**Phase 7: Integration & External Access – Student Management System**

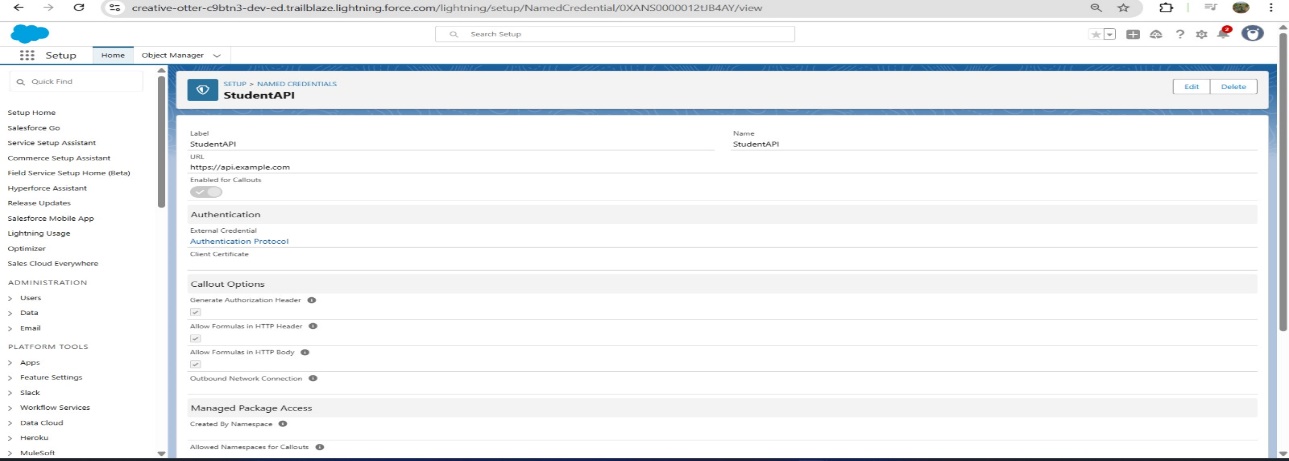
**Goal of This Phase**

The primary goal of this phase was to enable **seamless data exchange and interaction** between Salesforce and external systems.  
This ensures that the Student Management System can:

* Synchronize student data with other platforms (ERP, Learning Systems, etc.)
* Trigger real-time updates when changes happen inside Salesforce.
* Provide secure and reliable API endpoints for external applications.
* Enforce best practices for authentication, callouts, and integration limits.

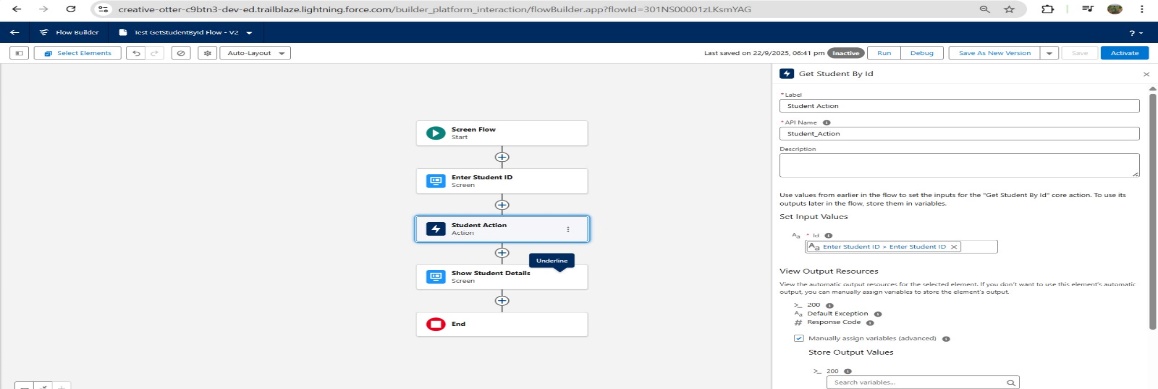
**1. Named Credentials**

* **Created Named Credential:** Student\_API\_Named\_Credential
* Configured with:
  + Base URL of the external Student API.
  + Authentication type (if required – basic or OAuth).
* Purpose: Simplified authentication and callout management without exposing credentials in Apex code.



