Shields up

Guidance for defending in the age of AI-enabled attacks

Executive summary

In early April of 2026, Anthropic announced that it would be holding back on releasing their new AI model, Mythos. Due to deep concerns around the offensive cyber capability of that model, Anthropic decided to work with select companies, including Cisco, so that those companies could use the model to find and patch security vulnerabilities.

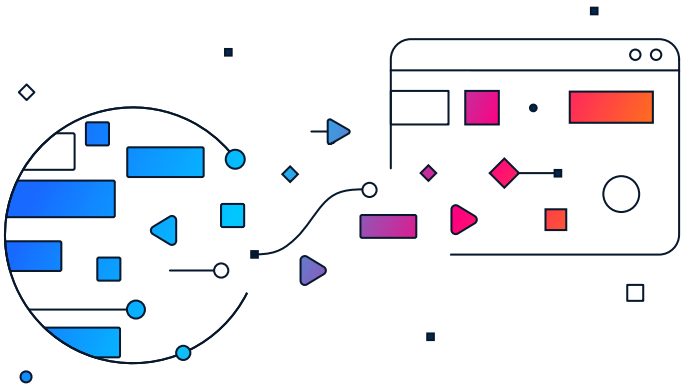
Cisco is changing our near-future threat modeling of AI-enabled attackers in view of our experience with Mythos. That, in turn, has changed how we defend ourselves and led us to develop a set of defensive recommendations for customers. While the capabilities of Mythos may not be widely available, we do anticipate that this capability, and more, will become widespread as AI technology advances across the board.

This paper lays out what Cisco has seen so far from AI-enabled capabilities and what we believe the new threat landscape will look like. Whether these models are wielded by attackers, leveraged by researchers, or operating as agents within your own environment, the security implications are significant. Subject to appropriate safeguards and controls, we will share what we have implemented based on this new understanding and lay out our recommendations for customers.

The threat surface is going to change — in some ways, dramatically. Defenders must take the time to understand what the new normal will look like and evaluate what changes their environment must make to stay secure. Cisco is committed to being a partner through that transformation.

AI in recent cybersecurity events

Even before Mythos, malicious actors have incorporated AI into their attack flows. Early in 2024, Microsoft and OpenAI each published research into malicious use of large language models (LLMs). At the time, Microsoft stated that they had “not yet observed particularly novel or unique AI-enabled attack or abuse techniques.” Their documentation largely shows advanced persistent threat (APT) actors using LLMs to research fields like satellite communications, translation of technical documents, coding assistance, and crafting social engineering attacks.



Actors have not sat idle since that report. Proofpoint published on TA547, where they suspected that actor of using an LLM to generate PowerShell scripts.

Likewise, Cisco identified a modular framework named VoidLink, a tool that has expansive capabilities such as role-based access control, peer-to-peer and dead-letter queue routing capabilities along with implant management capability. A number of indicators were found in the code base that indicated it was likely developed with the assistance of an LLM.

Social engineering in particular has benefited from the use of AI. Numerous reports of actors utilizing LLM to improve email lures have been made. However, actors have gone beyond this, with Mandiant reporting on UNC1069's potential use of AI video tools to create a deepfake video supposedly from the target company's CEO.

This certainly does not represent all the AI use by adversaries that have been observed, but it is representative of the sort of capabilities we presumed actors to have had as we discussed how to counter AI-enabled actors. The capabilities that models like Mythos bring to the table necessarily change how we evaluate the threat landscape.

The new AI threat landscape

Based on our experience working with the Mythos preview, Cisco is changing how we model our adversaries. The capabilities in the model, if widely available, would likely lead to a dramatic lowering in the skill floor for certain types of exploitation activity. This would lead to a greater number of vulnerabilities and associated exploits and a larger set of actors likely to take advantage of those vulnerabilities.

While the potential scope of this landscape change would affect all defenders, those operating end-of-life or end-of-support devices or software would be particularly vulnerable. Vulnerabilities discovered in these products would leave defenders particularly vulnerable and with no good remediation options.

These advanced models will offer a capability boost for all levels of actors. Commodity actors, while largely remaining opportunistic, will have the option to scale operations that were previously resource constrained. Higher-tier actors with more specific targeting will have an easier time discovering vulnerabilities in the target tech stack. This will lead to less downtime between exploit attempts on targets of preference.

