

Creating Fabric Data Agent

With a data agent in Microsoft Fabric, you can create conversational AI experiences that answer questions about data stored in lakehouses, warehouses, Power BI semantic models, KQL databases, and ontologies in Fabric. You can ask questions in plain English and receive data-driven answers grounded in data in Onelake.

Prerequisites

- A paid F2 or higher Fabric capacity, or a Power BI Premium per capacity (P1 or higher) capacity with Microsoft Fabric enabled
- Fabric data agent tenant settings is enabled.
- Cross-geo processing for AI is enabled.
- Cross-geo storing for AI is enabled.
- At least one of these, with data: A warehouse, a lakehouse, one or more Power BI semantic models, a KQL database, or an ontology.
- Power BI semantic models via XMLA endpoints tenant switch is enabled for Power BI semantic model data sources.
- Build permissions to the semantic model

In this workshop we will create a data agent for transactional data in a semantic model. With this data agent, user can ask questions regarding financial activity, transactions, account balances, user/category level spend/income etc.

Scope of the data agent:

Before creating the data agent, it's a good practice to identify & define the scope of the data agent which will help us configure the data agent to produce accurate responses.

Purpose

- Track and explain customer financial behavior: transaction activity (spend/income), account balances by type, and user-level cash flow (incoming – outgoing), including breakdowns by status and category.

What Data Agent should answer well

- User/customer analytics: top/bottom users by net cash flow, incoming, outgoing; active users; new users (if filtering on user created date).

- Category analytics: spending by category, income by category, net by category.
- Transaction health: completed vs pending vs failed amounts (and counts if you use transaction rows).
- Account analytics: total balances, balances by account type (checking/savings/credit), credit utilization, accounts per user.

What it cannot/will not answer

Time-based questions like “this month / last 30 days / trends over time”.

- Merchant/store/product-level questions (no merchant, store, SKU/product dimensions).
- Profitability, fees, interest, or revenue questions (no fee/interest/revenue fields/measures).
- Operational workflow questions (no timestamps for processing stages, no SLA metrics).
- User identity/profile reporting beyond IDs (no confirmed name/segment fields).

