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NVIDIA Embeds AI Agent Security in Silicon: What Enterprise Security Teams Need to Know About BlueField-4 STX

SECURITY ANALYSIS | MEDIUM | CVSS 5.0

SCC Item ID	SCC-STY-2026-0162
Type	Security Analysis
Severity	MEDIUM
CVSS Base Score	5.0
Affected Products	NVIDIA Vera BlueField-4 STX; NVIDIA DOCA (Argus, Vault, Flow); CrowdStrike Falcon Next-Gen SIEM; CrowdStrike Charlotte Agentic SOAR; VAST Data (integration partner)
Discovery Source	Rss:T1 Threatintel

Executive Summary

NVIDIA has announced BlueField-4 STX, a data processing unit that embeds security controls directly in silicon to govern agentic AI workloads at the infrastructure layer, before traffic or data reaches the host OS or hypervisor. CrowdStrike is integrating DPU-layer telemetry into its Falcon SIEM and Charlotte AI SOAR platform, while VAST Data is building zero trust storage controls on the same framework. This signals an industry shift: as AI agents proliferate across enterprise infrastructure, the security perimeter is moving into the hardware layer, and organizations that delay architectural planning risk deploying agentic AI on a foundation with no native security visibility.

Technical Analysis

The BlueField-4 STX is a DPU-class device that offloads and enforces security policy at the storage and networking layer, operating independently of the host CPU and OS stack. Three DOCA primitives define its security architecture. DOCA Vault provides cryptographic isolation and key management for AI workload data in motion and at rest, addressing CWE-668 (exposure of resources to wrong sphere) by ensuring AI agents cannot access data outside their authorized cryptographic boundary. DOCA Argus generates real-time telemetry and anomaly detection signals at the infrastructure layer, below the visibility threshold of traditional endpoint agents, directly relevant to MITRE ATT&CK techniques T1083 (file and directory discovery), T1119 (automated collection), and T1530 (data from cloud storage), which agentic AI systems could execute either maliciously or due to misconfiguration. DOCA Flow enforces east-west policy between AI agents and storage nodes, targeting the class of lateral movement and unauthorized resource access described by T1557 (adversary-in-the-middle)

and T1078 (valid accounts). The CWE profile assigned to this architecture - CWE-284 (improper access control), CWE-285 (improper authorization), CWE-693 (protection mechanism failure), and CWE-668 - reflects the actual weakness classes that uncontrolled agentic AI introduces: agents that act on behalf of users but inherit permissions they should not have, generate traffic that bypasses traditional inspection points, and interact with data stores without granular authorization controls. CrowdStrike's DOCA Argus integration into Falcon Next-Gen SIEM is architecturally significant. DPU telemetry fills a gap that endpoint detection agents cannot address: process behavior and network flows that originate below the OS layer or within bare-metal AI inference nodes where traditional EDR is not deployed. Correlating that signal with identity, cloud, and endpoint telemetry enables detection of AI agent abuse patterns, a threat category that current SIEM correlation rules are largely unprepared for. The Charlotte AI integration extends this to autonomous SOAR response, raising important questions about containment logic, blast radius, and human-in-the-loop requirements for agentic response actions. VAST Data's zero trust integration targets storage access specifically, a layer where AI agents are particularly dangerous, given that retrieval-augmented generation (RAG) pipelines and model training workflows require broad read access to sensitive data stores. Without cryptographic enforcement at the storage layer, a compromised or misconfigured AI agent could exfiltrate training data, customer records, or proprietary model weights using legitimate access paths, matching the T1071 (application layer protocol) and T1190 (exploit public-facing application) patterns. Partner platforms built on BlueField-4 STX are expected in H2 2026, giving security and infrastructure teams a 12-18 month window to assess architectural fit, define agentic AI security requirements, and update procurement criteria before deployment decisions are locked.

