

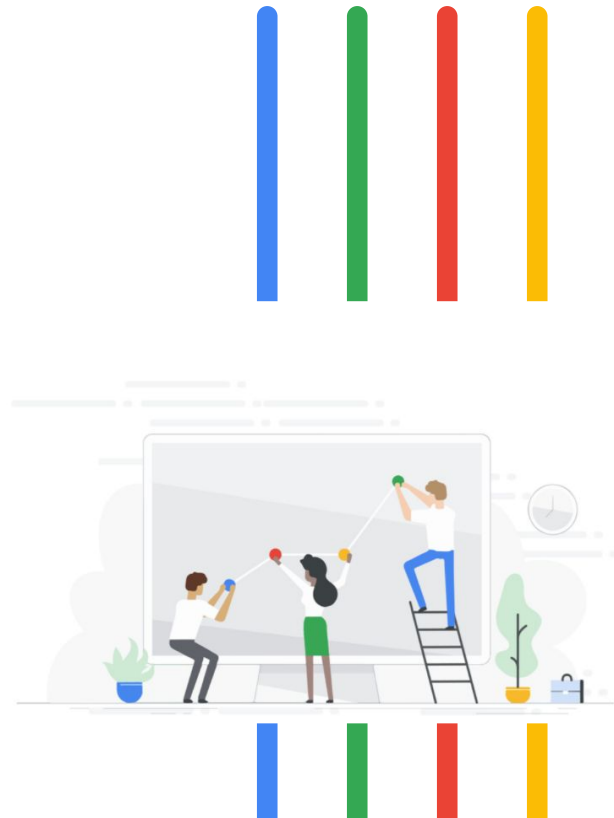


เปิดประตูสู่โลกแห่งข้อมูลด้วย เครื่องมือด้าน Data บน Google Cloud



MonsoonSIM Thailand

Business Simulation & Gamification
by Zonix Services Co.,LTD.





Boonrat (Lucky)
Chanchoke



Plub Wittawin
Waiyapat



Google's Data Cloud

Simple. Limitless. Intelligent.




Google Mission Statement



Organize the world's information and
make it **universally accessible and useful**

Google



Google Search

I'm Feeling Lucky



Google Search

I'm Feeling Lucky

The **innovation leader** in applying Data and AI to real-world situations



Search

Search ranking
Speech recognition



Translate

Text, graphic and
speech translations



Photos

Photos search



Gmail

Smart reply
Spam classification



Self Driving Car

20B miles driven



Smarter & Cleaner Infrastructure

2X more efficient



AlphaGo

First AI to beat a world
Go champion (2016)



YouTube

Video
recommendations
Better thumbnails

The Google logo is centered in the upper portion of the image, rendered in its characteristic multi-colored font. The background is a vast, dimly lit server room with a complex network of metal racks and glowing server units. The lighting is predominantly blue, creating a high-tech, industrial atmosphere. The ceiling features a dense grid of structural beams and various pipes, adding to the complexity of the scene.

Google

A white, horizontal search bar is positioned in the center of the image. It is empty, with a small, colorful microphone icon located on the right side, indicating voice search functionality. The bar is set against the background of the server room, which is filled with rows of server racks and overhead metal structures.

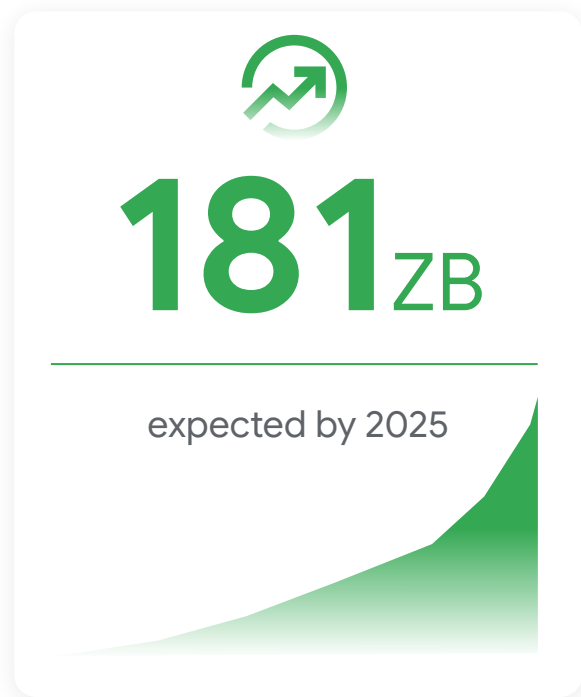
Google Search

I'm Feeling Lucky

Challenge #1

Data is big and multi-format.

- Structured and unstructured
- Real-time streams and at-rest
- Across clouds and on-premise



- [STATISTA](#), FEB 2022

Challenge #2

Data requires more than SQL.

- Machine learning & AI
- Stream analytics and events
- Data-driven applications



75%

of enterprises will shift from piloting to operationalizing artificial intelligence



Gartner®, Streaming Analytics in the Cloud: A Comparative Analysis of Amazon, Microsoft and Google, Sumit Pal, Shaurya Rana, 14 December, 2021

Challenge #3

Data needs to reach everyone.

