



# Data Analytics and AI for Finance made easy

27 August 2024

# Data & Finance ...



**In Finance, Data is both the problem as well as the solution!**

# Speakers



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KNIME



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Data Scientist,  
KNIME



**Mike Williams**  
Head of Digital Products,  
Grant Thornton UK

# Agenda

Challenges in Finance and how Data Analytics & AI can help

Why KNIME for Finance?

Using KNIME in Grant Thornton for Finance

Enrich Fraud Detection with GenAI

Q&A

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# Challenges in Finance and how Data Analytics & AI can help



# How can Data Analytics & AI help?

- Increase Productivity
  - By that also more time to focus on insights
  - Which makes work become more interesting & rewarding
  - Helping with shortage of skilled workforce
- Increase Quality
  - Less errors thanks to traceable way to process data
  - Much less manual intervention
  - Lower dependency on individuals
- Scalability & Flexibility
  - Ability to handle large amount of data
  - No code tools allow for broad adoption internally
  - Ability to connect to numerous input and output tools



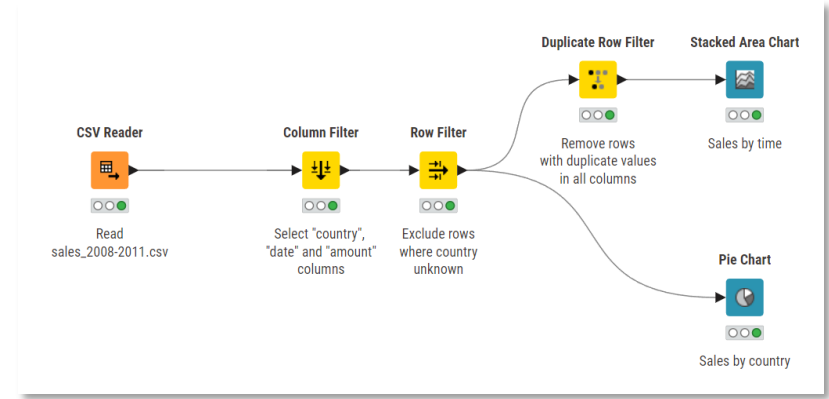


## Why KNIME for Finance?



# Benefits of tools such as KNIME

- Open Source & Rich Community
  - Source of innovation
  - Makes it easy to start using, learn, share & collaborate
- No code tool with user-friendly interface
  - Low / no barrier to adoption - easy to learn, intuitive
  - Doesn't require highly specialized skill-set
- Integration Capabilities & Scalability
  - Easy, ready-to use integrations with input (e.g. ERP, database, local files) and output (e.g. visualization files, Data Apps) tools
  - Ability to handle large amounts of data & users -> built for scale
- Sophistication – future proof
  - Built-in AI functionality + Ability to govern AI usage internally
  - Data Science functionality (Machine Learning, Regression Analysis)



# Overview KNIME for Finance Use Cases

- **Accounting:**
  - Bank Reconciliation
  - Dunning Management
  - Timesheet Aggregation
- **Audit & Compliance:**
  - Fraud Detection (different techniques)
- **Tax:**
  - Sales Tax Reporting
  - Transfer Pricing
- **Financial Planning & Analysis (FP&A):**
  - Budget Monitoring
  - Financial Metrics for FP&A
    - NPV & XNPV
    - IRR, XIRR & MIRR
  - Monthly and YTD Revenues
- **Financial Services:**
  - Credit Scoring
- **KPI Calculations:**
  - Customer Churn
  - Employee Turnover
  - Revenue Growth

All consisting of blog post, workflow, and video & more in the KNIME for Finance Hub space



**Using KNIME for Finance  
in Grant Thornton**

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# Enrich Fraud Detection with GenAI

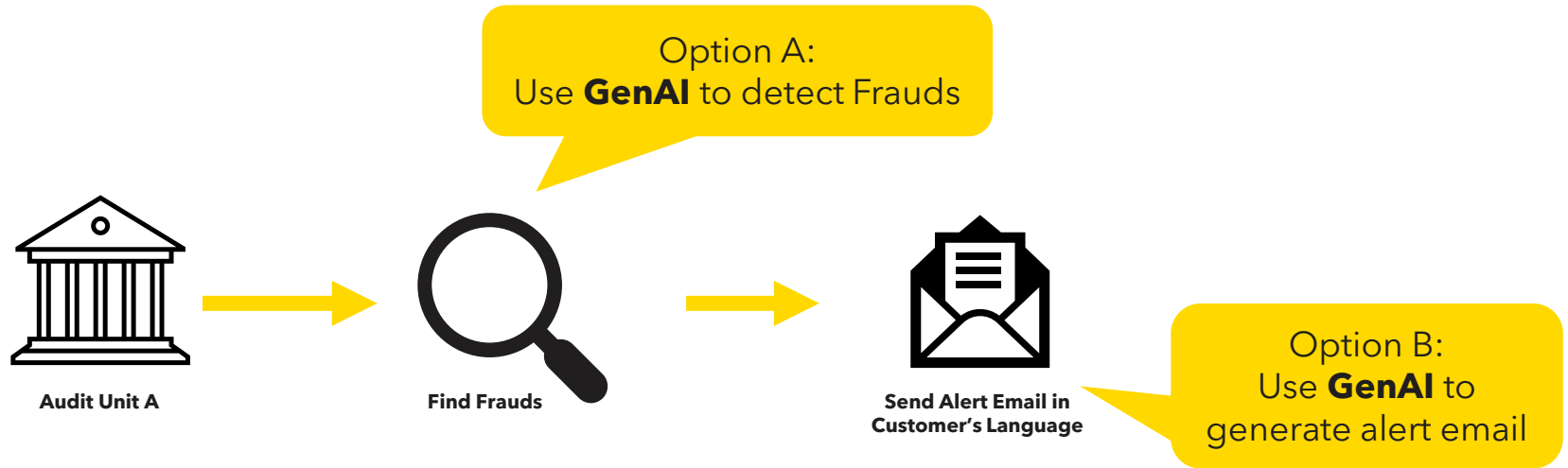
# Are Finance Departments ready for GenAI?

Let's use a Fraud Detection Use Case to try out GenAI!



# Fraud Detection Process

Banks monitor the risk of frauds regularly and notify their clients promptly if a suspicious transaction is detected



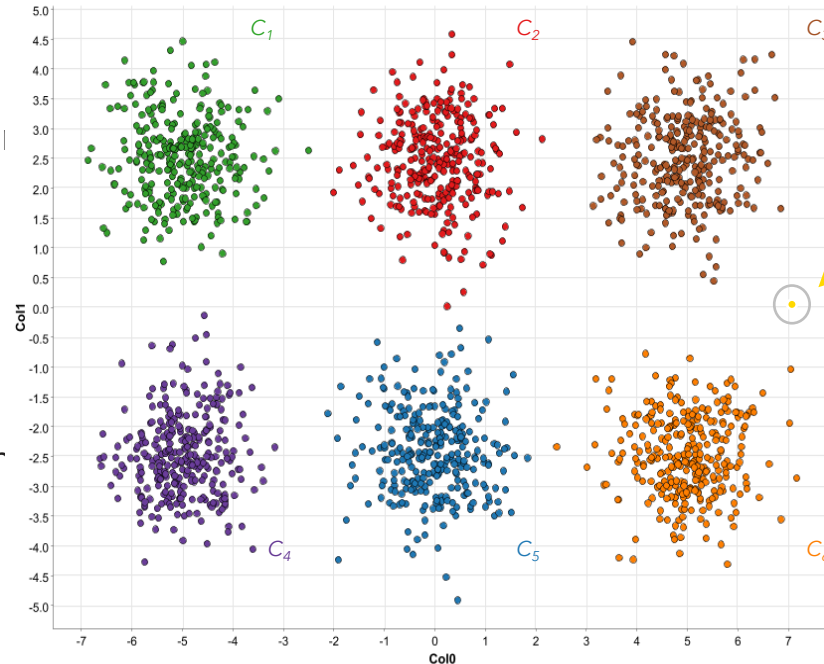
# Techniques for Outlier Detection

- Visualizations
- **Statistics**
- Clustering
- Machine Learning
- Deep Learning

