

# Unleashing Innovation with SAP BTP & GCP Solutions



*Driving Innovation Forward*



# Agenda

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- The Customer Story
- The Solution
- Future Innovations
- Questions & Answers



# The Customer Story

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The client is a leading distributor of electronic equipment in the North American market.

However.....



Losing market share



Customer satisfaction is down



FSRs motivation is at its lowest

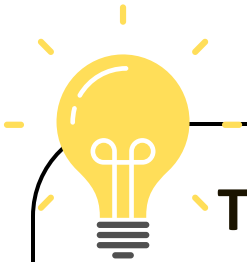


Sales and Revenues are dropping

# The Personas



# The Prototype: From Idea to Business Value!



## The Idea...

Build an innovative solution by leveraging advanced AI/ML features and data modeling capabilities to streamline Sales operations. Provide **key decision-making** data and a **fast-track approval process**

## The Solution!

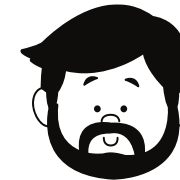
**SAP® Business** Technology Platform +  Google Cloud

- Using SAP Build we have developed an **intuitive UI** in LC/NC with an Approval Workflow
- Using GCP Vertex AI and BQ we are **enriching the data** with market external data
- Using DSP, we have modeled the data to provide an **Optimum Pricing**
- Using SAC, we are providing **sales insights** directly impacting pricing and sales revenues

## The Outcome!



Customer Satisfaction is boosted by simplifying ordering process and accelerated time-to-delivery.