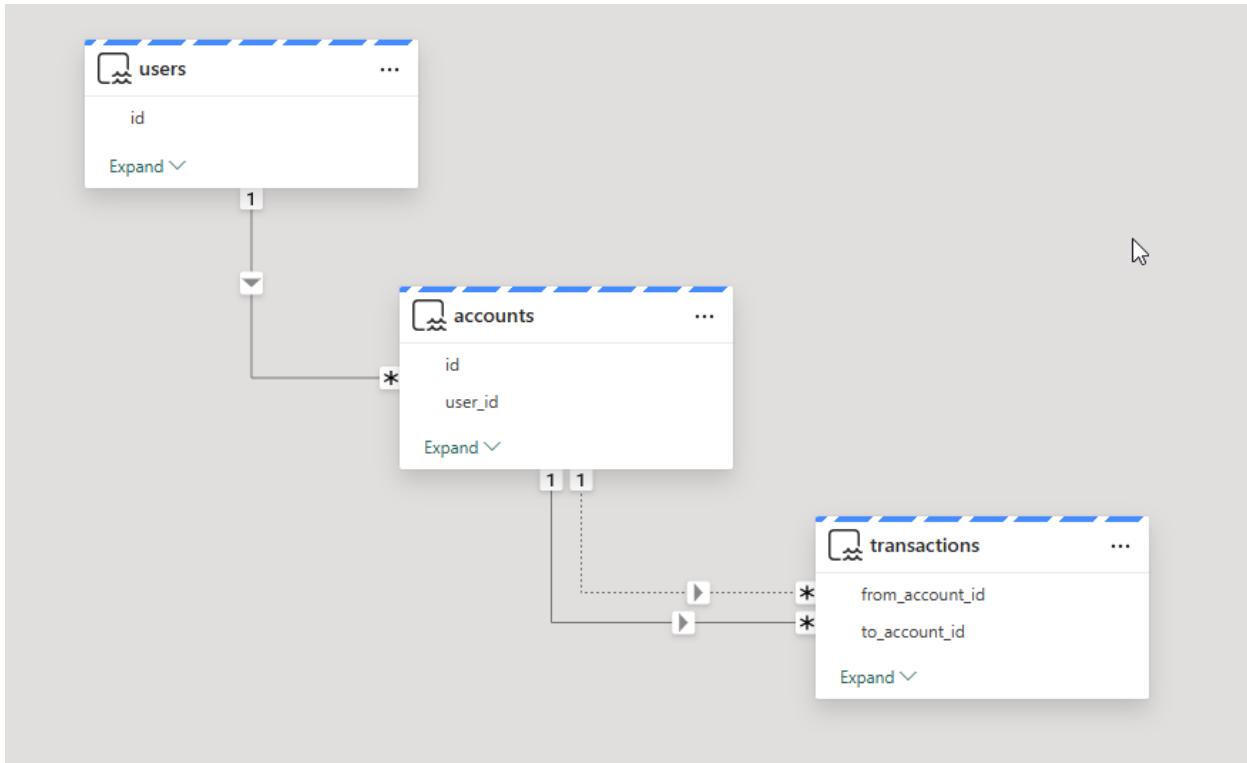
Intended users / personas

- *Product managers / growth*: understand customer cash flow patterns, activity, and category behavior.
- *Operations / risk*: monitor transaction status health (failed/pending), unusual net outflows, and credit utilization signals.
- *Finance / analytics*: summarize balances, deposits vs payments, and net movement across the customer base.
- *Support leads (light use)*: quick checks of user/account/transaction totals (not case-level troubleshooting without transaction identifiers and timestamps).

Semantic Model

The semantic model has three tables that are of interest for the scope of this data agent :

- *users* : customer dimension table
- *accounts* : account dimension table of accounts held by the customers
- *transactions* : fact table of money movement



Semantic model preparation:

Before we add the semantic model to the data agent, first the model needs to be prepared for AI use case. This will include:

- Check schema names
- Optimizing the model & DAX for performance
- Creating measures
- Aligning the semantic model with data agent scope

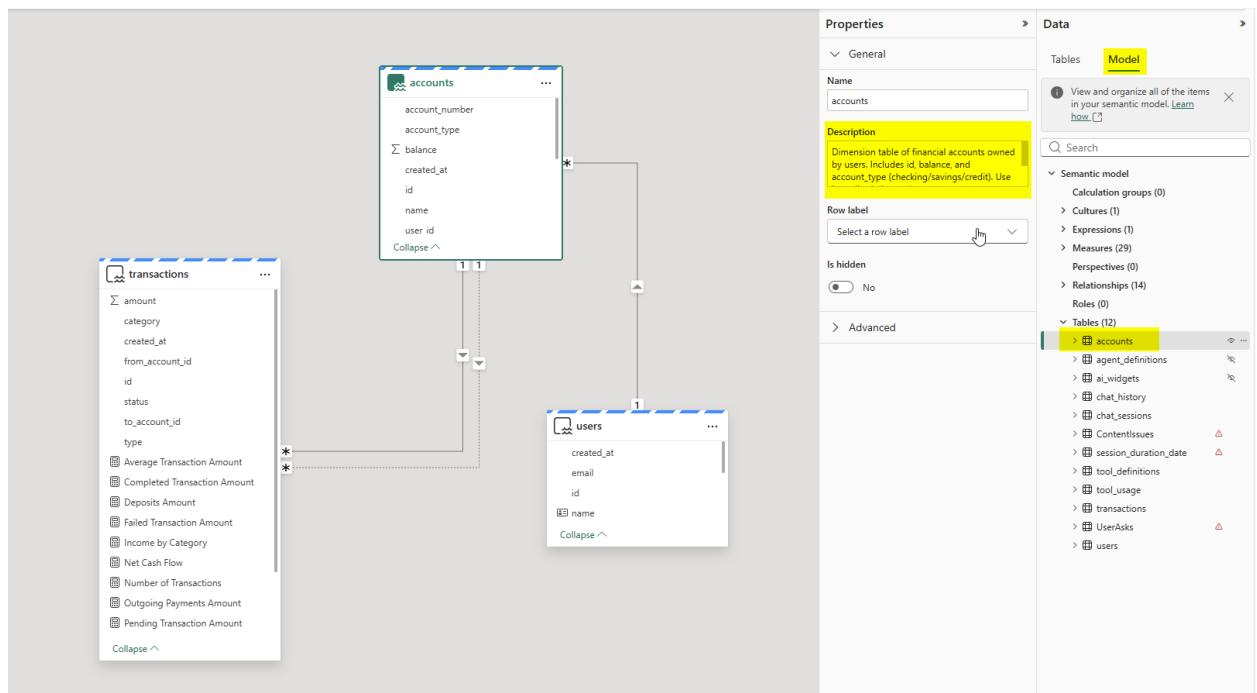
💡 Refer to the `semantic_model_dataagent_checklist.md` checklist for a comprehensive list of steps and `dataagent_utilities.ipynb` notebook for automating some of the steps.

