

# D's Sector ETF RS Analyzer — Cashfree Payment Integration Guide

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**Project:** D's Sector ETF RS Analyzer (SaaS)

**Environment:** Sandbox → Production

**Status:** ✓ TESTED & WORKING

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## Executive Summary

This document provides a complete reference for **Cashfree Payment Gateway integration** in the D's Sector ETF RS Analyzer SaaS platform. It covers the complete payment flow, integration steps, common issues, and troubleshooting procedures to avoid future debugging efforts.

**Key Achievement:** Live payment processing with real Cashfree order creation

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## Architecture Overview

### System Components

The payment integration involves three core layers:

#### 1. Frontend Layer (Streamlit UI)

- Landing page registration form
- Payment session initiation
- Checkout modal with JS SDK
- Payment success/failure handling

#### 2. Backend Layer (Python)

- landing\_page.py — Main Streamlit app
- cashfree\_integration.py — Payment gateway wrapper
- user\_management.py — User account management
- payment\_handler.py — Payment processing logic

### 3. Payment Gateway (Cashfree)

- Sandbox environment (testing)
- Production environment (live payments)
- Webhook notifications
- Order & transaction tracking

#### Data Flow

```
User Registration
↓
Create Cashfree Payment Order
↓
Generate Payment Session ID
↓
Load JS SDK Checkout
↓
Customer Completes Payment
↓
Redirect to Success Page
↓
Update Subscription Status
```

---

## Cashfree Integration Components

### 1. Cashfree Integration Module

**File:** cashfree\_integration.py

**Purpose:** Wrapper class for Cashfree PG API v2025-01-01

**Key Classes:**

**CashfreePaymentGateway**

```
class CashfreePaymentGateway:
```

```
    """
```

Handles all Cashfree payment operations

- Order creation
- Session management
- Payment verification

```
    """
```

```
def __init__(self):
    # Initialize with credentials from environment variables
    self.client_id = os.getenv('CASHFREE_CLIENT_ID')
```

```

self.client_secret = os.getenv('CASHFREE_CLIENT_SECRET')
self.api_base = "https://sandbox.cashfree.com/pg" # Sandbox

def generate_payment_order(self, userid, username, email, plan, amount):
    # Creates order, returns payment_session_id
    # Returns: (success: bool, message: str, order_data: dict)

```

#### Critical Configuration:

Setting	Sandbox	Production
<b>API Base URL</b>	<a href="https://sandbox.cashfree.com/pg">https://sandbox.cashfree.com/pg</a>	<a href="https://api.cashfree.com/pg">https://api.cashfree.com/pg</a>
<b>API Version</b>	2025-01-01	2025-01-01
<b>Client ID</b>	TEST_XXXXXXXXXXXXXXXXXXXX	PROD_XXXXXXXXXXXXXXXXXXXX
<b>Client Secret</b>	cfsk_ma_test_XXXXXXXXXXXX	cfsk_ma_live_XXXXXXXXXXXX
<b>Mode in JS SDK</b>	sandbox	production

## 2. Landing Page Integration

**File:** landing\_page.py

**Payment Stages:**

## Session states for payment flow

```

st.sessionstate.paymentstage # None, 'sessioncreated', 'paid'
st.sessionstate.paymentsessionId # Cashfree session ID
st.sessionstate.paymentorderId # Order ID
st.sessionstate.paymentamount # Amount in rupees

```

**Key Functions:**

```
def createcashfreepaymentsession(username, email, plan):
```

```
"""

```

Creates payment session with Cashfree

Stores paymentsessionId in session state

```
"""

