

Subscription Management System

Project Documentation

A comprehensive Salesforce CRM-based subscription management solution designed to streamline subscription lifecycle management, automate billing processes, and enhance customer relationship management through digital transformation.

Phase 1 Problem Statement & Requirements Analysis

Overview

The modern business landscape demands efficient subscription management systems to handle recurring revenue models and customer lifecycle management.

Problem Statement

Organizations face significant challenges in managing subscription-based services due to:

- Manual subscription tracking leading to revenue leakage
- Inefficient billing cycles causing customer dissatisfaction
- Limited visibility into subscription metrics and customer behavior
- Complex upgrade/downgrade processes affecting customer retention
- Lack of automated renewal notifications and payment reminders
- Insufficient integration between sales, billing, and customer service teams

Key Activities

Requirements Gathering

- Collect functional requirements for subscription lifecycle management
- Document non-functional requirements including performance and scalability
- Define user stories for different stakeholder personas
- Establish acceptance criteria for each requirement

Stakeholder Analysis

- **Subscription Managers:** Monitor subscription health and performance metrics
- **Sales Representatives:** Manage subscription sales and renewals
- **Customer Service Teams:** Handle subscription-related inquiries and modifications
- **Finance Teams:** Track billing, payments, and revenue recognition
- **System Administrators:** Configure and maintain the subscription platform

Business Process Mapping

- Map subscription acquisition workflow from lead to active subscription
- Document billing cycle processes and payment collection procedures
- Define subscription modification workflows (upgrades, downgrades, cancellations) Establish renewal and
- retention processes

Industry Analysis

- Research subscription economy trends and best practices
- Analyze competitor subscription management approaches
- Identify regulatory compliance requirements for subscription billing
- Study integration patterns with popular payment gateways

AppExchange Exploration

- Evaluate Salesforce AppExchange solutions for subscription management
- Assess compatibility with existing Salesforce infrastructure
- Identify potential third-party integrations for enhanced functionality

Phase 2 Org Setup & Configuration

Overview

Establish the foundational Salesforce environment configured specifically for subscription management operations.

Salesforce Edition Setup

- **Edition Used:** Developer Edition Org (comprehensive feature access)
- **Core Capabilities:** Custom objects, automation tools, Apex development, Lightning components
- **Development Approach:** Direct development in Developer Org environment **Future**
- **Considerations:** Sandbox strategy for production deployment

Company Profile Configuration


Basic Settings Configuration

- Navigate to Setup → Company Information
- Update organization name to "Subscription Management System" Configure regional
- settings:
 - Currency: USD (or regional currency)
 - Locale: United States (or appropriate region)
 - Time Zone: Eastern Standard Time (or local timezone)
- Set fiscal year to align with business calendar

Business Hours & Holiday Setup

- Define standard business hours: Monday–Friday, 8 AM 6 PM
- Configure regional holidays affecting subscription operations
- Set up escalation rules based on business hours

Company Information setup page :



SETUP

Company Information

Company Information

Subscription Management Corp

Help for this Page

The organization's profile is below.

[User Licenses \[10+\]](#) |
 [Permission Set Licenses \[10+\]](#) |
 [Feature Licenses \[11\]](#) |
 [Usage-based Entitlements \[10+\]](#)

Organization Detail

Edit

Organization Name	Subscription Management Corp	Phone	
Primary Contact	OrgFarm EPIC	Fax	
Division		Default Locale	English (United States)
Address	United States	Default Language	English
Fiscal Year Starts In	January	Default Time Zone	(GMT-07:00) Pacific Daylight Time (America/Los_Angeles)
Activate Multiple Currencies	<input type="checkbox"/>	Currency Locale	English (United States) - USD
Enable Data Translation	<input type="checkbox"/>	Used Data Space	344 KB (7%) [View]
Newsletter	<input checked="" type="checkbox"/>	Used File Space	17 KB (0%) [View]
Admin Newsletter	<input checked="" type="checkbox"/>	API Requests, Last 24 Hours	0 (15,000 max)
Hide Notices About System Maintenance	<input type="checkbox"/>	Streaming API Events, Last 24 Hours	0 (10,000 max)
Hide Notices About System Downtime	<input type="checkbox"/>	Restricted Logins, Current Month	0 (0 max)
Locale Formats	ICU	Salesforce.com Organization ID	00DgL00000BzgQb
		Organization Edition	Developer Edition
		Instance	CAN98

Created By

OrgFarm EPIC, 9/18/2025, 5:30 AM

Modified By

Abhinay Shrivastava, 9/24/2025, 9:08 AM

Edit

User Management & Security

User Creation Strategy

- **System Administrator:** Full platform access and configuration rights
- **Subscription Manager:** Oversight of subscription operations and reporting
- **Sales Representative:** Customer acquisition and subscription sales
- **Customer Service Agent:** Subscription support and modifications
- **Finance User:** Billing, payment tracking, and revenue reporting

Profile Configuration

- **Admin Profile:** Complete system access with configuration permissions **Subscription**
- **Manager Profile:**
 - Read/Edit access to all subscription objects
 - Dashboard and report access
 - Approval process permissions **Sales**
- **Profile:**
 - Create/Edit access to subscription opportunities
 - Read access to customer accounts and existing subscriptions
 - Limited access to pricing and billing information **Service**
- **Profile:**
 - Read/Edit access to subscription modifications
 - View customer payment history
 - Case management permissions

Role Hierarchy Implementation

- Establish organizational hierarchy: Admin → Subscription Manager → Sales Rep/Service Agent
- Configure role-based record access for subscription data
- Implement territory management for geographical subscription distribution

Permission Sets

- Create specialized permission sets for advanced subscription features
- Configure permission sets for integration users and API access
- Establish temporary access permissions for project implementations

Organization-Wide Defaults OWD

- **Subscription Records:** Private (role-based access required)
- **Billing Records:** Controlled by Parent (inherits from Subscription)
- **Customer Accounts:** Public Read Only (broad visibility for service) **Payment Records:** Private (sensitive financial data)



SETUP

Sharing Settings

Sharing Settings

[Help for this Page](#)

This page displays your organization's sharing settings. These settings specify the level of access your users have to each others' data. Go to [Background Jobs](#) to monitor the progress of a change to an organization-wide default or a parallel sharing recalculation.

Manage sharing settings for: Accounts

[Disable External Sharing Model](#)

Default Sharing Settings

Organization-Wide Defaults

[Edit](#)[Organization-Wide Defaults Help](#)

Object	Default Internal Access	Default External Access	Grant Access Using Hierarchies
Account and Contract	Private	Private	<input checked="" type="checkbox"/>

Other Settings

[Other Settings Help](#)

- Manager Groups ☐ [?](#)
- Secure guest user record access ☒ [?](#)
- Require permission to view record names in lookup fields ☐ [?](#)

Sharing Rules

Account Sharing Rules

[New](#)[Recalculate](#)[Account Sharing Rules Help](#)

No sharing rules specified.

Sharing Overrides

Profiles That Override Account Sharing

[Sharing Overrides Help](#)

Organization-wide permissions affect all objects in the organization. Object permissions affect only the given object.

[Tell me more!](#)[Don't show this message again](#)

Profile	Custom Profile	Organization-Wide Permissions		Account Permissions	
		View All Data	Modify All Data	View All Records	Modify All Records
Analytics Cloud Integration User	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Sharing Rules Configuration

- **Sales Team Sharing:** Share subscription opportunities across sales teams
- **Service Team Sharing:** Share customer subscriptions with service representatives
- **Finance Team Sharing:** Share billing and payment records with finance users
- **Manager Override:** Ensure management visibility across all subscription data

Development Environment Setup

- **SFDX Integration:** Configure VS Code with Salesforce Development Extensions
- **Version Control:** Set up Git repository for metadata management
- **Deployment Pipeline:** Establish development-to-production deployment process
- **Code Standards:** Define Apex and Lightning development standards

Phase 3 Data Modeling & Relationships

Overview

Design comprehensive data architecture to support all aspects of subscription management, from customer onboarding to revenue recognition.