Add Table Descriptions

Open `banking_semantic_model` in Web and add table descriptions:

- *transactions*: Fact table of money movements. Each row is a single transaction with amount, type (ex: payment/deposit), status (completed/pending/failed), and category. Direction is determined by which account key is populated: `from_account_id` = outgoing, `to_account_id` = incoming. Use this table for spend/income by category and transaction volume.

- **accounts**: Dimension table of financial accounts owned by users. Includes id, balance, and account_type (checking/savings/credit). Use it to slice balances by account type, compute total balances, and evaluate credit utilization (credit balances may be negative).
- **Users**: Dimension table of customers (users). Use it to group and rank metrics at the customer level (net cash flow per user, incoming/outgoing per user, active/new users). If a user creation date exists (ex: created_at), use it only for “new users” style questions, not for transaction-month filtering unless explicitly intended.



Add column descriptions:

Adding column descriptions helps AI understand the purpose of the columns and improves accuracy. For exercise purposes, we will add descriptions to the columns below only. In a real world project, it is recommended to add descriptions to all columns used in data agent.

Table	Column name	Description
transactions	from_account_id	Source account for outgoing transactions. If populated, treat the row as money leaving that account.

transactions	to_account_id	Destination account for incoming transactions. If populated, treat the row as money entering that account.
transactions	amount	Transaction monetary value (assumed positive). Direction is inferred from from_account_id vs to_account_id, not the sign.
transactions	type	Transaction kind (ex: payment = outgoing spend, deposit = incoming funds). Used to separate spending vs income.
transactions	category	Spend/income classification label (ex: Groceries, Housing). Use for category breakdowns.
transactions	status	Processing outcome/state (ex: completed, pending, failed). Use to filter transaction amounts by status.

The screenshot shows the Data Model Editor interface. On the left, a tree view lists various entities like 'transactions', 'category', etc. A specific node, 'amount', is selected and highlighted with a yellow box. On the right, the 'Properties' tab is active, displaying detailed information about the 'amount' measure. The 'General' section includes fields for 'Name' (set to 'amount') and 'Description' (containing the text: 'Transaction monetary value (assumed positive). Direction is inferred from from_account_id vs to_account_id, not the sign'). Below this, there are sections for 'Display folder' (with a placeholder 'Enter the display folder'), 'Is hidden' (with a toggle switch set to 'No'), and 'Formatting'. Under 'Formatting', the 'Data type' is set to 'Fixed decimal number'. The 'Model' tab is also visible, showing a sidebar with navigation links for Semantic model, Tables, and Measures. The 'Tables' section lists 12 tables, including 'accounts', 'agent_definitions', 'ai_widgets', and 'chat_history'.

Measures:

Explicit measures with descriptions help data agent calculate business metrics. Define measures based on the scope of the data agent.

