PRODUCT OVERVIEW
2. PRODUCT OVERVIEW

WHAT IS ACCOUNT AGGREGATION?

Account aggregation is a method that gathers information from different types of financial accounts & products, and compiles it in one place.

The goal is to provide customers with a truly complete & holistic picture of their finances.

This is done by accessing heterogeneous financial information from different banks and displaying it in a more useful & convenient way.
2. PRODUCT OVERVIEW

THE STRANDS AGGREGATION OFFERING

AGGREGATION TYPES

MANUAL
Users upload their external data into the aggregation engine via CSV, Excel, OFX or other formats.

AUTOMATIC
The Strands Aggregation Engine automatically pulls in data for accounts added by the user.

DELIBERATION MODES

ON-PREMISE
Dedicated on-site deployment guarantees aggregated data is safely stored within the bank’s internal infrastructure.

SaaS
Aggregation engine and data are managed by Strands but hosted externally by a trusted cloud services partner selected by the bank.
2. PRODUCT OVERVIEW

KEY BENEFITS FOR BANKS

1. BECOME YOUR CUSTOMER’S PRIMARY BANK
   Offer them a space to view all their accounts, even from non-financial entities, in one convenient place: their personal financial management tool.

2. GET A 360° VIEW OF CUSTOMERS
   Aggregation technology allows banks to obtain extremely valuable financial information to more accurately discover and target customers’ unique needs.

3. BOOST CROSS & UP-SELL REVENUE
   After collecting these crucial insights, banks can quickly customize and deliver personalized offerings and suggestions - often before customers even realize they need them.

4. INCREASE RETENTION & ATTRACT NEW CUSTOMERS WITH ELEVATED UX
   Customers who link multiple accounts become more engaged and ultimately more loyal to financial providers offering this service.

5. SAVE MONEY & MAXIMIZE ROI WITH OPTIMIZED BROKERING
   Because the Strands dynamic Broker Engine always selects the connection that will give maximum uptime, banks save money when they choose Meta-Aggregation. More access to more providers means better value for a lower price.

6. REDUCE DEPENDENCY ON A SINGLE AGGREGATION SERVICES PROVIDER
   Strands Meta-Aggregation gives you access to the optimal number of aggregators, meaning that if one connection breaks, it will be immediately and automatically replaced by another.

7. ACCESS RICHER, CLEANER CUSTOMER DATA
   The aggregated data indicating where your customers hold external accounts also enriches categorization mapping by adding additional details.
1. **HOLISTIC**

Strands Meta-Aggregation gives banks access to a variety of external sites, including non-financial entities, to deliver the best possible customer experience.

2. **OPTIMIZED**

The Broker Engine provides maximum availability and guarantees constant uptime and better value by leveraging multiple data sources simultaneously.

3. **RELIABLE**

Real-time Monitor Engine and Dashboard allow banks to monitor performance of all crawlers, track KPIs and take action to guarantee maximum uptime.

4. **COST-EFFICIENT**

The Broker Engine, powered by business rules, always chooses the aggregation data source that will deliver the best value to the host bank, thereby generating cost savings.

5. **RICHER DATA**

Aggregation provides otherwise inaccessible customer data that can enrich categorization of transactions and enable PFM widgets to generate more precise and relevant insights.

6. **FLEXIBLE**

Strands offers the widest variety of aggregation types (manual, automatic and optimized brokering) and delivery modes (SaaS or on-premise) to meet the aggregation needs of any bank.

7. **SECURE**

All data is protected with AES 256-bit symmetric key algorithm encryption and SHA-256 encryption. Usernames and passwords are hashed and stored on separate databases.

