Phase 7: Integration & External Access - Edu Connect Pro

Phase 7 focuses on understanding integration capabilities within Salesforce to enable communication between Edu Connect Pro and external systems. This phase demonstrates knowledge of various integration patterns, authentication mechanisms, and APIs that enable data exchange with third-party services such as payment gateways, SMS providers, document verification systems, and learning management platforms.

1. Named Credentials

Purpose

Named Credentials provide a secure, centralized way to store authentication details for external services without hardcoding credentials in Apex code. They bundle endpoint URLs with authentication protocols, making callouts more secure and maintainable.

Configuration Documentation

Potential Named Credentials for Edu Connect Pro:

Credential Name	Purpose	Endpoint URL	Auth Type
Payment_Gateway_API	Fee payment verification	https://api.paymentgateway.com	OAuth 2.0
SMS_Notification_Service	Send enrollment alerts	https://api.sms-provider.com	API Key
Document_Verification_API	Verify student certificates	https://verify.documents.com	Basic Auth

```apex
public class PaymentVerificationService {

    @future(callout=true)
    public static void verifyStudentPayment(Id enrollmentId, String transactionId) {
        HttpRequest req = new HttpRequest();
        // Using Named Credential - no hardcoded credentials
        req.setEndpoint('callout:Payment_Gateway_API/verify');
        req.setMethod('POST');
        req.setHeader('Content-Type', 'application/json');

        Map<String, String> requestBody = new Map<String, String>{
            'transactionId' => transactionId,
            'amount' => '50000'
        };
        req.setBody(JSON.serialize(requestBody));

        Http http = new Http();
        HttpResponse res = http.send(req);

        if (res.getStatusCode() == 200) {
            Map<String, Object> response =
                (Map<String, Object>)JSON.deserializeUntyped(res.getBody());
```

2. External Services

Purpose

External Services allow Salesforce to consume RESTful APIs defined by OpenAPI (Swagger) specifications. This auto-generates Apex actions that can be used in Flows, Process Builder, or Apex code without writing custom HTTP callout logic.

Academic Record Verification: Verify transfer credits from other institutions

Background Checks: Integrate with background verification services for employment

Scholarship Eligibility: Check eligibility against external scholarship databases

3. REST & SOAP Web Services

REST API Implementation

Edu Connect Pro exposes REST endpoints to allow external systems to interact with student and course data.

```
GET  /services/apexrest/api/students/{studentId}
POST /services/apexrest/api/students
PUT  /services/apexrest/api/students/{studentId}
```

```
# Get Student Data
curl https://yourinstance.salesforce.com/services/apexrest/api/students/STU001 \
  -H "Authorization: Bearer YOUR_ACCESS_TOKEN" \
  -H "Content-Type: application/json"

# Create Student
curl -X POST https://yourinstance.salesforce.com/services/apexrest/api/students \
  -H "Authorization: Bearer YOUR_ACCESS_TOKEN" \
  -H "Content-Type: application/json" \
  -d '{
    "name": "John Doe",
    "studentId": "STU12345",
    "department": "Computer Science",
    "email": "john.doe@student.edu",
    "dateOfBirth": "2003-05-15"
  }'

# Update GPA
curl -X PUT https://yourinstance.salesforce.com/services/apexrest/api/students/STU
  -H "Authorization: Bearer YOUR_ACCESS_TOKEN" \
  -H "Content-Type: application/json" \
  -d '{"gpa": 8.75}'
```

4. Platform Events

Purpose

Platform Events enable event-driven architecture by allowing real-time, asynchronous communication between Salesforce and external systems. They follow a publish-subscribe model.

Implementation

Create Platform Event

Object: Enrollment_Notification__e

Field Name	Data Type	Description
Student_Email__c	Text(255)	Student email address
Student_Name__c	Text(255)	Student full name

Field Name	Data Type	Description
Course_Name__c	Text(255)	Enrolled course name
Enrollment_Status__c	Text(100)	Enrollment status
Notification_Type__c	Text(50)	Type of notification

5. Change Data Capture (CDC)

Purpose

Change Data Capture publishes change events whenever Salesforce records are created, updated, deleted, or undeleted. External systems subscribe to these events for real-time synchronization.

6. HTTP Callouts

Remote Site Settings

Before making callouts, register external URLs:

Payment Gateway: Process student fee payments

Job Board APIs: Fetch external job postings for placement portal

SMS Gateway: Send enrollment confirmations via Twilio

Email Services: Bulk email via SendGrid/Mailchimp

Security Considerations

Best Practices Implemented

1. **Named Credentials**: No hardcoded credentials in code

2. **Field-Level Security**: Respected in all API responses

3. **Profile-Based Access**: Connected apps assigned to specific profiles

4. **IP Restrictions**: Limit API access to trusted IP ranges

5. **OAuth Scopes**: Minimal scope permissions (principle of least privilege)

6. **HTTPS Only**: All external communications over SSL

7. **Input Validation**: Sanitize all external inputs

8. **Rate Limiting**: Implement rate limits on public APIs