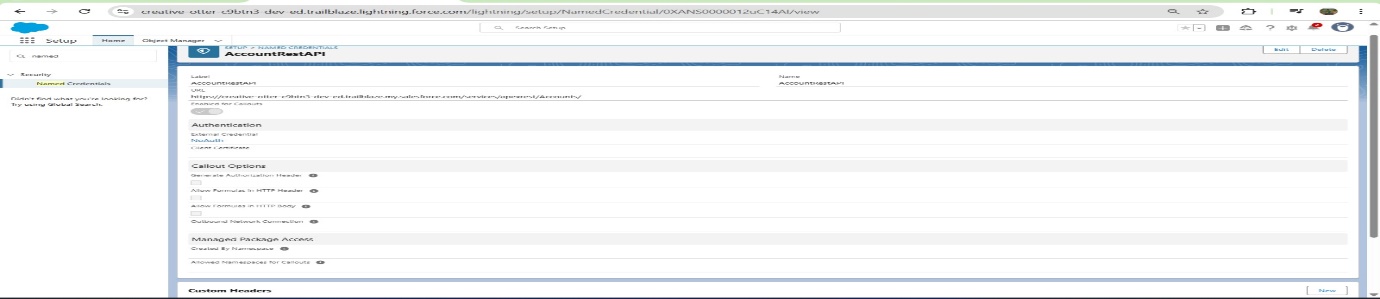
**2. External Services**

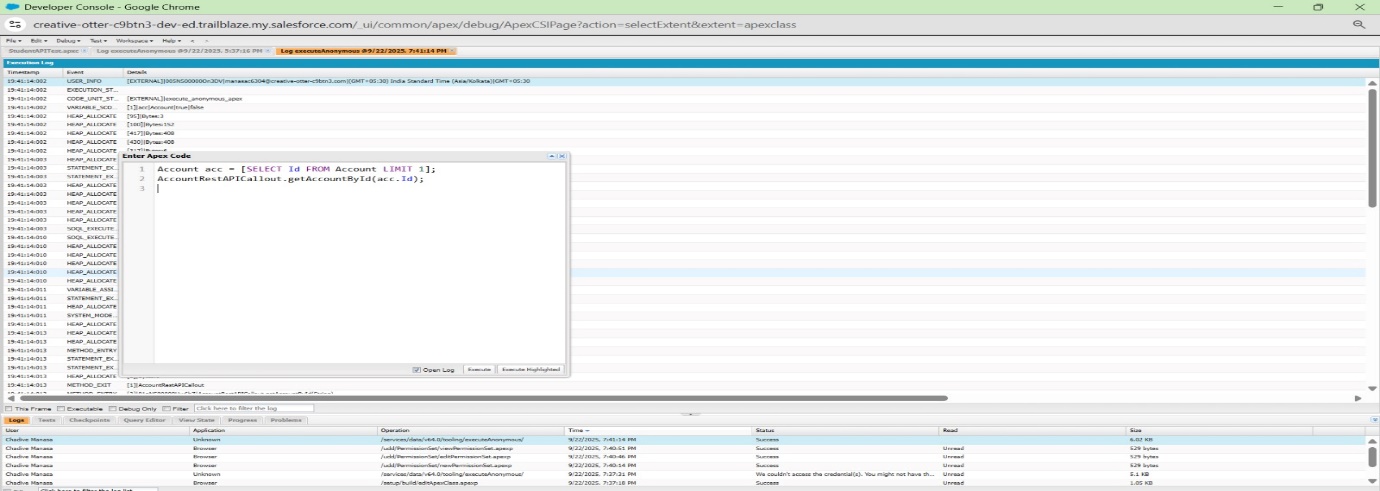
* **Registered External Schema:** Connected to the external Student REST API using the schema definition.
* Auto-generated Apex classes for:
  + Fetching student details.
  + Creating or updating student records externally.
* Purpose: Allow declarative integration (Flow & Apex) without manually writing callout code.



