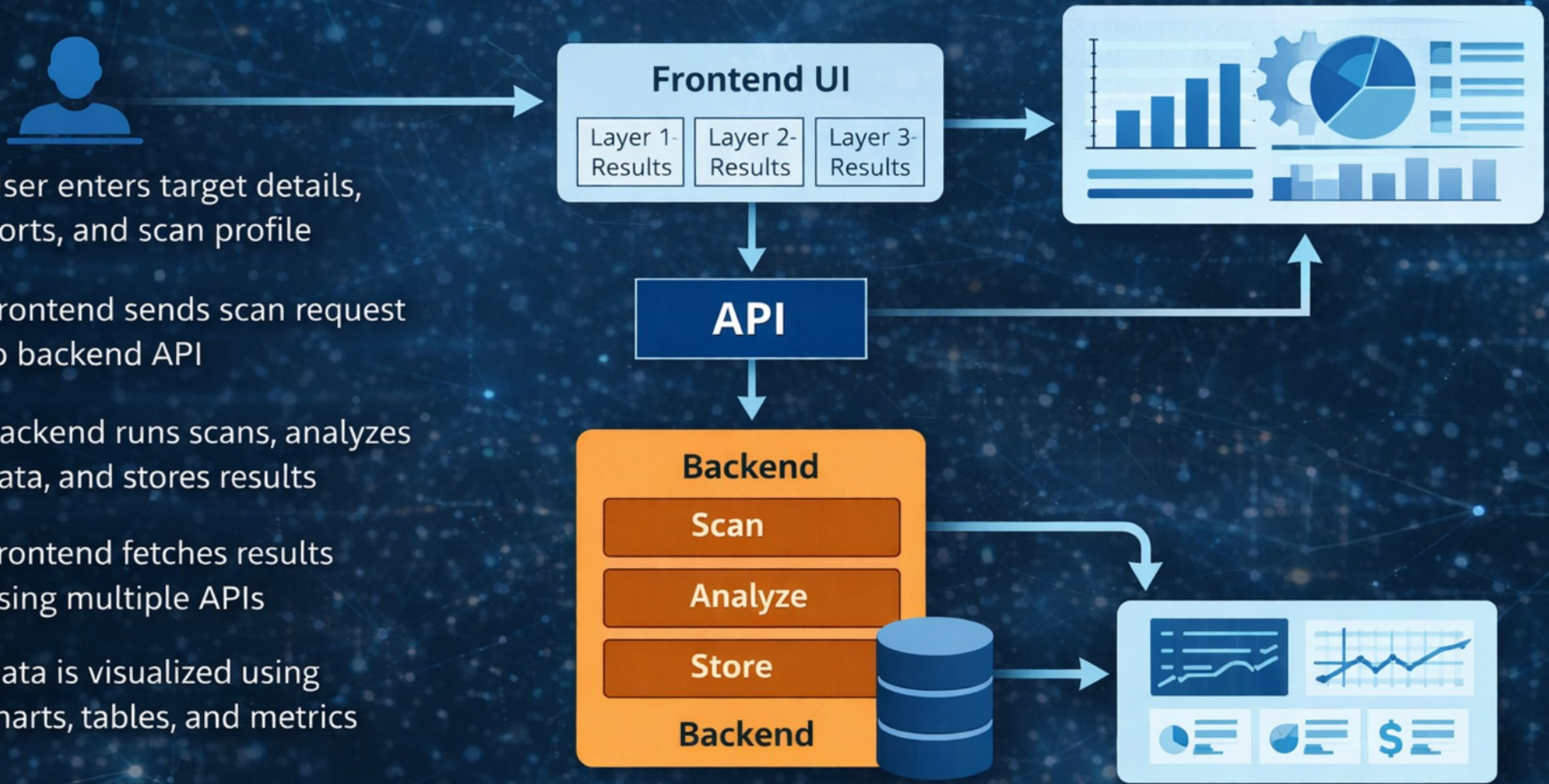
- **Separation of Concerns:**
  - Backend: scanning, threat intelligence, risk scoring
  - Frontend: visualization & user interaction
- **Layer-Aware Design**
  - Each dashboard tab corresponds to backend layer