Nume  
data

Nomir  
data

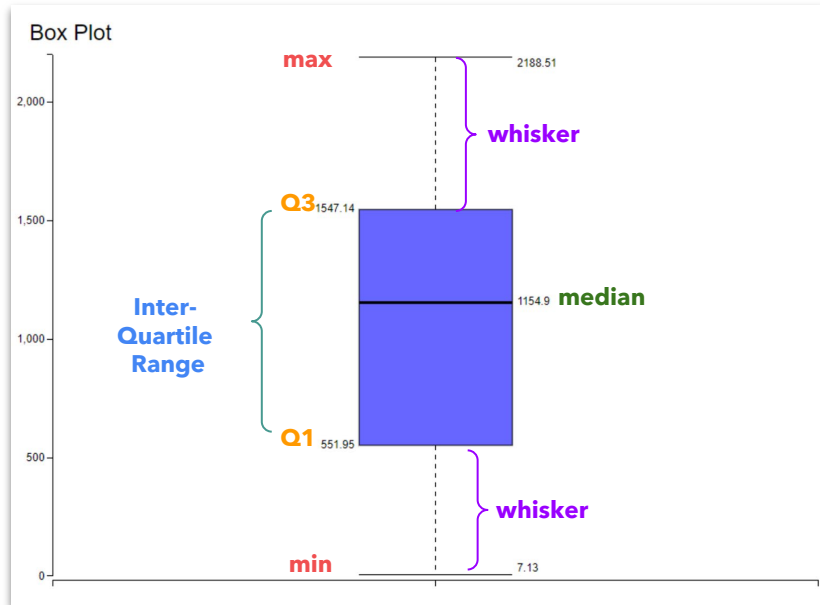
- String similarity metrics



Outlier

# Finding Outliers through Statistics

- IQR Technique



x is an outlier if:

$$x > Q3 + k(IQR)$$

or

$$x < Q1 - k(IQR)$$

where  $k \geq 0$  and  $IQR = Q3 - Q1$

$k \uparrow$ : less outliers

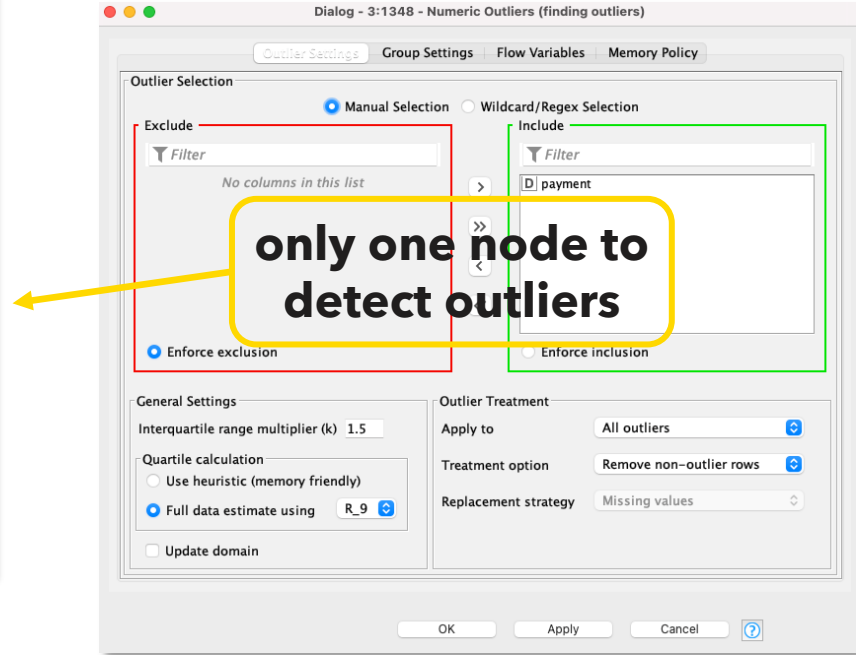
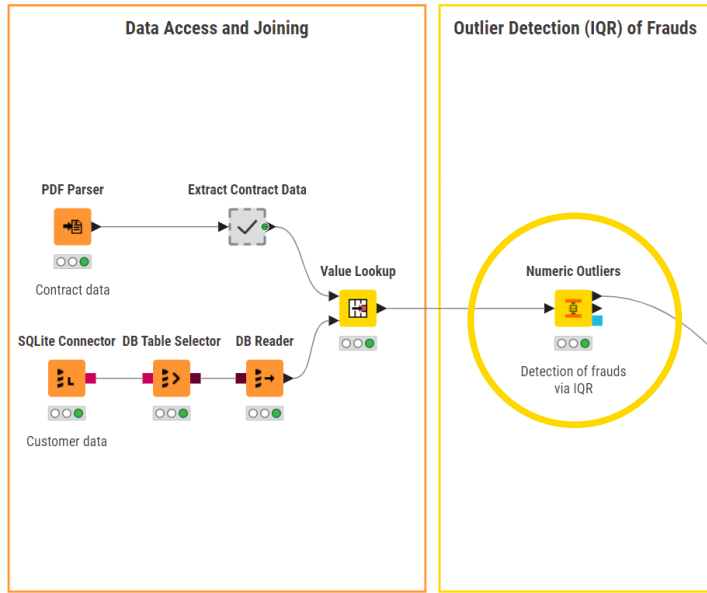
$k \downarrow$ : more outliers

Often,  $k = 1.5$



# Finding Outliers in KNIME - Classic Approach

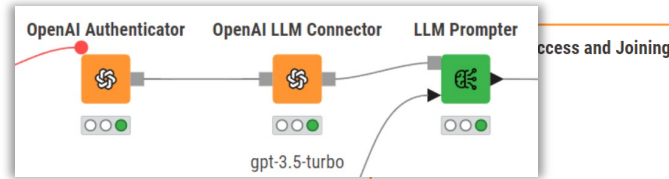
- Numeric Outliers node implements the IQR technique