DAX queries are discarded on close. DAX queries previously saved to the model are not shown or impacted. [Learn more](#)

Run **Update model with changes (2)**

```

1 Update model: Add new measure
1 DEFINE MEASURE 'transactions'[Total Transaction Amount2] = SUM ( 'transactions'[amount] )
2 Update model: Add new measure
2 DEFINE MEASURE 'transactions'[Total Outgoing Amount2] = CALCULATE ( SUM ( 'transactions'[amount] ), FILTER ( 'transactions', NOT ISBLANK ( 'transactions'
[from_account_id] ) ) )
3
4 🎨 |

```

TRANSACTIONS MEASURES

DEFINE MEASURE 'transactions'[Total Transaction Amount] = SUM ('transactions'[amount])

DEFINE MEASURE 'transactions'[Total Outgoing Amount] = CALCULATE (SUM ('transactions'[amount]), FILTER ('transactions', NOT ISBLANK ('transactions'[from_account_id])))

DEFINE MEASURE 'transactions'[Total Incoming Amount] = CALCULATE (SUM ('transactions'[amount]), USERELATIONSHIP ('accounts'[id], 'transactions'[to_account_id]), FILTER ('transactions', NOT ISBLANK ('transactions'[to_account_id])))

DEFINE MEASURE 'transactions'[Net Cash Flow] = [Total Incoming Amount] - [Total Outgoing Amount]

DEFINE MEASURE 'transactions'[Number of Transactions] = COUNTROWS ('transactions')

DEFINE MEASURE 'transactions'[Average Transaction Amount] = DIVIDE ([Total Transaction Amount], [Number of Transactions])

DEFINE MEASURE 'transactions'[Completed Transaction Amount] = CALCULATE ([Total Transaction Amount], 'transactions'[status] = "completed")

DEFINE MEASURE 'transactions'[Pending Transaction Amount] = CALCULATE ([Total Transaction Amount], 'transactions'[status] = "pending")

DEFINE MEASURE 'transactions'[Failed Transaction Amount] = CALCULATE ([Total Transaction Amount], 'transactions'[status] = "failed")

DEFINE MEASURE 'transactions'[Outgoing Payments Amount] = CALCULATE ([Total Outgoing Amount], 'transactions'[type] = "payment")

DEFINE MEASURE 'transactions'[Deposits Amount] = CALCULATE ([Total Incoming Amount], 'transactions'[type] = "deposit")

DEFINE MEASURE 'transactions'[Spending by Category] = CALCULATE ([Total Outgoing Amount], 'transactions'[type] = "payment")

```
DEFINE MEASURE 'transactions'[Income by Category] = CALCULATE ( [Total Incoming Amount], 'transactions'[type] = "deposit" )
```

ACCOUNTS MEASURES

```
DEFINE MEASURE 'accounts'[Total Account Balance] = SUM ( 'accounts'[balance] )
```

```
DEFINE MEASURE 'accounts'[Total Balance - Checking] = CALCULATE ( [Total Account Balance], 'accounts'[account_type] = "checking" )
```

```
DEFINE MEASURE 'accounts'[Total Balance - Savings] = CALCULATE ( [Total Account Balance], 'accounts'[account_type] = "savings" )
```

```
DEFINE MEASURE 'accounts'[Total Balance - Credit] = CALCULATE ( [Total Account Balance], 'accounts'[account_type] = "credit" )
```

```
DEFINE MEASURE 'accounts'[Credit Utilization] = VAR CreditBalance = [Total Balance - Credit] RETURN – CreditBalance
```

```
DEFINE MEASURE 'accounts'[Average Account Balance] = AVERAGE ( 'accounts'[balance] )
```

```
DEFINE MEASURE 'accounts'[Number of Accounts] = COUNTROWS ( 'accounts' )
```

```
DEFINE MEASURE 'accounts'[Accounts per User] = DIVIDE ( [Number of Accounts], DISTINCTCOUNT ( 'users'[id] ) )
```