Standard Objects Utilization

- **Account:** Customer organizations and individual subscribers
- **Contact:** Individual subscriber contacts and billing contacts
- **Opportunity:** Subscription sales pipeline and conversion tracking
- **User:** System users and subscription ownership assignment
- **Product2:** Subscription product catalog and service offerings

Custom Objects Architecture

Subscription__c Core Entity)

- **Purpose:** Central hub for all subscription lifecycle management **Key**
- **Fields:**
 - Subscription_Name__c Text Unique identifier for subscription
 - Account__c Lookup to Account): Customer relationship
 - Contact__c Lookup to Contact): Primary subscriber contact
 - Product__c Lookup to Product2 Subscribed product/service
 - Start_Date__c Date Subscription activation date
 - End_Date__c Date Subscription expiration date
 - Status__c Picklist): Active, Inactive, Suspended, Cancelled
 - Billing_Frequency__c Picklist): Monthly, Quarterly, Annually
 - Subscription_Amount__c Currency): Total subscription value
 - Monthly_Recurring_Revenue__c Currency): MRR calculation

Subscription_Plan__c Product Catalog)

- **Purpose:** Define available subscription tiers and pricing models **Key**
- **Fields:**
 - Plan_Name__c Text Subscription plan identifier
 - Description__c Long Text Area): Detailed plan features
 - Base_Price__c Currency): Standard pricing
 - Billing_Frequency__c Picklist): Available billing cycles
 - Trial_Period_Days__c Number Free trial duration
 - Features__c Long Text Area): Included features and limitations
 - Is_Active__c Checkbox): Plan availability status

SETUP > OBJECT MANAGER

Subscription

Details

Fields & Relationships

Page Layouts

Lightning Record Pages

Buttons, Links, and Actions

Compact Layouts

Field Sets

Object Limits

Record Types

Related Lookup Filters

Restriction Rules

Scoping Rules

Object Access

Triggers

Flow Triggers

Validation Rules

Conditional Field Formatting

Fields & Relationships

Quick Find

New Deleted Fields Field Dependencies Set History Tracking

5 Items, Sorted by Field Label

FIELD LABEL	FIELD NAME	DATA TYPE	CONTROLLING FIELD	INDEXED
Created By	CreatedById	Lookup(User)		
Last Modified By	LastModifiedById	Lookup(User)		
Owner	OwnerId	Lookup(User,Group)		✓
Record Type	RecordTypeId	Record Type		✓
Subscription Name	Name	Text(80)		✓

Billing_Record__c Financial Tracking)

Billing Record

Details	Fields & <input type="text" value="Quick Find"/> New Deleted Fields Field Dependencies Set History Tracking				
	9 Items, Sorted by Field Label				
Fields & Relationships	FIELD LABEL	FIELD NAME	DATA TYPE	CONTROLLING FIELD	INDEXED
Page Layouts	Account	Account__c	Lookup(Account)	✓	▼
Lightning Record Pages	Amount	Amount__c	Currency(18, 0)		▼
Buttons, Links, and Actions	Billing Date	Billing_Date__c	Date		▼
Compact Layouts	Billing Record Name	Name	Auto Number	✓	▼
Field Sets	Billing Status	Billing_Status__c	Picklist		▼
Object Limits	Created By	CreatedById	Lookup(User)		
Record Types	Last Modified By	LastModifiedById	Lookup(User)		
Related Lookup Filters	Payment Group	Payment_Group__c	Master-Detail(Payment Group)	✓	▼
Restriction Rules	Subscription	Subscription__c	Master-Detail(Subscription)	✓	▼
Scoping Rules					
Object Access					
Triggers					
Flow Triggers					
Validation Rules					
Conditional Field Formatting					

- **Purpose:** Track all billing transactions and payment processing **Key**
- **Fields:**
 - Subscription__c Master-Detail to Subscription__c): Parent subscription
 - Billing_Date__c Date Invoice generation date
 - Due_Date__c Date Payment due date
 - Amount__c Currency): Billing amount
 - Status__c Picklist): Pending, Paid, Overdue, Failed
 - Payment_Method__c Picklist): Credit Card, ACH, Wire Transfer Transaction_ID__c Text External payment processor reference
 - Late_Fee__c Currency): Additional charges for overdue payments

Subscription_Modification__c Change Management)

- **Purpose:** Audit trail for subscription changes and modifications **Key**
- **Fields:**
 - Subscription__c Lookup to Subscription__c): Modified subscription
 - Modification_Type__c Picklist): Upgrade, Downgrade, Pause, Resume
 - Previous_Plan__c Lookup to Subscription_Plan__c): Original plan
 - New_Plan__c Lookup to Subscription_Plan__c): Updated plan
 - Effective_Date__c Date Change implementation date
 - Reason__c Picklist): Customer request, retention offer, system update
 - Modified_By__c Lookup to User): User who processed change Price_Impact__c Currency):
 - Financial impact of modification

Relationship Design

Master-Detail Relationships

- Billing_Record__c → Subscription__c: Ensures billing records deletion with subscription
- Enables rollup calculations for total billing amounts and payment tracking

Lookup Relationships

- Subscription__c → Account__c: Flexible customer relationship management
- Subscription__c → Contact__c: Primary subscriber identification
- Subscription_Modification__c → Subscription__c: Independent change tracking

Placeholder for Screenshot: Schema Builder ERD view]

Page Layout Customization

Subscription Record Layout

- **Information Section:** Core subscription details and status
- **Billing Section:** Payment information and billing history
- **Related Lists:** Billing Records, Modification History, Support Cases
- **Custom Buttons:** Upgrade Subscription, Pause Service, Cancel Subscription

Billing Record Layout

- **Payment Details:** Amount, due date, payment method
- **Status Tracking:** Payment status and transaction references
- **Related Information:** Links to parent subscription and customer account

Validation Rules Implementation

- **Subscription Date Validation:** End date must be after start date
- **Billing Amount Validation:** Amount must be greater than zero
- **Status Transition Validation:** Enforce valid status change workflows
- **Modification Effective Date:** Must be current date or future date

Phase 4 Process Automation Workflows & Process Builder)

Overview

Implement declarative automation to streamline subscription operations and ensure consistent business process execution.

Validation Rules

Subscription Data Integrity

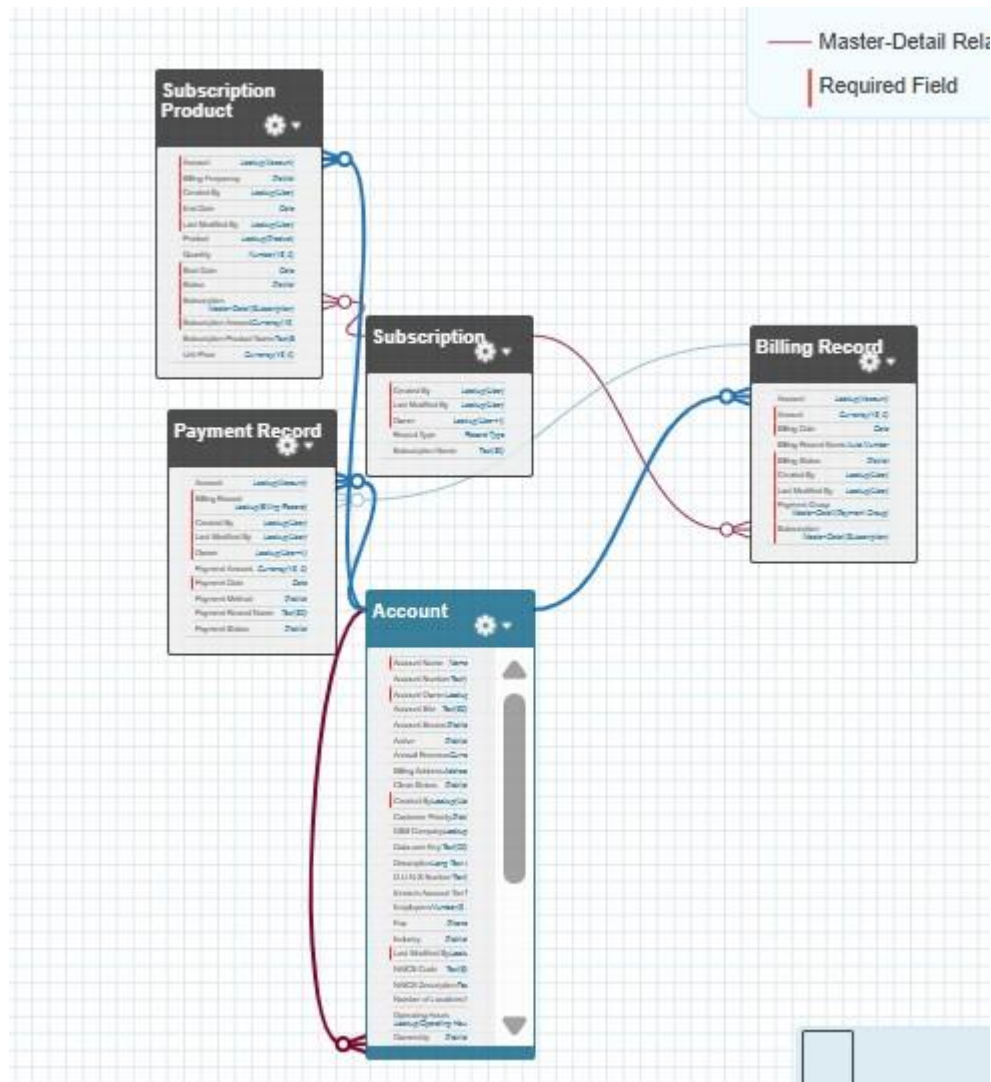
- **Positive Subscription Amount:** Ensures subscription amount > 0
 - Formula: `Subscription_Amount__c <= 0`
 - Error Message: "Subscription amount must be greater than zero"
- **Valid Date Range:** Ensures end date after start date
 - Formula: `End_Date__c <= Start_Date__c`
 - Error Message: "End date must be after start date"
- **Billing Frequency Alignment:** Validates billing frequency with plan requirements
- **Active Subscription Limit:** Prevents duplicate active subscriptions per customer