- Mission critical
- Accessed by everyone
- Governed



73%

of data leaders feel
real-time access to data is
extremely important



- [HBR](#), 2021



Classroom engagement report

Org unit

Last BQ Export Date
2022-11-27

Nov 20, 2022 - Nov 26, 2022

Active users by role

Active teachers

84

↓ -31.7%

Active students

90

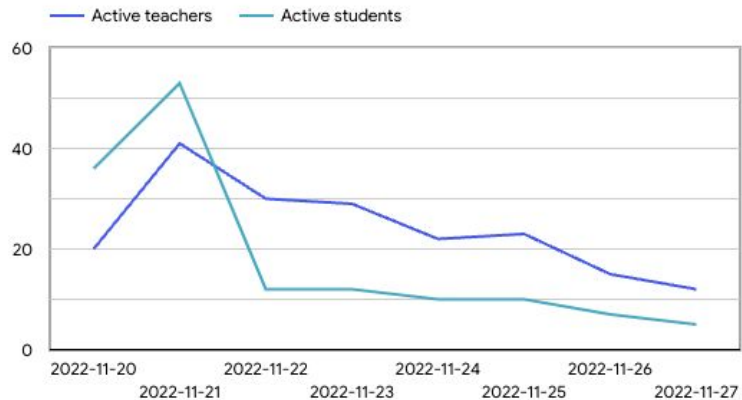
↑ 45.2%

Total % Active

12.81%

↑ 222.7%

* Total % Active represents percentage of active users in domain using Classroom



Assignment activity

Assignment published

1,114

↓ -20.6%

Assignments returned

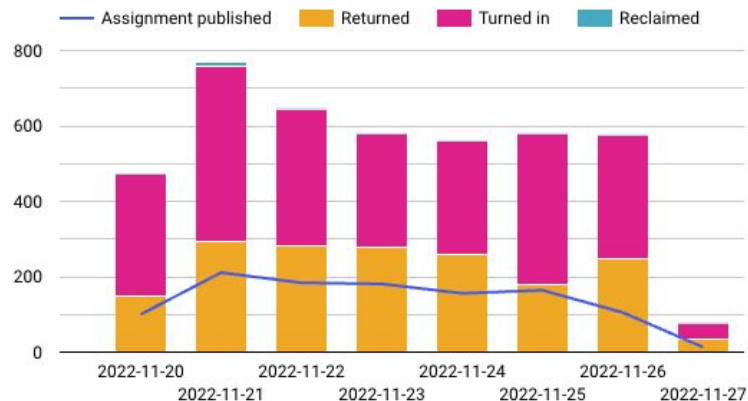
1,718

↓ -11.5%

Assignments turned in

1,439

↑ 1.0%



A data platform that supports any needs, for any personas

ANY USER

- Data engineers**
Clean, useful data
- ML engineers**
Integrated intelligence
- Data scientists**
Models that work
- Developers**
Intelligent apps
- Data analysts**
Query and analyze
- Business users**
Insights Everywhere
- Consumers**
Value

ANY DATA **ANY WORKLOAD** Data Fabric Dataplex **ANY INNOVATION**

Collect	Process	Store	Analyze	Activate	Empower
Pub/Sub Datastream Database Migration Service Storage Transfer Service	Dataflow (Apache Beam) Dataproc (Spark, Flink, Presto, MapReduce) Data Fusion Composer (Orchestration) Dataprep (Wrangling)	Relational Databases: Cloud SQL, Spanner NoSQL Databases: Bigtable, Firestore Memorystore	BigQuery BI Engine, BGML, Data QnA Google Storage, Multi Cloud	Vertex AI Training, AutoML, Explainable AI, Prediction APIs, MLOPs AI Solutions: CCAI, DocAI, Retail Search, Visual Inspection	Business Intelligence: Looker, Connected Sheets App Platforms: AppSheet, Firebase Analytics Hub
Fivetran Informatica confluent teradata Starburst databricks Collibra SAS DataRobot dataiku + a b l e a u					
Enterprise Capabilities Data Catalog IAM CMEK Monitor/Logging DLP Network					

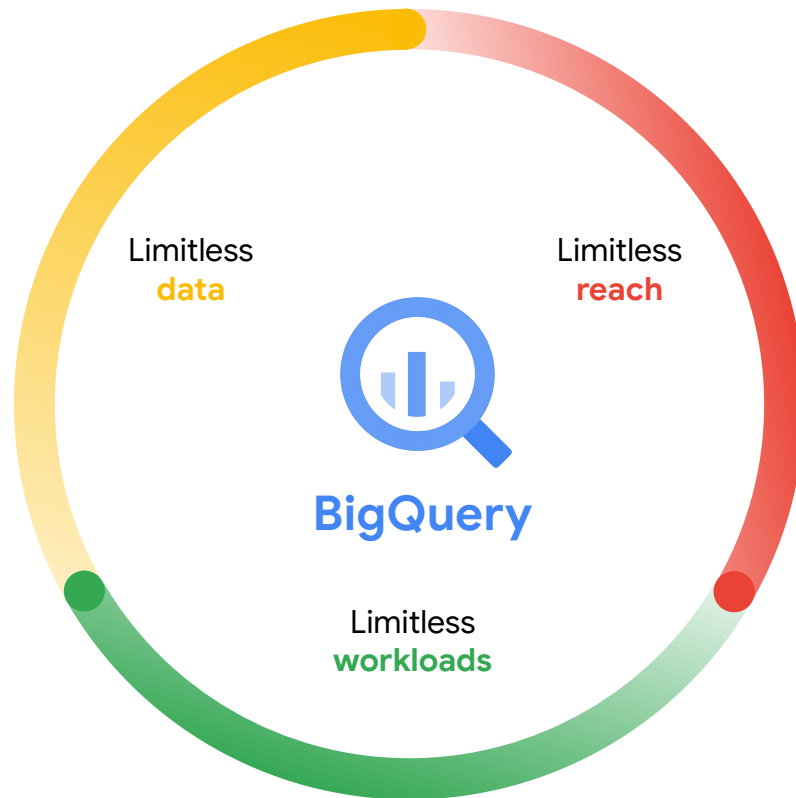
- Corporate and 3rd Systems
- E-Commerce
- SaaS Applications
- IoT Devices
- Social Media
- Geospatial

- Decision Making
- App Development
- SaaS Applications
- Exception Management
- Operational Intelligence
- Data Monetization

BigQuery

The core of Google's Data Cloud to power your **data-driven innovation**.

100k+ data professionals have started their Data Cloud journey using BigQuery with trials growing nearly **150% YoY in 2021**.