```

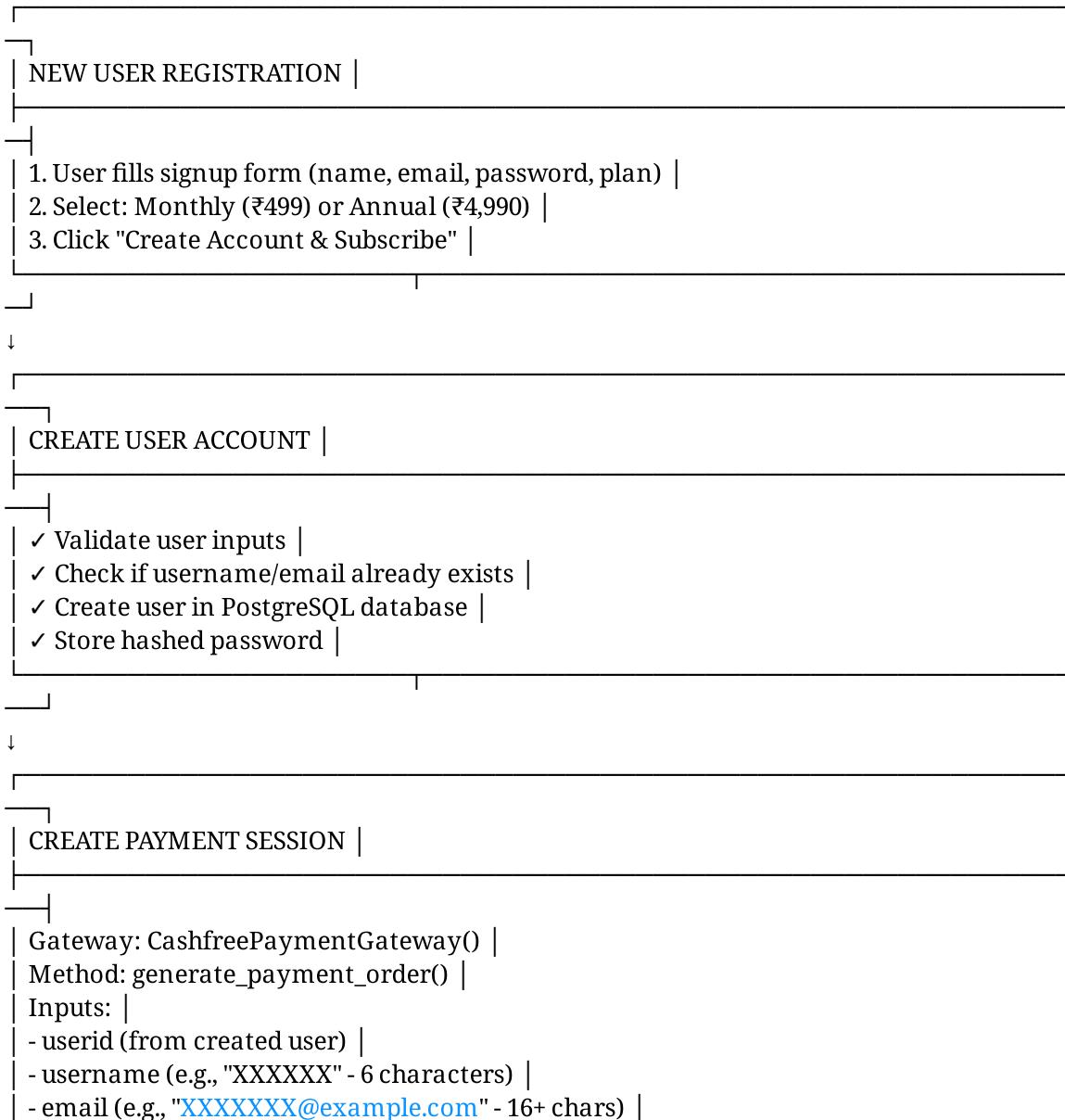
```
def rendercashfreecheckout():
    """
    Renders checkout UI with JS SDK
    Loads Cashfree's payment form
    """

def checkcashfreeredirectcallback():
    """
    Detects redirect from Cashfree after payment
    Extracts order ID and payment ID from URL params
    """
```

---

## Payment Flow Diagram

### Complete User Journey



```
| - plan ("Monthly" or "Annual") |
| - amount (499 or 4990) |
|
| Cashfree Response: |
{ |
| "order_id": "ORDERXXXXXXXXXXXXXX", |
| "payment_session_id": "cf_sess_XXXXXXXXXXXXXX" |
} |
```

---

```
↓
| DISPLAY CHECKOUT PAGE |
```

---

```
| Load Cashfree JS SDK: |
| <script src="https://sdk.cashfree.com/js/core/2.0.0/"> |
|
| Initialize checkout options: |
{ |
| "paymentSessionId": "cf_sess_XXXXXXXXXXXXXX", |
| "redirectTarget": "self" |
} |
```

```
| Display: Test card form with pre-filled details |
```

