Server-to-Server Integration Guide

Version 1.0 | April 2025

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1. Introduction

This guide provides detailed instructions for financial institutions and corporate partners to integrate with NVC Global's Server-to-Server (S2S) transfer system. The S2S system enables direct, secure, high-volume financial transactions between institutions with minimal latency and maximum security.

> **Note:** Server-to-Server transfers are designed for institutional use and require explicit authorization and setup by NVC Global. Please contact your NVC Global account manager to begin the verification and setup process.

2. System Architecture

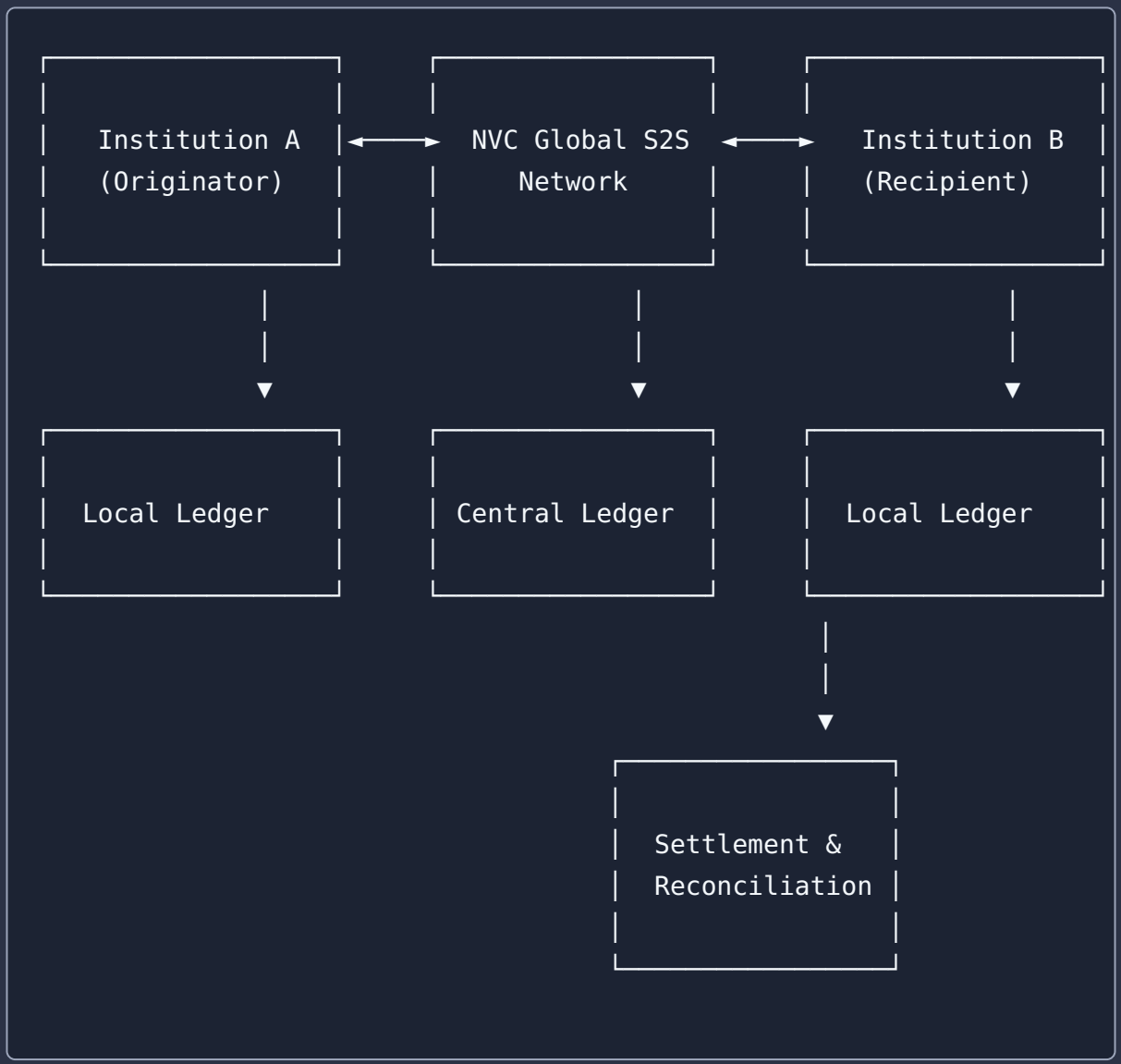
The NVC Global Server-to-Server transfer system is built on a secure, multi-layered architecture that ensures both performance and security for high-value transfers.