Data warehouse with customers ranging from TB to 100+ PB



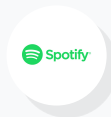
Cloud-scale enterprise data warehouse



Standard SQL for petabyte-scale queries and storage



Encrypted, durable, highly available



Limitless scalability

Unique



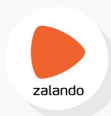
Real-time insights

Unique



Built-in ML with SQL

Unique

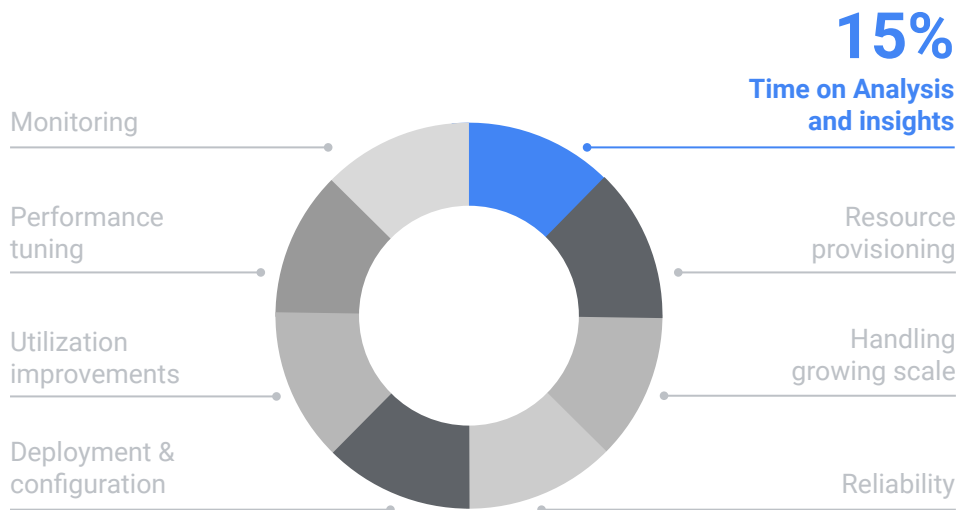


BI Engine for everyone

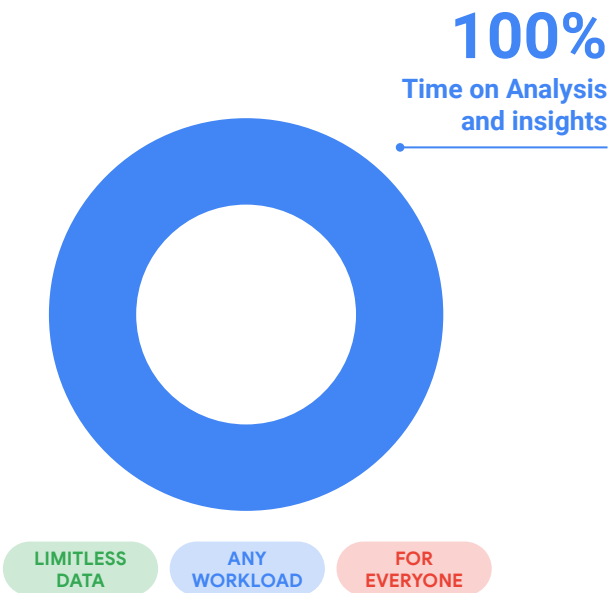
Unique

Serverless data warehouse means you spend 100% using data

Traditional data warehouses

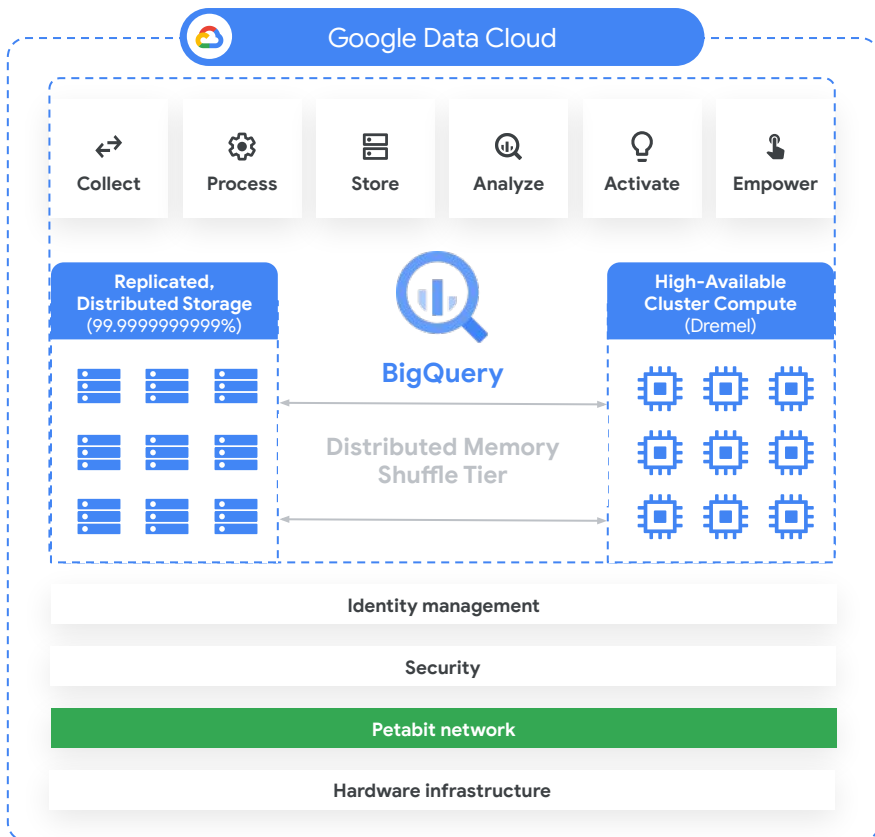


BigQuery



LIMITLESS DATA

Decoupled storage and compute for maximum flexibility



Completely elastic

Distributed storage and compute with ultra-high bandwidth including distributed petabyte scale in-memory storage for temp data and state:

- Auto-start / auto-pause
- 0-Second warm up to get maximum performance
- No performance cliff due to local capacity saturation
- Immune to large-scale hardware failures

BigQuery @ Spotify

BigQuery reduced
the time for running
common queries

**from minutes
to seconds**

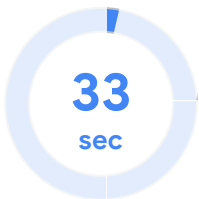
Question:

How many hours did users in Spain spend listening to Spotify in October, 2016?