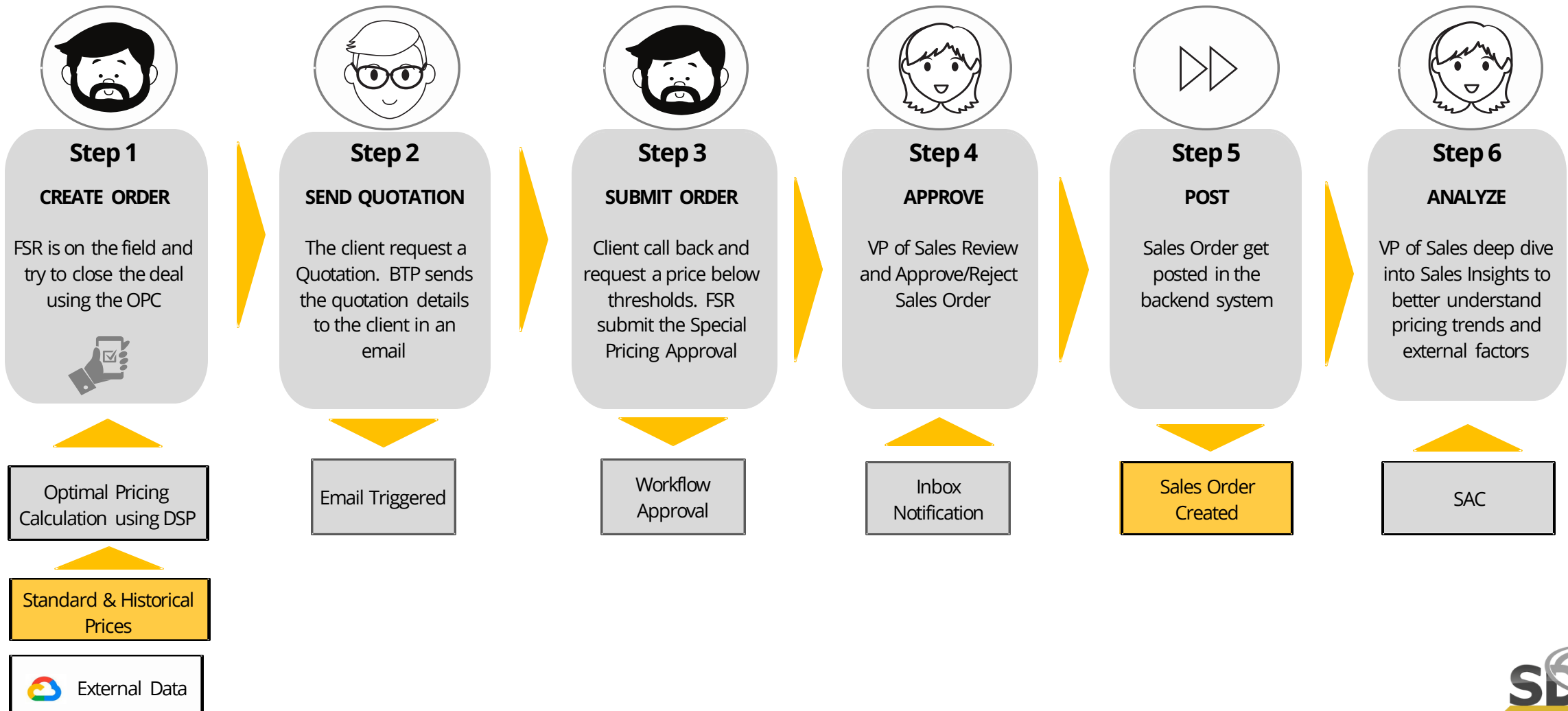


The Sales Cycle is shortened by empowering the business users to take faster, smarter and better decisions.



Management leverages data-to-value intelligence to drive competitiveness by using historical data, inflation rates and external market data

