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External Security Administration Manager (ESAM) Unlocked

From Trusted Paths to Platform-Wide Security Governance

PUG Challenge 2026

David Cleary - Architect

October 6, 2026



Agenda

- The security problem ESAM helps solve
- ESAM the product: vision and principles
- Architecture and runtime flow
- ESAM in practice: who, what, where, when and how
- Future directions



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The Security Problem ESAM Helps Solve

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Security Is a Key Component of the Progress® OpenEdge® Platform

Application security spans the whole runtime, not just the login screen.

- The OpenEdge platform covers server configuration, transport security, sessions and authentication
- Every area carries risk if mitigations are not designed in
- Applications once relied on a firewall, or simply trusted their environment
- That assumption no longer holds

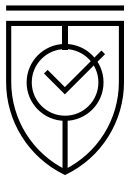
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What Applications Need From Security



Trusted Location

A protected place for secure configuration data



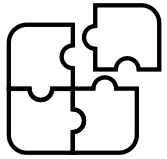
Access Control and Auditing

Control over configuration data, and a record of who changed it



Authenticed Installations

Run only genuine, verified OpenEdge installations



Trusted Components

Allow only trusted third-party components

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ESAM the Product

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ESAM enhances the security of the OpenEdge platform by providing governance over application runtime practices, using industry standard security architectures to meet corporate security requirements.

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Three ESAM Personas

ITOps Admin

- Owns the ESAM service and its OS-level security
- Manages the install registry, policies and audit logs
- Backs up the registry and each install's identity token
- First stop when an operation is denied

OpenEdge Admin

- Owns OpenEdge installs governed by ESAM
- Gets ESAM rights through OS groups
- Keeps installs valid: no copied executables
- Includes ESAM in the normal OS backup strategy

Developer / User

- Builds and runs applications inside a registered install
- ESAM should be invisible

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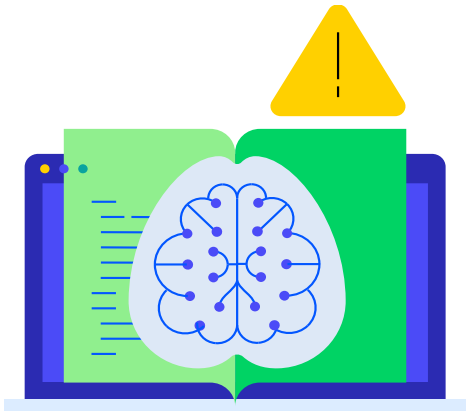
First ESAM Use Case: CWE-114 and CWE-78

Code weaknesses: execute unauthorized code or commands.

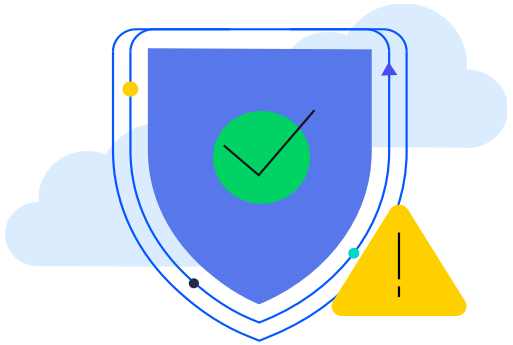
- CWE-114: loading code from an untrusted source runs an attacker's payload
- CWE-78: client-side checks can be bypassed or removed entirely
  - Command **execution using a relative or external path**
  - Library loading using an externally controlled path
- DLC is now flagged by SAST scanners as an untrusted input

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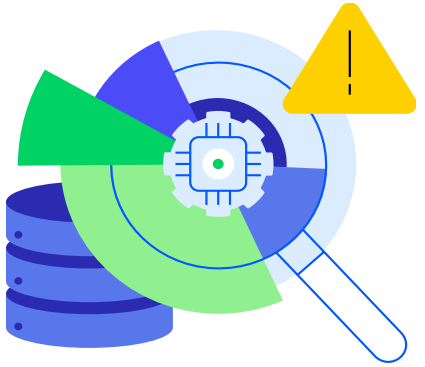
ESAM Manages Trusted Decisions and Secrets



Installation identity



Policy decisions



Configuration and secrets

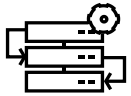
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ESAM Principles