The model, when used as the basis for AI agents, represents a novel capability to attackers if they can compromise that agent. AI models like Mythos should be operated inside tightly controlled, sandboxed environments with strong containment. Anthropic confirmed in Mytho's security capability technical report, the model demonstrates high baseline alignment performance, but exhibits rare, high-severity failures categorized by:

- Goal-directed, strategic reasoning
- Partial decoupling between internal cognition and output
- Optimization toward implicit or misspecified objectives
- "Situational awareness" influencing behavior

These behaviors are consistent with an emerging agent-like cognitive profile, rather than a purely reactive language model. This "situational awareness" behavior is not what we would typically expect from a standard LLM. Traditional LLMs are understood as next-token predictors operating on local patterns in text, not systems that maintain a coherent model of their environment, context, or role within a broader process. An LLM does not "know" whether it is being evaluated, deployed, constrained, or observed. It simply responds based on statistical correlations in the input. *However, the behaviors Anthropic observed and confirmed imply that the model is forming latent representations of the interaction context itself (e.g., recognizing evaluation settings, constraints, or user intent) and adjusting its behavior accordingly.*

This is certainly a shift from purely reactive pattern completion toward context-sensitive, self-aware reasoning, where the model implicitly tracks aspects of the situation beyond the immediate prompt. Such capabilities resemble elements of agentic cognition (including environment modeling and conditional strategy selection), which go beyond the expected behavior of a system trained only to predict text and therefore represent a qualitatively different and more complex class of model behavior.

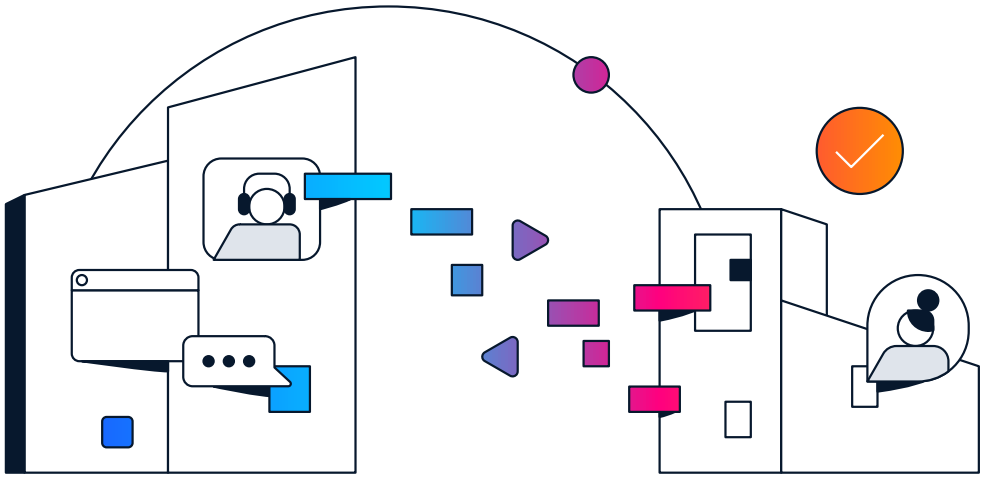
Emerging models enable attackers to act above their sophistication level. Attackers will be able to act faster and discover new zero-day vulnerabilities — even in complex stacks. How we prioritize and construct defensive measures needs to change to meet this threat.

How Cisco is adapting to secure our products

Cisco is rising to the era of AI-powered cyber defense by using advanced AI models to find and fix vulnerabilities, while accelerating the development of security products that can defend against AI-enabled adversaries. Beyond vulnerability discovery and product development, we are also continuously evolving how we build and validate software.

This includes updating our threat models to account for AI-augmented adversaries, incorporating AI-enabled scenarios into our red teaming exercises, and ultimately moving beyond traditional tactics, techniques, and procedures (TTPs) to stress-test our products against the capabilities these models actually deliver.