USERS MEASURES

```
DEFINE MEASURE 'users'[Total Balance per User] = CALCULATE ( SUM ( 'accounts'[balance] ) )
```

```
DEFINE MEASURE 'users'[Total Outgoing per User] = [Total Outgoing Amount]
```

```
DEFINE MEASURE 'users'[Total Incoming per User] = [Total Incoming Amount]
```

```
DEFINE MEASURE 'users'[Net Cash Flow per User] = [Net Cash Flow]
```

```
DEFINE MEASURE 'users'[Active Users] = CALCULATE ( DISTINCTCOUNT ( 'users'[id] ), FILTER ( VALUES ( 'users'[id] ), CALCULATE ( COUNTROWS ( 'transactions' ) ) > 0 ) )
```

```
DEFINE MEASURE 'users'[New Users] = DISTINCTCOUNT ( 'users'[id] )
```

[OPTIONAL] Measure Descriptions

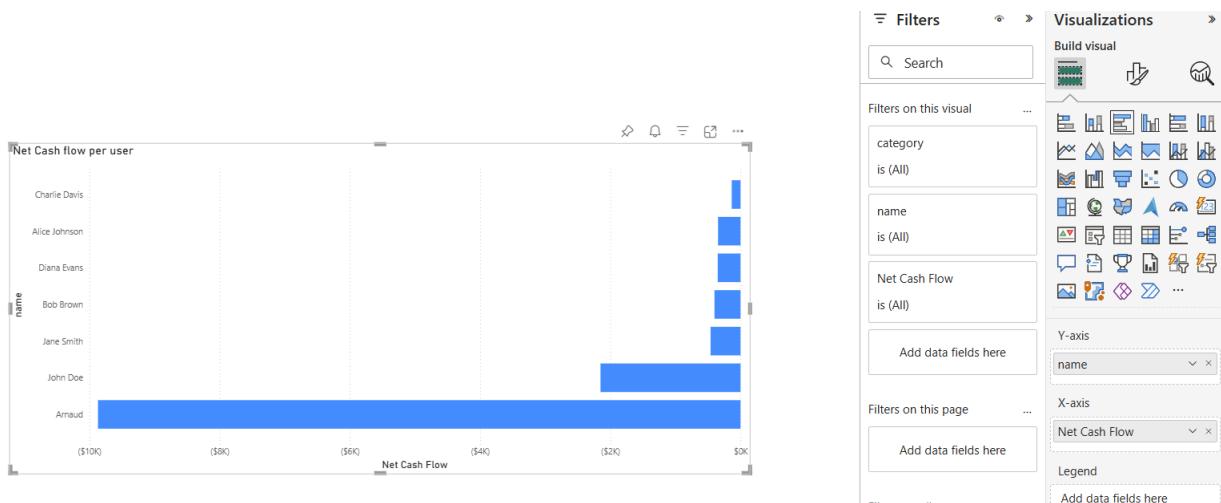
Add measure descriptions to define purpose, calculation logic in each measure

Create a sample report / visual

Explore the data by creating a report with a couple of visuals.

Use **user** column and **Net Cash Flow** measure to create a visual. Add **category** as a filter.

Feel free to create more visuals. Save the report.



Prep Data for AI:

Prep for AI helps you shape how AI experiences interpret the semantic model. It lets you define which parts of the model to expose, describe how they should be used, and provide extra context to improve the accuracy of generated responses. [Refer to documentation](#) for details.

Prep for AI offers three key configuration components in Power BI:

- **AI data schemas:** Define which tables and columns are prioritized for generated DAX queries.
- **Verified answers:** Predefined, validated responses to common or important questions.
- **AI instructions:** Contextual guidance to help AI generate relevant and accurate answers.

Steps:

1. Open Prep for AI

The screenshot shows the 'Details for agentic_semantic_model' page in Power BI. At the top right, there is a 'Prep data for AI' button. A red arrow points to this button. Below it, there are three main sections: 'Discover business insights', 'Share this data', and 'Explore this data'.