8. **SERVICES**

The Meta-Aggregation package includes integration services, custom-built crawler plugins, monitoring and maintenance, and technical training.
2. PRODUCT OVERVIEW

BENEFITS BY BUSINESS AREA

Value generation across the bank

- **MARKETING**
  - Differentiate against competitors without aggregation
  - Lead the FinTech race
  - Create image of innovative bank
  - Get more recognition & awards

- **CUSTOMER SERVICE**
  - Create a superior customer experience:
    - Higher satisfaction thanks to constant uptime
    - Improved loyalty & retention
    - Recommendations
  - Generate deeper & richer customer insights
  - Leverage a 360° customer view to further personalize product offerings

- **CHANNELS**
  - Position yourself as your users’ primary bank
  - Increase user adoption of online & mobile banking
  - Attract & engage more in digital channels, especially mobile

- **SALES**
  - Attract new customers (Millennials) by offering their number-one requested functionality: mobile aggregation
  - Sell more to existing customers:
    - Identify new selling opportunities
    - Make more personalized offers
    - Increase cross/up-sell
Value Proposition

Strands Meta-Aggregation leverages multiple aggregation service providers in order to:

- maximize uptime and cost savings
- elevate customer experience and
- reduce dependency on a single aggregation provider

Integrates seamlessly with Strands PFM and other Strands Finance Suite products for a frictionless user experience.
## 3. Architecture

### Aggregation Engine
- Executes crawler plug-ins designed specifically for aggregated FIs.
- Compiles and cleans heterogeneous financial data from aggregated entities, making it homogeneous & consistent.

### Broker Engine
- Encodes flexible & customizable business logic to decide which crawler is best for each context based on pricing models, availability, & data quality.
- Enables the Aggregation Engine to choose the best crawler for each FI based on various business rules.

### Monitor Engine
- Allows banks to monitor how the Aggregation Engine and its crawlers are working in terms of usage, volumes, availability, and costs.
- Works in real time and provides graphical insights on the status of the Aggregation Engine and crawlers.
### HOW IT WORKS

Multiple aggregation service providers enable the **Broker Engine** to dynamically decide which one is best at any time for a specific case.

---

**AGGREGATION SERVICE PROVIDERS**
- Bank X
- Bank Y
- Bank Z

**STRANDS META-AGGREGATION**
- Broker Engine
- Meta-Aggregation Engine
- Banking Data Model Interface
- Strands Finance Suite

**Bank Business Analyst**

**AGGREGATION DASHBOARD**

**MONITOR ENGINE**

**META-AGGREGATION**

**GENERIC AGGREGATOR**
- Yodlee
- Eurobits
- Intuit
In the SaaS integration model, the Strands Aggregation Engine is deployed within a hosting partner. Communication between the aggregation engine and the bank is done through HTTPS.

Customers’ bank credentials can be securely stored in the bank or with the hosting partner, subject to the partner’s security standards.
ON-PREMISE

All software and data stays within bank infrastructure and conforms to security standards.

Customers’ banking credentials are stored in Oracle-encrypted tables for extra security.
AGGREGATION PROCESS FOR THE USER

1. Get an overview of all bank accounts
AGGREGATION PROCESS FOR THE USER

2. Add accounts in three steps:

1. **Find & add account**: Upon selecting “Add Account” directly from their PFM dashboard, the user can easily search for and locate their account.

2. **Input credentials**: At this stage, the user provides their account credentials, which are automatically protected with AES 256-bit symmetric key algorithm encryption as well as SHA256 encryption.

3. **Confirm accounts**: The user’s accounts are now confirmed. They can be easily edited if credentials change and the transactional data is refreshed automatically.
AGGREGATION PROCESS FOR THE USER

3. See details of the aggregated account

All Accounts

- Bank A: -5,992,87€
- Credit Card 4940005062223783: 17,83€
- Cash Account: 0,00€
- Santander Credit Card Automatic: 5,000,00€
- Bank Account 01825688420201622453: 20,598,59€
- Credit Card 494015111782070: 234,36€
4. AGGREGATION PROCESS FOR THE USER

4. Within PFM select which accounts to include in the analysis and planning.
AGGREGATION PROCESS FOR THE BANK

Aggregator Application Login

Enter

User
admin

Password
....