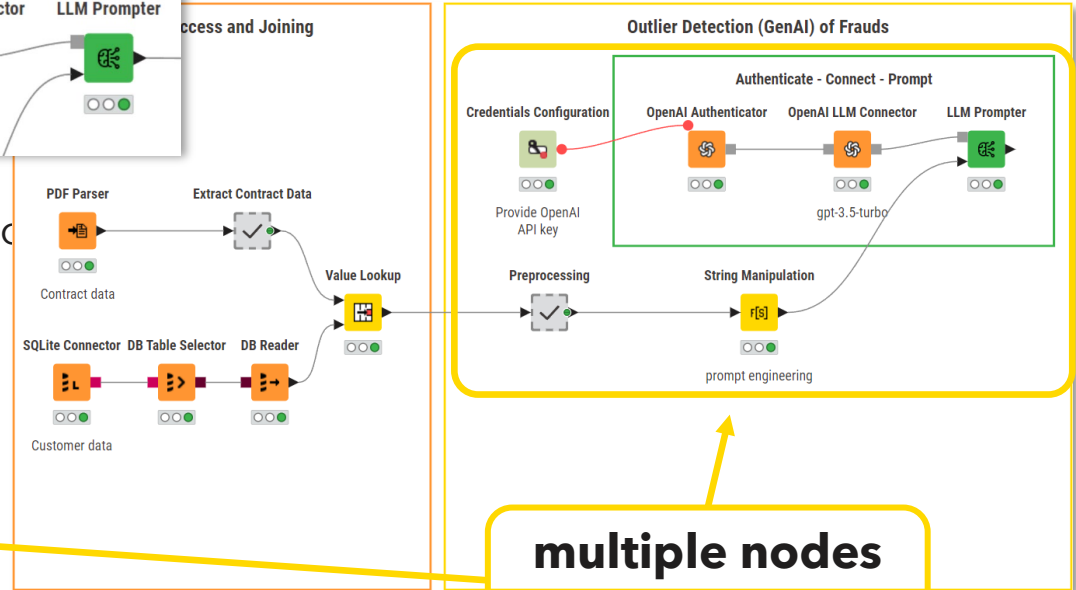
# Finding Outliers in KNIME - GenAI Approach

- Simple AI prompting needs three nodes:

- Authenticate
- Connect
- Prompt



- For the use case of Fraud Detection, prompt engineering is required

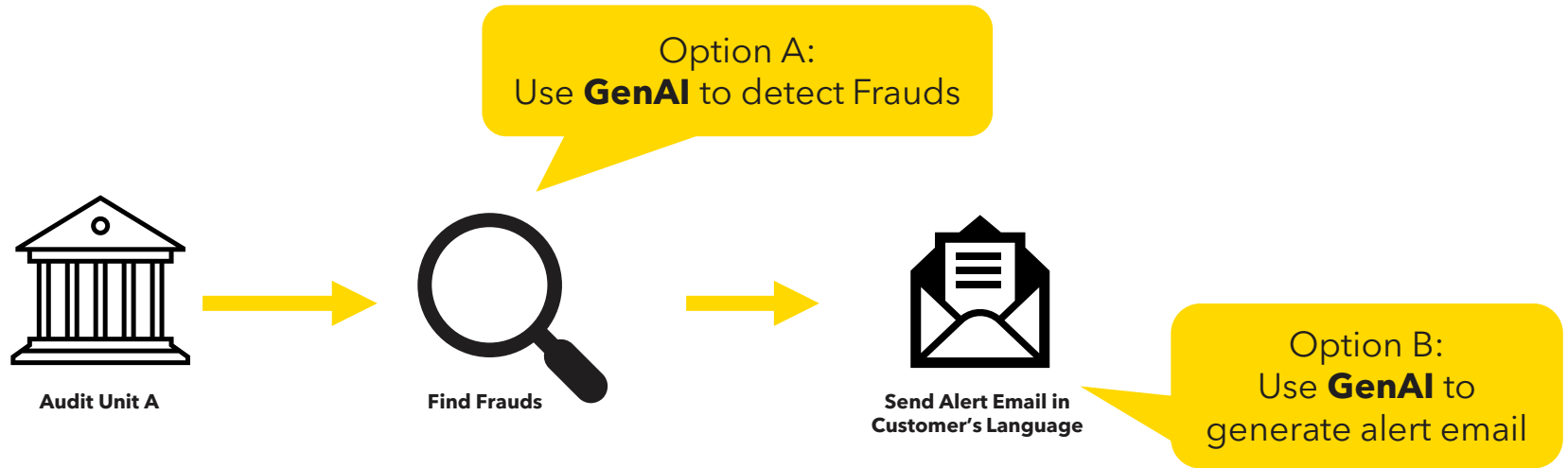


**Let's better use GenAI for text-related tasks**

**multiple nodes required**

# Fraud Detection Process

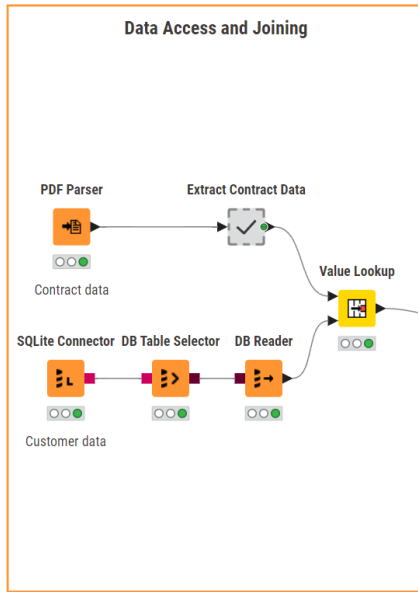
Banks monitor the risk of frauds regularly and notify their clients promptly if a suspicious transaction is detected



# Generate Alert Email with GenAI

- Remember: AI prompting needs **Authenticate - Connect - Prompt**

- ... and a prompt telling the LLM



Subject: Suspicious Activity Detected on Contract C000019

Dear Cosim

We hope th  
been detec  
records sho

However, u  
precaution  
resolve this  
necessary

We take the  
not compr

Thank you  
we assure

Best regard

Bank A Gm  
Debussyst  
Konstanz, G  
78460

Subject: Подозрительная активность на договоре Конвертируемого Долгового Соглашения (C000015)

Уважаемый Кай-Уве Эгер,

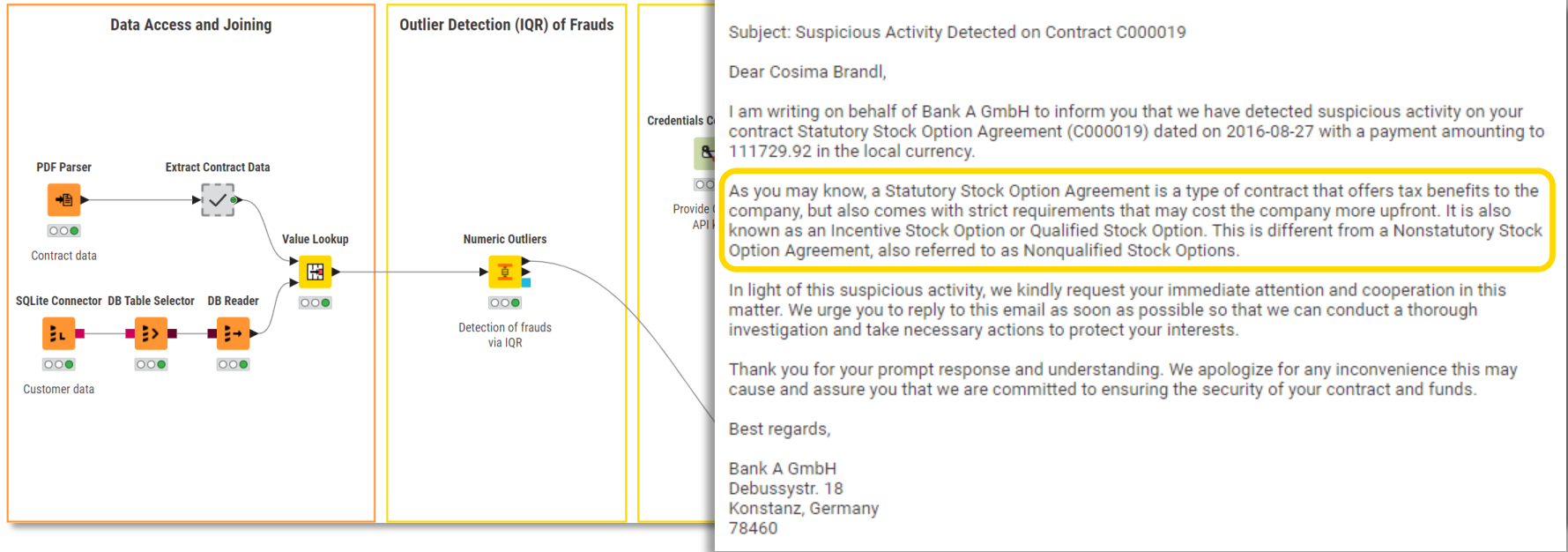
Мы обращаемся к вам от имени Банка A GmbH, чтобы проинформировать вас о подозрительной активности, обнаруженной на вашем договоре Конвертируемого Долгового Соглашения (C000015), датированном 18 января 2016 года, с суммой платежа в размере 234512.98 в местной валюте.