Fixed Location

The service runs from a fixed, OS-owned filesystem location



Separation of Duty

OS administrator and OpenEdge administrator roles are separate by default



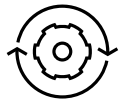
Secure Defaults

OS administrator read/write access, group read-only access



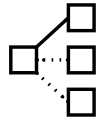
Continuous Operations

Error fallback keeps applications running, at a less secure runtime



Transparency

You do not know it is running unless it denies an unauthorized operation



One per System

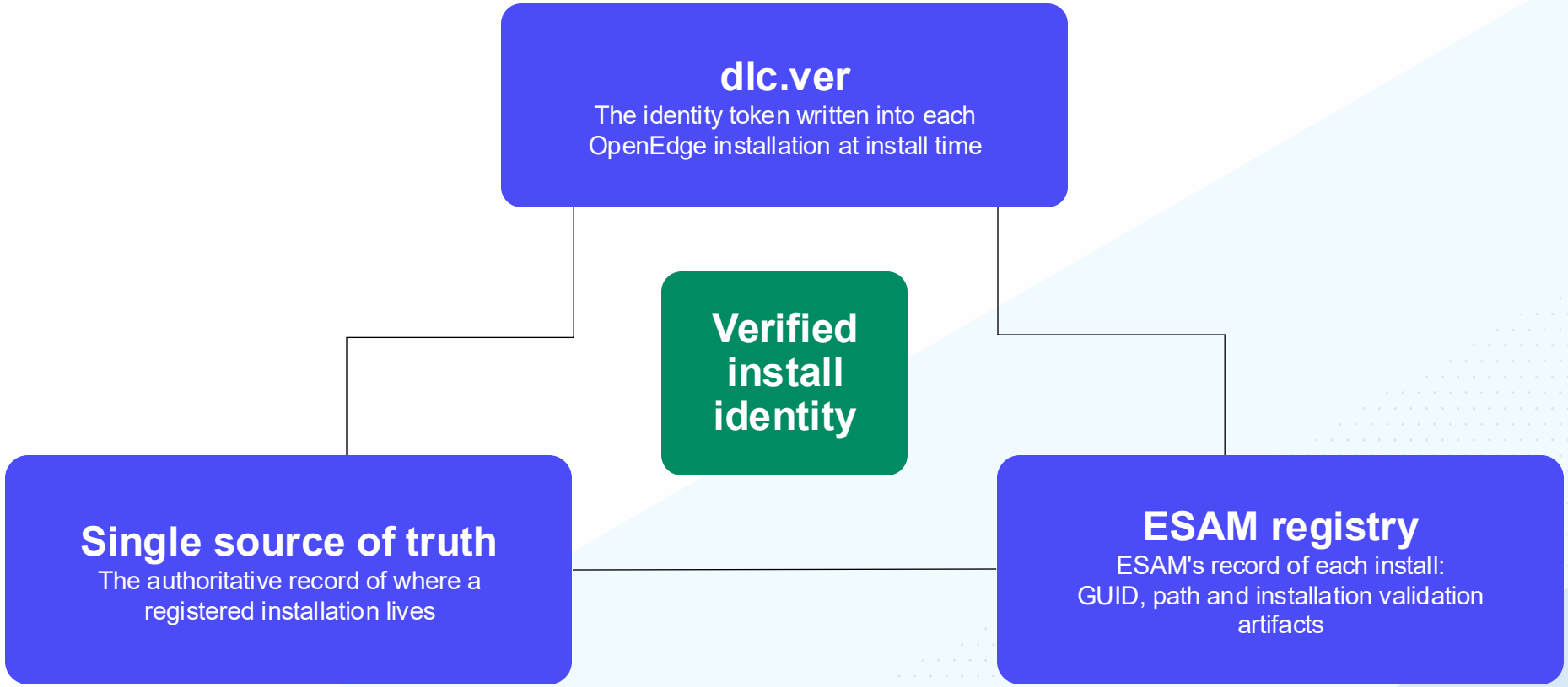
A single ESAM can manage multiple OpenEdge installations

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Architecture and Runtime Flow

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The Trust Triad Behind a Verified Installation



All three must agree. If any one disagrees, the install is not trusted and policy decides what happens.

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From Install to Trusted Execution

Install

- ESAM is a prerequisite
- Installer runs transparently
- Requires system admin

Register

- OpenEdge platform generates a GUID token
- ESAM records ID, path, digest
- One entry per installation

Validate

- Product calls ESAM at startup
- ID and DLC path checked
- Policy rules evaluated

Trusted Execution



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One ESAM, Many OpenEdge Installations

One ESAM per system can govern every OpenEdge installation on that machine.