Login
## AGGREGATION PROCESS FOR THE BANK

### View Provider Status

<table>
<thead>
<tr>
<th>Code</th>
<th>Name</th>
<th>Provider</th>
<th>Category</th>
<th>Products</th>
<th>% Success (last 7 days)</th>
<th>N° Executions (last 7 days)</th>
<th>Monitor</th>
<th>Manual</th>
<th>Actions</th>
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</thead>
<tbody>
<tr>
<td>0001</td>
<td>Barclays</td>
<td>Provider A</td>
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<td>CreditCard</td>
<td>100</td>
<td></td>
<td></td>
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<tr>
<td>0123</td>
<td>BBVA</td>
<td>Strands</td>
<td>bank</td>
<td>CreditCard</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0182</td>
<td>Citibank</td>
<td>Strands</td>
<td>bank</td>
<td>CreditCard, SavingAccount</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0182-cmt</td>
<td>Deutsche Bank</td>
<td>Provider B</td>
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<td>CreditCard, SavingAccount</td>
<td>55</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0183</td>
<td>ICBC</td>
<td>Strands</td>
<td>bank</td>
<td>SavingAccount</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0801</td>
<td>HSBC</td>
<td>Strands</td>
<td>bank</td>
<td>CreditCard, SavingAccount</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1234</td>
<td>Societe Generale</td>
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<td>CreditCard, SavingAccount</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>1465</td>
<td>INGDirect</td>
<td>Strands</td>
<td>bank</td>
<td>CreditCard</td>
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<td></td>
<td></td>
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<td></td>
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<td>2-AP-U5-AMEX</td>
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<td>Provider C</td>
<td>bank</td>
<td>CreditCard, SavingAccount</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>2-AP-U5-BOFA</td>
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<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4 DATA SECURITY
This is the storage process for user credentials.

Once the credentials (username and password) are obtained, a SALT is applied to the username simultaneously to obtain its SHA-256 encryption.

This HASH will be used as a KEY for password encryption using AES-256. Once encrypted, the password is stored in the database together with the username.

The SALT permanence in the server application prevents access to the user credentials in case of a breach.
META-AGGREGATION: CLIENT ADVANTAGES

**BANK**
- Understand % **wallet share**
- **KYC** for boosted cross- and up-sell via digital channels
- **Full control** over data location & security
- Multiple data source connections for maximum uptime & cost savings
- Increases likelihood of becoming customers’ primary bank

**CUSTOMERS**
- Most **valued** mobile banking feature
- **Real-time** convenience thanks to full integration with my PFM
- Personal data & keys **safely** managed by my bank, **NOT** sold to 3rd parties
- Easily navigable and **frictionless** user experience
WHAT OUR CLIENTS SAY ABOUT US

“The FinanzPlaner (powered by Strands) is a strategic investment for us. The huge amount of positive customer feedback proves that it was the right decision”

Michael Koch, Head of Online and Mobile Banking at Deutsche Bank

“My Money Manager (powered by Strands) provides our customers with deep financial insights, an excellent user experience and an ability to manage their money on the move through our online channels”

John Brennan, Head of Online Channel Development at AIB

“Strands has been a great partner in this journey. Barclays was able to integrate Strands widget logic and functionalities creating a seamless user experience”

Simon Shorey, Head of Social Media Platforms and Servicing, Digital Banking at Barclays

“We are excited about the positive response from our customers who have been looking for a better way to get a clear picture of where their money is going. MoneyLogic provides them with immediate insights into their spending and savings habits”

Dan Dickinson, Head of Online & Mobile Banking at Bank of Montreal
ABOUT STRANDS

**STRANDS** develops innovative software solutions that enable financial institutions & retailers to offer personalized customer experiences and create new revenue streams through digital channels.

The **Strands Finance Suite** includes white-label software solutions such as Personal Financial Management (PFM), Business Financial Management (BFM), and Card-Linked Offers (CLO), among others. In 2008, Strands revolutionized online banking by deploying the first PFM in Europe.

From our Barcelona HQ and offices in San Francisco, Miami, Madrid & Buenos Aires, we serve market leaders like Barclays, Deutsche Bank, BBVA, BNP Paribas, Bank of Montreal (BMO), Carrefour and Panasonic.
THANK YOU

LEARN MORE ABOUT STRANDS:
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BLOG
blog.strands.com
TWITTER
@StrandsFinance
5 BACKUP FOR DEMO
### 6. PREVIEW: BANK VIEW