Action Checklist

1. Step 1: Assess exposure, determine if your organization has active or planned agentic AI deployments (RAG pipelines, AI agents with storage access, autonomous SOAR workflows) that would fall within the threat surface BlueField-4 STX is designed to address
2. Step 2: Audit current east-west controls, verify that AI agent traffic and storage access is subject to policy enforcement (NIST AC-4, Information Flow Enforcement; CIS 4.4, Implement and Manage a Firewall on Servers) and is not implicitly trusted based on network position alone
3. Step 3: Review AI workload identity and authorization, map what permissions agentic AI systems currently hold against what they operationally require; apply least privilege principles (NIST AC-6, Least Privilege; CIS 5.4, Restrict Administrator Privileges) to service accounts and API credentials used by AI agents
4. Step 4: Evaluate DPU-layer visibility gaps, determine whether your current SIEM and EDR coverage extends to bare-metal AI inference nodes and storage controllers; identify logging blind spots using NIST AU-2 (Event Logging) and CIS 8.2 (Collect Audit Logs) as the baseline
5. Step 5: Update threat model, incorporate AI agent abuse patterns (unauthorized data collection T1119, cloud storage access T1530, valid account misuse T1078) into your threat register and begin developing detection hypotheses against current telemetry
6. Step 6: Engage procurement and architecture teams, initiate a 12-18 month planning cycle for DPU-class security controls aligned to your agentic AI roadmap; include security requirements in vendor RFPs before H2 2026 platform availability
7. Step 7: Monitor developments, track NVIDIA DOCA roadmap updates, CrowdStrike Falcon integration release notes, and CISA guidance on securing AI infrastructure as this architectural approach matures

IR / Forensic Enrichment

Triage Priority	DEFERRED
Escalation Criteria	Escalate to urgent if active agentic AI deployments are discovered during Step 1 assessment with no east-west policy enforcement and AI agent service accounts holding broad storage or SOAR execution permissions — conditions that make T1078, T1119, and T1530 immediately exploitable without a DPU-layer compensating control.
Recovery Notes	Because no active CVE or confirmed exploitation is associated with this threat story, recovery actions are architectural rather than reactive: after implementing east-west controls and least-privilege scoping from Steps 2-3, verify AI agent behavior returns to the documented baseline captured during the evidence collection phases, specifically confirming no anomalous storage access patterns persist. Monitor AI agent service account authentication logs and storage access logs for 30 days post-hardening to detect any credential misuse that predates the hardening effort. Retain all baseline evidence artifacts (process snapshots, IAM exports, flow logs) for a minimum of 90 days to support retrospective investigation if a related incident is declared.
Forensic Artifacts	AI agent process cmdline and environment snapshots from /proc//cmdline and /proc//environ on inference nodes — captures injected API credentials and storage endpoint configuration specific to RAG pipeline or SOAR agent processes | S3 or NFS access logs from VAST Data storage controllers covering AI agent service account activity — the primary artifact for detecting T1119 (Automated Collection) and T1530 (Data from Cloud Storage) by agent processes exceeding their data scope | Authentication and token issuance logs for AI agent service accounts from IdP (Okta system log, Azure AD sign-in log, or /var/log/auth.log) — establishes the timeline for T1078 (Valid Accounts) misuse if agent credentials are abused or exfiltrated | Auditd or Sysmon for Linux logs from bare-metal GPU/inference nodes capturing file open syscalls (openat) against model storage directories and unexpected network connection events — the host-layer artifact that would exist in the absence of DPU-layer telemetry from NVIDIA DOCA Argus | SOAR workflow execution audit logs from CrowdStrike Charlotte AI or equivalent autonomous SOAR platform — specifically automated action execution records showing which containment or investigation actions were triggered without human approval, relevant if an AI agent's SOAR credentials are misused under T1078

Per-Action IR Details

Step 1: Assess exposure — determine if your organization has active or planned agentic AI deployments (RAG pipelines, AI agents with storage access, autonomous SOAR workflows) that would fall within the threat surface BlueField-4 STX is designed to address

NIST Phase: Preparation

Reference: NIST 800-61r3 §2 — Preparation: establishing IR capability and understanding the threat surface before incidents occur