Workflow Rules

Subscription Renewal Notifications

Rule Name: Subscription Renewal Alert

- **Evaluation Criteria:** 30 days before subscription end date
- **Object:** Subscription__c **Criteria:**
- Status equals "Active"
- End_Date__c = TODAY + 30 **Actions:**
 - Email Alert: Send renewal notification to account manager
 - Task Assignment: Create renewal follow-up task
- Field Update: Set Renewal_Alert_Sent__c to true
- 8 **Payment Processing Automation**
 - **Rule Name:** Failed Payment Response
- **Evaluation Criteria:** Billing record status changes to "Failed" **Actions:**
- Email Alert: Notify customer of payment failure
- Task Creation: Assign follow-up task to customer service
 - Field Update: Increment failed payment counter
 -
 -



Process Builder Implementation

Subscription Status Management Process

- **Process Name:** Subscription Lifecycle Automation
- **Object:** Subscription__c
- **Start Process:** When record is created or edited

Decision Nodes:

New Subscription Created

- Criteria: `ISNEW() && Status__c = "Active"`
- Actions:
 - Create welcome email task
 - Update customer status to "Active Subscriber"
 - Generate first billing record

Subscription Cancelled

- Criteria: `ISCHANGED(Status__c) && Status__c = "Cancelled"`
- Actions:
 - Send cancellation confirmation email
 - Create retention outreach task
 - Update billing records to "Cancelled"

Billing Automation Process

- **Process Name:** Automated Billing Generation
- **Trigger:** Monthly scheduled process **Actions:**
- Create billing records for active subscriptions
 - Calculate prorated amounts for mid-cycle changes
 - Generate payment processing tasks
 - **Flow Implementation**

Subscription Upgrade Flow

- **Flow Type:** Screen Flow
- **Purpose:** Guide users through subscription upgrade process **Components:**
- Screen 1 Display current subscription details
 - Screen 2 Show available upgrade options
 - Screen 3 Calculate pricing impact
 - Screen 4 Confirmation and approval request
 - **Customer Self-Service Flow**
- **Flow Type:** Screen Flow accessible via Experience Cloud **Purpose:**
- Enable customers to modify their subscriptions **Features:**
- Subscription pause/resume functionality
 - Payment method updates
 - Billing information changes
 - Subscription cancellation requests
 - **Automated Dunning Process Flow**

- **Flow Type:** Scheduled Flow
- **Purpose:** Automate overdue payment collection **Process**
- **Steps:**
 - Identify overdue billing records
 - Generate escalating reminder emails
 - Create collection tasks for finance team
 - Suspend services for seriously delinquent accounts

Custom Notifications

Real-Time Subscription Alerts

- Configure custom notifications for subscription managers
- Alert triggers: High-value subscription cancellations, failed payments, upgrade opportunities
- Delivery channels: Email, Salesforce mobile notifications, Slack integration

Customer Communication Automation

- Welcome email sequences for new subscribers
- Payment confirmation notifications
- Service disruption alerts
- Renewal reminder campaigns

Phase 5 Process Automation Apex Development)

Overview

Develop custom Apex solutions to handle complex subscription business logic that cannot be achieved through declarative automation.

Monthly Recurring Revenue MRR Calculation Class

Class Name: SubscriptionMRRCalculator

Purpose: Calculate accurate MRR values considering billing frequencies and prorations **Key Methods:**

```
for(Subscription__c sub : subscriptions) {           Decimal mrr = 0;
if(sub.Billing_Frequency__c
== 'Monthly') {           mrr = sub.Subscription_Amount__c;
```


- `calculateMRR(List<Subscription__c> subscriptions)` : Main calculation method
- `prorateAmount(Decimal amount, String frequency)` : Handle billing frequency conversions
- `updateSubscriptionMRR(Map<Id, Decimal> mrrMap)` : Update subscription records with calculated MRR

```
public class SubscriptionMRRCalculator {
    public static void calculateMRR(List<Subscription__c> subscriptions) {
        Map<Id, Decimal> mrrMap = new Map<Id, Decimal>();
```

```

        } else if(sub.Billing_Frequency__c == 'Quarterly') {
mrr = sub.Subscription_Amount__c / 3;
        } else if(sub.Billing_Frequency__c == 'Annually') {
= sub.Subscription_Amount__c / 12;
        }
mrrMap.put(sub.Id, mrr);
    }
updateSubscriptionMRR(mrrMap);
}
}

```


Apex Classes

Apex Class

[Help for this Page ?](#)

Apex Class Edit
Save Quick Save Cancel

Apex Class Version Settings

```

1 public class SubscriptionMRRCalculator {
2     public static void calculateMRR(List<Subscription__c> subscriptions) {
3         Map<Id, Decimal> mrrMap = new Map<Id, Decimal>();
4
5         for(Subscription__c sub : subscriptions) {
6             Decimal mrr = 0;
7             if(sub.Billing_Frequency__c == 'Monthly') {
8                 mrr = sub.Subscription_Amount__c;
9             } else if(sub.Billing_Frequency__c == 'Quarterly') {
10                 mrr = sub.Subscription_Amount__c / 3;
11             } else if(sub.Billing_Frequency__c == 'Annually') {
12                 mrr = sub.Subscription_Amount__c / 12;
13             }
14             mrrMap.put(sub.Id, mrr);
15         }
16         updateSubscriptionMRR(mrrMap);
17     }
18
19     private static void updateSubscriptionMRR(Map<Id, Decimal> mrrMap) {
20         List<Subscription__c> subsToUpdate = new List<Subscription__c>();
21         for(Id subId : mrrMap.keySet()) {
22             subsToUpdate.add(new Subscription__c(
23                 Id = subId,
24                 Monthly_Recurring_Revenue__c = mrrMap.get(subId)
25             ));
26         }
27         update subsToUpdate;
28     }
29 }

```

Position: Ln 30, Ch 1
Total: Ln 30, Ch 1084

Subscription Trigger Implementation

Trigger Name: SubscriptionTrigger

Events: Before Insert, Before Update, After Insert, After Update **Handler**

Class: SubscriptionTriggerHandler **Before Insert/Update**

Logic:

- Validate subscription data integrity
- Calculate MRR values automatically
- Set default values for required fields
- Enforce business rules for subscription modifications

The screenshot shows the Salesforce 'Apex Triggers' setup page. At the top, there's a 'SETUP' header with a gear icon and the text 'Apex Triggers'. Below this, the page title 'Apex Triggers' is displayed, followed by a 'Help for this Page' link. A descriptive paragraph states: 'This page allows you to view and modify all the triggers in your organization. To create a new trigger, navigate to the appropriate sObject triggers page.' A green callout box indicates 'Percent of Apex Used: 0%' and provides details about the 6,000,000 character limit. Below the callout, there's a 'Compile all triggers' button and a 'View:' dropdown menu currently set to 'SubscriptionTrigger', with links for 'Edit' and 'Create New View'. At the bottom, a 'Developer Console' tab is visible, and a table header for triggers is partially shown with columns like Name, Namespace Prefix, sObject Type, Api Version, Status, Size, Method Comments, Last Modified By, and User Type Class.