Нам очень важно обратить ваше внимание на эту ситуацию и провести расследование как можно скорее. Мы просим вас ответить на это письмо, чтобы принять необходимые меры.

С уважением,  
Банк A GmbH  
Debussyst. 18, Konstanz, Germany, 78460

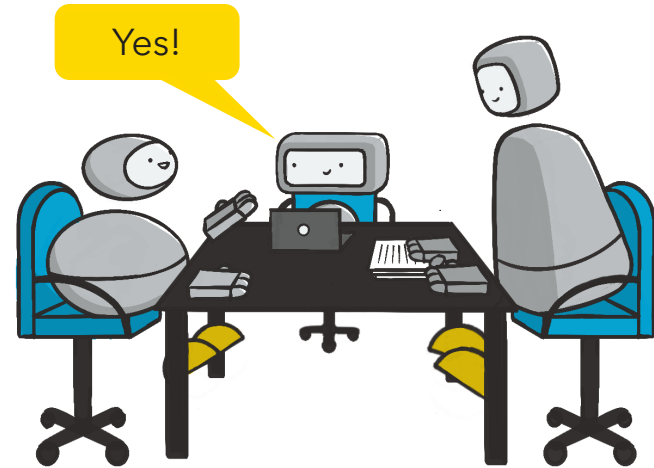
# Add Context: Email Generation with GenAI & RAGs

- RAG = Retrieval Augmented Generation
  - Allows to add additional context to the prompt → to create more specific response by LLM



# Are Finance Departments ready for GenAI?

- GenAI **powerful for text-related tasks** (e.g., the generation of multilingual alert emails)
- However, depending on task, GenAI might not be as beneficial
  - Sometimes, classic techniques provide **simpler, more transparent**, and **less costly** solution

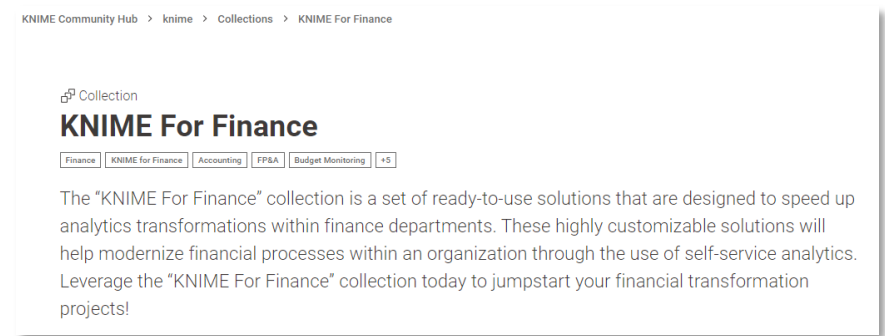
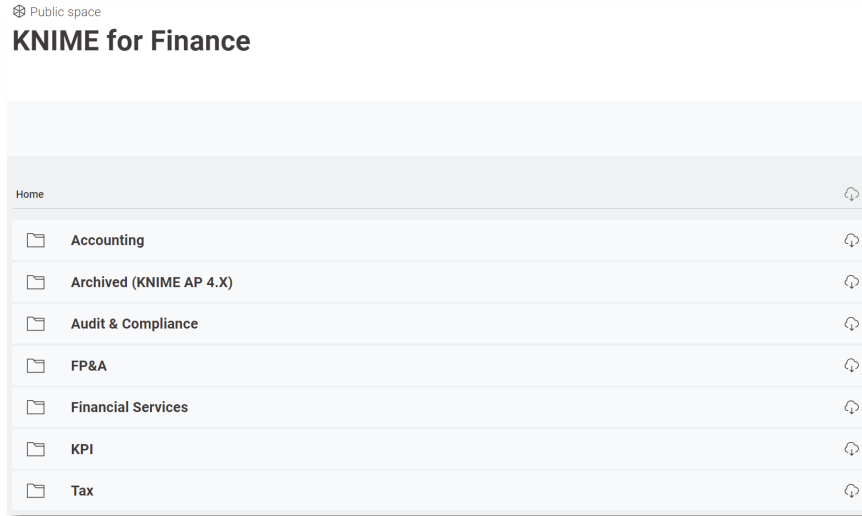


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## Tips for a Quick Start

# Visit the KNIME Community Hub

- Visit the [KNIME for Finance](#) space on the KNIME Community Hub...
- ... or check out the [KNIME for Finance](#) Collection Page to access **ready-to-use solutions** for Finance tasks.

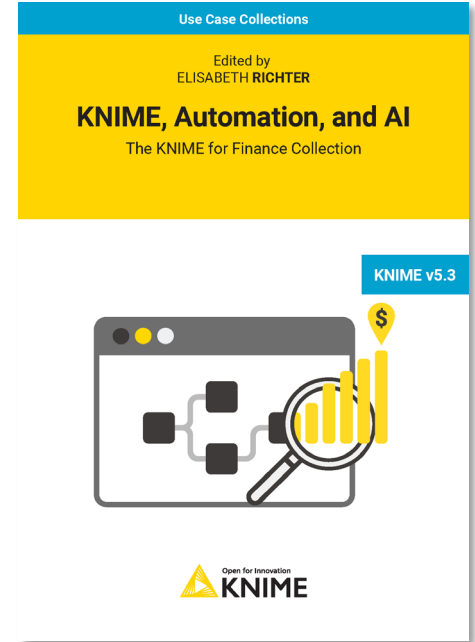
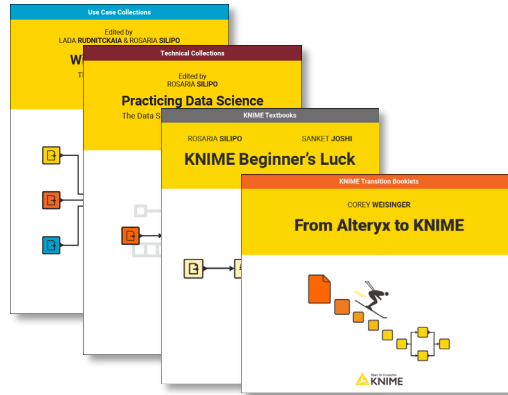






# KNIME Press: KNIME for Finance Booklet

- “[KNIME, Automation, and AI: The KNIME for Finance Collection](#)”  
A use case collection of the most common finance tasks
- Many other free booklets are available:
  - Use Case Collections
  - Technical Collections
  - Textbooks
  - Transition Booklets

