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AI SECURITY SOLUTIONS INITIATIVE

Q2/Q3 2025

AI Security Solutions Landscape

For LLM and Gen AI Apps

The Solutions Landscape monitors and maps the full LLM and Generative AI lifecycle, focusing on the DevOps–SecOps intersection to meet evolving security needs. Guided by the OWASP Top 10 Risks and Mitigations for LLM and Gen AI and SecOps tasks, it highlights open-source and commercial solutions by stage, identifying their coverage of LLM and Gen AI SecOps duties and Top 10 threat mitigation, and leverages industry and community input as a peer-reviewed resource for navigating the growing number of LLM and Gen AI security solutions. Updated Quarterly.

https://genai.owasp.org/ai-security-solutions-landscape/

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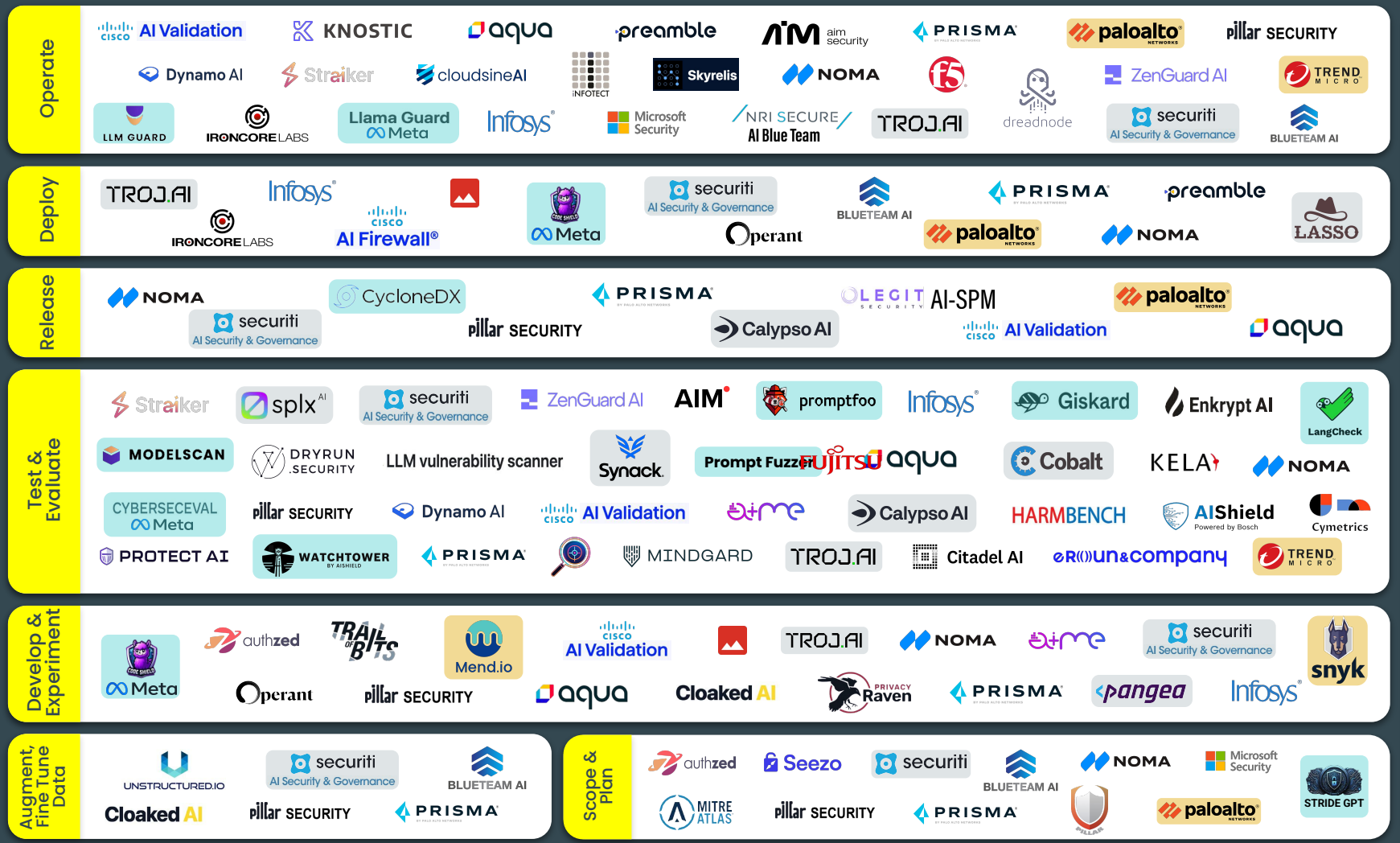
LLM & GenAI Security Landscape – 2025, Q2

https://genai.owasp.org/ai-security-solutions-landscape/



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Source; OWASP Gen AI Security Solutions Landscape Guide 2025. Q1