Controls: NIST RA-3 (Risk Assessment), NIST CA-7 (Continuous Monitoring), CIS 1.1 (Establish and Maintain Detailed Enterprise Asset Inventory), CIS 2.1 (Establish and Maintain a Software Inventory)

Compensating: Run 'ps aux | grep -E "python|uvicorn|ollama|langchain|autogen"' on candidate hosts to surface active inference or agent orchestration processes. Use osquery with 'SELECT name, path, cmdline FROM processes WHERE cmdline LIKE "%rag%" OR cmdline LIKE "%agent%";' to enumerate AI workload processes across the fleet. Document results in a shared spreadsheet with columns: host, process, storage backend, network egress destinations.

Evidence: Before scoping begins, capture a point-in-time snapshot of: (1) active network connections from known AI inference nodes using 'ss -tnp' or 'netstat -antp', preserving destination IPs and ports to storage controllers (e.g., VAST Data NFS/S3 endpoints); (2) running container images on GPU hosts via 'docker ps --format "{{.Image}} {{.Names}}

{{.Ports}}'"; (3) Kubernetes namespace listing ('kubectl get pods -A') to identify any deployed LangChain, AutoGen, or SOAR orchestration containers that would traverse the DPU fabric.

Step 2: Audit current east-west controls — verify that AI agent traffic and storage access is subject to policy enforcement (NIST AC-4, Information Flow Enforcement; CIS 4.4, Implement and Manage a Firewall on Servers) and is not implicitly trusted based on network position alone

NIST Phase: Preparation

Reference: NIST 800-61r3 §2 — Preparation: ensuring policy enforcement infrastructure is in place to detect and limit lateral movement by AI agents before a misuse event occurs

Controls: NIST AC-4 (Information Flow Enforcement), NIST SC-7 (Boundary Protection), CIS 4.4 (Implement and Manage a Firewall on Servers), CIS 4.2 (Establish and Maintain a Secure Configuration Process for Network Infrastructure)

Compensating: Deploy host-based iptables rules on AI inference nodes to allowlist only required storage endpoints: 'iptables -A OUTPUT -d -p tcp --dport 443 -j ACCEPT; iptables -A OUTPUT -j LOG --log-prefix "AI-AGENT-UNAUTH: "; iptables -A OUTPUT -j DROP'. Use Wireshark or tcpdump on a mirror port ('tcpdump -i eth0 -nn -w /tmp/ai_eastwest.pcap host ') to capture baseline east-west flows for 72 hours before enforcing policy. Review /var/log/kern.log or /var/log/syslog for iptables LOG hits.

Evidence: Capture iptables rule listings ('iptables -L -n -v --line-numbers') and current netfilter state before any changes. Export existing network ACLs or security group rules governing the AI inference subnet. Pull flow logs from the physical switch SPAN port or cloud VPC flow logs covering the AI workload subnet for the prior 30 days — specifically looking for AI agent process connections to storage controllers on ports 2049 (NFS), 9000 (MinIO/S3-compatible), or 443 (VAST Data REST API) that lack an explicit policy allowance.

Step 3: Review AI workload identity and authorization — map what permissions agentic AI systems currently hold against what they operationally require; apply least privilege principles (NIST AC-6, Least Privilege; CIS 5.4, Restrict Administrator Privileges) to service accounts and API credentials used by AI agents

NIST Phase: Preparation

Reference: NIST 800-61r3 §2 — Preparation: reducing blast radius by limiting what agentic AI credentials can access prior to a T1078 (Valid Account) misuse event against storage or SOAR systems

Controls: NIST AC-6 (Least Privilege), NIST AC-2 (Account Management), NIST IA-5 (Authenticator Management), CIS 5.4 (Restrict Administrator Privileges to Dedicated Administrator Accounts), CIS 5.1 (Establish and Maintain an Inventory of Accounts)

Compensating: Extract all service account credentials from AI agent configuration files: 'grep -rE "(api_key|token|secret|password|bearer)" /opt/ai-agent/ /etc/langchain/ ~/.autogen/ 2>/dev/null'. Cross-reference found credentials against your IdP or cloud IAM (AWS: 'aws iam list-attached-user-policies --user-name '; Azure: 'az role assignment list --assignee '). For SOAR webhook tokens used by Charlotte AI or equivalent, verify they scope to read-only investigation actions and cannot trigger automated containment without human approval.