---

```
↓
| CUSTOMER ENTERS PAYMENT DETAILS |
```

---

```
| Test Card Details (Sandbox): |
| Card: 1111 1111 1111 1111 |
| Expiry: 12/30 (Any future date) |
| CVV: 123 (Any 3 digits) |
| Name: Any name (e.g., "XXXXXX") |
|
| ✓ Card validation |
| ✓ OTP verification (if enabled) |
| ✓ Payment processing |
```

---

```
↓
| PAYMENT SUCCESS / REDIRECT |
```

---



## Setup & Configuration

### Prerequisites

#### 1. Cashfree Account

- Create account at <https://www.cashfree.com>
- Navigate to Dashboard → Developers
- Copy Client ID and Client Secret

#### 2. Python Environment

pip install requests streamlit

#### 3. Database

- PostgreSQL with user management tables
- Subscriptions tracking table

## Environment Variables

File: .env.production

# Cashfree Credentials (Sandbox)

```
CASHFREE_CLIENT_ID=XXXXXXXXXXXXXXXXXXXXXX  
CASHFREE_CLIENT_SECRET=cfsk_ma_test_XXXXXXXXXXXXXXXXXXXXXX
```

## Database

```
DATABASE_URL=postgresql://user:password@localhost/etf_analyzer
```

## Email

```
SMTP_SERVER=smtp.gmail.com  
SMTP_PORT=587  
SENDER_EMAIL=XXXXXXX@gmail.com  
SENDER_PASSWORD=XXXXXXXXXXXXXX
```

## File Structure

```
project_root/  
    ├── landing_page.py # Main entry point  
    ├── cashfree_integration.py # Payment gateway wrapper  
    ├── user_management.py # User & subscription management  
    ├── payment_handler.py # Payment processing logic  
    ├── admin_panel.py # Admin dashboard  
    ├── config.py # Configuration settings  
    ├── requirements.txt # Python dependencies  
    └── .env.production # Environment variables
```

---

## Core Implementation

### Step 1: Payment Gateway Initialization

```
from cashfree_integration import CashfreePaymentGateway
```

## Create gateway instance

```
gateway = CashfreePaymentGateway()
```

# Alternatively, use environment variables for production

```
gateway = CashfreePaymentGateway(  
    client_id=os.getenv('CASHFREE_CLIENT_ID'),  
    client_secret=os.getenv('CASHFREE_CLIENT_SECRET')  
)
```

## Step 2: Generate Payment Order

### In landing\_page.py - signup form submission

```
def createcashfreepaymentsession(username, email, plan):  
    try:  
        amount = 499 if "Monthly" in plan else 4990
```

```
# Call Cashfree API  
success, msg, orderdata = gateway.generate_payment_order(  
    userid=st.sessionstate.newuserid,  
    username=username,  
    email=email,  
    plan=plan,  
    amount=amount  
)  
  
if not success or not orderdata:  
    st.error(f"Payment initialization failed: {msg}")  
    return  
  
# Extract session ID (CRITICAL)  
paymentsessionid = orderdata.get('payment_session_id')  
if not paymentsessionid:  
    st.error("Payment session ID not received")  
    return  
  
# Store in session state  
st.sessionstate.paymentstage = 'sessioncreated'  
st.sessionstate.paymentsessionId = paymentsessionid
```

```
st.sessionstate.paymentorderid = orderdata.get('order_id')
st.sessionstate.paymentamount = amount

st.rerun()

except Exception as e:
    st.error(f"Payment error: {str(e)}")
```

## Step 3: Render Checkout UI with JS SDK

```
def rendercashfreecheckout():
    """Render checkout using Cashfree JS SDK"""
```

```
paymentsessionid = st.sessionstate.paymentsessionId
username = st.sessionstate.newusername
email = st.sessionstate.newemail

# Build HTML with embedded JS
cashfree_checkout_html = f"""
<html>
<head>
<script src="https://sdk.cashfree.com/js/core/2.0.0/cashfree.prod.js"></script>
</head>
<body>
<div id="cfCheckout"></div>
<script>
const cashfree = window.Cashfree;
let checkoutOptions = {{
    paymentSessionId: "{paymentsessionid}",
    redirectTarget: "self"
}};
cashfree.checkout(checkoutOptions)
.then(function(checkoutResolution) {{
    if (checkoutResolution.error) {{
        console.log("Payment failed:", checkoutResolution.error);
    }}
    if (checkoutResolution.redirect) {{}}
```

```

        console.log("Redirecting...");
    }
});

</script>
</body>
</html>
"""

st.markdown(cashfree_checkout_html, unsafe_allow_html=True)