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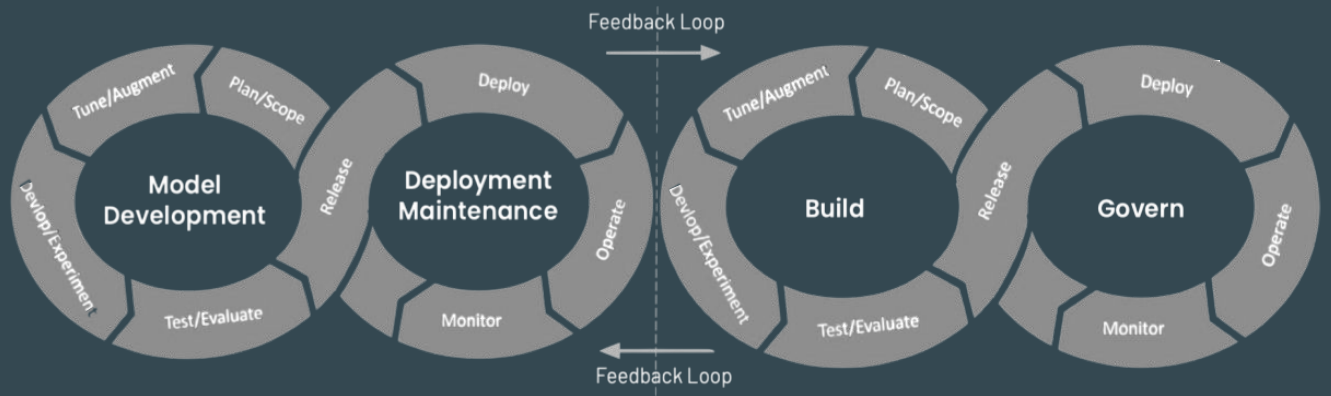
LLM and Gen AI App SecOps Framework



The OWASP LLMSecOps Framework was captured to help better align LLMOps processes and the security roles and dependencies for each stage. While LLMOps and MLOps are rooted in the same foundational principles of lifecycle management, they can diverge significantly in their focus and requirements, as one is focused primarily on model development, while the other extends DevOps to include support for various LLM, Gen AI and application patterns.

Plan & Scope

- Access Control and Authentication Planning
- Compliance and Regulatory Assessment
- Data Privacy and Protection Strategy
- Early Identification of Sensitive Data
- Third-Party Risk Assessment (Model, Provider, etc.)
- Threat Modeling
-

Augment & Fine Tune Data

- Data Source Validation
- Secure Data Handling
- Secure Output Handling
- Adversarial Robustness Testing
- Model Integrity Validation (ex: serialization scanning for malware)
- Vulnerability Assessment

Dev & Experiment

- Access, Authentication, and Authorization (MFA)
- Experiment Tracking
- LLM & App Vuln Scanning
- Model and Application Interaction Security
- SAST/DAST
- Secure Coding Practices
- Secure Library/Code Repository
- Software Comp Analysis

Test & Evaluation

- Adversarial Testing
- Application Security Orchestration and Correlation
- Bias and Fairness Testing
- Final Security Audit
- Incident Simulation, Response Testing
- LLM Benchmarking
- Penetration Testing
- IAST
- Vulnerability Scanning

Release

- AI/ML Bill of Materials (BOM)
- Digital Model\Dataset Signing
- Model Security Posture Evaluation
- Secure CI/CD pipeline
- Secure Supply Chain Verification
- Static and Dynamic Code Analysis
- User Access Control Validation
- Model Serialization Defenses