**3. Web Services (REST/SOAP)**

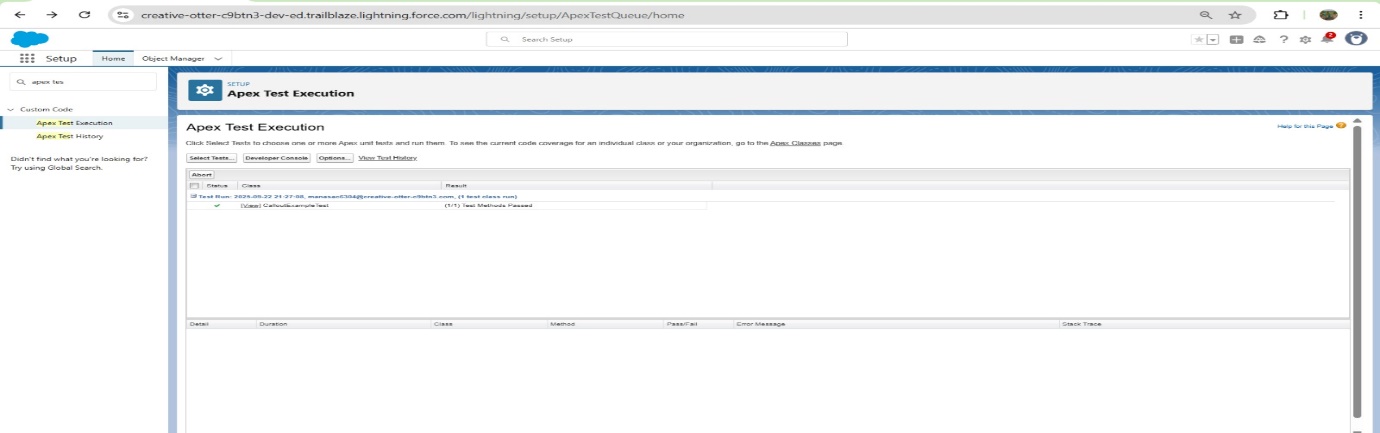
* **Developed REST Apex Class:** StudentRESTService
* Exposed endpoints:
  + /students → Create or update student records.
  + /students/{id} → Fetch student details by Student\_ID\_\_c.
* Added proper authentication and exception handling.
* Purpose: Allow external systems to push and pull student data securely.