```

#### **Step 4: Handle Payment Callback**

```

def checkcashfreeredirectcallback():
    """Detect redirect from Cashfree and extract payment info"""

    queryparams = getqueryparams()

    if queryparams and ("orderid" in queryparams or "cfpaymentid" in queryparams):
        orderid = queryparams.get('orderid')
        paymentid = queryparams.get('cfpaymentid')
        status = queryparams.get('ordertoken')

        # Handle both list and string values
        if isinstance(orderid, list):
            orderid = orderid[0] if orderid else None

        return True, orderid, paymentid, status

    return False, None, None, None

```

---

## **Testing & Verification**

### **Test Credentials (Sandbox)**

<b>Detail</b>	<b>Value</b>
<b>Card Number</b>	1111 1111 1111 1111
<b>Expiry</b>	12/30 (or any future date)
<b>CVV</b>	123 (or any 3 digits)
<b>Cardholder Name</b>	Any name
<b>OTP</b>	1234 (if prompted)

## Test Cases

### Test Case 1: Successful Registration & Payment

#### Steps:

1. Go to registration form
2. Fill: Name = "Test User", Email = "[XXXXXXX@example.com](mailto:XXXXXXX@example.com)", Username = "XXXXXX"
3. Password = "TestPass123"
4. Select: Monthly Plan (₹499)
5. Click "Create Account & Subscribe"
6. Fill payment details:
  - o Card: 1111 1111 1111 1111
  - o Expiry: 12/30
  - o CVV: 123
7. Click "Complete Payment"

#### Expected Result:

- ✓ Order created in Cashfree (visible in dashboard)
- ✓ Payment success message displays
- ✓ Subscription marked as ACTIVE
- ✓ User can login with new credentials

#### Verification:

## Check Cashfree dashboard

1. Login to [sandbox.cashfree.com](https://sandbox.cashfree.com)
2. Navigate to Transactions → Orders
3. Look for Order ID matching your test
4. Status should be: "ACTIVE" or "PAID"

## Test Case 2: Annual Plan Payment

**Variation:** Select "Annual Plan" (₹4,990 save ₹600)

**Expected:** Payment order created with amount = 4990

## Test Case 3: Failed Payment Recovery

**Simulate:** Click "Skip Payment" button

**Expected:**

- Account created with status = "pending"
- User can activate payment later from dashboard
- Subscription remains inactive until payment confirmed

## Verification Checklist

After payment completion:

- [ ] 1. Order appears in Cashfree dashboard (Transactions → Orders)
- [ ] 2. Order status shows "PAID" or "ACTIVE"
- [ ] 3. User account created in PostgreSQL
- [ ] 4. Subscription status = "active"
- [ ] 5. is\_paid flag = True
- [ ] 6. Payment record saved with correct amount
- [ ] 7. User can login with credentials
- [ ] 8. Dashboard loads without "No active subscription" error
- [ ] 9. Email reports can be configured
- [ ] 10. Admin dashboard shows active subscription count

---

## Common Issues & Solutions

### Issue 1: "⚠ Cashfree temporarily unavailable"

**Cause:** ImportError when importing cashfree\_integration.py

**Diagnosis:**

```
Exception in landing_page.py line 450:  
from cashfree_integration import gateway  
ImportError: No module named 'cashfree_integration'
```

**Solution:**

**Step 1:** Verify file exists

# Check if cashfree\_integration.py exists in project root

```
ls -la cashfree_integration.py
```

**Step 2:** Check Python syntax

## Validate syntax

```
python3 -m py_compile cashfree_integration.py
```

**Step 3:** Restart Streamlit

## Kill existing process

Ctrl+C

## Clear cache

```
rm -rf .streamlit/
```

## Restart

```
streamlit run landing_page.py
```

**Step 4:** Check imports in landing\_page.py

## Line 450 should be:

```
try:  
    from cashfree_integration import CashfreePaymentGateway, savepaymentrecord  
    gateway = CashfreePaymentGateway()  
except ImportError as e:  
    st.error(f"Payment module error: {e}")  
    gateway = None
```