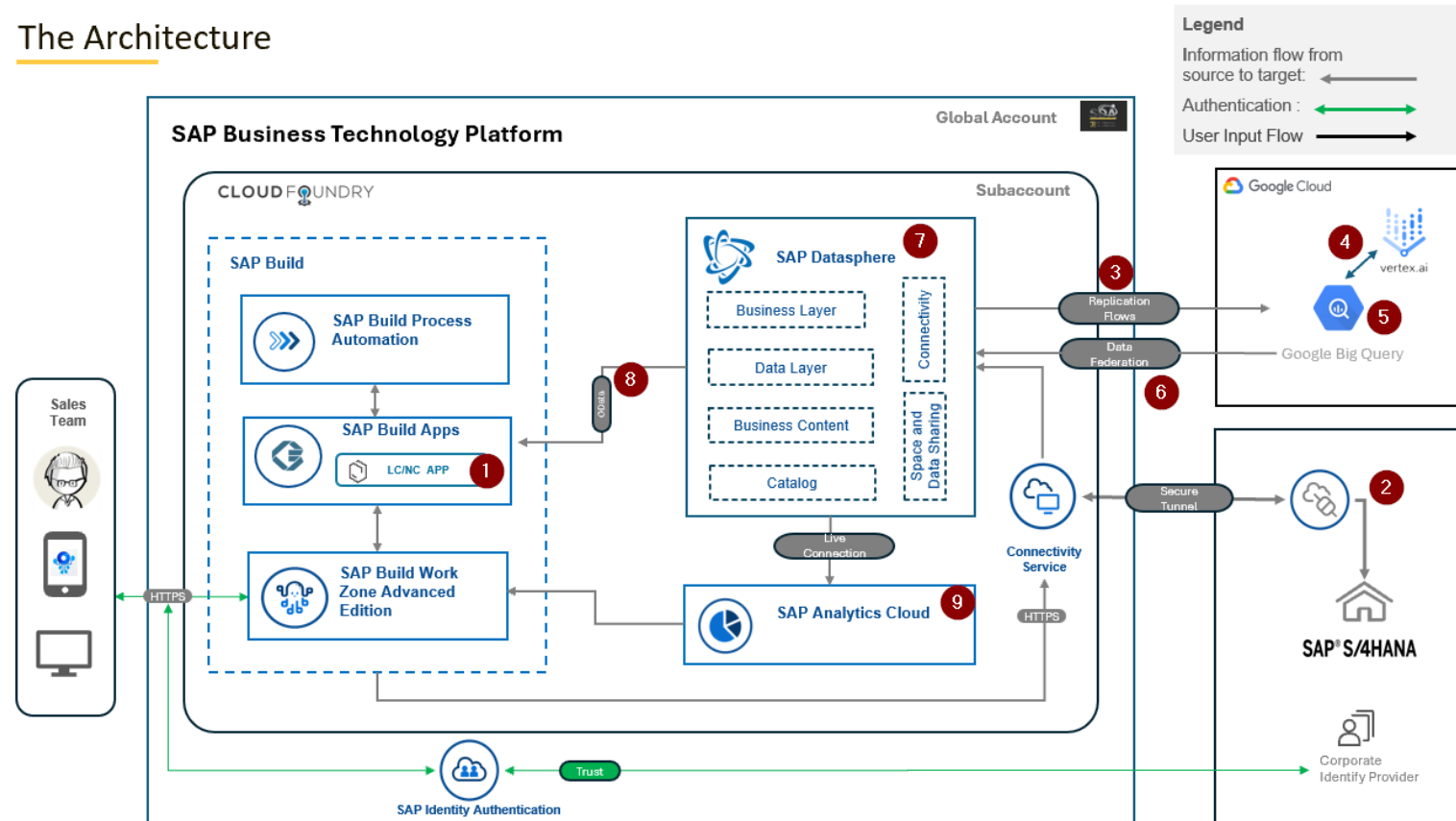
# The Process Flow



# How did we do it...?

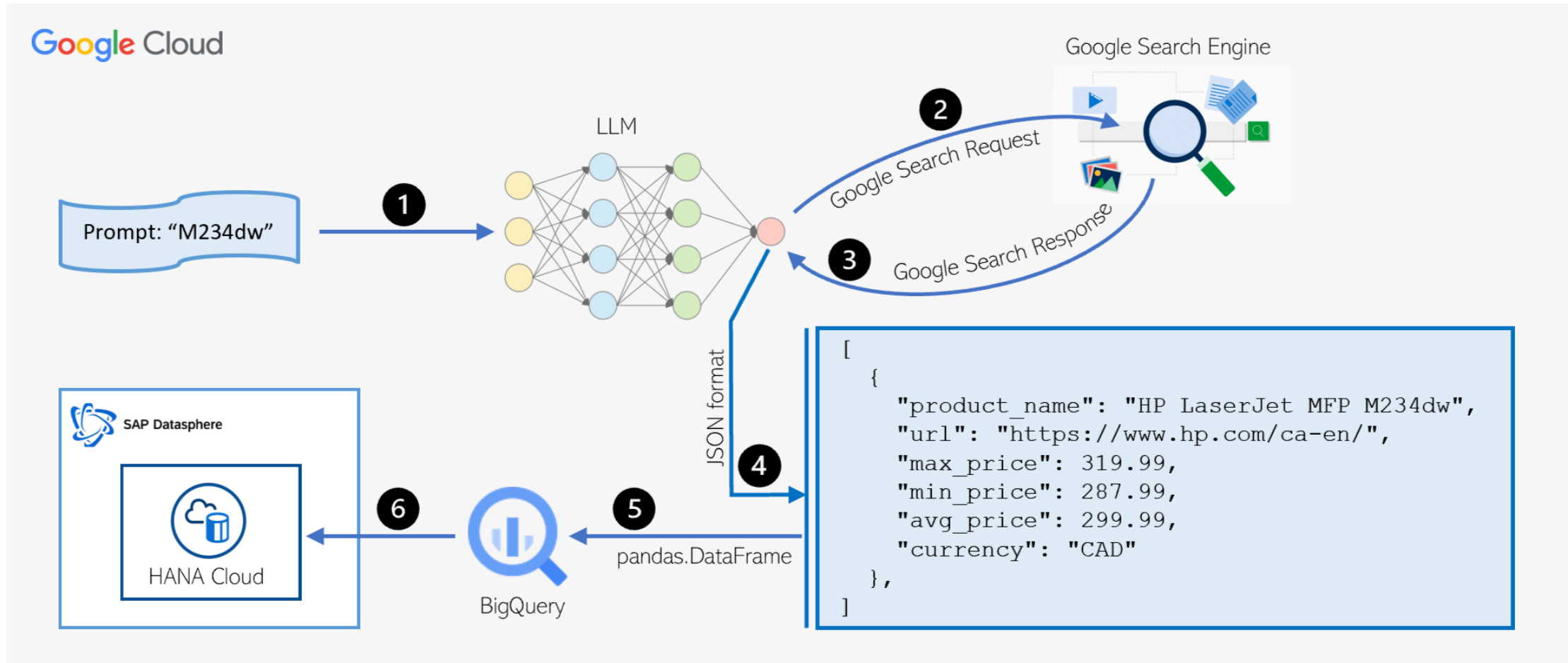
1. Using the LC/NC concept, we have developed an app in BTP for Sales Order Management
2. We are exposing corporate sales data using CDS views in S4/HANA into DSP
3. We are using data replication flows in DSP through the new BQ connector, to transfer data into BQ custom data sets
4. We are calling Vertex AI to fetch market pricing (competitors) and perform sentiment analysis
5. We are enriching sales data using BQ public data sets (i.e. inflation rate)
6. We are replicating the data back into DSP
7. We are using an algorithm in DSP (data model) for Optimum Price calculation
8. We are exposing the enriched data in the Sales Order app in BTP for business users
9. We are consuming the data in SAC for management reporting