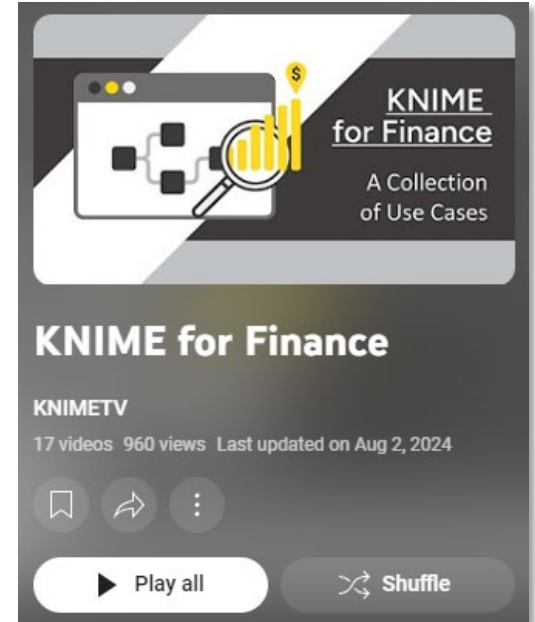


All **KNIME Press books** are free and available for download at:

[knime.com/knimepress](https://knime.com/knimepress)

# KNIMETV: KNIME for Finance Educational Videos

- [YouTube playlist](#) contains educational videos accompanying the blog posts on the KNIME Blog
- More content on the KNIME TV:
  - Webinars
  - Panel discussions
  - Educational videos
  - Data Science topics
  - Tutorials

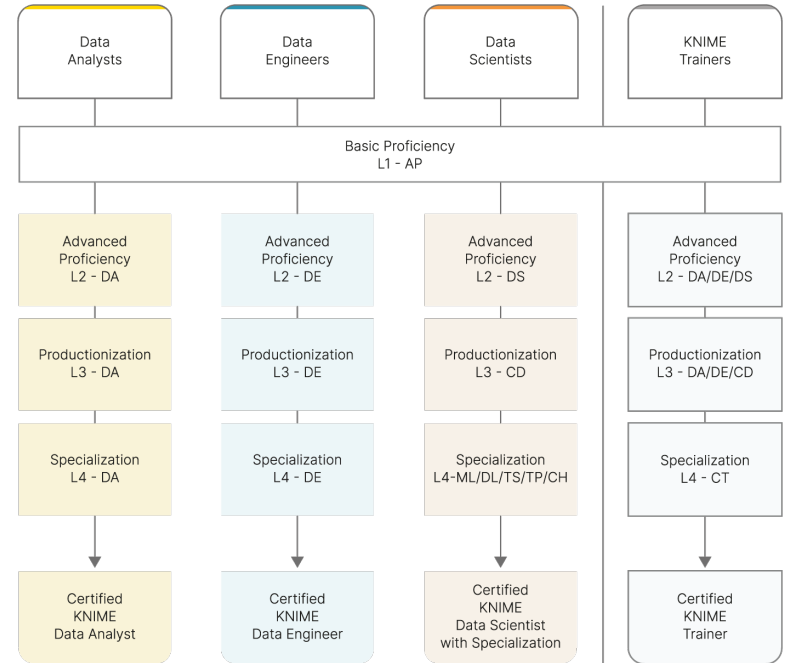


Find **KNIME YouTube channel** at:

<https://www.youtube.com/@KNIMETV>

# KNIME Learning Paths

- Courses from level **L1** to level **L4**
- Various professional profiles
- **Self-paced courses**
  - Videos and exercises at your own pace and for free
- **Instructor led courses**
  - Scheduled sessions and guided exercises in paid courses

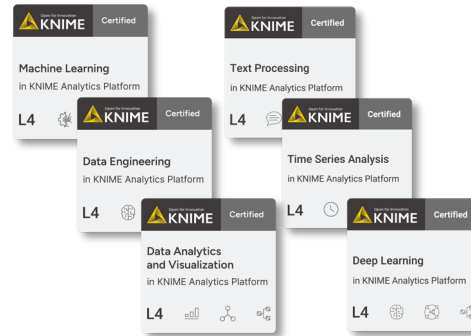


Find the **next course** at:

[knime.com/learning](https://www.knime.com/learning)

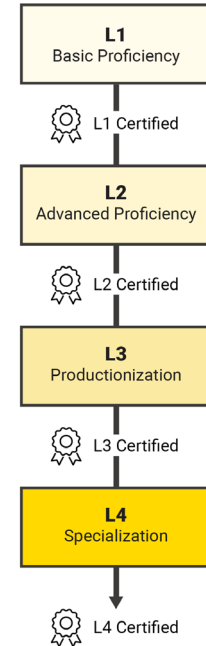
# KNIME Certification Exams

- From level **L1** to level **L4**
- Online examination
- Measure your expertise with KNIME software and data skills
- Get and share your badge!



## Teaching & Certifying

KNIME Expertise from level **L1** to level **L4**

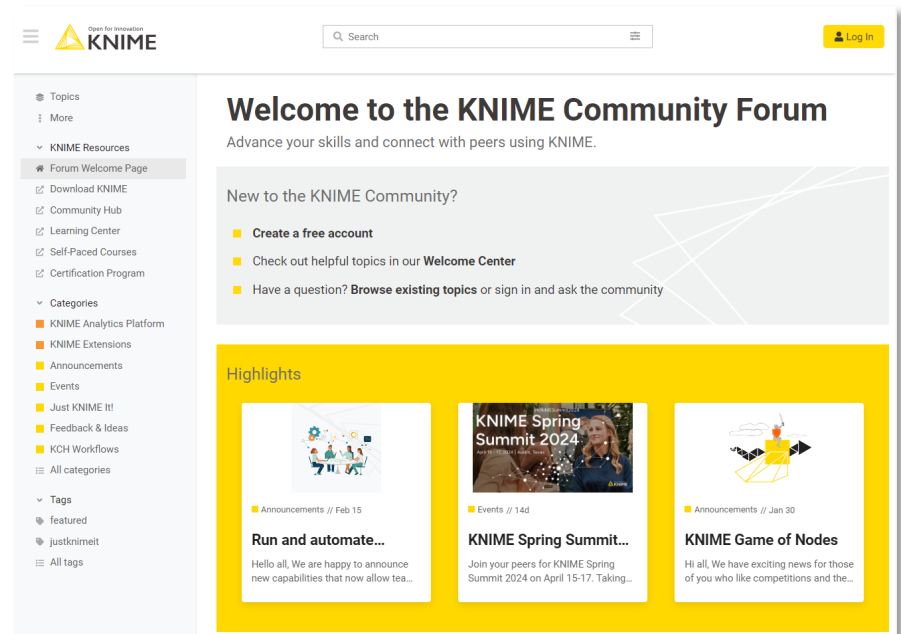


Get **certified** at:

[knime.com/certification-program](https://knime.com/certification-program)

