

This document is structured for immediate technical execution.

1. EXECUTIVE SUMMARY

SmartThink Platform will be built as a cloud-native, API-first, zero-trust cybersecurity intelligence ecosystem composed of:

- Public Marketing Site
- Training Academy Platform
- Automation & CRM Core

System must support:

- 500+ students per cohort
- Multi-region payments
- AI-based lab simulations
- Dashboards
- Contract automation
- Full compliance & security posture

Architecture Style: Microservices + Containerized + Event-Driven

2. SYSTEM ARCHITECTURE OVERVIEW

2.1 High-Level Architecture

Frontend:

- Next.js (SSR enabled)
- Hosted via Vercel or AWS Amplify (preferred: AWS-native)

Backend:

- Node.js (NestJS) OR Django REST Framework
- GraphQL + REST hybrid API
- JWT authentication with refresh tokens

Infrastructure:

- AWS (primary)
- Multi-AZ deployment
- Docker containers
- Kubernetes (EKS) orchestration

Database:

- PostgreSQL (RDS)
 - Redis (session & caching)
 - S3 (object storage for media & recordings)
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3. DOMAIN STRUCTURE

Primary Domain:

smarthink2llc.com

Subdomains:

academy.smarthink2llc.com

api.smarthink2llc.com

All routed via Application Load Balancer.

4. MICROSERVICES ARCHITECTURE

Each service containerized.

4.1 Auth Service

Responsibilities:

- User registration
- MFA enforcement
- Role-based access
- Token issuance (JWT)
- Password hashing (argon2)

Roles:

- Student
 - Instructor
 - Admin
 - Super Admin
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4.2 Enrollment & Agreement Service

Functions:

- Application intake
- Cohort assignment
- Contract PDF generation
- E-signature validation
- Enrollment activation logic

Logic Rule:

Payment link is unlocked ONLY after signed agreement is verified.

4.3 Payment Service

Integrations:

North America & Europe:
Square

Africa:
Paystack

Features:

- Geo-detection
 - Currency normalization
 - Webhook verification
 - Refund logic (14-day rule enforcement)
 - Invoice generation
 - Payment reconciliation logs
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4.4 Training Service

Features:

- Module management
- Assignment submission
- Progress tracking
- Certification issuance
- Cohort scheduling
- Gradebook

Recording Storage:

AWS S3 (encrypted) / Zoom Storage if not using AWS

4.5 Live Session Integration

API Integration with:

Zoom

Functions:

- Auto meeting creation
 - Tokenized join links
 - Attendance logging
 - Recording retrieval webhook
 - Calendar sync
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4.6 AI Lab Simulation Service

I will provide the API for the AI Intelligence Platform

Functions:

- Exercise orchestration
- User submission intake
- AI scoring engine (VPF API integration)
- Risk scoring models
- Secure coding validation
- Threat detection simulation
- Performance heatmap generation

Data Storage:

Lab_Results table

Encrypted output storage

4.7 CRM Connector Service

Integration:

HubSpot or Salesforce (Enterprise Tier) or check which other option to make this work

Functions:

- Lead sync
- Enrollment pipeline
- Email campaign trigger
- Cohort nurturing automation

Event-based sync model (webhook-driven).

5. DATABASE SCHEMA (CORE TABLES)

Users
Roles
Permissions
Cohorts
Programs
Modules
Assignments
Submissions
Lab_Results
Enrollments
Agreements
Payments
Remediation_Tasks
Graduate_Profiles
CRM_Leads
Email_Logs
Audit_Logs

All sensitive fields encrypted at rest.

6. SECURITY ARCHITECTURE

Security must reflect cybersecurity brand credibility.

6.1 Network Security

- Private VPC
 - Public load balancer only
 - App & DB in private subnet
 - Bastion host (IP restricted)
 - Security groups strict inbound rules
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6.2 Application Security

- WAF enabled
- Rate limiting
- CSRF protection

- Input validation
 - Output encoding
 - Secure headers
 - Dependency scanning in CI/CD
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6.3 Authentication Controls

- MFA mandatory
 - Token expiration logic
 - Device session management
 - Account lockout after 5 failed attempts
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6.4 Data Security

- TLS 1.3 in transit
 - AES-256 encryption at rest
 - KMS-managed keys
 - Automated encrypted backups
 - Data retention policy (configurable)
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6.5 Monitoring & Detection

- AWS GuardDuty
 - CloudWatch alerts
 - Centralized logging
 - SIEM integration (optional Phase 4)
 - Quarterly penetration testing
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7. DEVOPS & CI/CD

Pipeline:

GitHub → CI → Build Docker Image → Security Scan → Push to ECR → Deploy to EKS

Stages:

- Dev
- Staging
- Production

Automated tests:

- Unit tests
- Integration tests
- Load testing
- Security scan (Snyk or similar)

Rollback capability required.

8. PERFORMANCE REQUIREMENTS

- Page load under 2 seconds globally
 - Support 1,000 concurrent active users
 - 99.9% uptime target
 - Auto-scaling enabled
 - CDN edge caching
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9. AUTOMATION WORKFLOWS

9.1 Enrollment Flow

Application → Agreement → Signature → Payment → Confirmation → Portal Access → CRM Sync

Fully automated via event triggers.

9.2 Engagement Automation

If:

Progress < 40% after 14 days → reminder email
Lab score > 85% → mark recruiter visible
Certificate completed → alumni invite triggered

10. NON-FUNCTIONAL REQUIREMENTS

- WCAG 2.1 accessibility compliance
 - GDPR & CCPA compliance
 - Audit log retention (minimum 12 months)
 - Role-based access control everywhere
 - API rate limiting
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12. PHASED DEPLOYMENT PLAN

Phase 1:

Enrollment + Payment + Basic Academy

Phase 2:

AI Labs

Phase 4:

Optimization + Security Hardening + Global Scale

13. ACCEPTANCE CRITERIA

Platform considered production-ready when:

- Full enrollment flow automated
- Secure payments verified
- AI labs functional
- Security controls validated
- Load testing passed
- Penetration test completed