After Insert/Update Logic:

- Create initial billing records for new subscriptions
- Update related account statistics
- Send notification emails to stakeholders
- Update subscription analytics and reporting data

Billing Generation Batch Class

Class Name: BillingGenerationBatch

Purpose: Generate monthly billing records for active


subscriptions **Batch Size:** 200 records per batch **Scheduling:** Runs

on 1st of each month **Key Features:**

Identifies subscriptions requiring billing

Calculates prorated amounts for mid-cycle changes

Creates billing records with appropriate due dates

 **Apex Classes**






Apex Class

[Help for this Page](#)

Apex Class Edit

SaveQuick SaveCancel

Apex ClassVersion Settings



```
1 global class BillingGenerationBatch implements Database.Batchable<sObject> {
2     global Database.QueryLocator start(Database.BatchableContext BC) {
3         String query = 'SELECT Id, Account__c, Subscription_Amount__c, Billing_Frequ
4         return Database.getQueryLocator(query);
5     }
6
7     global void execute(Database.BatchableContext BC, List<sObject> scope) {
8         List<Billing_Record__c> billingRecords = new List<Billing_Record__c>();
9         for(Subscription__c sub : (List<Subscription__c>)scope) {
10             Billing_Record__c billing = new Billing_Record__c();
11             billing.Subscription__c = sub.Id;
12             billing.Amount__c = sub.Subscription_Amount__c;
13             billing.Billing_Date__c = Date.today();
14             billing.Due_Date__c = Date.today().addDays(30);
15             billing.Status__c = 'Pending';
16             billingRecords.add(billing);
17         }
18         insert billingRecords;
19     }
20
21     global void finish(Database.BatchableContext BC) {
22         System.debug('Billing generation completed');
23     }
24 }
25
```

Position: Ln 1, Ch 1Total: Ln 25, Ch 1086

-
-
- Integrates with payment processor APIs
- Handles error logging and retry logic

```
global class BillingGenerationBatch implements
Database.Batchable<SObject> {      global Database.QueryLocator
start(Database.BatchableContext BC) {      String query = 'SELECT Id,
Account__c, Subscription_Amount__c, ' +
        'Billing_Frequency__c FROM Subscription__c ' +
        'WHERE Status__c = \'Active\'';
return Database.getQueryLocator(query);
    }
    global void execute(Database.BatchableContext BC, List<SObject> scope) {
List<Billing_Record__c> billingRecords = new List<Billing_Record__c>();
        for(Subscription__c sub :
(List<Subscription__c>)scope) {      Billing_Record__c
billing = new Billing_Record__c();
billing.Subscription__c = sub.Id;
            billing.Amount__c = sub.Subscription_Amount__c;
billing.Billing_Date__c = Date.today();
            billing.Due_Date__c = Date.today().addDays(30);
            billing.Status__c = 'Pending';

            billingRecords.add(billing);
        }

        insert billingRecords;
    }
}
```

Subscription Analytics Utility Class

Class Name: SubscriptionAnalytics

Purpose: Calculate key subscription metrics and KPIs **Key Metrics:**

- Customer Lifetime Value CLV
- Churn rate calculations
- Average Revenue Per User ARPU Subscription growth
- rates

Exception Handling and Logging

Error Logging Framework:

- Custom object for error tracking: Error_Log__c
- Automatic error capture in all Apex classes
- Integration with monitoring tools for real-time alerts
- Comprehensive logging for troubleshooting and debugging

Test Class Coverage:

- Comprehensive test classes for all Apex components
- 95%+ code coverage requirement
- Mock external service calls for testing
- Both positive and negative test scenarios Placeholder for

Asynchronous Processing Implementation

Queueable Apex for Payment Processing

- Handle large volume payment processing
- Chain multiple queueable jobs for complex workflows
- Implement retry logic for failed payment attempts

Scheduled Apex for Recurring Tasks

- Daily subscription health checks
- Weekly analytics calculations
- Monthly billing cycle automation
- Quarterly subscription reviews

Phase 6 User Interface & Lightning Experience

Overview

Design intuitive Lightning Experience interfaces optimized for subscription management workflows and user productivity.

Lightning App Builder Implementation

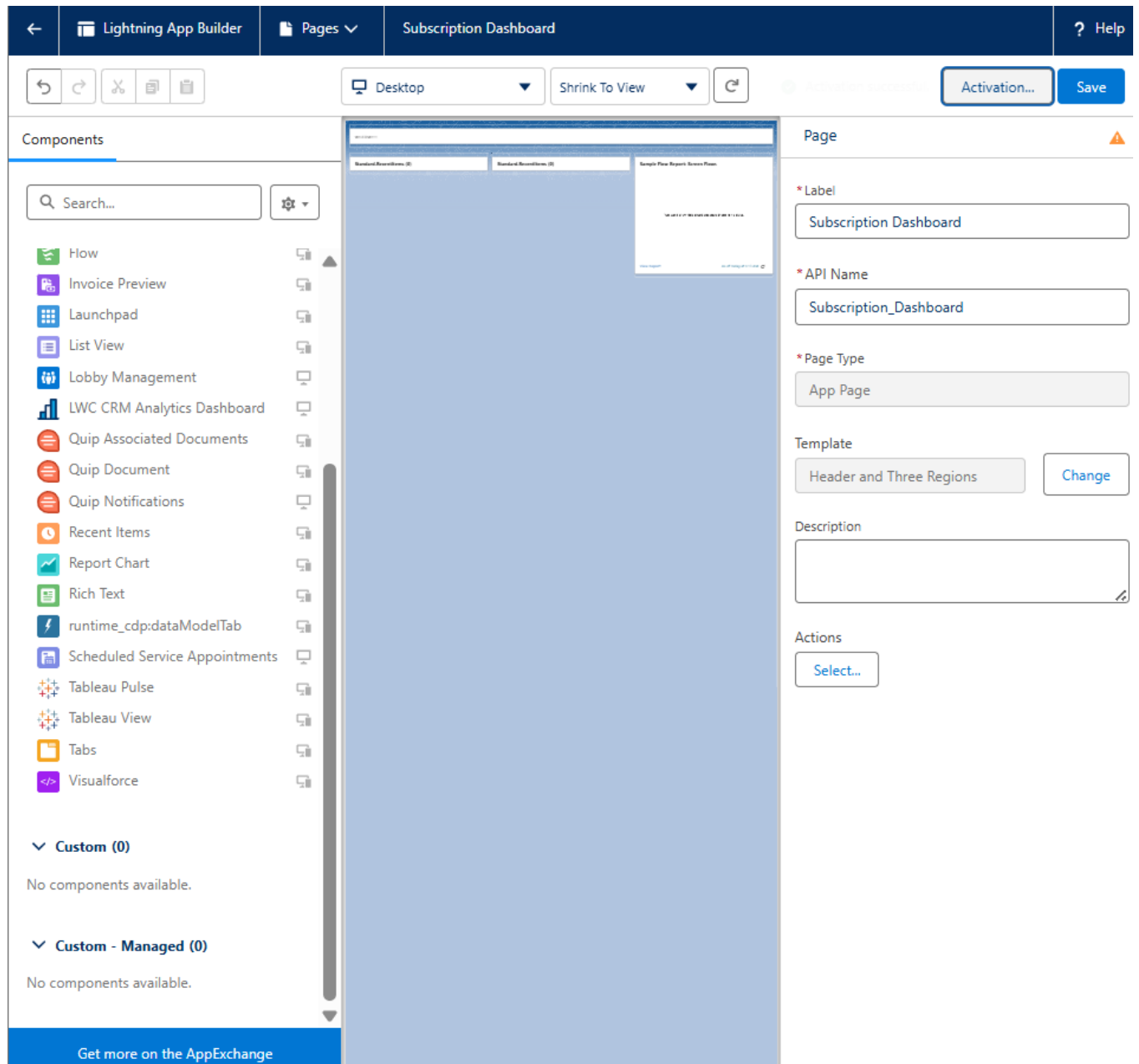
Custom Lightning App: Subscription Manager

- **Navigation Items:**
 - Home Dashboard overview)
 - Subscriptions Primary object access)
 - Customers Account management)
 - Billing Financial tracking)
 - Products Subscription catalog)
 - Reports & Dashboards

App Visibility:

- Assigned to Subscription Manager and Admin profiles
- Available on desktop, tablet, and mobile devices
-

Custom branding with company logo and color scheme **Custom**



Tab Configuration

Object-Specific Tabs:

- **Subscriptions Tab:** Primary workspace for subscription management
- **Billing Records Tab:** Financial tracking and payment oversight
- **Subscription Plans Tab:** Product catalog management
- **Analytics Tab:** Custom dashboard and metrics view


Tab Styling:

- Custom icons for each subscription-related object
- Color-coded tabs for visual workflow identification
- Consistent naming conventions across all tabs