# KNIME Forum

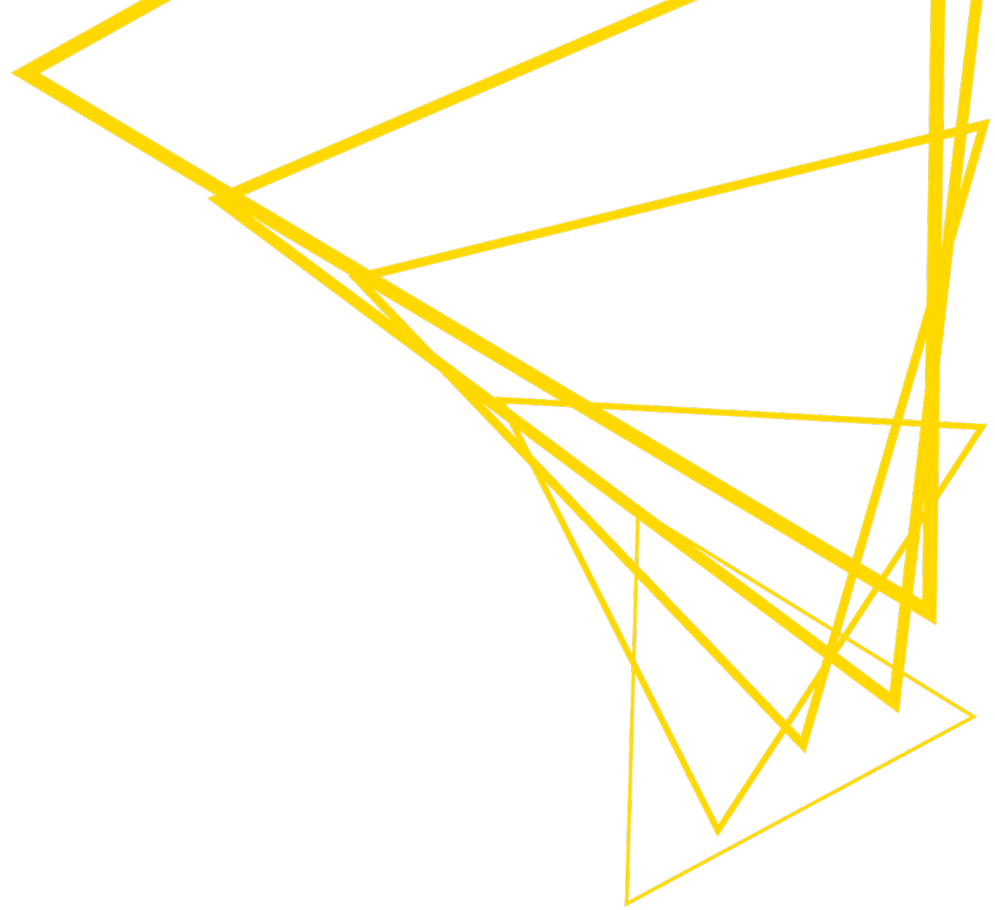
- Round-the-clock community support
- Specialized categories
  - KNIME Analytics Platform
  - KNIME Extensions
  - KNIME Business Hub
  - ...
- Multilingual support groups
  - French
  - Italian
  - Spanish
  - ...



Visit the KNIME Forum at:  
<https://forum.knime.com/>

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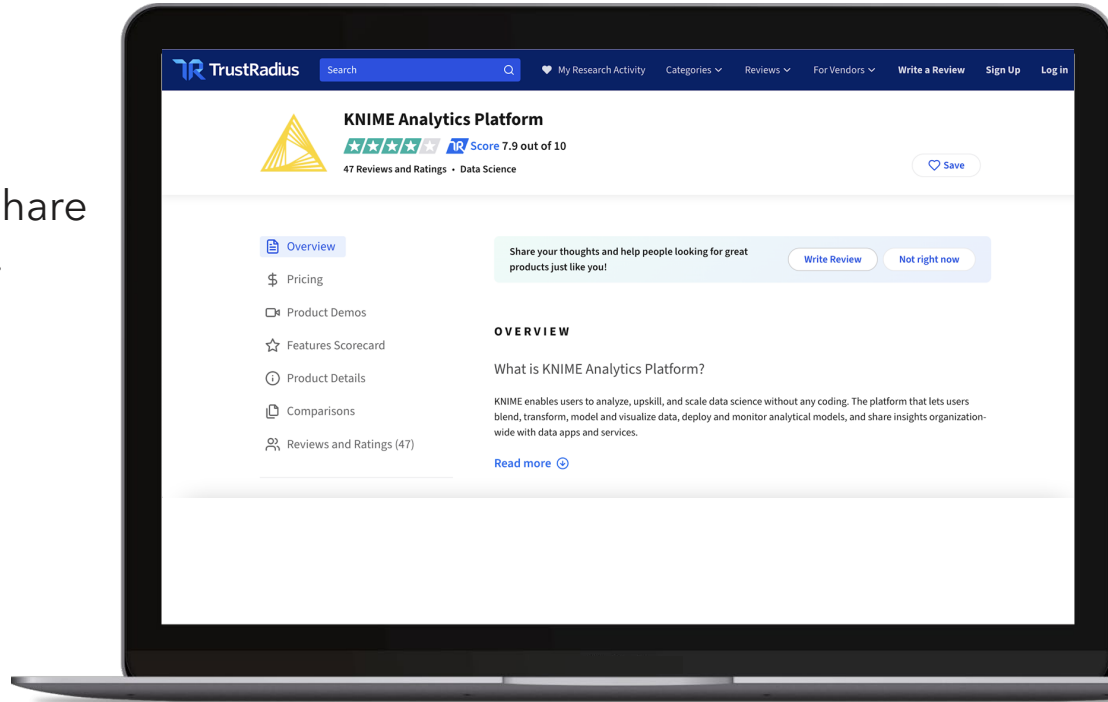
## Live Q&A



# Drop a review

Leave a review on TrustRadius and share your KNIME experience with others.

[Write a review](#)





# Upcoming Events

## ✦ **KNIME DataHop:**

- ✦ London, September 10, 2024 - Sign up [here](#)
- ✦ Boston, October 30, 2024 - Sign up [here](#)

## ✦ **KNIME for Finance Roadshow:**

- ✦ Munich, September 25, 2024
- ✦ London, October 2, 2024
- ✦ Stockholm, Oct 10, 2024

## ✦ **KNIME Spring Summit**, March 18 – 20, 2025 in Berlin – Sign up [here](#)



# Let's stay in touch



Reception



Stage



Networking



Expo



Contact Us!



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[/company/knime.com](https://www.linkedin.com/company/knime.com)



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KNIMETV

Contact Us



# Using KNIME in Grant Thornton for finance

**Mike Williams – Grant Thornton**

**Aug 27th**

# Why we use KNIME at GT



## Analytic Depth

- Complete range of analytic techniques
- Choice to use any tools, scripts or techniques
- Low code/no code environment, appropriate for all skill levels



## A Complete Platform

- Build, deploy and manage, all in a single platform.
- No integration friction for lower total cost of ownership and faster time-to-value



## Enterprise Scale

- Centralised administration for data privacy and security
- Flexible deployment: On-prem, In the Cloud.