Evidence: Before revoking or rotating credentials, document the current permission state: export IAM policy JSON for every service account attached to AI agent processes ('aws iam get-user-policy' or equivalent). Capture /proc//environ for running agent processes to extract injected environment variables containing credentials. On Kubernetes, run 'kubectl get secrets -A -o yaml' to enumerate mounted secrets in AI agent pods — this establishes the pre-hardening baseline and is required evidence if a credential misuse incident is later discovered.

Step 4: Evaluate DPU-layer visibility gaps — determine whether your current SIEM and EDR coverage extends to bare-metal AI inference nodes and storage controllers; identify logging blind spots using NIST AU-2 (Event Logging) and CIS 8.2 (Collect Audit Logs) as the baseline

NIST Phase: Detection Analysis

Reference: NIST 800-61r3 §3.2 — Detection and Analysis: establishing what telemetry is available from DPU-layer and bare-metal inference infrastructure before attempting to detect AI agent abuse via MITRE T1119 or T1530

Controls: NIST AU-2 (Event Logging), NIST AU-12 (Audit Record Generation), NIST SI-4 (System Monitoring), CIS 8.2 (Collect Audit Logs)

Compensating: On bare-metal GPU/inference nodes lacking EDR, deploy Sysmon for Linux (or auditd) with a rule set targeting process creation, network connections, and file access in model storage paths. Auditd rule example: '-a always,exit -F arch=b64 -S openat -F dir=/models -F perm=r -k ai_model_read'. Ship auditd logs to a central syslog server ('rsyslog' forwarding to a Graylog or ELK stack). For VAST Data storage controllers, enable S3 access logging and NFS audit trails if the appliance supports it, and forward to the same log aggregator.

Evidence: Enumerate current log coverage gaps before remediation: run 'auditctl -l' on each inference node to confirm whether auditd is active and which syscalls are captured. Check EDR enrollment status against your asset inventory — any GPU host or storage controller not appearing in your EDR console is a confirmed blind spot. Pull the last 30 days of SIEM ingestion source inventory to verify whether DPU telemetry from BlueField-series cards (NVIDIA DOCA Argus telemetry, if deployed) is currently reaching your log pipeline.

Step 5: Update threat model — incorporate AI agent abuse patterns (unauthorized data collection T1119, cloud storage access T1530, valid account misuse T1078) into your threat register and begin developing detection hypotheses against current telemetry

NIST Phase: Detection Analysis

Reference: NIST 800-61r3 §3.2 — Detection and Analysis: developing detection hypotheses and adversary behavior models specific to agentic AI abuse patterns before incidents are declared

Controls: NIST RA-3 (Risk Assessment), NIST SI-4 (System Monitoring), NIST IR-4 (Incident Handling), CIS 7.1 (Establish and Maintain a Vulnerability Management Process)

Compensating: Author three Sigma rules targeting the named MITRE techniques against your current log sources: (1) T1119 — alert on AI agent processes (e.g., python processes with 'langchain' or 'autogen' in cmdline) opening file handles to directories outside their declared data scope; (2) T1530 — alert on S3/NFS access from inference node IPs to buckets or shares not in the approved allowlist; (3) T1078 — alert on AI service account logins outside business hours or from unexpected source IPs. Push Sigma rules to your SIEM or convert to grep patterns for manual log review if no SIEM is available.

Evidence: Before finalizing detection hypotheses, pull 90 days of historical logs for the three MITRE technique indicators: S3 GET/LIST API calls from AI agent service accounts (CloudTrail or MinIO audit logs), NFS read operations from inference node IPs to VAST Data volumes, and authentication events for AI service accounts from IdP audit logs (Okta system log, Azure AD sign-in logs, or /var/log/auth.log). This establishes a behavioral baseline distinguishing normal agent activity from anomalous data collection.