Record Page Customization

Subscription Record Page Layout:

- **Header Section:** Key subscription metrics MRR, status, renewal date)
- **Details Section:** Comprehensive subscription information organized in logical groups
- **Activity Timeline:** Historical changes and communications
- **Related Records:** Billing history, modifications, and support cases



Object Manager

6 Items, Sorted by Label

[Schema Builder](#)
[Create ▼](#)

LABEL ▲	API NAME	TYPE	DESCRIPTION	LAST MODIFIED	DEPLC
Communication Subscription	CommSubscription	Standard Object			
Communication Subscription Channel Type	CommSubscriptionChannelType	Standard Object			
Communication Subscription Consent	CommSubscriptionConsent	Standard Object			
Communication Subscription Timing	CommSubscriptionTiming	Standard Object			
Subscription	Subscription__c	Custom Object		9/24/2025	✓
Subscription Product	Subscription_Product__c	Custom Object		9/24/2025	✓

Page Components:

- **Custom Lightning Components:** Subscription
 - health indicator
 - Renewal timeline visualization
 - Quick action buttons for common tasks
- **Einstein Analytics:** Embedded subscription performance charts
- **Flow Components:** Subscription modification wizards

Record Type

Monthly Subscription

[« Back to Custom Object: Subscription](#)

Use the Edit button to change the properties of this record type. Use the Edit links in the Picklist Values related list to choose the picklist values available for records with this record type.

Edit

Record Type Label	Monthly Subscription	Active	✓
Record Type Name	Monthly_Subscription		
Namespace Prefix			
Description			
Created By	Abhinay Shrivasa, 9/24/2025, 11:07 AM	Modified By	Abhinay Shrivasa, 9/24/2025, 11:07 AM

Configuration:

- **Pause Subscription:** Temporary service suspension
- **Upgrade Plan:** Subscription tier enhancement
- **Update Payment:** Payment method modifications
- **Schedule Cancellation:** Future cancellation processing

Lightning Home Page Customization

Subscription Manager Dashboard:

- **KPI Cards:** Total subscriptions, MRR, churn rate, renewal pipeline
- **Charts:** Subscription growth trends, payment status distribution
- **Recent Items:** Latest subscription activities and tasks
- **Performance Metrics:** Individual and team performance indicators

User-Specific Layouts:

- **Sales Role:** Focus on opportunities and new subscriptions
- **Service Role:** Emphasize customer issues and modification requests
- **Finance Role:** Highlight billing, payments, and revenue metrics
- **Manager Role:** Executive dashboard with high-level insights

Mobile Experience Optimization

Mobile App Configuration:

- Responsive design for subscription management on mobile devices
- Offline capability for critical subscription information
- Push notifications for urgent subscription events
- Touch-optimized interface for quick subscription updates

Mobile-Specific Components:

- Compact subscription summary cards
- Swipe actions for common subscription tasks
- GPS integration for field service subscription support
- Camera integration for document capture

Lightning Flow Integration Embedded

Flows in Record Pages:

- Subscription modification wizard directly on subscription records
- Payment processing flow integrated with billing records
- Customer communication flow for service notifications

Guided Business Processes:

- New subscription onboarding flow
- Subscription renewal negotiation process
- Cancellation retention workflow
- Billing dispute resolution process

Global Actions and Utility Bar

Global Quick Actions:

- Create New Subscription (accessible from any page)
- Quick Customer Lookup
- Generate Billing Report
- Emergency Service Suspension

Utility Bar Configuration:

- Recent subscription activities
- Pending approval notifications
- Payment processing queue
- Customer service chat integration

Phase 7 Integration & External Access

Overview

Establish secure connections with external systems to create a comprehensive subscription ecosystem supporting payment processing, accounting, and customer communications.

Payment Gateway Integration

Stripe Integration Implementation

- **Named Credentials:** Secure storage of Stripe API credentials
 - Endpoint: `https://api.stripe.com`
 - Authentication: Bearer token with encrypted key storage
 - Certificate management for secure SSL connections

Payment Processing Callouts:

- Create customer profiles in Stripe from Salesforce accounts
- Process subscription payments through Stripe API
- Handle webhook notifications for payment status updates
- Synchronize payment methods between systems

```
public class StripeIntegrationService {
    public static HttpResponse createStripeCustomer(Account acc) {
        Http http = new Http();
        HttpRequest request = new HttpRequest();
        request.setEndpoint('callout:Stripe_API/customers');
        request.setMethod('POST');
        request.setHeader('Content-Type', 'application/x-www-form-urlencoded');
        String body = 'email=' + acc.Email__c + '&name=' + acc.Name;
        request.setBody(body);

        HttpResponse response = http.send(request);
        return response;
    }
}
```

Placeholder for Screenshot: Named Credentials configuration]

Accounting System Integration

QuickBooks Online Integration

- **External Services:** Declarative integration with QB Online API
- **Data**
 - **Synchronization:**
 - Customer account synchronization
 - Invoice generation from billing records
 - Payment reconciliation

Tax calculation and reporting

Automated Financial Workflows:

- Daily subscription revenue recognition
- Monthly financial reporting automation
- Automated dunning and collections processing Real-time cash flow monitoring

Customer Communication Platform

Email Service Provider Integration Mailchimp/SendGrid)

- **Platform Events:** Real-time subscription event notifications
- **Customer Segmentation:** Automated list management based on subscription status
- **Drip Campaigns:** Onboarding, renewal, and retention email sequences
- **Performance Tracking:** Email engagement metrics integration

SMS Notification Service

- **Twilio Integration:** Payment reminders and service alerts
- **Automated Messaging:** Subscription status updates and renewal notices
- **Two-Factor Authentication:** Enhanced security for subscription modifications

API Development

REST API for External Systems

```
@RestResource(urlMapping='/subscription/v1/*')
global with sharing class SubscriptionRESTService
{
    @HttpGet
    global static SubscriptionWrapper getSubscription() {
        RestRequest req = RestContext.request;
        String subscriptionId =
req.requestURI.substring(req.requestURI.lastIndexOf('/') +
        Subscription__c sub = [SELECT Id, Status__c, Amount__c, Start_Date__c
                                FROM Subscription__c
                                WHERE Id = :subscriptionId];

        return new SubscriptionWrapper(sub);
    }

    @HttpPost
    global static String createSubscription(SubscriptionWrapper subWrapper) {
        Subscription__c newSub = new Subscription__c();
newSub.Account__c = subWrapper.accountId;
newSub.Amount__c = subWrapper.amount;
newSub.Status__c = 'Active';
```

```
        insert newSub;  
        return newSub.Id;  
    }  
}
```

Platform Events Architecture

Real-Time Event Processing

- **Subscription_Event__e**: Broadcast subscription lifecycle changes
- **Payment_Event__e**: Real-time payment processing notifications
- **Customer_Event__e**: Customer interaction and service events **Event-Driven**

Automation:

- Trigger external system updates based on subscription changes
- Enable real-time analytics and reporting
- Support microservices architecture for scalable integrations

Change Data Capture Configuration

CDC for Subscription Objects:

- Monitor changes to subscription records in real-time
- Sync updates with external CRM and ERP systems
- Audit trail for compliance and regulatory reporting Real-time data
- warehousing for analytics

Security and Authentication

OAuth 2.0 Implementation:

- Secure authentication for external applications
- Token-based access control for API endpoints
- Refresh token management for long-term integrations
- Scope-based permission management

API Security Measures:

- Rate limiting to prevent API abuse
- IP whitelisting for trusted external systems
- Encryption of sensitive data in transit and at rest
- Regular security audits and penetration testing

Remote Site Settings

External Service Endpoints:

- Payment gateway URLs (Stripe, PayPal, Square)
- Email service provider endpoints
- Accounting system APIs
- Telecommunications service providers (Analytics and reporting services)

Integration Monitoring

API Usage Analytics:

- Monitor API call volumes and performance
- Track integration success rates and error patterns
- Set up alerts for integration failures
- Generate integration performance reports

Error Handling and Retry Logic:

- Implement exponential backoff for failed API calls
- Log integration errors for troubleshooting
- Automatic retry mechanisms for transient failures
- Escalation procedures for persistent integration issues

Phase 8 Data Management & Quality

Overview

Implement comprehensive data governance strategies to ensure subscription data accuracy, prevent duplicates, and maintain system integrity.

Duplicate Management

Duplicate Rules Configuration



SETUP

Duplicate Rules

New Duplicate Rule

Account

[Help for this Page](#) ?