Deploy

- Compliance Verification
- Deployment Validation
- Digital Model\Dataset Verification
- Encryption, Secrets management
- Multi-factor Authentication
- Network Security Validation
- Secure API Access
- Secure Configuration
- User and Data Privacy Protections

Operate

- Adversarial Attack Protection
- Automated Vuln Scanning
- Data Integrity and Encryption
- LLM Guardrails
- LLM Incident Detection and Response
- Patch Management
- Privacy, Data Leakage Protection
- Prompt Security
- Runtime Self-Protection
- Secure Output Handling

Monitor

- Adversarial Input Detection
- Model Behavior Analysis
- AI/LLM Secure Posture Management
- Patch and Update Alerts
- Regulatory Compliance Tracking
- Security Alerting
- Security Metrics Collection
- User Activity Monitoring
- Observability
- Data Privacy and Protection
- Ethical Compliance

Govern

- Bias and Fairness Oversight
- Compliance Management
- Data Security Posture Management
- Incident Governance
- Risk Assessment and Management
- User/Machine Access audits

Source; OWASP Gen AI Security Solutions Landscape Guide 2025. Q1

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Scope & Plan

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The focus is on defining the application's goals, understanding the specific needs the LLM will address, and determining how the pre-trained model will be integrated into the larger system. This stage involves gathering requirements, assessing potential ethical and compliance considerations, and setting clear objectives for performance, scalability, and user interaction. The outcome is a detailed project plan that outlines the scope, resources, and timelines needed to implement the LLM-powered application successfully.

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LLMOps	LLMSecOps
• Data Suitability • Model Selection • Requirements Gathering (business, technical, and data) • Task Identification • Task Suitability	• Access Control and Authentication Planning • Compliance and Regulatory Assessment • Data Privacy and Protection Strategy • Early Identification of Sensitive Data • Third-Party Risk Assessment (Model, Provider, etc.) • Threat Modeling

Source; OWASP Gen AI Security Solutions Landscape Guide 2025.Q2/Q3

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Augment, Fine Tune Data

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The focus is on customizing the pre-trained model to better suit the specific application needs. This involves augmenting the original dataset with additional domain-specific data, enhancing the model's ability to generate accurate and contextually relevant responses. Fine-tuning is then conducted by retraining the LLM on this enriched dataset, optimizing its performance for the intended use case. This stage is critical for ensuring that the LLM adapts effectively to the unique challenges of the target domain, improving both accuracy and user experience with fewer instances of hallucination..

LLMOps	LLMSecOps
• Data Integration • Retrieval Augmented Generation (RAG) • Fine Tuning • In-context Learning and Embeddings • Reinforcement Learning with Human Feedback	• Data Source Validation • Secure Data Handling • Secure Data Pipeline • Secure vector database • Secure Output Handling • Adversarial Robustness Testing • Model Integrity Validation (ex: serialization scanning for malware) • Vulnerability Assessment

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Source; OWASP Gen AI Security Solutions Landscape Guide 2025.Q2/Q3

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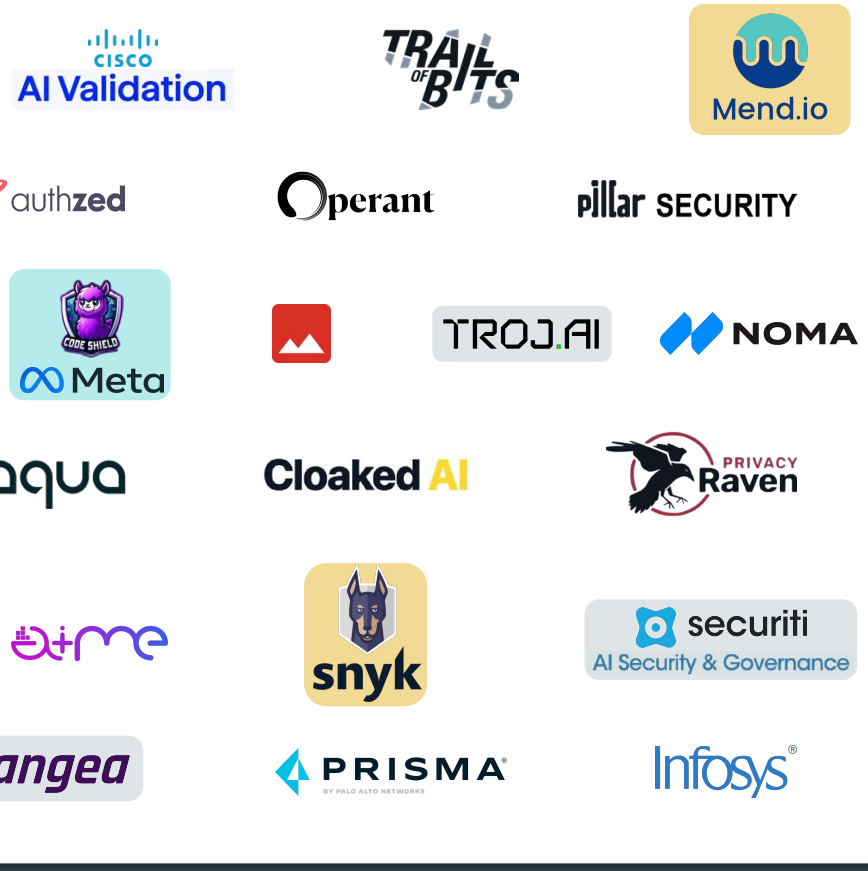
Develop & Experiment