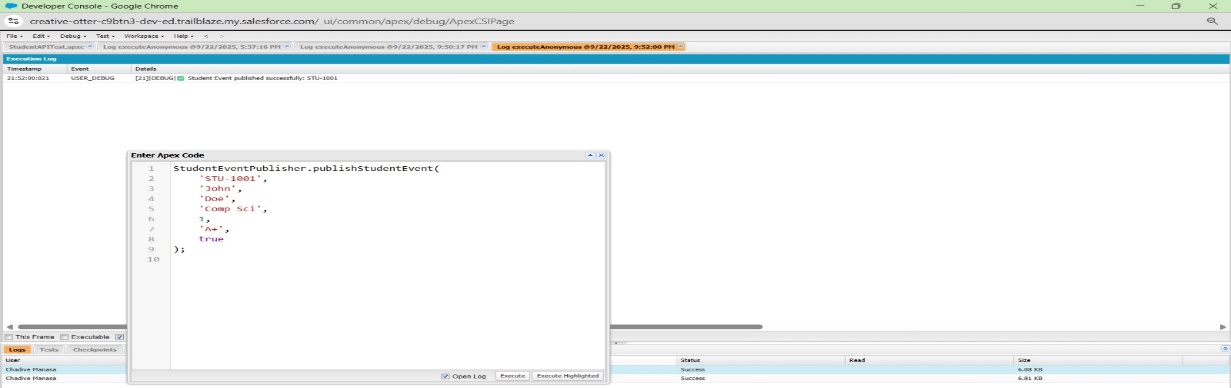
**4. Callouts**

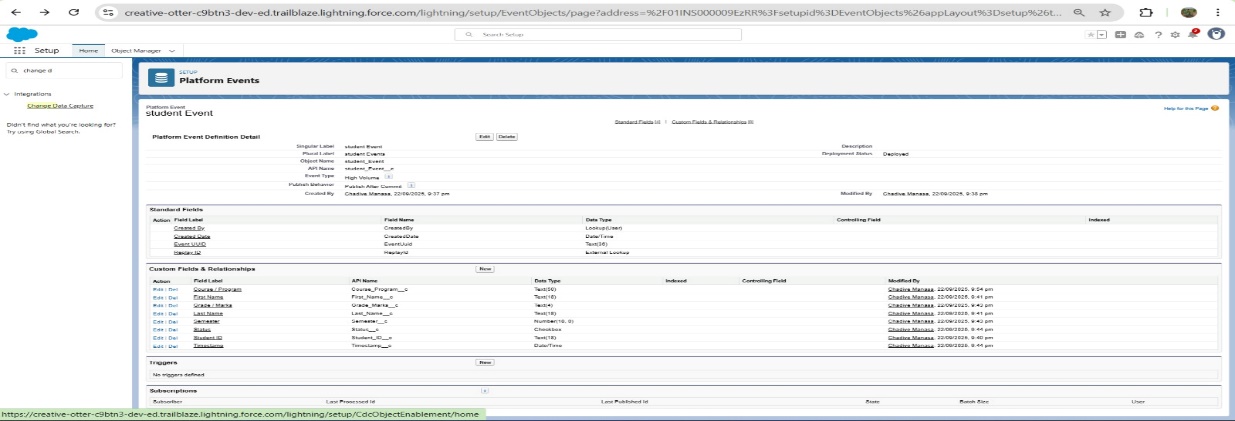
* **Created Apex Callout Class:** CalloutExample
* Added test class with HttpCalloutMock to enable test coverage.
* Verified callout works with Remote Site Settings and Named Credentials.
* Purpose: Send student updates from Salesforce to external systems when a record is created or updated.



**5. Platform Events**

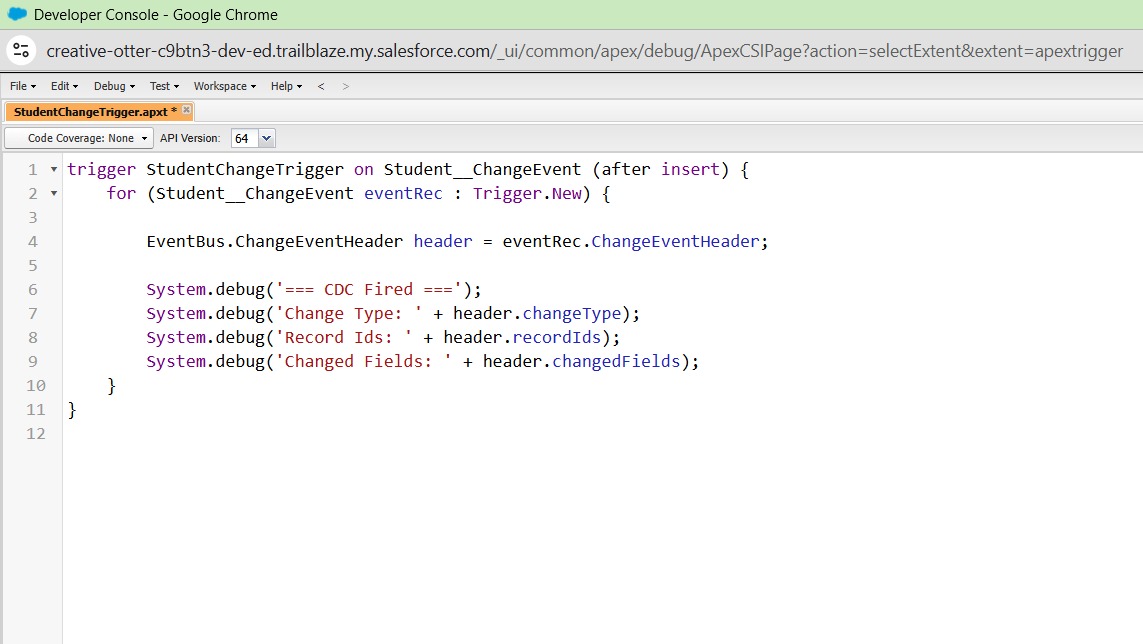
* **Created Platform Event:** Student\_Event\_\_e
* Custom Fields:
  + Student\_ID\_\_c (Text)
  + First\_Name\_\_c (Text)
  + Last\_Name\_\_c (Text)
  + Course\_Program\_\_c (Text)
  + Grade\_Marks\_\_c (Text)
  + Semester\_\_c (Number)
  + Status\_\_c (Checkbox)
  + Timestamp\_\_c (Date/Time)
* Purpose: Publish student data changes to subscribers (internal or external) in real time.