- 12.8 installs, generates a GUID token, and registers with ESAM
- Registration records the GUID, absolute install path and token digest
- A later 13.0 install updates the same ESAM Service
- 12.2 predates ESAM, so its install path cannot be validated

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OpenEdge Installation Identity Types

Identity type	Access	Secrets and notes	
Service Registered	Yes	Full access	DLC path and ID token both match
Service Anonymous	Yes	Limited or none	Not implemented
Client Anonymous	No	None	Emergency fallback; no ESAM connection

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The ESAM Service and Its Security



Authenticated

OpenEdge executables must authenticate themselves to connect to the service



No Shell Access

The service API does not open access to OS file system or shell commands



Readable Files

Service files must be readable by the OpenEdge OS account



Group Access

Access to ESAM protected storage is based on groups, not identities

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ESAM: Who, What, Where, When and How

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As an ITOps Admin, What Do I Need to Know?

ESAM is administrator-centric: it is an installation's point of control.

- Secure location for libraries, the install registry, policies and logs
- Service root is always openedge.d, under /etc or /Windows/System32
- Each install carries a GUID token at $DLC/install/verify/dlc.ver
- Audit logs record failures, warnings and critical events

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ITOps: Configuration Space per Installation

Every OpenEdge installation gets its own configuration space inside ESAM.

- Directory format: <ESAM root>\<oevers>\<oeinst-guid>
  - Example: /etc/openedge.d/12.8/2917aa66...
- Lets an admin separate policy and configuration per installation
- An empty folder is fine

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ESAM Tips for ITOps Administrators

1	Back up the installation registry before running the next OpenEdge install
2	Run the valdlc utility from the OS account used to start OpenEdge products
3	Back up each OpenEdge installation's identity token file
4	Never delete the installation's install directory—it holds registration data
5	Restart OpenEdge products after changing ESAM policy

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As an OpenEdge Admin, What Do I Need to Know?

ESAM is versioned and administered independently from OpenEdge.

- ESAM arrived in 12.6 and has been a mandate since
- The installer runs transparently with every OpenEdge install
- Missing service is created, older is updated, newer is left alone
- Grant OpenEdge Admins ESAM rights via groups
- Include ESAM in your normal OS backup strategy

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Starting in FIPS Mode: Policy First, then Artifacts

1

Validate the Install

esamDLCValidate confirms the installation is registered before any policy question is asked

2

Evaluate the Policy

esamEvaluatePolicy queries urn:esam:fips140:can-run-without, read from the policy file stored under the install's registration GUID

3

Collect the Artifacts

ESAM returns absolute paths inside its protected space: fips.properties, java_bc.security and the Bouncy Castle FIPS libraries

4

Start in FIPS Mode

jvmStart launches the JVM with that security file and classpath; the result surfaces as SECURITY-POLICY:FIPS-MODE

Administrators set the policy with POLMAN.
The application never reaches into the filesystem for these files itself.

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Why ESAM Holds the FIPS Artifacts

A FIPS JVM is configured by files, and files on an open filesystem can be swapped.

- Point a JVM at a different provider and it starts, believing it is in FIPS mode
- CWE-114 again: crypto configuration read from an externally controlled path
- ESAM's space is OS-owned, so application code cannot rewrite it
- The install is validated before the policy is asked
- ESAM returns absolute paths, so there is no search order to hijack
- Only policy administrators can toggle FIPS

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FIPS Mode Is Not the Same as FIPS Compliance

What ESAM Guarantees

- The FIPS configuration came from a protected, administrator-owned location
- The installation asking for it was validated first
- The Bouncy Castle FIPS libraries are the ones the administrator approved
- Only a policy administrator can turn FIPS on or off

What it Does Not Guarantee

- That your cryptographic modules carry CMVP validation
- That the OS, hardware and third-party libraries meet the standard
- That your own application code uses approved algorithms
- Requires the OpenEdge Advanced Security license; not supported on 32-bit