2.1 Core Components

- **Authentication Layer** - Multi-factor authentication and API key validation
- **Encryption Layer** - End-to-end encryption of all transaction data

- **Transaction Processing Engine** - High-throughput processing for instant settlements
- **Audit & Compliance System** - Real-time transaction monitoring and regulatory reporting
- **Reconciliation System** - Automated matching and confirmation

2.2 System Architecture Diagram



3. Integration Requirements

3.1 Technical Requirements

- HTTP/HTTPS support with TLS 1.2 or higher

- JSON request/response processing capabilities
- Ability to generate and validate digital signatures
- API endpoint exposed for receiving notifications
- Secure storage for API credentials
- Recommended: 99.9% uptime for critical systems

3.2 Security Requirements

- Implementation of OAuth 2.0 or equivalent authentication protocol
- Adherence to data protection regulations (GDPR, CCPA, etc.)
- Implementation of IP whitelisting for API access
- Regular security audits and penetration testing
- Encryption of sensitive data at rest and in transit

3.3 Compliance Requirements

- Compliance with AML/KYC regulations
- Implementation of transaction monitoring systems
- Record keeping according to financial regulatory requirements
- Ability to generate regulatory reports
- Support for transaction freezing/reversal procedures

> **Important:** All integrating institutions must sign the NVC Global Security & Compliance Agreement before gaining access to production systems.

4. API Reference

4.1 Authentication

All API requests must include the following authentication headers:

```
Authorization: Bearer {your_api_token}
X-API-Key: {your_api_key}
X-Request-Timestamp: {unix_timestamp}
X-Request-Signature: {hmac_signature}
```

The signature should be calculated as follows:

```
HMAC-SHA256(
    API_SECRET,
    API_KEY + UNIX_TIMESTAMP + REQUEST_METHOD + ENDPOINT_PATH + REQUEST_BO
)
```

4.2 Server-to-Server Transfer API

Initiate Transfer

POST `/s2s/api/transfer`

Request Body:

```
{
  "institution_id": "12345",
  "amount": 1000000.00,
  "currency": "USD",
  "description": "Payment for services",
  "reference_code": "INV-2025-04-26",
  "transfer_type": "CREDIT",
  "callback_url": "https://your-institution.com/callbacks/s2s"
}
```

Response:

```
{
  "success": true,
  "transaction_id": "f8c3de3d-1d35-4e97-9e55-c578a9c9c897",
  "status": "PENDING",
  "message": "Server-to-Server transfer initiated successfully"
}
```

Check Transfer Status

GET `/s2s/api/status/{transaction_id}`

Response:

```
{
  "transaction_id": "f8c3de3d-1d35-4e97-9e55-c578a9c9c897",
  "status": "COMPLETED",
```

```
  "amount": 1000000.00,
  "currency": "USD",
  "created_at": "2025-04-26T10:30:00Z",
  "completed_at": "2025-04-26T10:30:05Z",
  "settlement_reference": "NVC-S2S-2025042600001"
}
```

Schedule Future Transfer

> **POST** `/s2s/api/schedule`

Request Body:

```
{
  "institution_id": "12345",
  "amount": 1000000.00,
  "currency": "USD",
  "description": "Scheduled quarterly payment",
  "reference_code": "QTR-2025-Q2",
  "transfer_type": "CREDIT",
  "schedule_date": "2025-06-30T00:00:00Z",
  "callback_url": "https://your-institution.com/callbacks/s2s"
}
```

Response:

```
{
  "success": true,
  "transaction_id": "a1b2c3d4-5e6f-7g8h-9i0j-k1l2m3n4o5p6",
  "status": "SCHEDULED",
  "scheduled_for": "2025-06-30T00:00:00Z",
  "message": "Server-to-Server transfer scheduled successfully"
}
```

5. Implementation Guide

5.1 Integration Process

1. **Application & Approval** - Submit request for S2S access and complete compliance review