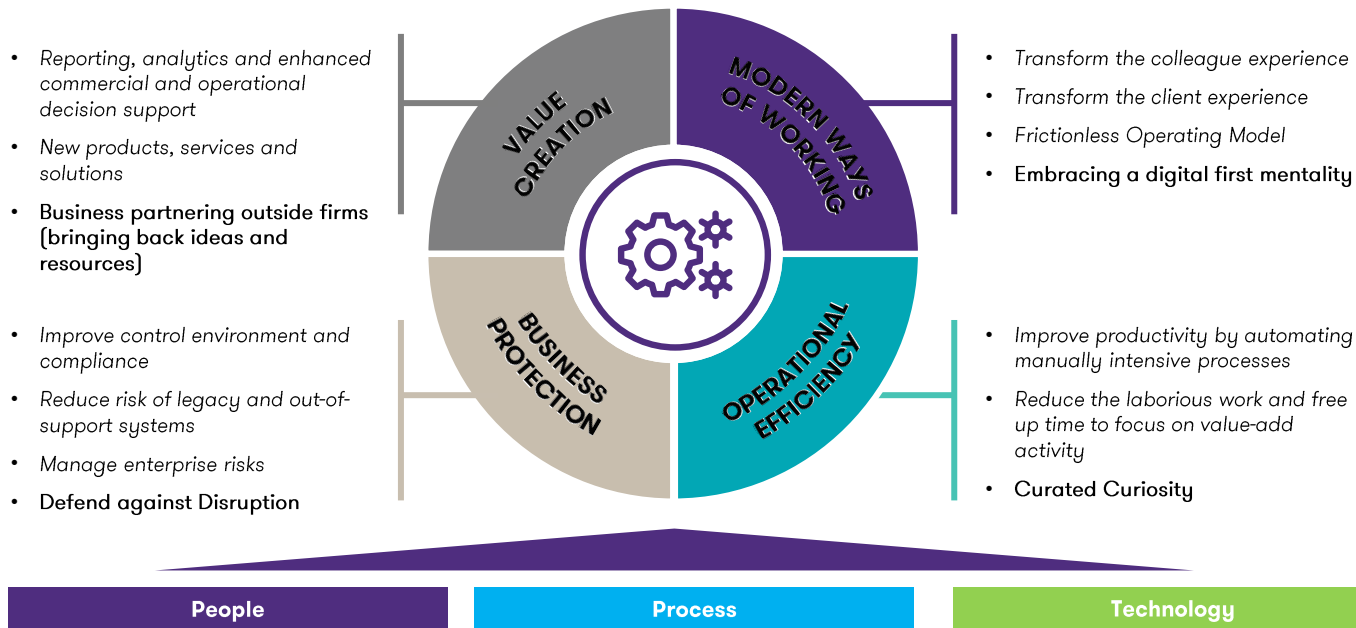
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## Open-source for Future-Proof

**Community-driven innovation** means that KNIME is always on the bleeding edge of modern data science. 10,000+ analytics blueprints enable users to quickly join and learn from a community of data scientists from other industry-leading organizations.

# How it drives innovation at GT

We look at Innovation through the following four lenses:



# Using KNIME in finance

Use cases across the finance function, from data ingestion to visualisation.

## Accountancy

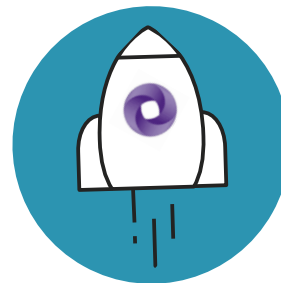
- Month end reconciliation
- Source system extraction

## Tax

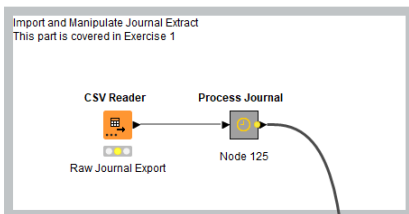
- Tax reporting and classification
- Invoice processing

## FP&A

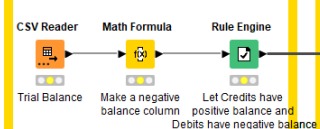
- Data visualisation and mapping
- Budgeting



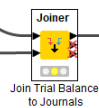
# Month end - reconciling trial balance



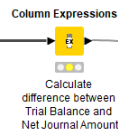
**Activity I: Import and Process Trial Balance**  
Read the trial\_balance.csv file. You can find it in the data folder.  
Create a column Negative Balance as the negative of the Balance column  
Use a Rule Engine node to assign negative values to the Balance column if the Type is Debit. Use the following formula  
\$Type\$ = "Debit" => -\$Negative Balance\$  
TRUE => -\$Balance\$



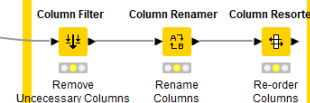
**Activity II: Join Trial Balance to Journals**  
Use a Joiner node to join the Trial Balance data with the Journal data from Exercise 1.  
Use the Account Name as joining columns  
Perform a right outer join, in order to also include the rows from the trial balance that do not have a match in the Journal table.



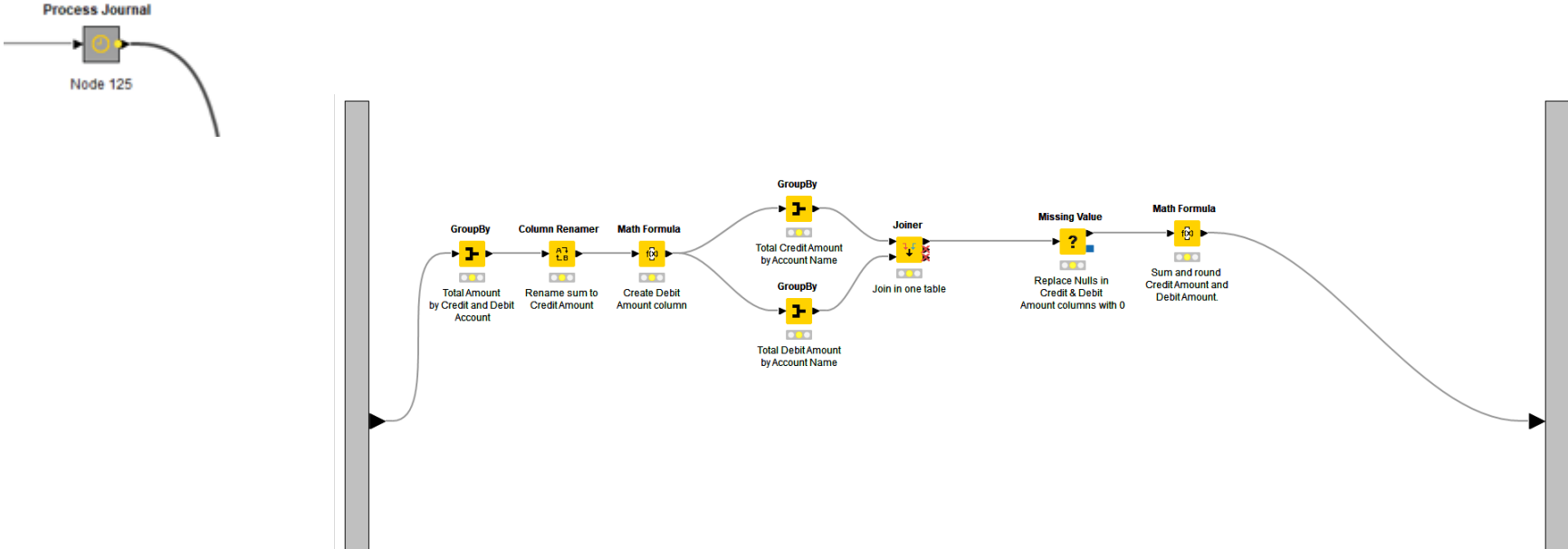
**Activity III: Calculate Difference**  
Create a new column Difference, containing the difference between the Net column of the Journal and the Balance column.  
Note: You can do this operation with a Math Formula or a Column Expression node



**Activity IV: Polish Table**  
Use a Column Filter node to remove the unnecessary columns. The columns you need are  
Account Name  
Net  
Balance  
Difference  
Rename the columns as follows  
Net->Jnl Value  
Balance->TB Value  
Resort the columns in the following order: Account Name, Jnl Value, TB Value, Difference.