Duplicate Rule Edit

Save

Save & New

Cancel

Rule Details

! Required Information

Rule Name **Account_Matching_Rule**Description

Object Account

Record-Level Security ☒ Enforce sharing rules [i](#)
☐ Bypass sharing rules

Actions

Specify what happens when a user tries to save a duplicate record.

Action On Create **Allow** ☒ Alert ☒ ReportAction On Edit **Allow** ☐ Alert ☐ ReportAlert Text **Use one of these records?** [i](#)

Matching Rules

Define how duplicate records are identified.

Compare Accounts With **Accounts**Matching Rule **Standard Account Matching Rule**Matching Criteria Matching rule for account records. [More info](#)Field Mapping ☒ Mapping Selected

Add Rule

Remove Rule

Conditions

Account Duplicate Prevention:

- **Matching Rule:** `Account_Email_Match`
 - Match fields: Email Address Exact match)
 - Matching logic: Single field exact match
- **Duplicate Rule:** `Prevent_Duplicate_Accounts`
 - Object: Account
 - Record-level security: Bypass sharing rules
 - Actions: Alert Allow save with warning)
 - Alert text: "Potential duplicate account detected. Review existing records before creating."

Contact Duplicate Prevention:

- **Matching Rule:** `Contact_Email_Phone_Match`
 - Match fields: Email Exact, Phone Fuzzy match)
 - Matching logic: Email AND Phone criteria
- **Duplicate Rule:** `Prevent_Duplicate_Contacts`
 - Actions: Block Prevent save)
 - Report: Generate duplicate contact report for review

Subscription Duplicate Prevention:

- **Custom Matching Logic:** Account + Product + Active Status
- **Validation Rule:** Prevent multiple active subscriptions for same product
- **Error Message:** "Customer already has an active subscription for this product. Consider upgrading existing subscription."

Data Import & Migration

Data Loader Configuration:

- **Subscription Migration:** Import existing subscriptions from legacy systems
 - Field mapping: Legacy ID to External ID for data relationship maintenance
 - Date formatting: Ensure proper date conversion for start/end dates
 - Status mapping: Convert legacy status values to new picklist options
 - Error handling: Generate error logs for failed imports

Data Import Wizard Usage:

- **Customer Data Import:** Bulk import of customer accounts and contacts
- **Product Catalog Import:** Load subscription plans and pricing tiers
- **Historical Billing Import:** Import payment history for customer continuity

Import Best Practices:

- Pre-import data validation and cleansing
- Staged import approach Accounts → Contacts → Subscriptions → Billing)
- Post-import data verification and reconciliation
- Rollback procedures for failed imports

Data Export & Backup

Scheduled Data Export:

- **Weekly Exports:** Full subscription and customer data backup
- **Daily Exports:** Incremental billing and payment data
- **Monthly Archives:** Comprehensive system backup for compliance

Data Export Formats:

- CSV for spreadsheet analysis and reporting
- XML for system integrations and data exchange
- JSON for API consumption and web services **Compliance**

Considerations:

- GDPR compliance for customer data exports
- SOX compliance for financial data retention
- Industry-specific regulatory requirements
- Data encryption for sensitive information exports

Change Management

Change Sets Deployment:

- **Development to Testing:** Deploy subscription configuration changes
- **Testing to Production:** Promote validated changes to live environment
- **Rollback Procedures:** Quick reversion capabilities for failed deployments

Metadata Management:

- Version control for all customizations
- Documentation of change impacts
- Approval workflows for production changes
- Testing protocols for subscription-critical changes

Package Management

Unmanaged Packages for Development:

- **Subscription Core Package:** Essential objects and basic automation
- **Subscription Analytics Package:** Reports, dashboards, and metrics
- **Integration Package:** External system connections and APIs

Package Components:

- Custom objects and fields
- Page layouts and record types

- Validation rules and workflows
- Apex classes and triggers
- Lightning components and flows

Version Management:

- Semantic versioning for package releases
- Change logs for each package version
- Dependency management between packages
- Upgrade and migration utilities

Data Quality Monitoring

Data Health Dashboards:

- **Completeness Metrics:** Track missing required fields
- **Accuracy Indicators:** Monitor data validation failures
- **Consistency Reports:** Identify data relationship inconsistencies
- **Timeliness Tracking:** Alert on stale or outdated records

Automated Data Cleansing:

- **Batch Jobs:** Scheduled data quality improvement processes
- **Data Standardization:** Consistent formatting for names, addresses, phones
- **Duplicate Merge Automation:** Intelligent duplicate record consolidation
- **Data Enrichment:** External data source integration for enhanced profiles

Audit Trail Management

Field History Tracking:

- Enable field history for critical subscription fields
- Track changes to subscription amount, status, and billing frequency
- Monitor customer payment method modifications
- Log user access to sensitive subscription information

Setup Audit Trail:

- Track all administrative configuration changes
- Monitor user permission modifications
- Log integration and API configuration changes
- Maintain compliance audit documentation

Data Archiving Strategy

Retention Policies:

- **Active Subscriptions:** Maintain full data accessibility
- **Cancelled Subscriptions:** 7-year retention for financial compliance
- **Billing Records:** 10-year retention for audit purposes
- **Customer Communications:** 3-year retention for service history

Archival Process:

- Automated identification of archival candidates
- Secure archive storage with encrypted access
- Purge procedures for end-of-life data
- Restore capabilities for archived information

Phase 9 Reporting, Dashboards & Analytics

Overview

Develop comprehensive reporting and analytics capabilities to provide actionable insights into subscription performance, customer behavior, and revenue optimization opportunities.

Report Development

Subscription Performance Reports

1. Subscription Growth Analysis Matrix Report)

- **Purpose:** Track subscription acquisition and growth trends
- **Grouping:** Month/Quarter by Subscription Plan
- **Metrics:** New subscriptions, upgrades, downgrades, cancellations
- **Filters:** Date range, subscription status, customer segment
- **Visualization:** Line chart showing growth trajectory
- **Audience:** Executive team, sales management

2. Revenue Recognition Report Summary Report)

- **Purpose:** Monthly Recurring Revenue (MRR) tracking and forecasting
- **Fields:** Subscription ID, Customer, Plan, MRR, ARR, Billing Status
- **Grouping:** By month and subscription plan
- **Calculations:** Sum of MRR, Average deal size, Revenue growth rate
- **Drill-down:** Individual subscription details
- **Export:** Automated monthly delivery to finance team

-

3. Customer Churn Analysis Tabular Report)


Purpose: Identify churn patterns and at-risk customers

- **Data:** Cancelled subscriptions, churn reasons, customer lifetime value
- **Segmentation:** By customer size, industry, subscription duration
- **Metrics:** Churn rate, average time to churn, revenue impact
- **Actionable Insights:** Retention opportunity identification

4. Payment Performance Report Summary Report)

- **Purpose:** Track billing success rates and payment issues
- **Metrics:** Payment success rate, failed payment trends, dunning effectiveness
- **Grouping:** By payment method, customer segment, billing frequency
- **Alerts:** High failure rate notifications for immediate action


Custom Report Types



SETUP





Custom Report Types













Custom Report Type

All Custom Report Types ▾ 


New Custom Report Type

12 items • Sorted by Label • Filtered by All custom report types • Updated a few seconds ago

Label ↑ ▾	Name ▾	Description ▾	Category ▾	Cre... ▾	Created Date ▾	
Orchestration R...	flow_orchestration...	Find out which orc...	Other Repor...	autoproc	9/18/2025, 5:30 AM	
Orchestration R...	flow_orchestration...	Find out which orc...	Other Repor...	autoproc	9/18/2025, 5:30 AM	
Orchestration St...	flow_orchestration...	Find out which orc...	Other Repor...	autoproc	9/18/2025, 5:30 AM	
Orchestration St...	flow_orchestration...	Find out which orc...	Other Repor...	autoproc	9/18/2025, 5:30 AM	
Orchestration ...	flow_orchestration...	Find out which orc...	Other Repor...	autoproc	9/18/2025, 5:30 AM	
Program Definit...	Program_Definitio...	Review your analyt...	Other Repor...	autoproc	9/18/2025, 5:30 AM	
Program Definit...	Program_Definitio...	Review your analyt...	Other Repor...	autoproc	9/18/2025, 5:30 AM	
Program Item P...	Program_Task_Pro...	Report on tasks lik...	Other Repor...	autoproc	9/18/2025, 5:30 AM	
Program Item P...	Program_Task_Pro...	Report on tasks lik...	Other Repor...	autoproc	9/18/2025, 5:30 AM	
Program Progre...	Program_Progress...	Report on progra...	Other Repor...	autoproc	9/18/2025, 5:30 AM	
Program Progre...	Program_Progress...	Report on progra...	Other Repor...	autoproc	9/18/2025, 5:30 AM	
Screen Flows	screen_flows_preb...	Find out which flo...	Other Repor...	autoproc	9/18/2025, 5:30 AM	

•

 **SETUP**
Custom Report Types

New Custom Report Type

2 Define Report Records Set

Select related objects to define which records are included in reports using this report type.