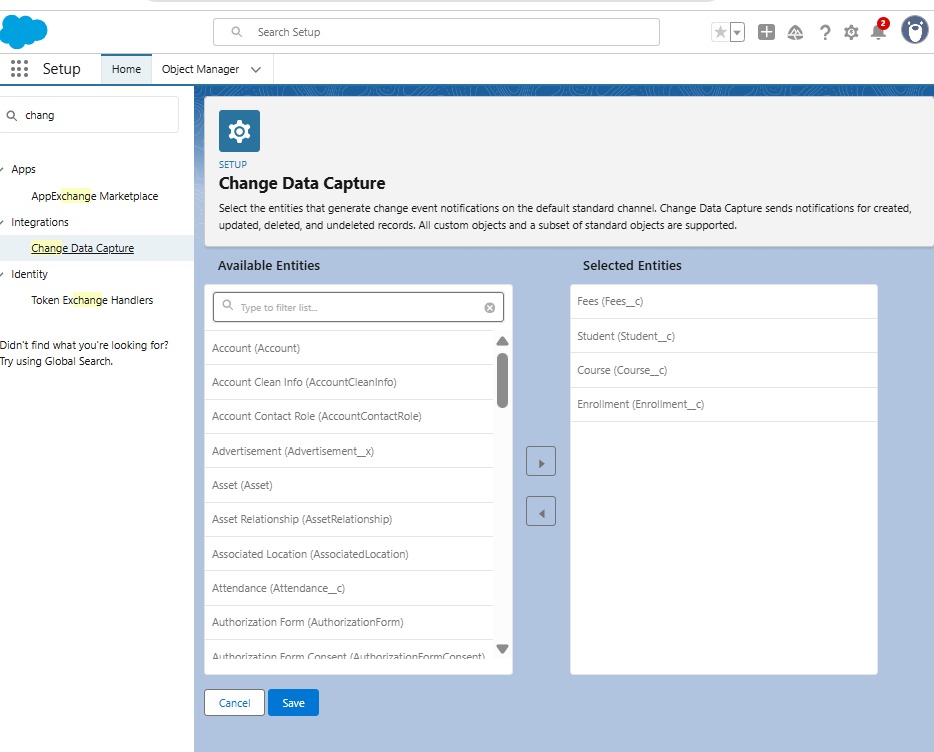




**6. Change Data Capture (CDC)**

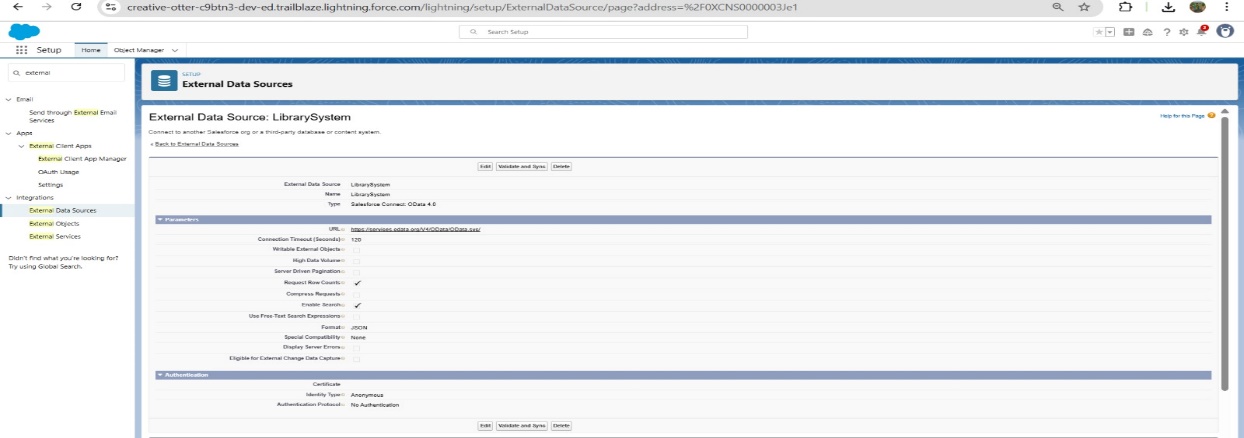
* **Enabled CDC for Student\_\_c object**
* **Created Apex Trigger:** StudentChangeTrigger
  + Logs change type, changed fields, and commit timestamp.
  + Takes action when Grade\_Marks\_\_c is updated.
* Purpose: Monitor and respond to changes in real time without writing complex logic.