3 Technology Stack

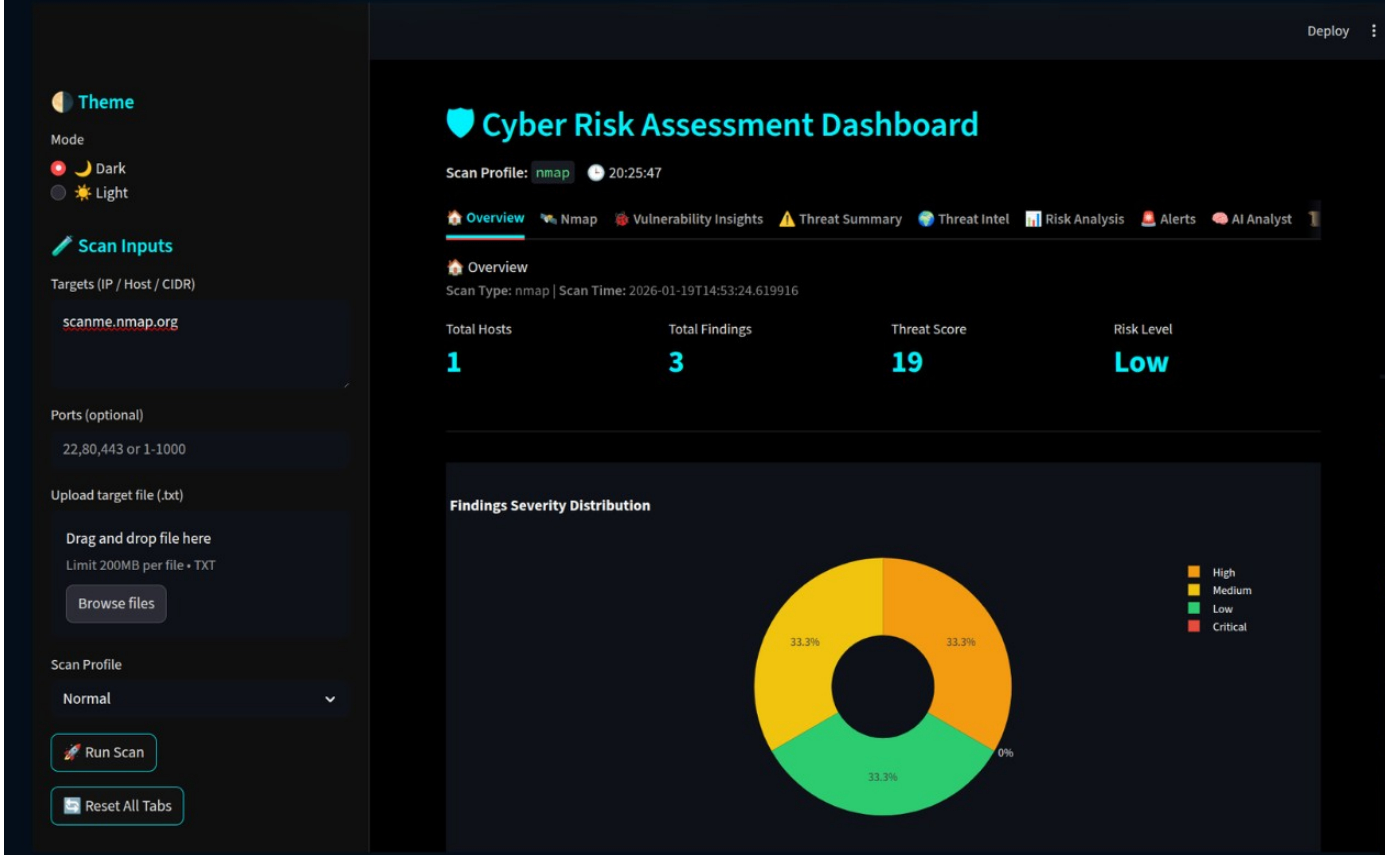
- **Streamlit** – UI framework
- **Python** – Core language
- **Pandas** – Data manipulation
- **Plotly** – Interactive visualizations
- **REST APIs (FastAPI backend)** – Data communication

Working

- User enters target details, ports, and scan profile
- Frontend sends scan request to backend API
- Backend runs scans, analyzes data, and stores results
- Frontend fetches results using multiple APIs
- Data is visualized using charts, tables, and metrics



WATCH THE LIVE ACTION!