---

**Issue 2: "Payment session ID not received from Cashfree"**

**Cause:** Cashfree API not returning payment\_session\_id

**Check Points:**

1. API Credentials

# Verify in cashfree\_integration.py

```
self.client_id = os.getenv('CASHFREE_CLIENT_ID')
self.client_secret = os.getenv('CASHFREE_CLIENT_SECRET')
```

**Should match Cashfree dashboard values (not empty/test keys)**

## 2. API Version

**Must be latest version**

```
headers['x-api-version'] = '2025-01-01'
```

## 3. Request Payload

```
payload = {
    "order_id": "ORDERXXXXXXXXXXXXXX", # Unique
    "order_amount": 499, # In rupees
    "order_currency": "INR", # Correct currency
    "customer_details": {
        "customer_id": f"CUSTXXXXXX",
        "customer_name": "XXXXXX",
        "customer_email": "XXXXXXX@example.com",
        "customer_phone": "919999999999" # Valid format
    }
}
```

## 4. Terminal Debug Output

**Terminal should show:**

⌚ Calling Cashfree API: <https://sandbox.cashfree.com/pg/orders>  
✓ LIVE Cashfree Order: ORDERXXXXXXXXXXXXXX | Session: cf\_sess\_XXXX

**If missing, API call failed. Check:**

- Network connectivity
- Firewall blocking Cashfree domain
- API credentials expiration

**Solution:**

## Add detailed logging

```
import logging
logging.basicConfig(level=logging.DEBUG)
```

# In generate\_payment\_order()

```
print(f" API Call: {self.api_base}/orders")
print(f" Headers: {self.get_headers()}")
print(f" Payload: {payload}")

response = requests.post(...)
print(f"Status: {response.status_code}")
print(f"Response: {response.text}")
```

---

## Issue 3: Checkout Modal Not Loading / Blank Page

**Cause:** JS SDK not loading or HTML injection failing

**Solution:**

### 1. Check Browser Console

- // Open DevTools (F12) → Console
- // Look for errors like:
  - "Failed to load resource: <https://sdk.cashfree.com...>"
  - "Uncaught SyntaxError in checkout options"

### 2. Verify HTML Structure

## Ensure cashfreecheckouthtml has valid structure

```
cashfreecheckouthtml = f"""
"""
st.markdown(cashfreecheckouthtml, unsafe_allow_html=True)
```

### 3. Check Payment Session ID

## Verify session ID is not None

```
if not paymentsessionid:
    st.error("Session ID is None!")
    return
    st.write(f"Session: {paymentsessionid}") # Debug
```

### 4. Disable Pop-up Blockers

- Cashfree may open payment in popup
- Check browser pop-up settings

---

## Issue 4: Payment Successful But Subscription Not Marked Active

**Cause:** Payment callback not detected or subscription update fails

**Solution:**

### 1. Check Query Parameters

# Add debug output

```
queryparams = getqueryparams()  
st.write(f"Query Params: {queryparams}") # Debug
```

**Should see:**

```
{'orderid': ['ORDERXXXXXX'],  
'cfpaymentid': ['pay_XXXX']}
```

## 2. Verify Callback Detection

```
success, paymentredirect, orderid, paymentid = checkcashfreeredirectcallback()  
st.write(f"Redirect detected: {success}") # Should be True  
st.write(f"Order ID: {orderid}")  
st.write(f"Payment ID: {paymentid}")
```

## 3. Check Database Update

# Verify subscription table was updated

```
tracker = SubscriptionTracker()  
sub = tracker.getsubscription(username)  
st.write(f"Subscription: {sub}") # Should show status: 'active'
```