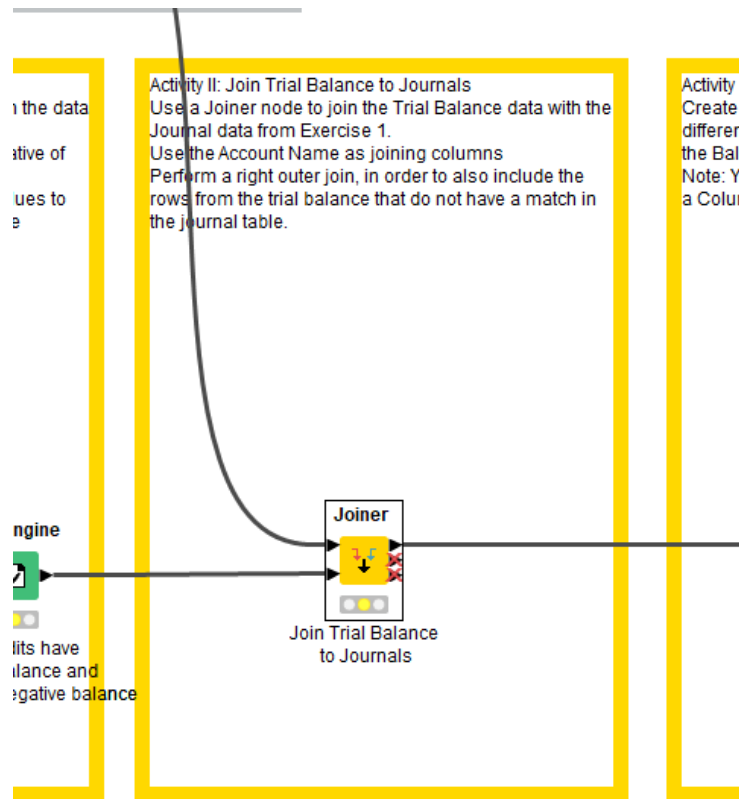


# A use case – reconciling trial balance





# Month end- reconciling trial balance



# Other finance flows

Given the vast number of nodes, and modular nature, you can make some pretty amazing tools

- **Large population audit sampling**
  - Encapsulating complex Python script in reusable Component that is easy to use for non-technical users
- **Gender pay gap reporting**
  - Reusable workflow for processing client payroll data producing results for Statutory Gender Pay Gap report in Power BI
- **Invoice OCR processing front-end**
  - Processing and sending zipped PDF invoices to Azure OCR for data extraction and collecting results.
- **Competitor intelligence - categorisation of news article summaries**
  - Training and application of predictive models (XGBoost) for categorisation and rating of competitor intelligence news article summaries
- **Anomaly detection**
  - Anomaly detection for a large insurance client based on clustering and predictive modelling. Useful to identify anomalies that usually can't be found with traditional statistical/z-score analysis

# KNIME Community Hub

## Place to search and share

- Workflows
- Nodes
- Components
- Extensions

The image displays two screenshots of the KNIME Community Hub website. The top screenshot shows the homepage with a search bar and a summary of content counts: 13,056 Workflows, 4,293 Nodes, 1,276 Components, and 222 Extensions. The bottom screenshot shows search results for 'Sentiment Analysis', displaying 350 results. The results list workflows with details such as tags (e.g., 'deep learning', 'keras', 'text classification'), descriptions, and user avatars.

Open for Innovation  
**KNIME** Hub

Pricing About Sign in

Welcome to the  
**KNIME Community Hub**  
Solutions for data science: find workflows, nodes and components, and collaborate in spaces.

Search workflows, nodes and more...

**13 056** Workflows  
**4 293** Nodes  
**1 276** Components  
**222** Extensions

KNIME Hub > Search

**350** results

All Nodes Components Workflows Extensions

**Sentiment Analysis**  
deep learning | keras | text classification | +11  
This workflow shows how to train a simple neural network for text classification, in this case sentiment analysis. The used network learns a 128 dimensional word embedding followed by an LSTM. This e...  
knime > Examples > 04\_Analytics > 14\_Deep\_Learning > 02\_Keras > 08\_Sentiment\_Analysis\_with\_Deep\_Learning\_KNIME\_nodes

**Sentiment Analysis**  
deep learning | keras | text classification | +12  
This workflow shows how to train a simple neural network for text classification, in this case sentiment analysis. The used network learns a 128 dimensional word embedding followed by an LSTM. This e...  
knime > Examples > 04\_Analytics > 14\_Deep\_Learning > 02\_Keras > 07\_Sentiment\_Analysis\_with\_Deep\_Learning

**Sentiment Analysis (Classification) of Documents**  
This workflow shows how to import text from a csv file, convert it to documents, preprocess the documents and transform them

<https://hub.knime.com>

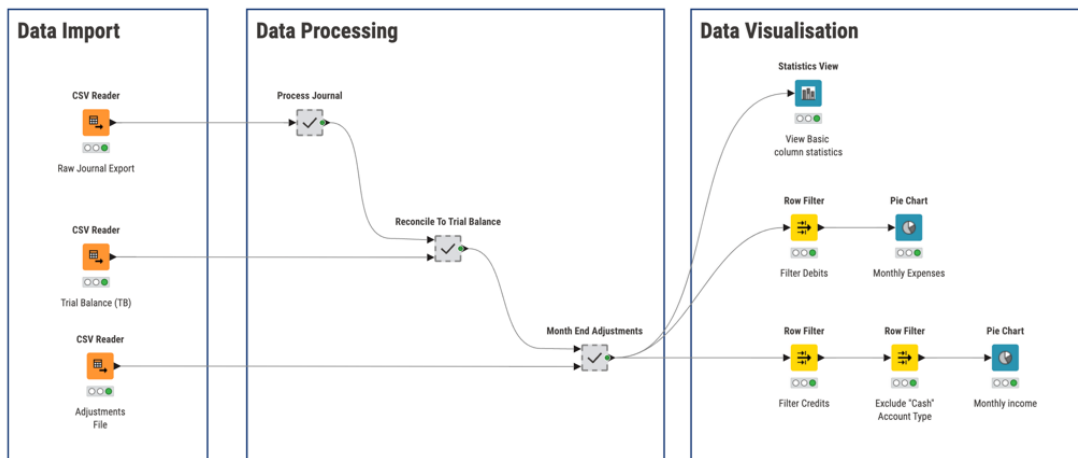
# The KNIME finance community

- <https://www.knime.com/blog/fraud-detection-using-dbscan>
- <https://www.knime.com/blog/knime-finance-fraud-detection-ml-model>
- <https://www.knime.com/blog/how-to-calculate-customer-churn-kpi>
- <https://www.knime.com/blog/how-to-calculate-year-to-date-aggregation>
- <https://www.knime.com/blog/dunning-management>
- <https://www.knime.com/blog/calculate-revenue-growth-kpi>
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- <https://www.knime.com/blog/knime-for-finance-automation>
- <https://www.knime.com/blog/how-to-do-credit-scoring-for-loan-approval>
- <https://www.knime.com/blog/fraud-detection-using-quantiles-in-knime>

# KNIME finance workshops with GT

## Performing Month End Close Procedures

- You will undertake some of the operations many organisations undertake at month end.
- You will import a synthetic Journal file, reconcile to the Trial balance, undertake month end adjustments
- Finally you will report total expenditure and income breakdowns by pie chart.





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