2. You can use the guided experience to configure Prep for AI

Prep data for AI

Get started

Simplify the data schema

Verified answers

Add AI instructions



Prep this model to be AI-ready

Improve Copilot insights about this semantic model in a few simple steps. Your changes will apply to all Copilot chats, but updates may take a moment. [Learn more](#)

Simplify the data schema

Improve response accuracy by deselecting fields
Copilot doesn't need to analyze.

Verified answers

Save predefined responses for your most critical
business topics.

Add AI instructions

Help Copilot understand industry terms, business
priorities, and important data fields.

3. Simplify data schema

Select only the accounts, transactions and users tables. In users table, exclude email and id columns. Always select only the columns that are in scope for data agent.

Prep data for AI

Get started

Simplify the data schema

Verified answers

Add AI instructions

Simplify the data schema (preview)

Improve response accuracy by deselecting fields Copilot can ignore

 Filter by keyword

- ✓  agentic_semantic_model
- >  accounts
- >  agent_definitions 
- >  ai_widgets 
- >  chat_history
- >  chat_sessions
- >  ContentIssues
- >  session_duration_date
- >  tool_definitions
- >  tool_usage
- >  transactions
- >  UserAsks
- ✓  users
 -  Active Users
 -  created_at
 -  email
 -  id
 -  name
 -  Net Cash Flow per User
 -  New Users
 -  Total Balance per User
 -  Total Incomina per User

4. Verified answers

Verified answers are human-approved, visual responses in Copilot that are triggered by predefined phrases. Each verified answer includes one or more trigger phrases, a visual, and optional associated filters.

Open the previously saved report in Edit mode and mark the visual as a Verified answer.

Prep data for AI

The screenshot shows the 'Verified answers (preview)' section of the Copilot interface. On the left, there are navigation links: 'Get started', 'Simplify the data schema', 'Verified answers' (which is highlighted with a yellow box), and 'Add AI instructions'. In the center, under 'Phrases connected to verified answers', there is a text input field containing 'what is the' and an 'Add' button. Below it is a list of phrases: 'Which user has the highest net cash flow?' (highlighted with a yellow box), 'Copilot suggestions', 'Which user has the lowest net cash flow?', and 'What is the net cash flow for each user?'. At the bottom of this section is a 'Refresh' button and a note: 'Copilot uses AI. Always review content for mistakes. [Read terms](#)'. To the right is a 'Visual' card with a bar chart titled 'Net Cash Flow' showing data for six users: Alice Johnson, Diana Evans, Bob Brown, Jane Smith, John Doe, and Arnaud. The chart has a legend indicating 'category' and shows blue bars for all users. The 'Available to viewers' section includes a checkbox for 'category' which is checked. The 'Applied to visual' section has a red arrow pointing to a button. A note says: 'Select up to 3 filters viewers can ask about for this verified answer. You can't change this later.'

5. Add AI instructions

Provide context on important data fields, business goals, and industry terms to improve Copilot insights about this semantic model.

Model purpose

- This model is for analyzing financial activity: transactions, account balances, user-level cash flow, and category-level spend/income.

Data model (what to use)

- Primary fact table: transactions (amount, type, status, category, from_account_id, to_account_id).
- Dimensions: users (customer = user), accounts.
- Treat “customer” and “user” as the same concept unless explicitly distinguished.

Core business logic (must follow)

- Outgoing money = transactions where from_account_id is populated; use measure Total Outgoing Amount.
- Incoming money = transactions where to_account_id is populated; use measure Total Incoming Amount (it activates the destination relationship internally).
- Net cash flow = incoming – outgoing; use Net Cash Flow / Net Cash Flow per User.
- Transaction “spending” means outgoing payments; use Spending by Category.
- Transaction “income” means incoming deposits; use Income by Category.
- For status-based totals, use: Completed Transaction Amount, Pending Transaction Amount, Failed Transaction Amount.