Step 6: Engage procurement and architecture teams — initiate a 12-18 month planning cycle for DPU-class security controls aligned to your agentic AI roadmap; include security requirements in vendor RFPs before H2 2026 platform availability

NIST Phase: Post Incident

Reference: NIST 800-61r3 §4 — Post-Incident Activity: translating lessons learned and threat model updates into infrastructure investment decisions and architectural improvements before the next generation of agentic AI workloads is deployed

Controls: NIST SA-3 (System Development Life Cycle), NIST SA-8 (Security and Privacy Engineering Principles), NIST PM-7 (Enterprise Architecture), CIS 4.2 (Establish and Maintain a Secure Configuration Process for Network Infrastructure)

Compensating: Without dedicated procurement budget, draft a one-page security requirements addendum for any AI infrastructure RFP that mandates: (1) out-of-band telemetry collection independent of the host OS (equivalent to NVIDIA DOCA Argus capability); (2) cryptographic identity for AI agent service accounts at the hardware layer; (3) documented API for exporting DPU-layer flow telemetry to SIEM in CEF or JSON format. Circulate this as a minimum baseline to architecture and vendor management teams immediately.

Evidence: Document the current architecture's control gaps as a formal gap analysis artifact before procurement begins: record which AI inference nodes lack hardware-root-of-trust attestation, which storage controllers lack per-session audit trails, and which SOAR automation workflows (including any CrowdStrike Charlotte AI or equivalent)

execute without human-in-the-loop approval gates. This gap register is the evidentiary basis for procurement decisions and must be preserved as a versioned document.

Step 7: Monitor developments — track NVIDIA DOCA roadmap updates, CrowdStrike Falcon integration release notes, and CISA guidance on securing AI infrastructure as this architectural approach matures

NIST Phase: Post Incident

Reference: NIST 800-61r3 §4 — Post-Incident Activity: maintaining situational awareness of evolving vendor capabilities and regulatory guidance to update threat models and detection content as the BlueField-4 STX and DOCA ecosystem matures

Controls: NIST SI-5 (Security Alerts, Advisories, and Directives), NIST PM-16 (Threat Awareness Program), CIS 7.1 (Establish and Maintain a Vulnerability Management Process), CIS 7.2 (Establish and Maintain a Remediation Process)

Compensating: Create a free RSS/Atom feed monitor (using Feedly free tier or a self-hosted RSS reader like FreshRSS) tracking: NVIDIA DOCA release notes (developer.nvidia.com/doca), CrowdStrike blog and release notes (crowdstrike.com/blog), and CISA AI security advisories (cisa.gov/ai). Assign one team member to review these feeds weekly and log relevant updates to a shared threat intelligence register. Set a calendar reminder to re-evaluate this checklist against updated CISA AI guidance every 90 days.

Evidence: Maintain a dated intelligence log recording each significant development: DOCA version releases, new CrowdStrike Falcon sensor capabilities covering DPU telemetry, and any CISA advisories referencing agentic AI infrastructure. This log serves as the evidentiary record that your threat model remains current — it is the artifact an auditor would review to confirm your organization is actively tracking this emerging attack surface rather than treating this assessment as a one-time exercise.

