Enterprise Agentic Engineering: Advanced Orchestration with LangGraph & LlamaIndex

- 2 Days Course
- Hands-on

Course Overview

This 2-day hands-on workshop equips engineers to design, build, and deploy production-grade, stateful multi-agent systems. Participants master deterministic state machines and cyclic graphs using LangGraph, implement advanced hierarchical data indexing and retrieval pipelines with LlamaIndex, build resilient real-world retry loops, and integrate human-in-the-loop validation checkpoints for high-reliability enterprise execution.

Who Should Attend

- Senior Software Engineers
- AI Architects
- Enterprise Systems Developers

What You'll Learn

- Design cyclic, stateful multi-agent architectures using LangGraph state machines.
- Build advanced structured data indexing, parsing, and retrieval-augmented generation pipelines using LlamaIndex.
- Bridge LlamaIndex advanced retrieval tools seamlessly into LangGraph agent nodes.
- Implement production-ready persistence, time-travel debugging, and human-in-the-loop checkpoints.

Outline

1. Deterministic State Machines with LangGraph

- State Machine Foundations: Overcoming the limits of linear DAG chains with cyclic, stateful agent graphs.
- LangGraph Core Primitives: Configuring StateGraph, custom nodes, edges, conditional routing, and state reducers.
- Resilience Engineering: Designing deterministic retry loops, global exception handling, and fallback routes.
- Hands-on Lab: Engineering a cyclic, self-correcting agent loop with memory state persistence.

2. Enterprise Data Indexing & Tool Extraction with LlamaIndex

- Advanced Ingestion Pipelines: Utilizing LlamaParse for complex documents, hierarchical indexing, and metadata tagging.
- RAG as a Service: Packaging advanced vector index workflows and query engines into clean, deterministic execution functions.
- Strict Schema Output: Enforcing rigid, structured Pydantic syntheses from disparate multi-source enterprise queries.

- Hands-on Lab: Building an enterprise-grade multi-document querying engine optimized for agent consumption.

3. Multi-Agent Topology & Hybrid Orchestration

- Cross-Framework Integration: Connecting LlamaIndex query engines as specialized tools within LangGraph nodes.
- Multi-Agent Design Patterns: Developing supervisor-worker, hierarchical teams, and peer-to-peer communication graphs.
- Visualizing System State: Leveraging LangGraph Studio for real-time trace testing, state inspection, and validation.
- Hands-on Lab: Constructing a multi-agent supervisor network that routes complex operational prompts to specialized sub-graphs.

4. Enterprise Production Readiness & Capstone

- Human-in-the-Loop Mechanics: Setting state breakpoints, auditing actions, and injecting human modifications during live execution runs.
- Enterprise Ops & Tracing: Managing token limits, rate-limiting strategies, and advanced tracing via LangSmith.
- 3-Hour Capstone Project: Architect a production-ready Enterprise Graph Orchestrator that uses LlamaIndex for heavy document parsing, LangGraph for cyclic agent routing, and an active Human-in-the-Loop verification gate.

Prerequisites

- Advanced proficiency in Python
- Familiarity with foundational RAG concepts and vector databases
- Experience working with Pydantic and data validation schemas