Analysis rules (how to answer common questions)

- “Who has the highest net cash flow?”
 - Rank users by Net Cash Flow per User (descending). Return top N users and include the value.
- “How much are customers spending by category?”
 - Group by transactions[category] and use Spending by Category. Include a total across categories.
- “Deposit vs payment amounts”
 - Use Deposits Amount and Outgoing Payments Amount (don’t infer by sign).
- Account totals and breakdowns
 - Use Total Account Balance and the type measures (Total Balance - Checking/Savings/Credit). For credit utilization, use Credit Utilization.

Time logic / “this month”

- If a transaction date column exists in transactions, use it for month/period filtering.
- If no transaction date exists (or it’s unclear), ask a clarification question: “Which column should define ‘this month’ for transactions?”

Output expectations

- Prefer measures over raw column aggregations when a measure exists.
- When returning breakdowns (by category, status, account_type), include:

- The breakdown table
- The total
- Top 3 contributors (if applicable)
- If user-friendly names aren't available, use users[id] as the identifier.

Semantic model is now ready for data agent !

1. Create a new data agent and add this semantic model as a data source
2. Select the same columns you selected earlier in Prep data for AI schema selection

Home

Agent instructions | Publish | Revert to published version

Explorer

Data Setup

+ Data source

agentic_semantic_...
 accounts
 chat_history
 chat_session...
 Contentless...
 session_du...
 tool_definition...
 tool_usage
 transactions
 UserAsks
 users

Agent instructions

Guide the data agent to the best data sources for different types of questions by writing a detailed system prompt. [Learn more](#)

These instructions are for the overall data agent and will always be sent regardless of the question asked. Explain:

- Rules for planning how to approach each question
- Which data sources to use for different topics
- Any terminology or acronyms with consistent meanings across all connected data sources
- Tone, style, and formatting for finished responses

3. Agent instructions : Always return amounts, cost, spending, balance related responses with dollar signs, e.g. \$123.1 instead of 123.1
4. Test the data agent with following questions
5. Always evaluate the responses by expanding the steps, verify the answers, DAX/SQL queries.

which user has the most transactions?

The user with the most transactions is Arnaud, with 28 transactions.

1 step completed ^

🕒 Response time: 14 sec

Analyzed agentic_semantic_model SemanticModel for: "Show which user has the highest number of transactions."

</> Query code

```
Dax
// Top user by total number of transactions.
// Uses the existing [Number of Transactions] measure to respect model logic for counting transactions.
EVALUATE
TOPN(
    1,
    SUMMARIZECOLUMNS(
        'users'[id],
        'users'[name],
        "Number of Transactions", [Number of Transactions] // measure preferred over raw counts
    ),
    [Number of Transactions], DESC, // rank by highest transaction count
    'users'[id], ASC // tie-breaker for deterministic result
)
ORDER BY
```

6. After verifying the responses, publish the data agent with a description : *This data agent can be used for analyzing financial activity: transactions, account balances, user-level cash flow, and category-level spend/income.*
7. Share the data agent with other users
8. You can programmatically evaluate the data agent, refer to the `dataagent_utilities.ipynb` for sample code
9. You can also query the data agent in VS Code using MCP server. See [Data agent as Model Context Protocol server \(preview\) - Microsoft Fabric | Microsoft Learn](#) for details.

List of questions

- What is the net cash flow per user, and who has the highest net cash flow?
- How much are customers spending by category (and which categories are highest)?

- What is the total account balance breakdown by account type (checking vs savings vs credit)?
- How many active users are there, and what is the average transaction amount for their activity?
- What are the totals for completed vs pending vs failed transactions (amount and count)?
- Which accounts have the highest credit utilization, and what is the total outstanding credit?
- What is income by category vs spending by category (net by category)?
- What is the average number of accounts per user, and how does it vary by user segment (if available)?
- What are deposit amounts vs payment amounts, and how do they compare overall?
- For new users (by users created date), what are their incoming, outgoing, and net cash flow?

Challenging questions:

- Identify users who have more outgoing than incoming transactions but maintain positive account balances. What's their average balance and primary spending categories
- For users with negative net cash flow, what's the breakdown of their spending by category, and which account types are they using most for payments