Hive

15.5TB processed



BigQuery

750GB processed



Let's query 2TB dataset!
(57,000,000,000 rows)

Just load data, then query. ~~No start up, no cluster.~~

**ANY
WORKLOADS**

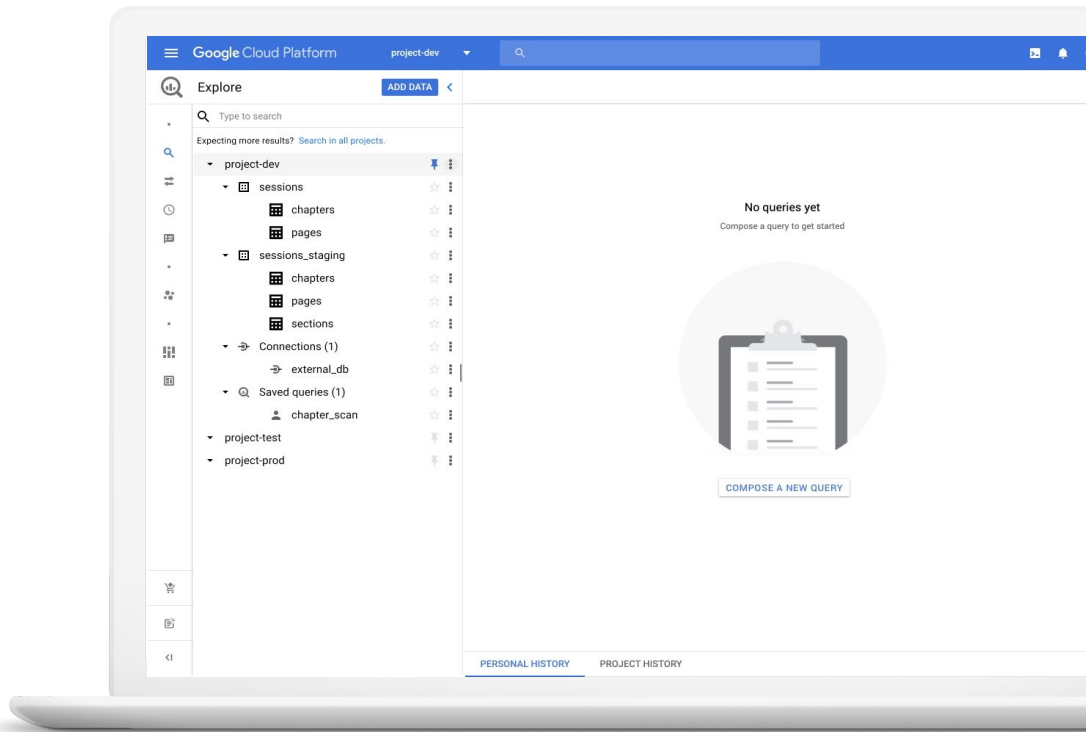
Unified SQL and Spark experience

Unified SQL and Spark experience

Enable data warehousing users to easily write and execute Spark on BigQuery data **without exporting it**

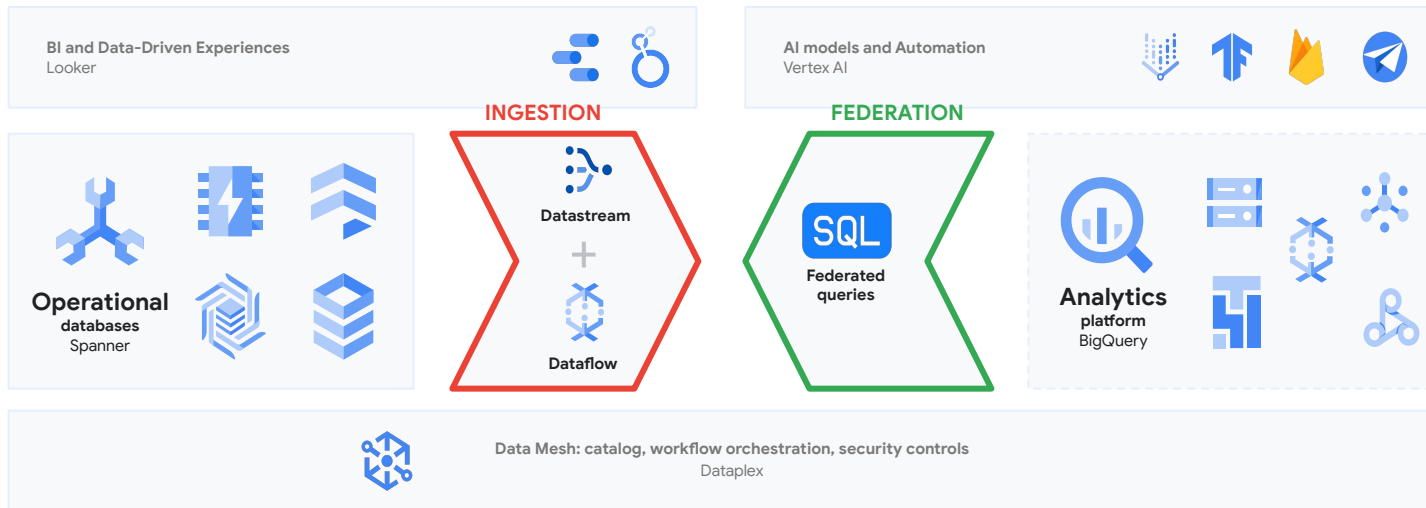
Fully-managed Spark and SQL analytics

No infrastructure management required for either Spark or SQL analytics. **Both autoscale.**



Analytical + Transactional OLAP and OLTP in one place

Analyze Cloud Spanner and Cloud SQL data in real-time **without data movement or copy.**