A Subscriptions

Primary Object

(Click to relate another object)

A

↓

A

Subscription with Billing History

- **Primary Object:** Subscription__c
- **Related Objects:** Billing_Record__c A to B relationship)
- **Available Fields:** All subscription fields plus payment history
- **Use Cases:** Customer payment analysis, billing dispute resolution

Customer Subscription Portfolio

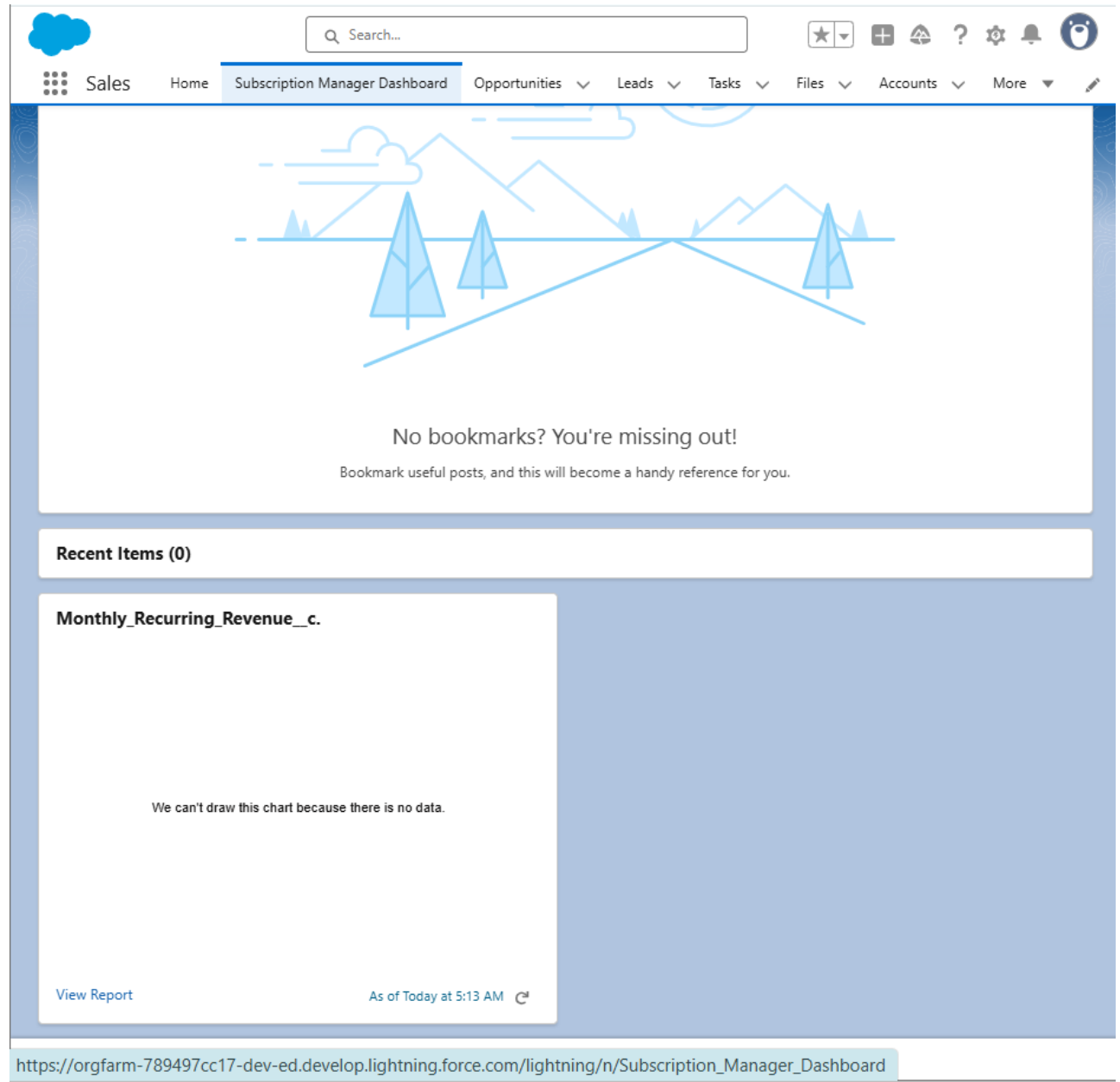
- **Primary Object:** Account
- **Related Objects:** Subscription__c A to B, Contact A to B
- **Purpose:** Complete customer subscription overview
- **Applications:** Account management, upselling opportunities

Dashboard Development

Executive Subscription Dashboard Components:

KPI Scorecard:

- Total Active Subscriptions Gauge chart)
- Monthly Recurring Revenue Lightning KPI
- Customer Acquisition Cost Metric component)
- Churn Rate Gauge with target line) **Revenue**



Trends:

- MRR Growth Chart Line chart with trend line)
- Revenue by Plan Type Donut chart)
- Subscription Lifecycle Pipeline Funnel chart) **Operational Metrics:**
- Payment Success Rate Bar chart)
- Support Case Volume Stacked bar by priority)
-

-

Renewal Pipeline Horizontal bar chart)

Subscription Manager Dashboard Focus Areas:

- **Renewal Management:** Upcoming renewals requiring attention
- **Customer Health:** At-risk subscription identification
- **Performance Tracking:** Individual and team metrics
- **Process Efficiency:** Automation success rates and bottlenecks

Interactive Features:

- Click-through drilling from dashboard to detailed records
- Real-time data refresh for current metrics
- Mobile-responsive design for field access Customizable date ranges and filters

Advanced Analytics

Einstein Analytics Integration

- **Subscription Analytics App:** Pre-built analytics templates
- **Customer Journey Analysis:** Visualize subscription lifecycle paths
- **Predictive Modeling:** Churn prediction and retention recommendations
- **Cohort Analysis:** Track customer behavior over time

Custom Analytics Components:

- **Subscription Health Score:** Composite metric combining usage, payments, and engagement
- **Revenue Forecasting:** Predictive models for subscription revenue
- **Customer Segmentation:** Dynamic grouping based on subscription patterns
- **Competitive Analysis:** Market position and pricing optimization insights

Report Automation

Scheduled Report Delivery:

- **Daily:** Payment failure alerts to operations team
- **Weekly:** Subscription performance summary to management
- **Monthly:** Comprehensive revenue reports to finance and executives
- **Quarterly:** Strategic business review analytics package

Subscription-Based Reports:

- **New Subscription Welcome Package:** Automated delivery to account managers
- **Renewal Opportunity Reports:** 60/30/15 day advance notifications
- **Churn Analysis:** Monthly delivery to customer success teams
- **Revenue Recognition:** Monthly financial reporting automation

Data Visualization Best Practices

Chart Selection Guidelines:

- **Trend Analysis:** Line charts for time-series subscription data
- **Composition:** Pie/donut charts for subscription plan distribution
- **Comparison:** Bar charts for performance metrics across segments
- **Relationship:** Scatter plots for correlation analysis (usage vs. retention)

Dashboard Design Principles:

- **5 Second Rule:** Key metrics immediately visible
- **Progressive Disclosure:** Summary to detail navigation
- **Consistent Color Coding:** Status and category consistency
- **Mobile-First Design:** Touch-optimized for mobile devices

Security and Access Control

Report Folder Security:

- **Executive Reports:** Restricted to VP+ roles
- **Operational Reports:** Access based on functional responsibility
- **Customer Data:** Compliance with privacy regulations
- **Financial Reports:** SOX compliance and audit controls

Dynamic Report Filtering:

- Role-based data visibility (manager sees team data only)
- Territory-based customer access
- Data governance for sensitive subscription information
- Audit logs for report access and modifications

Phase 10 Security, Testing & Deployment

Overview

Implement comprehensive security measures, conduct thorough system testing, and execute controlled deployment to ensure a secure, reliable subscription management system.