Detection Guidance

Current detection tooling has limited native coverage for the threat surface BlueField-4 STX targets. In the interim, focus detection efforts on behavioral anomalies in AI agent activity. Review access logs for service accounts and API credentials assigned to AI agents, flag any account accessing data stores outside normal working hours, accessing resource categories not typical for the agent's function (T1083, T1530), or generating unusually high data transfer volumes (T1119). Correlate identity logs with storage access logs to surface cases where a single AI agent credential accesses multiple sensitive data stores in rapid succession, a pattern consistent with T1530 and a RAG pipeline gone wrong or compromised. Hunt for east-west traffic between AI inference nodes and storage systems that lacks explicit policy authorization; absence of enforcement at this layer is itself a policy gap worth documenting under NIST AC-4. For SOAR and automation platforms, audit the permissions held by automated response workflows, agentic SOAR actions that carry broad endpoint or identity permissions represent a T1078 risk if those platforms are compromised or manipulated. Monitor for anomalous TLS or application-layer communication from AI nodes (T1071) that could indicate an agent operating outside its intended scope. Where DPU-layer telemetry is eventually available via DOCA Argus and Falcon SIEM integration, prioritize correlation rules targeting: cryptographic key access anomalies (DOCA Vault events), east-west policy violations (DOCA Flow denies), and infrastructure-layer process anomalies that have no corresponding host-OS event, the last category is the most operationally novel and the hardest to detect without hardware-layer telemetry. NIST SI-4 (System Monitoring) and AU-6 (Audit Record Review, Analysis, and Reporting) provide the control framework for building this detection capability.

Framework Mappings

MITRE-ATTACK

- **T1557** — Adversary-in-the-Middle
- **T1530** — Data from Cloud Storage
- **T1562** — Impair Defenses
- **T1078** — Valid Accounts
- **T1083** — File and Directory Discovery
- **T1071** — Application Layer Protocol
- **T1210** — Exploitation of Remote Services
- **T1190** — Exploit Public-Facing Application
- **T1119** — Automated Collection

NIST-800-53R5

- **AC-6** — Least Privilege
- **AU-9** — Protection of Audit Information
- **CM-6** — Configuration Settings
- **SI-4** — System Monitoring
- **AC-2** — Account Management
- **IA-2** — Identification and Authentication (Organizational Users)
- **IA-5** — Authenticator Management
- **CA-7** — Continuous Monitoring
- **SC-7** — Boundary Protection
- **SI-2** — Flaw Remediation
- **CA-8** — Penetration Testing
- **RA-5** — Vulnerability Monitoring and Scanning
- **SI-7** — Software, Firmware, and Information Integrity
- **AC-3** — Access Enforcement
- **SC-13** — Cryptographic Protection

OWASP-TOP10-2021

- **A01:2021** — Broken Access Control

CIS-V8

- **6.1** — Establish an Access Granting Process
- **6.2** — Establish an Access Revoking Process
- **8.2** — Collect Audit Logs

SOC2-TSC

- **CC6.1** — The entity implements logical access security software, infrastructure, and architectures over protected information assets

HIPAA-SECURITY

- **164.312(a)(1)** — Access Control

ISO-27001-2022

- **A.5.34** — Privacy and protection of personal information
- **A.8.24** — Use of cryptography
- **A.5.23** — Information security for use of cloud services

NIST-CSF-2

- **DE.CM-01** — Networks and network services are monitored

MITRE ATT&CK Mapping

Technique ID	Technique Name	Tactic
T1557	Adversary-in-the-Middle	Credential-Access
T1530	Data from Cloud Storage	Collection
T1562	Impair Defenses	Defense-Evasion
T1078	Valid Accounts	Defense-Evasion
T1083	File and Directory Discovery	Discovery
T1071	Application Layer Protocol	Command-And-Control
T1210	Exploitation of Remote Services	Lateral-Movement
T1190	Exploit Public-Facing Application	Initial-Access
T1119	Automated Collection	Collection

Sources

Source	URL	Tier
Blog	https://www.crowdstrike.com/en-us/blog/crowdstrike-nvidia-bring-ent...	T3
	https://nvidianews.nvidia.com/news/nvidia-vera-bluefield-4-stx-brin...	T3
	https://www.stocktitan.net/news/NVDA/nvidia-vera-blue-field-4-stx-b...	T3
	https://securitybrief.asia/story/nvidia-adds-security-features-to-v...	T3
VAST Data's Zero Trust Framework for Agentic AI	https://www.vastdata.com/blog/vast-zero-trust-agentic-ai-nvidia-blu...	T3

Organizations should conduct their own validation and consult qualified security professionals before taking action based on this report. Tech Jacks Solutions is not liable for any damages resulting from the use of this information.

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