Stream Analytics right in the data warehouse

Analyze business events in real-time

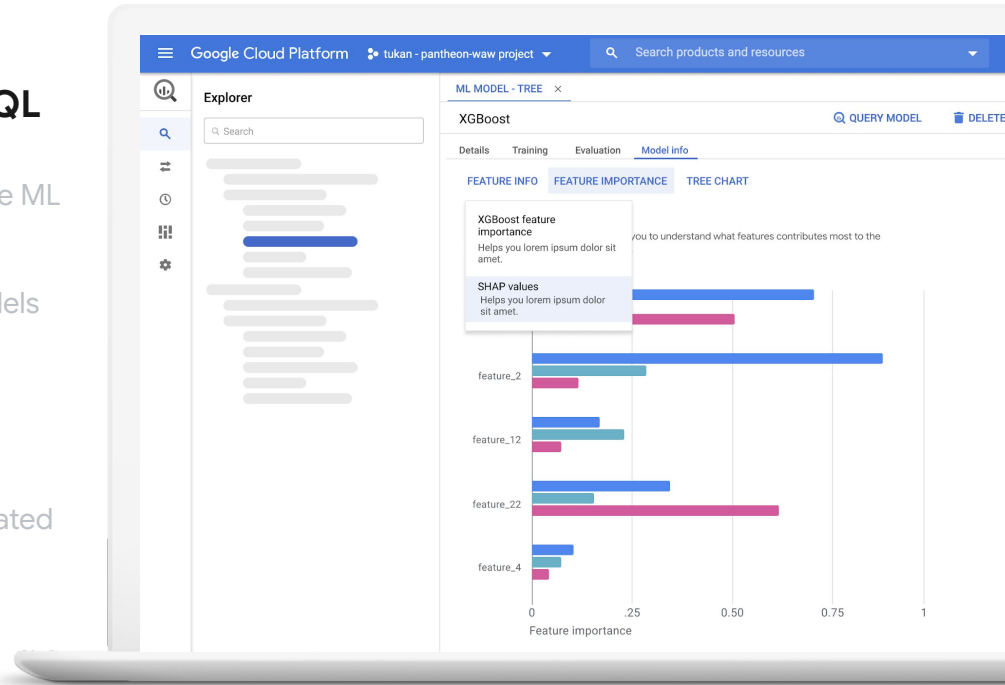
Move your business to event-driven action for logstream, clickstream, and sensor data to enable use cases like anomaly detection and continuous intelligence.



BigQuery ML Built-in AI/ML + Explainable AI (XAI)

Machine Learning for all Built-in ML with SQL

- **No Data Movement** Execute, iterate, and automate ML initiatives all without data movement
- **Pre-built algorithms** plus leveraging external models developed in Tensorflow directly from SQL
- **Production Ready** Export developed models for production deployment in Vertex AI
- **Complete MLOps** environment, seamlessly integrated with Google Vertex AI






BigQuery ML

Now supports
unstructured data

Public preview

Let's build some ML in BigQuery!

Score threshold

Positive class threshold		0.0162
Positive class		1
Negative class		0
Precision		0.0904
Recall		0.9895
Accuracy		0.9037
F1 score		0.1656

Confusion matrix

This table shows how often the model classified each label correctly (in blue),

True label	Predicted label	
	1	0
1	99%	1%
0	10%	90%

FOR EVERYONE

A platform for all users and intents throughout the data life cycle



Developer

Intelligent apps



Messaging
Pub/Sub



Data Processing
Dataflow



OSS Engines
Dataproc
(Spark, Flink)



DW & DB
BigQuery,
Cloud Bigtable



Data Apps
Looker
(LookML)



Data engineer

Get clean, useful data



Messaging
Pub/Sub or
Confluent Kafka



Data processing
(OSS) pipelines
Dataproc
(Spark, Presto, Flink)