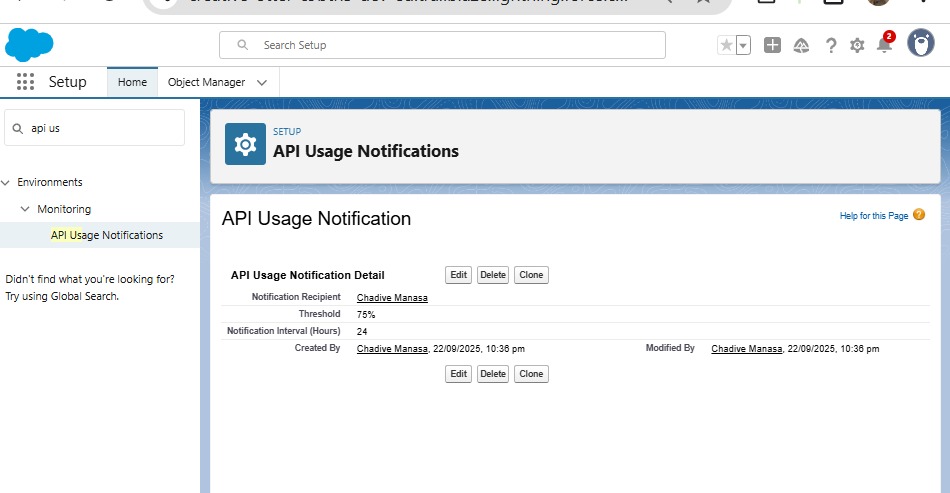
**7. Salesforce Connect**

* Configured **External Object** (Student\_External\_\_x) to display external student data within Salesforce.
* Verified CRUD operations (read-only or writable depending on requirement).
* Purpose: Provide a unified view of external student records directly in Salesforce UI.



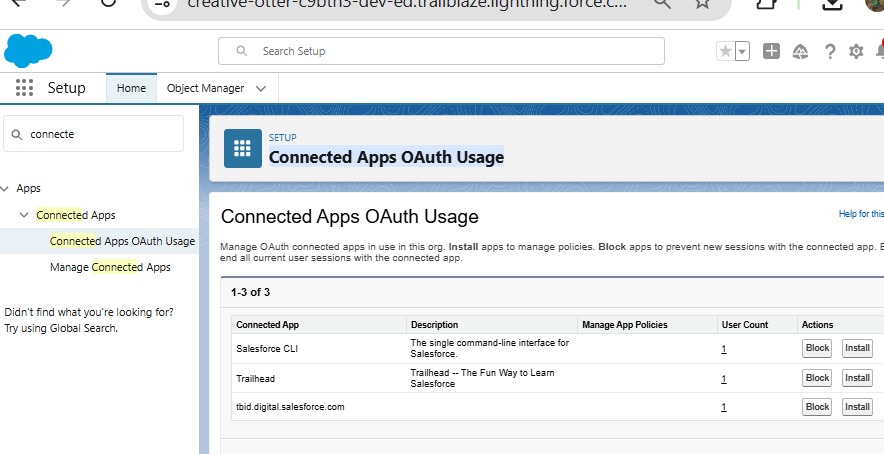
**8. API Limits**

* Enabled **API Usage Notifications** to alert when API usage reaches 75% and 90%.
* Monitored API calls through **System Overview** and **Reports**.
* Purpose: Prevent API over-consumption and avoid service interruptions.



**9. OAuth & Authentication**

* **Created Connected App:** StudentManagementIntegration
* Configured OAuth scopes:
  + Full Access (full)
  + Perform requests on your behalf at any time (refresh\_token, offline\_access)
* Assigned profiles/permission sets.
* Tested authentication using Postman and verified in **Connected Apps OAuth Usage**.
* Purpose: Securely allow external applications to authenticate and integrate.



**10. Remote Site Settings**

* **Created Remote Site:** Student\_API\_Remote\_Site
* Added base URL of external API to allow callouts.
* Purpose: Ensure Salesforce can make HTTPS callouts to the external Student API.