## The Architecture



# Data Enrichment using Vertex AI and BQ

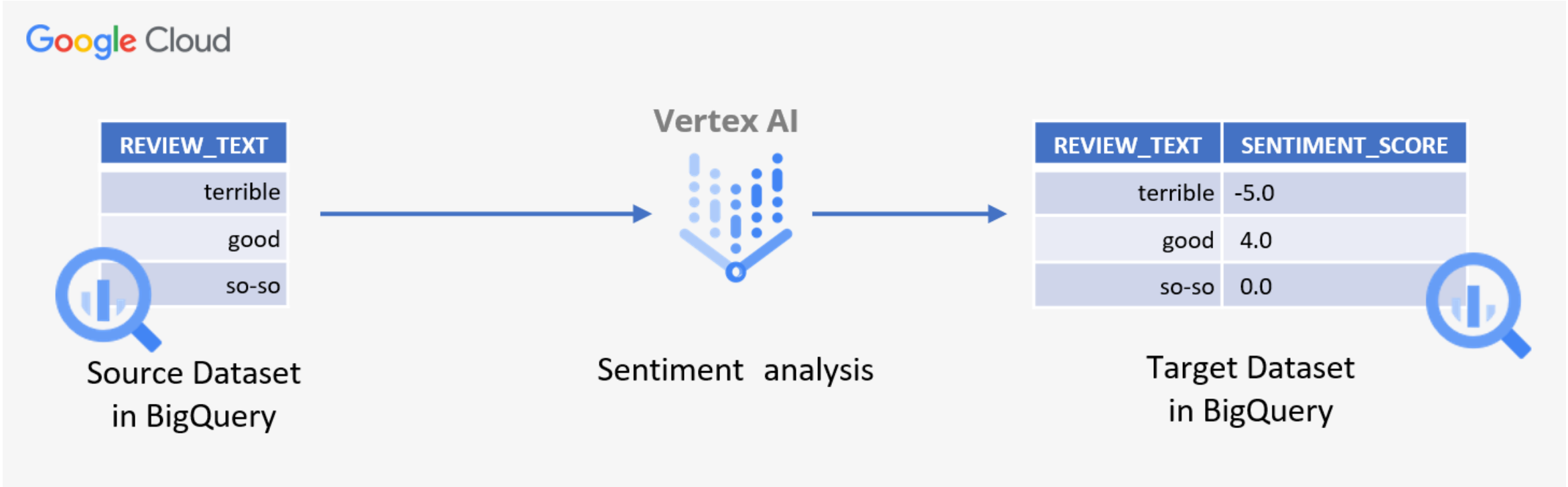
## Comparative Market Pricing





# Data Enrichment using Vertex AI and BQ

## Sentiment Analysis



# Data Enrichment using Vertex AI and BQ

## Jupyter Notebook / Python Code

```
fedml-test-wbi
File Edit View Run Kernel Git Tabs Settings Help

Google_Search.ipynb
Python 3 (ipykernel) (Local)

Using LangChain library to execute Google Search Engine

[5]: from langchain.chains import LLMRequestsChain, LLMChain
from langchain.prompts import PromptTemplate
from langchain.google import ChatGoogleGenerativeAI

search_template = """Extract the answer to the question '{query}' using the Google Search results.

Provide only three extracted entries from different websites. From each of the websites extract information about the product name, url, maximum, minimum, average
The output must be generated in JSON format, exactly as in the following JSON Schema Example:
>>> Start of the JSON Schema Example <<<

[
  (
    {
      "product_name": "replace with the actual product name",
      "url": "replace with the actual URL from the Google Search Engine response",
      "max_price": "extract the maximum price for this product in float format",
      "min_price": "extract the minimum price for this product in float format",
      "avg_price": "extract the average price for this product in float format",
      "currency": "extract the price currency for this product. Example: CAD, USD, EUR >"
    }
  ),
  ...
]

>>> End of the JSON Schema Example <<<

google search results: {requests_result},
Extracted:
"""

# LLM model
llm = VertexAI(
    model_name="text-bison@001",
    max_output_tokens=1024,
    temperature=0.1,
)

requests_chain = LLMRequestsChain(
    llm=llm,
    search_template=search_template,
)

result = requests_chain.run(inputs={"query": "What are the prices for the following product in (location): (product)"})
print(result)
```

```
fedml-test-wbi
File Edit View Run Kernel Git Tabs Settings Help

Google_Search.ipynb
Python 3 (ipykernel) (Local)

location = "USA"
product = "M234dw"

query = f"What are the prices for the following product in (location): (product)"
inputs = {
    "query": query,
    "url": "https://www.google.com/search?q=" + query
}

result = requests_chain.run(inputs)
print(result)

{
  "product_name": "HP LaserJet MFP M234dw Wireless Black & White All-in-One Printer",
  "url": "https://www.amazon.com/HP-LaserJet-M234dw-Wireless-Printer-Bundle/dp/B083136444/ref=sr_1_1?crid=22144936385&keywords=hp+laserjet+m2344dw&qid=1642732052&pf_rd_p=2344dw&pf_rd_r=2344dw",
  "max_price": 164.08,
  "min_price": 159.08,