Data Processing
(native) pipelines
Dataflow



Dataplex
BigQuery &
Cloud Storage



Orchestration
Cloud
Composer



Data analyst

Query and analyze



Ingestion
BigQuery
Streaming & DTS



Visual data
Integration
Cloud Data Fusion



Data warehouse
& Orchestration
BigQuery



Data models,
catalog
Looker, Data
Catalog



ML in SQL
BigQuery ML



Business user

Insights everywhere



Data warehouse
BigQuery



Governed BI
Looker



Data warehouse
in a spreadsheet
Connected
Sheets



Data models,
catalog
Looker, Data
Catalog



Natural Language
Query



Data scientist

Models that work



Dataplex
BigQuery &
Cloud Storage



Portable
notebooks
User-managed
notebooks



Simplified ML
BigQuery ML &
AutoML



Spark
Dataproc



Collaboration
Feature Store,
Vertex AI



Security admin

Protecting data



Fine-grained
access control
IAM



Metadata
management
Data Catalog



Redact sensitive
data
Cloud DLP



Always
encrypted
Data at rest and
in transit



Secure data
sharing
BigQuery

See your BigQuery data in one click with Looker Studio

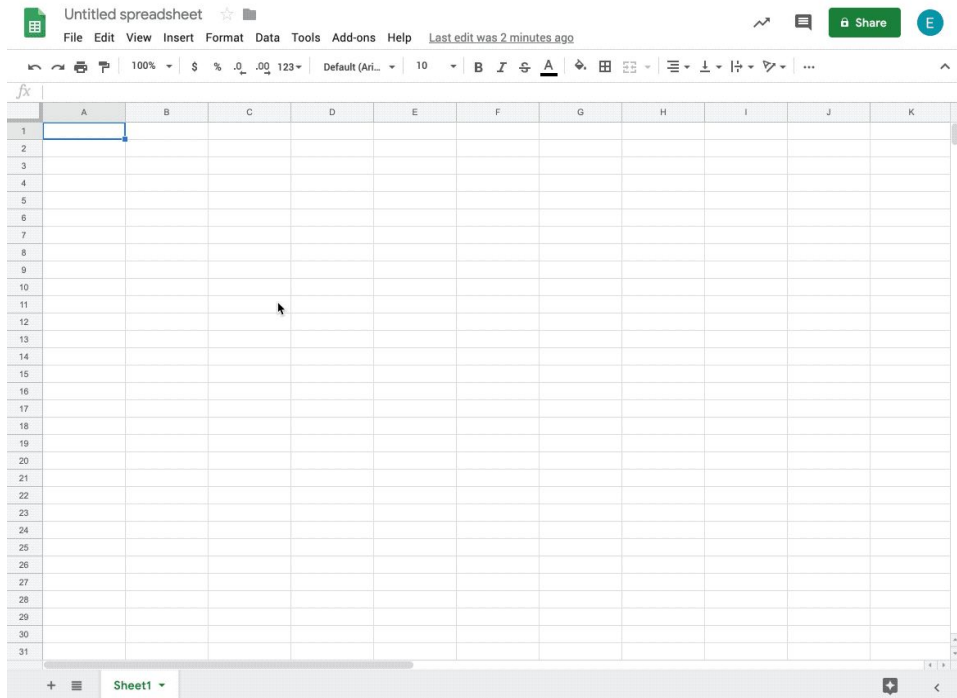


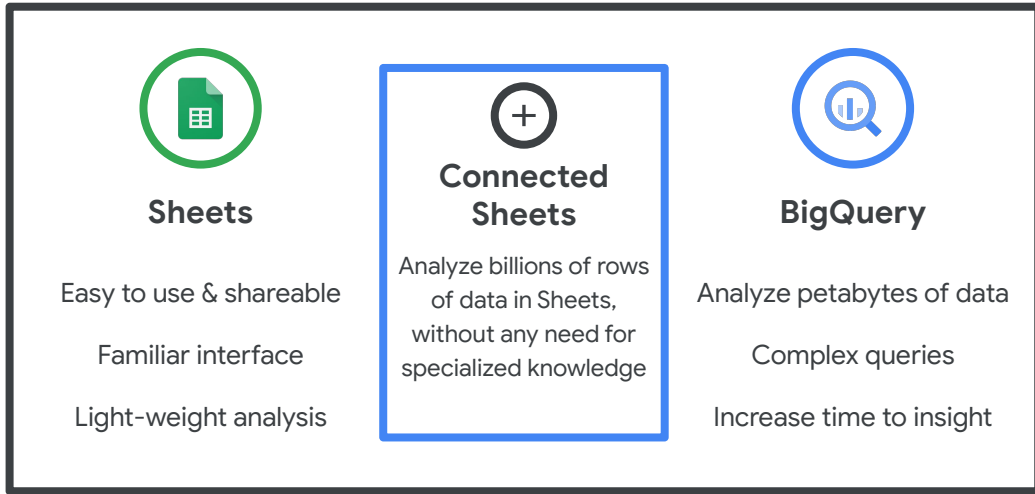
The screenshot displays the Google Cloud BigQuery interface. On the left, a navigation pane shows a tree view of resources, with 'publications' selected under the 'data' folder. The main area is the 'Query editor', which is currently empty. Below the editor, there are buttons for 'Run', 'Save query', 'Save view', 'Schedule query', and 'More'. The 'publications' table is displayed in a table view with columns for 'Field name', 'Type', 'Mode', 'Policy tags', and 'Description'.

Field name	Type	Mode	Policy tags	Description
id	STRING	NULLABLE		
title	RECORD	NULLABLE		
title_preferred	STRING	NULLABLE		
title_original	STRING	NULLABLE		
year	INTEGER	NULLABLE		
doi	STRING	NULLABLE		
volume	STRING	NULLABLE		
issue	STRING	NULLABLE		
pages	STRING	NULLABLE		
abstract	RECORD	NULLABLE		

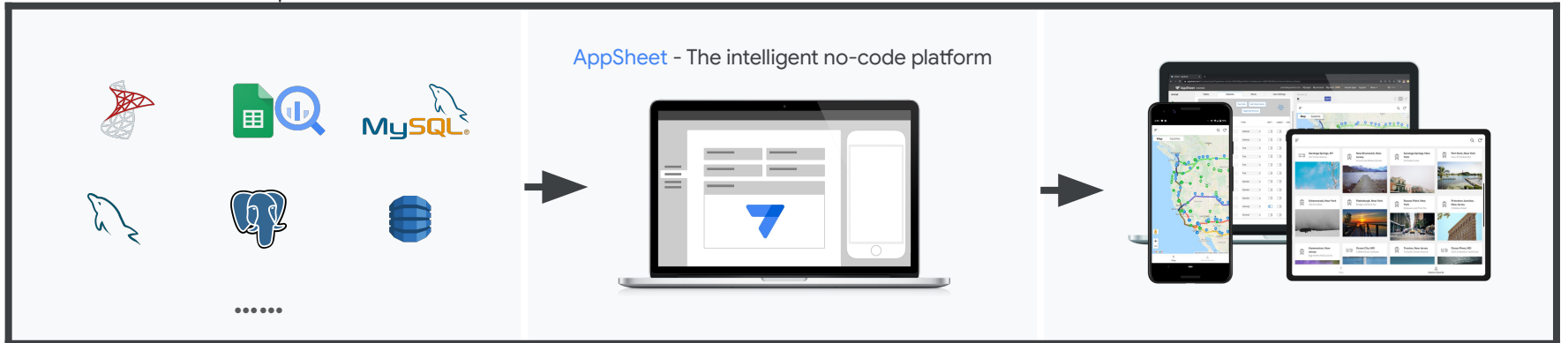
Work with spreadsheet in [Sheets](#), analyzing data with pivot table in a few clicks

Powered by [BigQuery](#) on the backend.





Use data from Google BigQuery with the BigQuery data source / Connected Sheets in AppSheet app.



Driving insights from your data with **maps visualization** in a few steps in BigQuery Geo Viz

1) Select data
in BigQuery

2) Select column
In Geo Viz

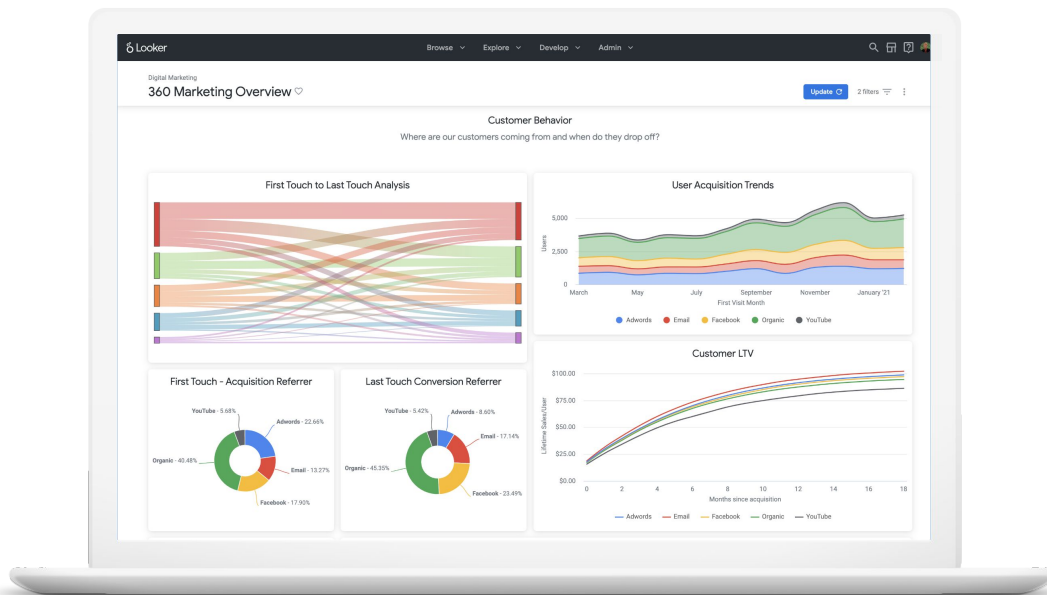
3) Style the viz
interactively



Looker




The Platform for first-party data

Google's cloud-native enterprise data platform for **accessing**, **analyzing**, and **activating** first-party data.