Deploy ⋮

🌗 Theme

Mode

● 🌙 Dark
○ ☀️ Light

🧪 Scan Inputs

Targets (IP / Host / CIDR)

scanme.nmap.org

Ports (optional)

22,80,443 or 1-1000

Upload target file (.txt)

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

Browse files

Scan Profile

Normal ⌄

🚀 Run Scan

🔄 Reset All Tabs

🛡️ Cyber Risk Assessment Dashboard

Scan Profile: `nmap` 🕒 20:25:47

🏠 Overview | 🛰️ Nmap | 🐞 Vulnerability Insights | ⚠️ Threat Summary | 🌍 Threat Intel | 📊 Risk Analysis | 🚨 Alerts | 🧠 AI Analyst

🏠 Overview

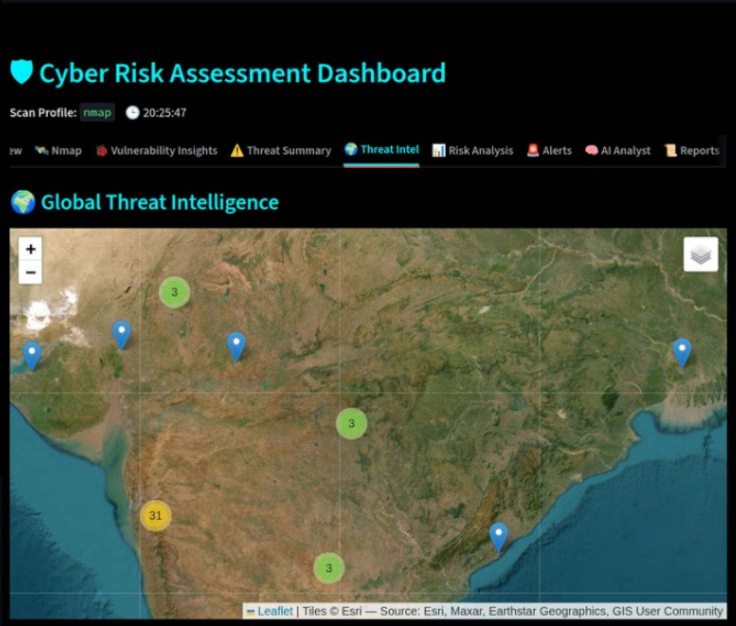
Scan Type: nmap | **Scan Time:** 2026-01-19T14:53:24.619916

Total Hosts	Total Findings	Threat Score	Risk Level
1	3	19	Low

Findings Severity Distribution

33.3%
33.3%
33.3%
0%

- 🟧 High
- 🟨 Medium
- 🟩 Low
- 🟥 Critical



🛡️ Cyber Risk Assessment Dashboard

Scan Profile: `nmap` 🕒 20:25:47

ew | 🛰️ Nmap | 🐞 Vulnerability Insights | ⚠️ Threat Summary | 🌍 Threat Intel | 📊 Risk Analysis | 🚨 Alerts | 🧠 AI Analyst | 📜 Reports

🌍 Global Threat Intelligence

+
−
3
3
31
3
Leaflet | Tiles © Esri — Source: Esri, Maxar, Earthstar Geographics, GIS User Community

FUTURE SCOPE OF CRATIP

PERSONALIZATION SUPPORT

- Role-based dashboards (Admin, Analyst, Manager)
- Custom risk thresholds and alerts
- Organization-specific security policies

REAL-TIME MONITORING & ALERTS

- Continuous scanning instead of periodic scans
- Real-time alerts for critical vulnerabilities
- Email / SMS / webhook notifications

AUTOMATED THREAT RESPONSE (SOAR)

- Auto-isolate vulnerable systems
- Automated ticket creation for incidents
- Suggested mitigation steps using AI

THANK YOU!