

## **Architecture Overview**

The Modular Media Streaming Suite adopts a layered architecture centered on the MediaFacade, which coordinates all major operations and ensures high decoupling, modularity, and maintainability.

### **1. Control Layer**

Handled by the MediaFacade, this layer provides a simplified interface to the client (AppInitializer) and delegates tasks to specific subsystems such as the Renderer and Plugin Manager.

### **2. Rendering Strategy Layer**

Implements the Strategy Pattern through a Renderer hierarchy that enables runtime switching between playback techniques — specifically **hardware-accelerated** and software-based rendering.

### **3. Data Layer**

Abstracted through the ISourcecontract, this layer supports polymorphic access to multiple media sources (Local, HLS, Remote).

It integrates the Proxy Pattern via the Service Worker to enable caching and offline playback for remote streams.

### **4. Extensibility Layer**

Employs a Plugin Pattern that allows runtime addition of features such as watermarking or audio equalization.

The PluginManager handles registration and activation of plugins without modifying the core MediaFacade or rendering logic.