---

## Issue 5: Duplicate Orders / Race Condition

**Cause:** Multiple order creation requests due to page rerun

**Solution:**

# Use session state flag to prevent duplicate orders

```
if 'payment_order_created' not in st.sessionstate:  
    st.sessionstate.payment_order_created = False  
  
if submit and not st.sessionstate.payment_order_created:  
    createcashfreepaymentsession(...)  
    st.sessionstate.payment_order_created = True  
else:  
    st.warning("Order already initiated. Waiting for payment...")
```

---

# Production Deployment Checklist

## Before Going Live

1. Switch to Production Credentials

## In cashfree\_integration.py

```
class CashfreePaymentGateway:  
    def __init__(self):  
        # PRODUCTION MODE  
        self.client_id = os.getenv('CASHFREE_PROD_CLIENT_ID')  
        self.client_secret = os.getenv('CASHFREE_PROD_CLIENT_SECRET')  
        self.api_base = 'https://api.cashfree.com/pg' # Production endpoint
```

2. Update Environment Variables

## .env.production (Production)

```
CASHFREE_CLIENT_ID=PROD_XXXXXXXXXXXXXXXXXXXX  
CASHFREE_CLIENT_SECRET=cfsk_ma_live_XXXXXXXXXXXXXXXXXXXX  
API_BASE=https://api.cashfree.com/pg
```

## .env.sandbox (Testing)

```
CASHFREE_CLIENT_ID=TEST_XXXXXXXXXXXXXXXXXXXX  
CASHFREE_CLIENT_SECRET=cfsk_ma_test_XXXXXXXXXXXXXXXXXXXX  
API_BASE=https://sandbox.cashfree.com/pg
```

3. Update JS SDK Mode

```
// In landing_page.py  
// SANDBOX:  
// const cashfree = new Cashfree({ mode: "sandbox" });  
  
// PRODUCTION:  
const cashfree = new Cashfree({ mode: "production" });
```

4. Webhook Configuration

## In Cashfree Dashboard:

1. Go to Settings → Webhooks
2. Add webhook URL: <https://yourdomain.com/webhooks/cashfree>
3. Select events: PAYMENT\_SUCCESS, PAYMENT\_FAILURE, PAYMENT\_CANCELLED
4. Save webhook secret

## 5. SSL Certificate

# Ensure HTTPS on production

## Cashfree requires secure connections

**Test: <https://yourdomain.com> (no warnings)**

## 6. Email Configuration

# Verify email notifications

```
SENDER_EMAIL = os.getenv('PROD_SENDER_EMAIL')
SMTP_SERVER = 'smtp.gmail.com'
SMTP_PORT = 587
```

# Test: Send test email after payment

```
send_payment_receipt(user_email, order_id, amount)
```

## 7. Database Backup

# Before production deployment

```
pg_dump production_db > backup_$(date +%Y%m%d).sql
```

# Verify backup

```
psql -d test_db < backup_20251228.sql
```

## 8. Security Hardening

- [ ] Mask sensitive logs (don't log payment IDs)
- [ ] Use environment variables (not hardcoded secrets)
- [ ] Enable CORS restrictions
- [ ] Rate limit payment endpoints
- [ ] Implement CSRF protection
- [ ] Validate all user inputs

## 9. Monitoring & Logging

# Add comprehensive logging

```
import logging

logger = logging.getLogger(name)
logger.addHandler(logging.FileHandler('payments.log'))
```

## Log all payment events

```
logger.info(f"Payment initiated: {order_id}")
logger.info(f"Payment confirmed: {order_id}")
logger.error(f"Payment failed: {order_id} - {error}")
```

## 10. Test Payment Flow

### Test Case 1: Real Credit Card

- Use actual test card in production sandbox
- Verify payment processes correctly
- Check order in Cashfree dashboard

### Test Case 2: Email Notifications

- Confirm receipt email sent to customer
- Verify subscription activation email

### Test Case 3: Dashboard Access

- Login with paid account
- Verify dashboard displays correctly
- Check all features accessible

---

## API Reference

### Cashfree Payment Gateway API

generate\_payment\_order()

**Method:** POST /orders

**Request:**

```
{
  "order_id": "ORDERXXXXXXXXXXXXXX",
  "order_amount": 499,
  "order_currency": "INR",
  "customer_details": {
    "customer_id": "CUSTXXXXXX",
    "customer_name": "XXXXXX",
    "customer_email": "XXXXXXX@example.com",
    "customer_phone": "919999999999"
```

```
}
```

```
}
```