Security Implementation

Field-Level Security Configuration

-

Sensitive Financial Data Protection:

- **Credit Card Information:** Visible only to Finance and Admin profiles
- **Subscription Revenue:** Restricted access for Sales roles below Manager level
- **Customer Payment History:** Service agents have read-only access
- **Billing Address:** Full access for billing team, limited for others

Role-Based Field Access Matrix:

- **System Administrator:** Full access to all fields
- **Subscription Manager:** Full access except system configuration fields
- **Sales Representative:** Limited access to pricing and payment fields
- **Customer Service:** Read access to customer data, edit access to subscription modifications
- **Finance User:** Full access to billing and payment information

Object-Level Security:

- **Subscription__c:** Private with sharing rules for team visibility
- **Billing_Record__c:** Private, controlled by parent subscription access
- **Payment_Method__c:** Private with strict access controls for PCI compliance
- **Subscription_Plan__c:** Public read-only for product catalog visibility

Data Security Measures

Encryption Implementation:

- **Platform Encryption:** Enable for sensitive customer and payment data
- **Fields Encrypted:** SSN, Credit Card numbers, Bank account information
- **Key Management:** Tenant secret management with regular rotation
- **Performance Impact:** Monitor query performance on encrypted fields

PCI DSS Compliance:

- **Tokenization:** Replace sensitive card data with secure tokens
- **Secure Transmission:** SSL/TLS for all payment-related communications
- **Access Controls:** Restrict payment data access to authorized personnel only
- **Audit Logging:** Comprehensive logging of all payment data access

Loss Prevention:

- **Export Restrictions:** Limit bulk data export capabilities by role
- **Login IP Restrictions:** Restrict access to trusted networks for admin users
- **Session Management:** Automatic timeout for inactive sessions
- **Device Management:** Mobile device management for Salesforce app access

User Authentication & Access Control

Multi-Factor Authentication MFA :

- **Requirement:** Mandatory for all administrative users
- **Methods:** Salesforce Authenticator app, SMS, hardware tokens
- **High-Risk Events:** Additional verification for subscription modifications
- **Compliance:** Meet SOX and financial industry security requirements

Single Sign-On SSO Integration:

- **Identity Provider:** Active Directory Federation Services ADFS
- **Protocol:** SAML 2.0 for secure authentication
- **User Provisioning:** Automated account creation and deactivation
- **Role Mapping:** Automatic profile assignment based on AD groups

Password Policies:

- **Complexity Requirements:** Minimum 8 characters, mixed case, numbers, symbols
- **Expiration:** 90-day password rotation for admin users
- **History:** Prevent reuse of last 5 passwords
- **Account Lockout:** 5 failed attempts trigger temporary lockout

Testing Strategy

Unit Testing for Apex Components

Test Class Coverage Requirements:

- **Minimum Coverage:** 95% for all custom Apex classes
- **Critical Path Testing** 100% coverage for financial calculation methods
- **Error Handling:** Test exception scenarios and error conditions
- **Bulk Testing:** Verify batch processing with large data volumes

```
@isTest
public class SubscriptionMRRCalculatorTest {

    @testSetup    static void
    setupTestData() {
```

-

```
Account testAccount = new Account(Name = 'Test Customer');
insert testAccount;

Subscription__c testSub = new Subscription__c(
    Account__c = testAccount.Id,
    Subscription_Amount__c = 1200,
    Billing_Frequency__c = 'Annually',
    Status__c = 'Active'
);
insert testSub;
}

@isTest
static void testMRRCalculationAnnual() {
    Subscription__c sub = [SELECT Id, Subscription_Amount__c,
                                Billing_Frequency__c FROM Subscription__c LIMIT
1];

    Test.startTest();
    SubscriptionMRRCalculator.calculateMRR(new List<Subscription__c>{sub});
    Test.stopTest();

    sub = [SELECT Monthly_Recurring_Revenue__c FROM Subscription__c WHERE
Id = :sub.Id
    System.assertEquals(100, sub.Monthly_Recurring_Revenue__c, 'MRR
should be 1200/12
    }
}
```

Integration Testing:

- **Payment Gateway:** Mock external API calls for reliable testing
- **Email Integration:** Verify notification delivery without sending actual emails
- **Data Synchronization:** Test bi-directional sync with external systems
- **Performance Testing:** Load testing with realistic subscription volumes

User Acceptance Testing UAT

Test Scenarios by Role:

Subscription Manager UAT:

- Create new subscriptions for various customer types
- Process subscription modifications (upgrades, downgrades, cancellations)
- Generate and review subscription performance reports
- Manage billing disputes and payment issues

Sales Representative UAT:

- Convert opportunities to subscriptions
- Access customer subscription history
-

Generate subscription quotes and proposals

Track subscription-related sales pipeline

Customer Service UAT:

- Handle customer subscription inquiries
- Process service requests and modifications
- Access payment history for dispute resolution
- Escalate complex subscription issues

Performance Testing

Load Testing Scenarios:

- **Peak Billing Processing:** 10,000 billing records generated simultaneously
- **High-Volume Reporting:** Dashboard performance with 50+ concurrent users
- **API Performance:** External integration response times under load
- **Mobile Performance:** App responsiveness on various device types

Performance Benchmarks:

- **Page Load Times:** < 3 seconds for standard pages
- **Report Generation:** < 10 seconds for complex reports
- **API Response:** < 2 seconds for standard subscription queries
- **Batch Processing:** Complete billing cycle within maintenance window

Deployment Planning

Environment Strategy:

- **Development Org:** Individual developer environments
- **Testing Sandbox:** Integration testing and UAT
- **Staging Sandbox:** Production-like environment for final testing
- **Production:** Live customer-facing environment

Change Management Process:

Development: Code and configuration development

Code Review: Peer review of all changes

Unit Testing: Automated test execution and validation

Integration Testing: Cross-system functionality verification

UAT: Business user validation of functionality

Production Deployment: Scheduled deployment with rollback capability

Deployment Checklist:

-
- [] All test classes pass with required coverage
- [] Security review completed and approved
- [] Performance testing validates system capacity
- [] UAT sign-off received from business stakeholders
- [] Rollback plan documented and tested
- [] Communication plan for users and stakeholders
- [] Post-deployment monitoring plan activated

Post-Deployment Monitoring

System Health Monitoring:

- **Error Logs:** Daily review of system errors and exceptions
- **Performance Metrics:** Monitor response times and system resource usage
- **User Activity:** Track user adoption and system utilization
- **Integration Status:** Monitor external system connections and data flow

Success Metrics:

- **User Adoption Rate:** Percentage of users actively using new functionality
- **System Performance:** Maintain performance benchmarks post-deployment
- **Error Rate:** < 1% error rate for critical subscription processes
- **Customer Satisfaction:** Measure impact on customer service metrics

Maintenance and Support

Ongoing Support Structure:

- **Level 1 Support:** User training and basic troubleshooting
- **Level 2 Support:** System administration and configuration changes
- **Level 3 Support:** Development support for complex issues
- **Vendor Support:** Escalation path for platform-level issues

Continuous Improvement Process:

- **Monthly Reviews:** System performance and user feedback analysis
- **Quarterly Updates:** Feature enhancements and optimization
- **Annual Assessment:** Strategic review and roadmap planning
- **User Training:** Ongoing education and best practices sharing

Conclusion

The Subscription Management System represents a comprehensive solution for managing the complete subscription lifecycle within Salesforce CRM. This 10-phase implementation approach ensures a robust, scalable, and secure platform that addresses the complex requirements of modern subscription-based businesses.

Key Success Factors

Technical Excellence:

- Comprehensive data model supporting all aspects of subscription management
- Automated business processes reducing manual effort and errors
- Robust security implementation protecting sensitive customer and financial data
- Scalable architecture supporting business growth and expansion

Business Value:

- Streamlined subscription operations improving operational efficiency
- Enhanced customer experience through self-service capabilities and transparent processes
- Comprehensive reporting and analytics enabling data-driven decision making
- Integration capabilities supporting ecosystem connectivity and workflow automation

Risk Mitigation:

- Thorough testing ensuring system reliability and performance
- Comprehensive security measures meeting industry compliance requirements
- Change management processes supporting controlled deployment and maintenance
- Monitoring and support structures ensuring ongoing system health

This documentation provides a complete blueprint for implementing a world-class subscription management system in Salesforce, combining technical best practices with business process optimization to deliver measurable value to the organization.

The modular approach allows for phased implementation, enabling organizations to realize value incrementally while building toward the complete vision. Each phase builds upon previous foundations, ensuring a cohesive and integrated final solution.

Future enhancements can leverage emerging Salesforce technologies including Einstein AI for predictive analytics, Experience Cloud for enhanced customer self-service, and advanced integration patterns for ecosystem expansion.