  "avg_price": 161.58,
  "currency": "USD"
},
{
  "product_name": "HP LaserJet MFP M234dw Wireless Black & White All-in-One Printer",
  "url": "https://www.amazon.com/HP-LaserJet-M234dw-Wireless-Printer-Bundle/dp/B083136444/ref=sr_1_1?crid=22144936385&keywords=hp+laserjet+m2344dw&qid=1642732052&pf_rd_p=2344dw&pf_rd_r=2344dw",
  "max_price": 164.08,
  "min_price": 159.08,
  "avg_price": 161.58,
  "currency": "USD"
},
{
  "product_name": "HP LaserJet MFP M234dw Printer",
  "url": "https://www.hp.com/us-en/shop/pdp/hp-laserjet-mfp-m234dw-printer-6gd9p",
  "max_price": 199.08,
  "min_price": 159.08,
  "avg_price": 174.08,
  "currency": "USD"
}
```

```
fedml-test-wbi
File Edit View Run Kernel Git Tabs Settings Help

Google_Search.ipynb
Python 3 (ipykernel) (Local)

[7]: product name      url      max_price      min_price      avg_price      currency
0  HP LaserJet MFP M234dw Wireless Black & White ...  https://www.amazon.com/HP-LaserJet-Wireless-Pr...  164      159      161.5      USD
1  HP LaserJet MFP M234dw Wireless Black and Whit...  https://www.amazon.com/HP-LaserJet-Wireless-Pr...  164      159      161.5      USD
2  HP LaserJet MFP M234dw Printer  https://www.hp.com/us-en/shop/pdp/hp-laserjet-...  199      159      174.0      USD

Add "ID" column to Pandas DataFrame

[8]: json2df.insert(0, 'id', json2df.index)
json2df

[8]: id      product name      url      max_price      min_price      avg_price      currency
0  0  HP LaserJet MFP M234dw Wireless Black & White ...  https://www.amazon.com/HP-LaserJet-Wireless-Pr...  164      159      161.5      USD
1  1  HP LaserJet MFP M234dw Wireless Black and Whit...  https://www.amazon.com/HP-LaserJet-Wireless-Pr...  164      159      161.5      USD
2  2  HP LaserJet MFP M234dw Printer  https://www.hp.com/us-en/shop/pdp/hp-laserjet-...  199      159      174.0      USD

Open connection to HANA Cloud DB for SAP Datasphere

[9]: db_conn = DbConnection(url='config/config.json')

Delete entries from table GOOGLE_SEARCH

[10]: db_conn.delete_from_table('GOOGLE_SEARCH')


2024-02-15 20:49:33,995: fedml_gcp.logger INFO: Deleting from table 'GOOGLE_SEARCH'
2024-02-15 20:49:33,996: fedml_gcp.logger INFO: The delete query is: DELETE FROM "GOOGLE_SEARCH"

Insert data into table GOOGLE_SEARCH

[11]: db_conn.insert_into_table('GOOGLE_SEARCH', json2df)

2024-02-15 20:49:34,051: fedml_gcp.logger INFO: Inserting into table...
2024-02-15 20:49:34,053: fedml_gcp.logger INFO: INSERT INTO "GOOGLE_SEARCH" (id, product_name, url, max_price, min_price, avg_price, currency, INSERTED_AT) VALUES (:id, :product_name, :url, :max_price, :min_price, :avg_price, :currency, :INSERTED_AT)
```