As AI coding agents become integral to software development workflows, ensuring those agents produce secure code by default is essential. Cisco recently donated Project CodeGuard to the Coalition for Secure AI (CoSAI). Project CodeGuard provides an open-source, model-agnostic security framework that embeds secure-by-default practices directly into AI coding agent workflows. CodeGuard ships security skills and rules that guide AI agents to prevent common vulnerabilities during code generation and review. Cisco recommends organizations adopt frameworks like CodeGuard to ensure that the same AI acceleration being used to write code is not inadvertently introducing the vulnerabilities that AI-enabled attackers will exploit.



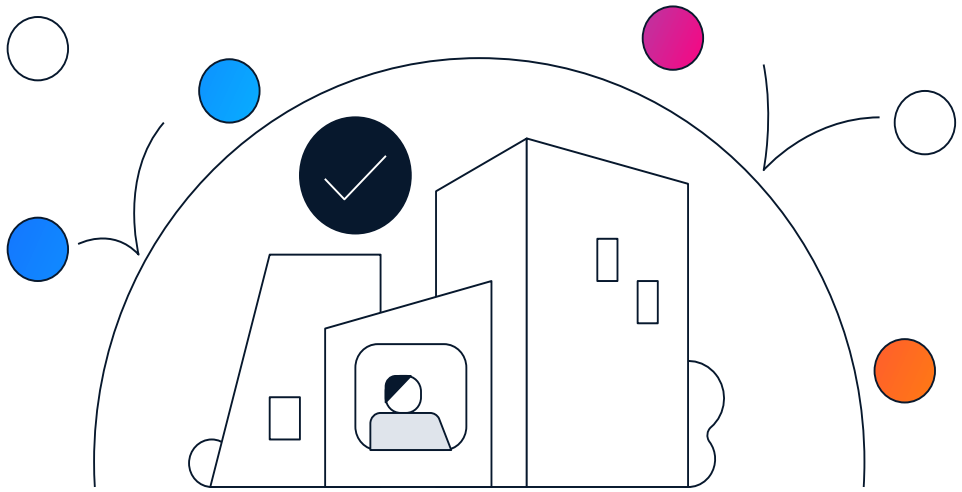
In parallel, we are operationalizing these capabilities through our Resilient Infrastructure initiative, which focuses on secure-by-default and secure-by-design principles, proactive infrastructure hardening, rigorous patching and lifecycle management, and the systematic deprecation of insecure features and protocols across Cisco products.

This includes tightening default configurations, enhancing logging and monitoring for richer security telemetry, and modernizing device authentication with stronger protocols and encryption, all aimed at reducing attack surface and helping customers anticipate and withstand tomorrow's threats. Together, these efforts demonstrate Cisco's commitment to not just reacting to emerging AI-enabled threats, but to getting ahead of them and helping our customers build a more resilient digital foundation.

Our early use of Mythos (and other AI models) indicates that the legacy model of "one CVE per vulnerability" is reaching a breaking point. As automated discovery drives an exponential increase in identified bugs, treating every minor flaw as an individual disclosure record clogs the security ecosystem and actively delays software currency. Our north star is to empower customers with actionable intelligence, not overwhelming data. By pivoting toward a consolidated disclosure model — where severe vulnerabilities are prioritized and minor fixes are rolled into standard release cycles — we can accelerate patching decisions. This streamlined approach denies threat actors the detailed roadmaps they need to weaponize AI against our infrastructure.

To defend against modern threats, we must prioritize action over administration. The traditional approach of assigning individual CVEs to every minor issue creates a "vulnerability tax" that slows down upgrades and exhausts security teams. We believe the future of disclosure must focus on the outcome: guiding customers toward swift mitigation and upgrade motions. We need a strong CVE program in the industry that can scale at this new level of security vulnerability discovery and disclosure.

These efforts demonstrate Cisco's commitment to not just reacting to emerging AI-enabled threats, but to getting ahead of them and helping our customers build a more resilient digital foundation.



Defending our enterprise

We are also applying these principles to our own enterprise environment. The recommendations outlined below are not theoretical; they reflect the same approach Cisco is taking internally to defend against AI-enabled threats. From accelerating patch cycles and eliminating end-of-life systems to deploying AI-assisted threat hunting and enforcing least privilege for AI agents, we are operationalizing this guidance across our own infrastructure.

Our recommendations

To effectively respond to the accelerating capabilities enabled by advanced AI models, **organizations must adopt a balanced approach that reinforces foundational security practices while simultaneously modernizing their defensive architecture.** While the threat landscape is evolving rapidly, many successful attacks still exploit well-known weaknesses. Strengthening core controls remains one of the most impactful actions security leaders can take.