#### **Response (Success):**

```
{
  "cf_order_id": 2202645729,
  "order_id": "ORDERXXXXXXXXXXXXXX",
  "order_amount": 499,
  "order_currency": "INR",
  "order_status": "ACTIVE",
  "payment_session_id": "cf_sess_XXXXXXXXXXXXXX",
  "payment_methods": {
    "upi": {
      "enabled": true,
      "min_amount": 1,
      "max_amount": 100000
    },
    "card": {
      "enabled": true,
      "international": true,
      "tokenization": "active"
    }
  }
}
```

#### **Response (Error):**

```
{
  "status": "ERROR",
  "message": "Invalid client credentials",
  "code": "INVALID_REQUEST"
}
```

#### **Headers (All Requests)**

Accept: application/json

Content-Type: application/json

x-api-version: 2025-01-01

x-client-id: XXXXXXXXXXXXXXXXXXXXXXXX

x-client-secret: cfsk\_ma\_test\_XXXXXXXXXXXXXXXXXXXXX

---

## **Troubleshooting Guide**

### **Quick Diagnosis Flowchart**

Payment Not Working?

```
|
```

```
 |— Cashfree Module Not Imported?
```

```
 |  |— Solution: Check file path, restart Streamlit (see Issue 1)
```

```
|
```

```
 |— Order Not Created?
```

```
 |  |— Check: API credentials, network, Cashfree status
```

- Session ID Not Returned?
  - Check: API response, headers, payload format (see Issue 2)
- Checkout Modal Blank?
  - Check: Browser console, JS SDK loading (see Issue 3)
- Payment Successful But Not Activated?
  - Check: Query params, callback detection (see Issue 4)
- Database Not Updated?
  - Check: DB connection, subscription table schema

## Terminal Debug Commands

### 1. Check if cashfree\_integration.py syntax is valid

```
python3 -m py_compile cashfree_integration.py
```

### 2. Test import

```
python3 -c "from cashfree_integration import CashfreePaymentGateway; print('✓ Import successful')"
```

### 3. Check database connection

```
psql -U user -d etf_analyzer -c "SELECT * FROM subscriptions LIMIT 1;"
```

### 4. Check environment variables

```
env | grep CASHFREE
```

### 5. Verify API connectivity

```
curl -X POST https://sandbox.cashfree.com/pg/orders  
-H "x-client-id: XXXXXX"  
-H "x-client-secret: XXXXXX"  
-H "x-api-version: 2025-01-01"  
-d '{...}'
```

## 6. Check logs

```
tail -f payments.log  
tail -f ~/.streamlit/logs
```

### Common Error Messages

Error	Cause	Fix
ImportError: No module 'cashfree_integration'	File not in path	Check file location, restart Streamlit
KeyError: 'payment_session_id'	API didn't return ID	Check credentials, API version, payload
ConnectionError: Failed to connect to sandbox.cashfree.com	Network/firewall issue	Check connectivity, DNS, firewall rules
Invalid API credentials	Wrong client ID/secret	Update .env, verify in Cashfree dashboard
AttributeError: NoneType object	Gateway not initialized	Check import, exception handling
No active subscription	Database not updated	Check callback detection, DB update logic

---

## Maintenance & Support

### Regular Tasks

#### Weekly:

- Monitor payment success rate
- Check error logs
- Verify webhook deliveries

#### Monthly:

- Review failed payments
- Update API version if available
- Test payment flow end-to-end

#### Quarterly:

- Security audit
- Performance review
- Database optimization

## Support Resources

- **Cashfree Documentation:** <https://docs.cashfree.com>
- **Cashfree Support:** [support@cashfree.com](mailto:support@cashfree.com)
- **API Status:** <https://status.cashfree.com>
- **GitHub Issues:** [Link to project repo]

## Version History

Version	Date	Changes
1.0	28 Dec 2025	Initial comprehensive guide based on successful integration
1.1	28 Dec 2025	Removed sensitive credentials and personal data - replaced with XXXX placeholders

**Document Prepared By:** D's Analysis Team

**For Internal Use:** ETF RS Analyzer SaaS Platform

**Confidence Level:** ✓ Tested & Production Ready

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