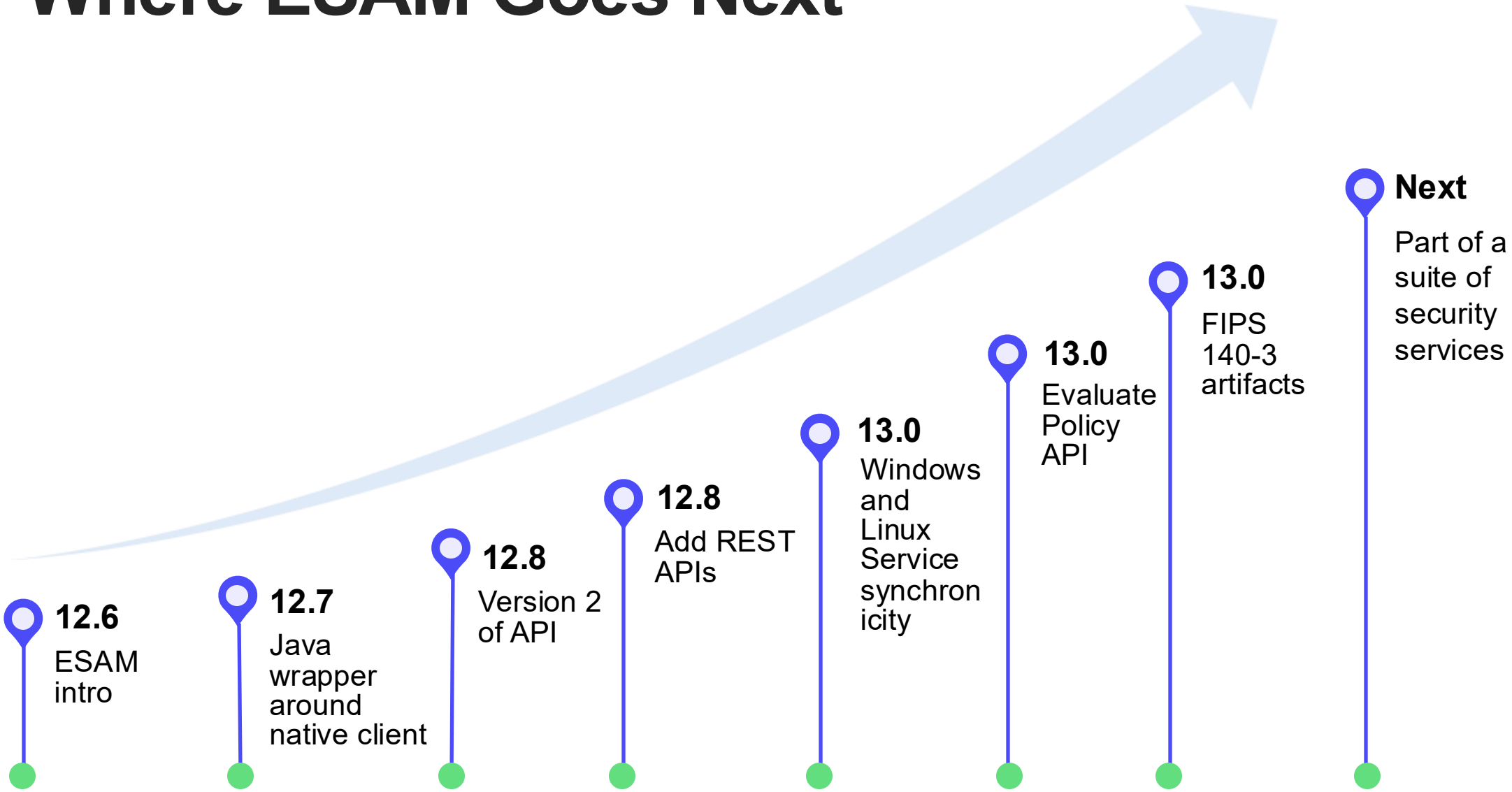
ESAM is the difference between asserting FIPS and being able to demonstrate it.

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ESAM Directions

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Where ESAM Goes Next



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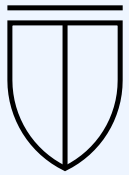
A Versioned API, Not a Moving Target

OpenEdge C and Java clients call ESAM through one versioned function table.

- Each version builds on the one before it, so older callers keep working
- Every function takes an API context, and variadic parameters leave room to grow
- Compile-time version checks stop a client and service from silently mismatching

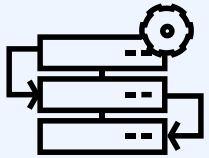
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Summary



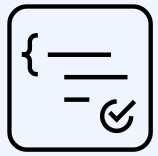
Security Pillar

ESAM is a critical component of OpenEdge platform security



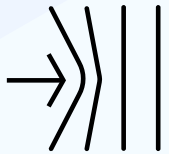
Separately Administered

Installation and administration are separate from the OpenEdge platform itself



Environment-Aware Policy

Policies are expected to differ between development and production



Built to Grow

The foundation for FIPS enablement and centralized governance

ESAM Documentation: https://docs.progress.com/bundle/openedge-security-and-auditing/page/ESAM.html

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