BigQuery helps you do more




Limitless **data**

-  Completely serverless
-  All data types
-  Data exchanges

All **workloads**

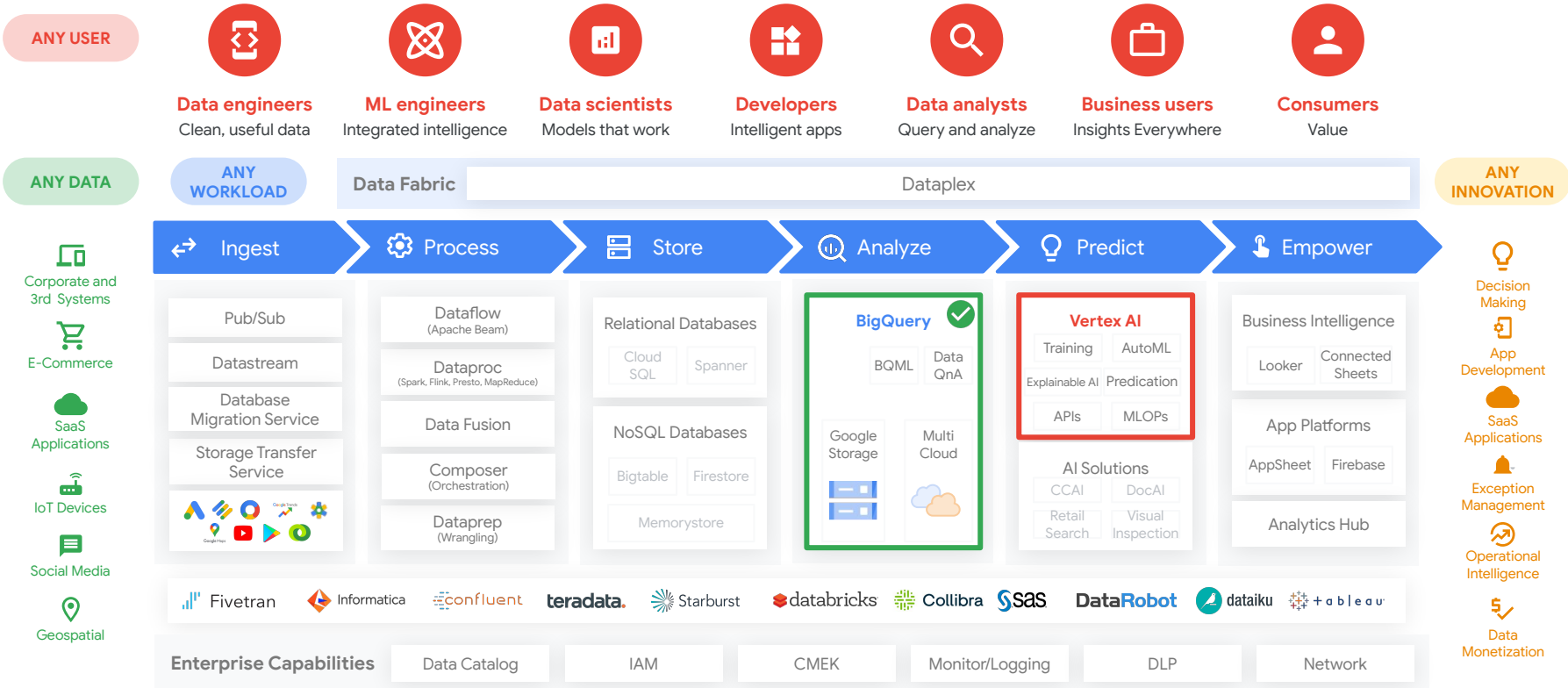
-  SQL, Spark, Search, Stream
-  Built-in AI/ML
-  Analytical + Transactional

For **everyone**

-  Built-in BI
-  Analytical applications
-  Partner ecosystem

Cost Effective | Highly Productive | Governed | Easy to Secure | Clear Compliance | Open Extensions

A data platform that supports any needs, for any personas



Vertex AI has multiple pathways of consumption

offering a unified platform to build, deploy and scale ML models with innovations developed by Google

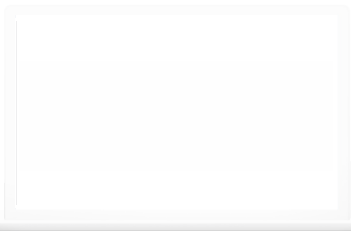
Out of the box

DIY



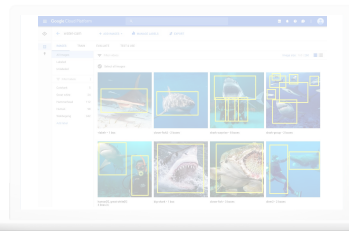
1 Pre-trained APIs & AI Solutions

- Call API to predict
- Pre-trained
- No training data needed
- Get started right away



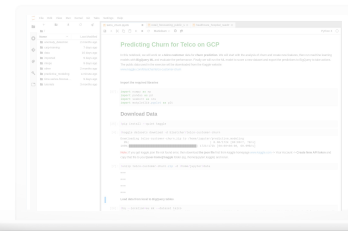
2 BigQuery ML

- Simple SQL code
- Descriptive and predictive modeling on structured data
- Hyper-parameter tuning
- Feature engineering
- Explainability



3 AutoML in Vertex AI

- No code, form-driven
- Structured & unstructured data
- Hyper-parameter tuning
- Feature engineering
- Explainability



4 End-to-end MLOps

- Code on managed infra
- Custom models on pre-built frameworks
- Noops, serverless training with hyperparameter tuning
- Explainability

1 Pre-trained AI APIs

Sight



Vision API



Video
Intelligence API

Language



Translation API



Natural Language API

Conversation



Dialogflow Enterprise
Edition



Text-to-Speech



Speech-to-Text

AI Solutions



Document AI



Retail API



Recommendation AI

1 Pre-trained AI APIs: Vision API

```
import io
import os

# Imports the Google Cloud client library
from google.cloud import vision

# Instantiates a client
client = vision.ImageAnnotatorClient()

# The name of the image file to annotate
file_name = os.path.abspath('resources/wakeupcat.jpg')

# Loads the image into memory
with io.open(file_name, 'rb') as image_file:
    content = image_file.read()

image = vision.Image(content=content)


# Performs label detection on the image file
response = client.label_detection(image=image)
labels = response.label_annotations

print('Labels:')
for label in labels:
    print(label.description)
```

<https://cloud.google.com/vision/docs/drag-and-drop>

Try the API

Objects Labels Properties Safe Search



download.jpg

Cat	95%
Carnivore	89%
Felidae	88%
Small To Medium-sized Cats	84%

Show JSON ▾

RESET NEW FILE

What is Document AI?