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The focus shifts to integrating the fine-tuned model into the application's architecture. This stage involves building the necessary interfaces, user interactions, and workflows that leverage the LLM's capabilities. Developers experiment with different configurations, testing the model's performance within the application and refining the integration based on user feedback and real-world scenarios. This iterative process is crucial for optimizing the user experience and ensuring the LLM functions effectively within the broader application context.

LLMOps	LLMSecOps
• Agent Development • Experimentation, Iteration • Prompt Engineering	• Access, Authentication, and Authorization (MFA) • Experiment Tracking • LLM & App Vulnerability Scanning • Model and Application Interaction Security • SAST/DAST/ IAST • Secure Coding Practices • Secure Library/Code Repository • Software Composition Analysis

Source; OWASP Gen AI Security Solutions Landscape Guide 2025.Q2/Q3

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Test & Evaluate

Straiker | splx AI | securiti AI Security & Governance | ZenGuard AI | AIM
MODELSCAN | DRYRUN .SECURITY | LLM vulnerability scanner | Synack
CYBERSECEVAL Meta | HARMBENCH | Prompt Fuzzer | cisco AI Validation
PROTECT AI | WATCHTOWER BY AISHIELD | PRISMA | MINDGARD
promptfoo | Infosys | Giskard | Enkrypt AI | LangCheck
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At this stage in the LLM SDLC/Ops process, the focus is on assessing performance, security, and reliability through comprehensive functional, security, and usability testing. Metrics track accuracy, speed, and user interactions for fine-tuning. This phase ensures issues are resolved before deployment, enabling secure, effective real-world operation.

LLMOps	LLMSecOps
• Evaluate the model on validation and test datasets. • Integration Testing • Perform bias and fairness checks. • Stress / Performance Testing • Use cross-validation and other techniques to ensure robustness. • Validate the model's interpretability and explainability.	• Adversarial Testing • Application Security Orchestration and Correlation • Bias and Fairness Testing • Final Security Audit • Incident Simulation, Response Testing • LLM Benchmarking • Penetration Testing • SAST/DAST/IAST • Vulnerability Scanning • Available Agent Scanning

Source; OWASP Gen AI Security Solutions Landscape Guide 2025.Q2/Q31

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The focus shifts to deploying the finalized application to the production environment. This stage involves finalizing the deployment strategy, configuring the infrastructure for scalability and security, and ensuring that all components, including the LLM, are integrated and functioning as intended. Critical tasks include setting up monitoring and alerting systems, conducting a final security review, and preparing for user onboarding. The goal is to ensure a smooth and secure transition from development to production, making the application available to users with minimal risk and downtime.