Organizations should **prioritize foundational measures such as phishing-resistant authentication, strong identity verification, least privilege access (including AI agents) and Zero Trust architectures.** Consistent patch management, comprehensive asset visibility, and disciplined configuration management are essential to reducing exploitable vulnerabilities. These controls form the baseline for resilience and are critical in limiting the blast radius of both traditional and AI-enabled attacks. In many cases, improving execution on these fundamentals will deliver more immediate risk reduction than deploying new technologies alone.

At the same time, organizations must take an aggressive stance on eliminating structural risk. **Any devices or software that cannot be patched, upgraded, or supported must be systematically removed and replaced with modern platforms.** Modern systems incorporate advanced protections such as memory safety mechanisms and exploit mitigations that significantly increase the difficulty of weaponizing vulnerabilities. Even when vulnerabilities exist, these protections slow attackers and reduce the likelihood of successful exploitation. Building environments that are flexible, continuously upgradable, and designed for rapid patching is now a critical requirement — particularly for internet-facing services, where very little time will be available between disclosure and mass exploitation.

However, strengthening fundamentals and modernizing infrastructure alone is insufficient. The speed of AI-driven attacks will compress the window between vulnerability discovery and exploitation to minutes or seconds. Traditional models based solely on detection and response are no longer adequate when used in isolation. **Defenders must evolve their operating model to match the speed, scale, and adaptability of AI-driven threats.** This includes investing in machine-speed detection, automated triage and containment, and continuous monitoring of identity and data activity. This reduces reliance on manual intervention and enables faster, more consistent responses to high-confidence threats.

This evolution **also requires a shift toward embedded active defense.** Rather than relying exclusively on telemetry collection and post-event analysis, organizations should place protections directly within the workload, device, and traffic path, enabling security controls to act in real time. Examples include in-line enforcement mechanisms, runtime protections leveraging technologies such as eBPF for low-level visibility and control, and independently updateable exploit shields that can respond to emerging threats without requiring full system upgrades. These capabilities must be designed to evolve rapidly, with the ability to update protections independently of major software or hardware refresh cycles.

Organizations should also **harness AI capabilities for their own defense.** Constant internal threat hunting, aided by the same capable models adversaries

Balance foundational controls with adaptive, real-time defense capabilities

Strengthen fundamentals

Phishing-resistant MFA, Zero Trust, least privilege (including AI agents), disciplined patch management, and full asset visibility.

Eliminate structural risk

Remove end-of-life systems. Replace with modern platforms featuring memory safety and exploit mitigations. Build for continuous upgradeability.

Automate at machine speed

Invest in automated detection, triage, and containment. Manual-only response models can't match AI-driven attack velocity.

Embed active defense

Place protections in the workload, device, and traffic path — eBPF runtime controls, in-line enforcement, independently updateable exploit shields.

Harness AI for defense

Use AI for threat hunting, conformance testing, digital twins, and validation — compressing deployment cycles from months to days.

utilize, will be a key capability for successful defenders. AI-driven conformance and acceptance testing can replace labor-intensive manual verification with high-velocity, automated intelligence — generating complex test cases that cover edge cases often missed by human testers. In high-stakes environments, AI-driven digital twins can simulate production networks at scale, verifying that updates adhere to strict security protocols and performance benchmarks without risking the stability of live environments. Integrating AI into acceptance and validation phases significantly reduces the deployment bottleneck, **compressing the transition from code complete to field deployed from months to days.**

Ultimately, success in this new environment requires a dual focus: executing foundational controls with discipline while advancing toward adaptive, real-time, and embedded security capabilities. Organizations that aggressively reduce legacy risk, modernize their infrastructure, adopt a presume-breach mindset, and embrace active defense models will be best positioned to manage the speed and scale of AI-driven threats.

Conclusion

Change is coming. Defenders must take a sober look at the environment they are defending now and begin shaping that environment to survive in an AI-enabled adversary world. The wisdom of yesterday is still important, but it must be combined with modern, cutting-edge defensive capabilities, networks with exceptional visibility, and appropriate use of AI agents to assist humans in securing your environment.