# Enriched Data consumed in BTP App

  
Home  
page

## Add Items

Select Product

Apple - MacBook Pro - 13

Sales Price

2250

Quantity

5

UoM

EA

Add Item

Optimum Price: 2110.58 CAD

Low Threshold Price: 2100 CAD

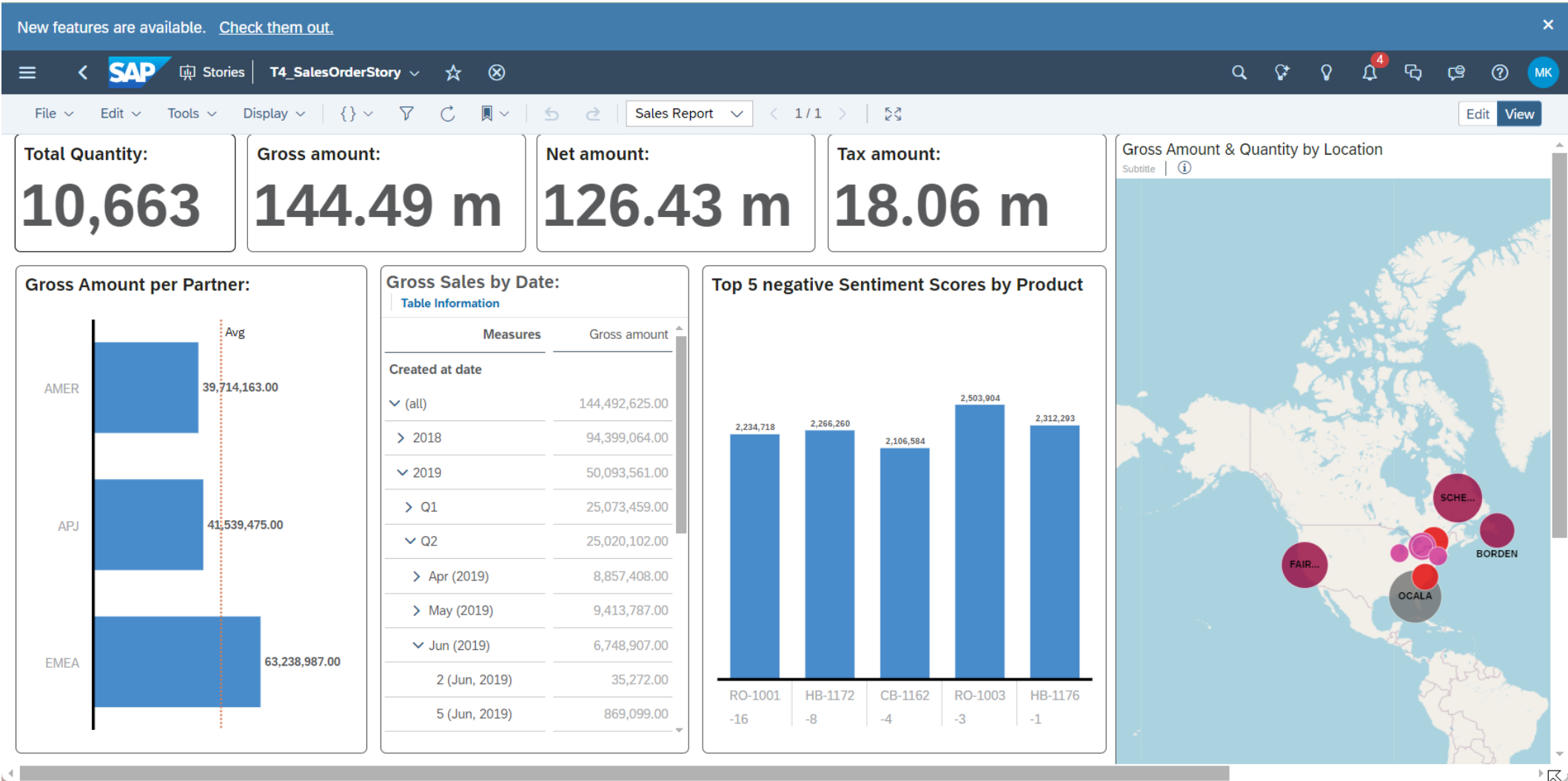
Historical Average Price: 2168.3 CAD

Competitor Average Price: 2109 CAD (6 months)

# Detailed Data Available directly in BTP App

 Home page	Competitors Prices	
	Walmart.com - 1 Day(s) back	2075.11 CAD >
	Bestbuy.com - 6 Day(s) back	2054.28 CAD >
	Nikon.com - 1 Day(s) back	2234.21 CAD >
	Walmart.com - 10 Day(s) back	2047.63 CAD >
	Apple.com - 1 Day(s) back	2231.14 CAD >
	Walmart.com - 1 Day(s) back	2048.42 CAD >

# Consume data in SAC Dashboard

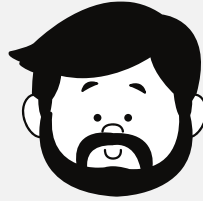


# Recap on the Benefits

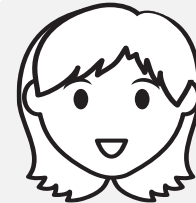
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- Higher Customer Satisfaction
- Faster Order-to-Delivery Process



- Optimized Sales Cycle
- Reduced Loss of Sales Opportunities



- Better Insights & Decision Making
- Improved Market Competitiveness



**STREAMLINING THE SALES PROCESS**



# Future Innovations / Product Roadmap

- Introduce additional AI/ML features, such as product pricing comparison based on digital images and product features (for manufacturers)
- Geographical / Sales Org data / Team Performance
- Cost of Good Sold (COGS) / Target Margins / Standard Pricing Determination
- Profitability Analysis / Forecasting / What-if Scenarios
- Additional Market Insights / Dimensions by leveraging existing GCP data sets
- Expand the solution to Procurement scenarios

# Questions?

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# Thank you!

*For more information, please visit us at:  
[www.consultSDA.com](http://www.consultSDA.com)*

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