LLMOps	LLMSecOps
• Enable continuous delivery of model updates • Integrate security checks and automated testing in the pipeline. • Package the model for deployment (e.g., using Docker, Kubernetes). • Set up CI/CD pipelines to automate application and model training, testing, and deployment.	• AI/ML Bill of Materials (BOM) • Digital Model\Dataset Signing • Model Security Posture Evaluation • Secure CI/CD pipeline • Secure Supply Chain Verification • Static and Dynamic Code Analysis • User Access Control Validation • Model Serialization Defenses

Source; OWASP Gen AI Security Solutions Landscape Guide 2025.Q2/Q3

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Deploy

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preamble

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The focus is on securely launching the LLM and its associated components into the production environment. This stage involves configuring the deployment infrastructure for scalability and reliability, ensuring that all security measures are in place, and validating the integration of the LLM with other application components. Key activities include setting up real-time monitoring, conducting final checks to prevent any vulnerabilities, and implementing fallback mechanisms to ensure continuous operation. The goal is to smoothly transition from development to live operation, ensuring that the application is ready to handle real-world usage.

LLMOps	LLMSecOps
• Infrastructure Setup • Integrate with existing systems or applications. • Model and App Deployment • Set up APIs or services for access • User access and role management • Agent Permission and Ownership Control • Agentic Registry	• Compliance Verification • Deployment Validation • Digital Model\Dataset Signing Verification • Encryption, Secrets management • LLM Enabled Web Application Firewall • Multi-factor Authentication • Network Security Validation • Secrets Management • Secure API Access • Secure Configuration • User and Data Privacy Protections

Source; OWASP Gen AI Security Solutions Landscape Guide 2025.Q2/Q31

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Operate

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IRONCORE LABS
Llama Guard Meta
Infosys
preamble
aim security
PRISMA
iNFOTECT
Skyrelis
NOMA
f5
Microsoft Security
NRI SECURE AI Blue Team
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The focus at this stage in the LLM SDLC and Ops process is on managing and maintaining the application in a live production environment. This stage involves continuous monitoring of the application's performance, security, and user interactions to ensure it operates smoothly and securely. Key activities include responding to incidents, applying updates or patches, and refining the model based on real-world data and feedback. The goal is to maintain high availability, optimize performance, and ensure the application remains secure and effective over time.

LLMOps	LLMSecOps
• Feedback Collection • Iterative Enhancements • Model Maintenance • Performance Management • Scalability and Infrastructure Management • User Support and Issue Resolution	• Adversarial Attack Protection • Automated Vulnerability Scanning • Data Integrity and Encryption • LLM Guardrails • LLM Incident Detection and Response • Patch Management • Privacy, Data Leakage Protection • Prompt Security • Runtime Application Self-Protection • Secure Output Handling • Anomaly Detection in Agent Chains • Runtime Agent Policy Validation

Source; OWASP Gen AI Security Solutions Landscape Guide 2025.Q2/Q3

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The focus at this stage is on real-time monitoring of performance, security, and user interactions. Key metrics are tracked to detect anomalies, ensure components work as expected, and maintain compliance. Data is gathered for improvement, issues are addressed proactively, and stability, security, and efficiency are maintained throughout the application's lifecycle.

LLMOps	LLMSecOps
• Automate retraining processes based on new data. • Detect and respond to model drift or degradation. • Manage model versioning and rollback if necessary • Monitor model performance (e.g., latency, accuracy, user interactions).	• Adversarial Input Detection • Model Behavior Analysis • AI/LLM Secure Posture Management • Patch and Update Alerts • Regulatory Compliance Tracking • Security Alerting • Security Metrics Collection • User Activity Monitoring • Agents Activity Monitoring • Observability • Data Privacy and Protection • Ethical Compliance

Source; OWASP Gen AI Security Solutions Landscape Guide 2025.Q2/Q3

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At this stage in the LLMOps process, the focus is on establishing and enforcing policies, standards, and best practices to ensure the application operates securely and ethically throughout its lifecycle. This stage involves setting governance frameworks that oversee data usage, model management, compliance, and security controls. Key activities include auditing, risk management, and ensuring the application adheres to regulatory requirements and organizational policies. .

LLMOps	LLMSecOps
• Conduct regular audits for compliance (e.g., GDPR, CCPA). • Data Governance • Document model decisions, datasets used, and model versions. • Implement model governance frameworks.	• Bias and Fairness Oversight • Compliance Management • Data Security Posture Management • Incident Governance • Risk Assessment and Management • User/Machine Access audits • Agent Action Audit

Source; OWASP Gen AI Security Solutions Landscape Guide 2025.Q2/Q31

Acknowledgement

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Contributing to the Landscape Guide

Use the **QR Code** and associated form to submit an Agentic AI Security Landscape entry

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