ClearML Systems Administrator

- 3 Days
- Lecture and Hands-on Labs

Course Overview

The ClearML Systems Administrator course at Alta3 Research Labs is a definitive, hands-on training program for Systems Administrators and DevOps Engineers tasked with deploying and securing enterprise-grade MLOps environments. Moving beyond basic usage, students dive deep into the Alta3 lab environment—assisted by VIRGIL, our AI Lab Coach—to master the underlying topology of ClearML, including the complex relationships between Servers, Agents, and Kubernetes. You will learn to architect robust data flows, manage external data stores like MongoDB and Elasticsearch, and handle secrets securely, ensuring you understand not just how to use the platform, but how to own the infrastructure that powers it.

A critical focus is placed on transforming standard deployments into secure, multi-tenant ecosystems suitable for large organizations. Participants will master identity integration via OIDC and SSO, implement strict Role-Based Access Control (RBAC), and govern isolated tenants mapped to specific resources. The training culminates in a rigorous Capstone Lab covering "Day-2" operations, where you will deploy Prometheus and Grafana for observability, troubleshoot agent queues, and provision a new tenant end-to-end. By the end of this course, you will possess the specialized skills to architect and maintain a resilient, scalable ClearML platform that satisfies enterprise security and operational standards.

Review this course online at https://www.alta3.com/courses/clearml-sa

Who Should Attend

- System Administrators

What You'll Learn

- ClearML Architecture Topology
- Secure Multi-Tenancy Implementation
- Identity & Access Governance
- Kubernetes & Agent Orchestration
- Observability & System Monitoring
- Enterprise Operational Troubleshooting

Outline

Welcome to ClearML Systems Administrator

- 🖥 Lecture + Lab: Exploring Your Lab Environment
- 🖥 Lecture + Lab: Meet VIRGIL: Your AI Lab Coach
- 🖥 Lecture + Lab: Register for Polls

Core ClearML Platform Operations

- ⌨ Lecture: The Role of ClearML in the MLOps Ecosystem
- ⌨ Lecture: Connecting External Stores and Managing Secrets
- 🖥 Lecture + Lab: ClearML the Alta3 Way

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Use ClearML for Tracking & Orchestration

- ⌨ Lecture: ClearML Architecture: Clients, Server, Agents
- ⌨ Lecture: Tasks, Projects, and Artifacts Explained
- 🖥 Lecture + Lab: ClearML Quickstart: Log a Training Run
- 🖥 Lecture + Lab: Explore Tasks, Projects, and Artifacts in ClearML

Understand ClearML Topology (Stores, Queues, Security)

- ⌨ Lecture: ClearML Core Components and Data Flow
- ⌨ Lecture: External Data Stores: MongoDB, Elasticsearch, Redis
- ⌨ Lecture: Queues, Agents, and Cache Management
- ⌨ Lecture: Security Foundations: TLS, OIDC, RBAC
- 🖥 Lecture + Lab: Explore ClearML Architecture Topology
- 🖥 Lecture + Lab: ClearML Agent: Kubernetes Glue

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Deploy Tenant Services (Multi-Tenancy & Web Authentication)

- ⌨ Understanding Multi-Tenancy in ClearML
- ⌨ Web Login and Authentication Options (SSO / OIDC / SAML)
- 🖥 Create and Manage Tenants via ClearML SDK
- 🖥 Map Tenants to Kubernetes Namespaces & Apply Policy

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Identity & Authentication (OIDC / SSO / SAML)

- ⌨ Lecture: Identity Provider Integration: OIDC, SAML, and Authentication Flows
- ⌨ Lecture: ClearML Authentication Modes: Internal, External, Hybrid
- 🖥 Lecture + Lab: Configure ClearML with OIDC (Keycloak / Azure AD Example)
- 🖥 Lecture + Lab: Test & Validate SSO Login Workflows
- ⌨ Lecture: Troubleshooting Authentication & Login Failures

Tenant Administration & Governance

- ⌨ Lecture: Understanding Multi-Tenancy in ClearML Enterprise
- ⌨ Lecture: Tenant Governance: RBAC, Groups, Permissions, Separation of Data
- 🖥 Lecture + Lab: Create & Manage Tenants in the ClearML UI
- 🖥 Lecture + Lab: User & Group Lifecycle: Provisioning, Access, Deactivation
- 🖥 Lecture + Lab: Inspect Tenant Activity, Audit Logs & Usage Patterns
- ⌨ Lecture: Tenant Lifecycle Best Practices (Provision → Operation → Decommission)

Queue & Agent Operations for SysAdmins

- 💬 Lecture: How ClearML Agents Work (without Kubernetes-level details)
- 💬 Lecture: Queue Design: Shared Queues, Tenant Queues, GPU Queues
- 🖥 Lecture + Lab: Create/Modify Queues & Assign to Tenants
- 🖥 Lecture + Lab: Managing Agents: Start/Stop, Logs, Troubleshooting
- 💬 Lecture: Diagnosing Tasks Stuck in Queues

Observability & Monitoring for ClearML Administrators

- 💬 Lecture: Observability in ClearML: What SysAdmins Need to Monitor
- 🖥 Lecture + Lab: Deploy Prometheus & Grafana for ClearML Metrics
- 💬 Lecture: Understanding ClearML System Metrics (Agents, Tasks, Queues)
- 🖥 Lecture + Lab: Connect ClearML Metrics to Grafana Dashboards
- 💬 Lecture: Event Logs, Usage Patterns & Failure Analysis

System Administration Troubleshooting & Best Practices

- 💬 Lecture: Troubleshooting Identity (OIDC/SSO Failures)
- 💬 Lecture: Troubleshooting Tenants (Access, Isolation, Group Issues)
- 💬 Lecture: Common Queue & Agent Operational Failures
- 🖥 Lecture + Lab: Admin Roleplay Lab: Resolve a Tenant Support Ticket
- 💬 Lecture: Admin Runbooks: Checklists, Playbooks, Safety Checks
- 💬 Lecture: Audit Readiness & Documentation Strategies

Capstone: Administering a Multi-Tenant ClearML Deployment

- 🖥 Lecture + Lab: Capstone Lab: Provision a New Tenant End-to-End
- 🖥 Lecture + Lab: Configure OIDC, Assign Groups, Add Users
- 🖥 Lecture + Lab: Configure Tenant Queues & Run Supervised Tasks
- 🖥 Lecture + Lab: Build a Grafana Dashboard for Agent Performance
- 🖥 Lecture + Lab: Troubleshoot a Simulated User Issue & Document Fix

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Continuing Education

- 🖥 Lecture + Lab: Continuing Education (ClearML in Practice)
- 💬 Lecture: Curriculum Path: FILL OUT LATER

Prerequisites