

## Integration Phase

Date	15 April 2025
Team ID	SWTID1744094910
Project Title	Personal Expense Tracker App
Maximum Marks	2 Marks

## Third-Party Service Integration Guide

### 1. Accounting & Finance Integrations

Service	Integration Method	Key Benefits
QuickBooks	REST API/OAuth 2.0	Auto-sync expenses for seamless accounting reconciliation <sup>16</sup>
Xero	Webhooks + XML API	Real-time ledger updates and tax compliance
Sage Intacct	SOAP API	Multi-entity financial reporting for businesses
Expensify	Expensify API	Receipt OCR, policy compliance checks, and automated reimbursement <sup>6</sup>

Example Workflow:

```
// QuickBooks expense sync
axios.post('https://quickbooks.api/intuit.com/expenses', {
  amount: 45.50,
  category: 'Meals',
  date: '2025-04-23'
}, {
  headers: { 'Authorization': `Bearer ${quickbooksToken}` }
});
```

## 2. Payment Gateway Integrations

Service	Integration Method	Use Case
Stripe	REST API/Webhooks	Track card transactions in real-time <sup>23</sup>
PayPal	Braintree API	Reconcile PayPal business expenses
Plaid	Link API	Auto-import bank/card transactions

Key Feature:

- Auto-categorize Stripe/PayPal transactions using merchant codes.
- Fraud detection via payment gateway analytics.

## 3. Cloud Storage & Receipt Management

Service	Integration Method	Functionality
AWS S3	AWS SDK	Secure receipt/image storage (AES-256)
Google Drive	Drive API	Backup expense reports and CSV exports
Dropbox	Dropbox API	Team shared folder integration

Security:

- Presigned URLs for secure uploads/downloads.
- GDPR-compliant retention policies.

## 4. Communication Services

Service	Integration Method	Purpose
Twilio	SMS API	Budget alert notifications <sup>2</sup>
SendGrid	SMTP/API	Monthly report emails
Slack	Incoming Webhooks	Team expense approval workflows

Example Alert:

```
# Twilio budget alert
client.messages.create(
  body="Warning: You've spent $450 of $500 in Food",
  from_='+123456789',
  to=user_phone
)
```

## 5. Advanced Integrations

Service	Integration Method	Use Case
Google Maps	Places API	Mileage tracking for travel expenses
Zapier	Webhooks	Connect to 5,000+ apps (e.g., Trello, Asana) <sup>3</sup>
TaxJar	Sales Tax API	Automated tax calculation for business expenses

## Implementation Best Practices

1. Authentication
  - Use OAuth 2.0 for services like QuickBooks/Xero.
  - Store tokens securely using AWS Secrets Manager/Hashicorp Vault.
2. Error Handling
  - Implement retry logic with exponential backoff for API failures.
  - Log errors to Sentry/Datadog for monitoring.
3. Data Validation
4. Compliance
  - Encrypt PII data (PCI-DSS Level 1 compliance for payment gateways).
  - Provide data deletion endpoints for GDPR/CCPA.

## Cost-Effective Stack for Startups

Tier	Services
Free	Firebase (DB), SendGrid Free Tier, Twilio Trial
Mid	AWS S3, Plaid Development, QuickBooks API
Enterprise	SAP Concur, Expensify Corporate, Oracle Netsuite

This integration plan enhances core functionality while keeping development costs under control.