2. **Development Access** - Receive sandbox API credentials
3. **Implementation** - Develop against the sandbox environment
4. **Testing** - Complete test scenarios provided by NVC Global
5. **Security Review** - Pass security assessment
6. **Production Deployment** - Receive production credentials and go live

5.2 Sample Code (Python)

```
import requests
import hmac
import hashlib
import time
import json

API_KEY = 'your_api_key'
API_SECRET = 'your_api_secret'
API_TOKEN = 'your_api_token'
BASE_URL = 'https://api.nvcglobal.com'

def generate_signature(method, endpoint, body):
    timestamp = str(int(time.time()))

    if isinstance(body, dict):
        body = json.dumps(body)

    message = API_KEY + timestamp + method + endpoint + (body or '')
    signature = hmac.new(
        API_SECRET.encode('utf-8'),
        message.encode('utf-8'),
        hashlib.sha256
    ).hexdigest()

    return signature, timestamp

def initiate_s2s_transfer(institution_id, amount, currency, description, r
    endpoint = '/s2s/api/transfer'
    method = 'POST'

    payload = {
        'institution_id': institution_id,
        'amount': amount,
        'currency': currency,
        'description': description,
```

```
        'reference_code': reference_code,
        'transfer_type': 'CREDIT',
        'callback_url': 'https://your-institution.com/callbacks/s2s'
    }

    signature, timestamp = generate_signature(method, endpoint, payload)

    headers = {
        'Authorization': f'Bearer {API_TOKEN}',
        'X-API-Key': API_KEY,
        'X-Request-Timestamp': timestamp,
        'X-Request-Signature': signature,
        'Content-Type': 'application/json'
    }

    response = requests.post(
        BASE_URL + endpoint,
        headers=headers,
        json=payload
    )

    return response.json()

# Example usage
result = initiate_s2s_transfer(
    institution_id='12345',
    amount=1000000.00,
    currency='USD',
    description='Payment for services',
    reference_code='INV-2025-04-26'
)

print(result)
```

5.3 Callback Handling

Your system must implement a callback endpoint to receive updates about transfer status changes. The callback will be sent as a POST request with the following payload:

```
{
  "event": "s2s.transfer.status_update",
  "transaction_id": "f8c3de3d-1d35-4e97-9e55-c578a9c9c897",
```

```
  "previous_status": "PENDING",
  "new_status": "COMPLETED",
  "timestamp": "2025-04-26T10:30:05Z",
  "settlement_reference": "NVC-S2S-2025042600001",
  "signature": "hmac_signature_of_payload"
}
```

Your system should validate the signature using the same HMAC-SHA256 algorithm described in the authentication section.

6. Testing and Certification

6.1 Sandbox Environment

A complete sandbox environment is available for testing your integration. The sandbox environment is identical to production but uses separate credentials and does not affect real accounts or balances.

Sandbox Base URL: `https://sandbox.api.nvcglobal.com`

6.2 Test Scenarios

Complete the following test scenarios to verify your integration:

1. Successful transfer with valid parameters
2. Failed transfer due to insufficient funds
3. Transfer with callback processing
4. Scheduled future transfer
5. Transfer status verification
6. Error handling for invalid requests

6.3 Certification Process

Once you have successfully implemented and tested your integration, contact your NVC Global account manager to begin the certification process. Certification involves:

1. Code review of your implementation
2. Security assessment
3. Performance testing
4. Compliance verification

5. End-to-end testing with NVC Global

> **Note:** Allow 2-4 weeks for the full certification process to be completed.

7. Production Considerations

7.1 Going Live Checklist

- Complete all test scenarios successfully
- Receive certification approval from NVC Global
- Implement proper error handling and retry logic
- Set up monitoring for the integration
- Create runbooks for common issues
- Train support staff on the integration
- Set up alert notifications for failed transfers
- Implement reconciliation procedures

7.2 Support and Escalation

NVC Global provides 24/7 support for all S2S integrations. Contact information:

- Technical Support: `s2s-support@nvcglobal.com`
- Emergency Hotline: `+1-888-NVC-S2S1` (available 24/7)
- Support Portal: `https://support.nvcglobal.com`

7.3 Monitoring and Alerting

Implement monitoring for these key metrics:

- API response times
- Transfer success rates
- Callback processing success rates
- Error rates by error type
- Transfer volumes and amounts
- Authentication failures