**AGGREGATION PROCESS FOR THE BANK**

See Crawler List

<table>
<thead>
<tr>
<th>Code</th>
<th>Name</th>
<th>Provider</th>
<th>Category</th>
<th>Description</th>
<th>Current price</th>
<th>Actions</th>
</tr>
</thead>
<tbody>
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<td>Barclays</td>
<td>Strands</td>
<td>bank</td>
<td>Strands: Fixed Price</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>0123</td>
<td>BBVA</td>
<td>Strands</td>
<td>bank</td>
<td>Strands: Fixed Price</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>0182</td>
<td>ICBC</td>
<td>Strands</td>
<td>bank</td>
<td>Fixed Price</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>0182-cmt</td>
<td>Deutsche Bank</td>
<td>SaltEdge</td>
<td>bank</td>
<td>SaltEdge: Fixed Price</td>
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<td></td>
</tr>
<tr>
<td>0183</td>
<td>Societe Generale</td>
<td>Strands</td>
<td>bank</td>
<td>Strands: Fixed Price</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>0801</td>
<td>ING</td>
<td>Strands</td>
<td>bank</td>
<td>Strands: Fixed Price</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>1234</td>
<td>Citibank</td>
<td>Strands</td>
<td>bank</td>
<td>Strands: Fixed Price</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>1455</td>
<td>HSBC</td>
<td>Strands</td>
<td>bank</td>
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<td></td>
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<tr>
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<td>bank</td>
<td>Plaid API</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

Showing 1 to 10 of 23 entries
AGGREGATION PROCESS FOR THE BANK

Price Details for Aggregation Provider “Plaid API”
AGGREGATION PROCESS FOR THE BANK

6. PREVIEW: BANK VIEW

Login for Execution

Client ID: 4519011368964204
Password: ********

[Image of login page for ICBC]

Execute
AGGREGATION PROCESS FOR THE BANK

Execution in Process
6. PREVIEW: BANK VIEW

AGGREGATION PROCESS FOR THE BANK

View Complete Executions - Accounts Overview

<table>
<thead>
<tr>
<th>Marketing Info</th>
<th>Account Number</th>
<th>Account Type</th>
<th>Available Balance</th>
<th>Ledger Balance</th>
<th>Currency</th>
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</thead>
<tbody>
<tr>
<td>LIBRETÓN</td>
<td>01825088420201622453</td>
<td>SAVINGS</td>
<td>20598.59</td>
<td>20598.59</td>
<td>EUR</td>
</tr>
</tbody>
</table>

Transactions from 17/09/2015 to 17/11/2015

| VISA BUSINESS CRIO | 434013111732070 | VISA BUSINESS CRIO | 3000 | 284.36 | EUR |

Transactions from 17/09/2015 to 17/11/2015

| TARIETA DESPUES BBVA | 454000562223783 | TARIETA DESPUES BBVA | 3000 | 17.83 | EUR |

Transactions from 17/09/2015 to 17/11/2015
6. PREVIEW: BANK VIEW

AGGREGATION PROCESS FOR THE BANK

View Complete Executions - Credit Card

Transactions from 30/06/2015 to 31/08/2015

<table>
<thead>
<tr>
<th>Date Posted</th>
<th>Date Available</th>
<th>Concept</th>
<th>Amount</th>
<th>Currency</th>
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<tbody>
<tr>
<td>25/08/2015</td>
<td>25/08/2015</td>
<td>PAYMENT - THANK YOU / PAYSÉMENT - MERCI</td>
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<td>CAD</td>
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<tr>
<td>24/08/2015</td>
<td>24/08/2015</td>
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<td>CAD</td>
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<tr>
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<td>CAD</td>
</tr>
<tr>
<td>22/08/2015</td>
<td>22/08/2015</td>
<td>GOODLIFE E CIGH TORONTO ON</td>
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<td>CAD</td>
</tr>
<tr>
<td>21/08/2015</td>
<td>21/08/2015</td>
<td>CAFE HAVANA OAKVILLE ON</td>
<td>10.02</td>
<td>CAD</td>
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<td>TU *TRANSUNION 800-508-2597 CA</td>
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<td>CAD</td>
</tr>
<tr>
<td>19/08/2015</td>
<td>19/08/2015</td>
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<td>CAD</td>
</tr>
<tr>
<td>17/08/2015</td>
<td>17/08/2015</td>
<td>CUBALLAMA TORONTO ON</td>
<td>5</td>
<td>CAD</td>
</tr>
</tbody>
</table>