Document AI turns unstructured content into business-ready structured data.

Document image



Structured data

```
{Class:
/us/gov/ID/Driverslicense
State: Ohio
Name: Jane Doe
Issued: 7/2/2018
Expires: 1/21/2021
}
```

1 AI Solutions: Document AI

```

from google.cloud import documentai_v1 as documentai

# You must set the api_endpoint if you use a location other than 'us', e.g.:
opts = {}
if location == "eu":
    opts = {"api_endpoint": "eu-documentai.googleapis.com"}

client = documentai.DocumentProcessorServiceClient(client_options=opts)

# The full resource name of the processor, e.g.:
# projects/project-id/locations/location/processor/processor-id
# You must create new processors in the Cloud Console first
name = f"projects/{project_id}/locations/{location}/processors/{processor_id}"

# Read the file into memory
with open(file_path, "rb") as image:
    image_content = image.read()

document = {"content": image_content, "mime_type": "application/pdf"}

# Configure the process request
request = {"name": name, "raw_document": document}

result = client.process_document(request=request)
document = result.document

document_pages = document.pages

# For a full list of Document object attributes, please reference this page: https://cloud.google.com/documentai/docs/reference/python

# Read the text recognition output from the processor
print("The document contains the following paragraphs:")
for page in document_pages:
    paragraphs = page.paragraphs
    for paragraph in paragraphs:
        print(paragraph)
        paragraph_text = get_text(paragraph.layout, document)
        print(f"Paragraph text: {paragraph_text}")

```

<https://cloud.google.com/document-ai/docs/drag-and-drop>

Pay Slip schema JSON

Filter Type to filter

end_date	12/31/2014 2014-12-31
employer_name	Google Singapore Google
pay_date	01/07/2015 2015-01-07
employer_address	70 Maple tree Business City, Singapore 117371 70 Pasir Panjang Rd #03-71 Mapletree Business City II Singapore 117371
employee_name	Dave Petty
ssn	015-04-3122 15043122
employee_address	208 E. Main Street Bozeman MT 59715
regular_pay	740.00 740
regular_pay_ytd	2,220.00 2220
overtime	66.00 66
overtime_ytd	198.00 198

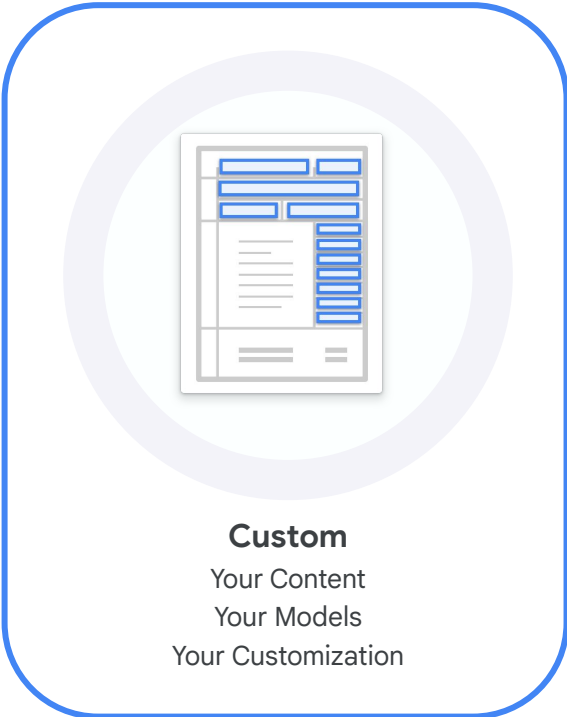
Document AI Processors



General
Your Content
Google's General Models



Specialized
Your Content
Google's Specialized Models



Custom
Your Content
Your Models
Your Customization

Document AI Workbench

Automate document processing by using your data to build models with Document AI's machine learning platform powered by state of the art computer vision, NLP, and neural networks.



Why Document AI Workbench?

1 Any doc type

Use your data to create ML models with DocAI Workbench for many doc types (e.g., printed, scanned, handwritten, tables, etc.)

2 Democratized ML

Label data with a simple interface; train ML models with the click of a button

3 Time to market (TTM)

Reduce TTM with Workbench instead of building custom ML models

4 Less training data

Transfer learnings (aka “uptrain”) from relevant models to get accurate results faster for your documents

5 No cost training

Create and evaluate ML models for free; pay as you go once you deploy and use processors to extract document data

6 Own your data

You own your data within your GCP project

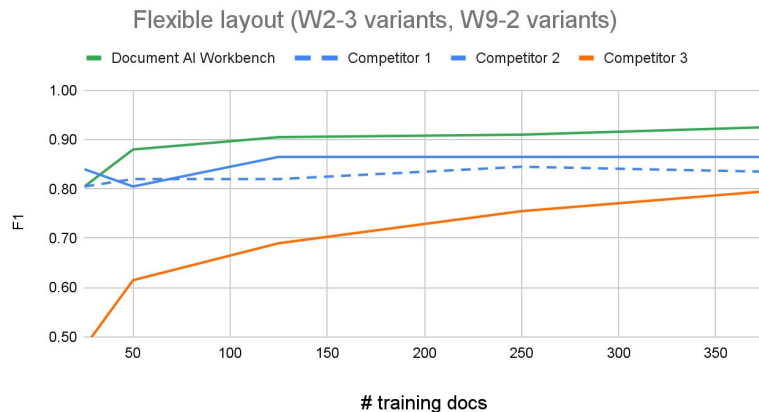
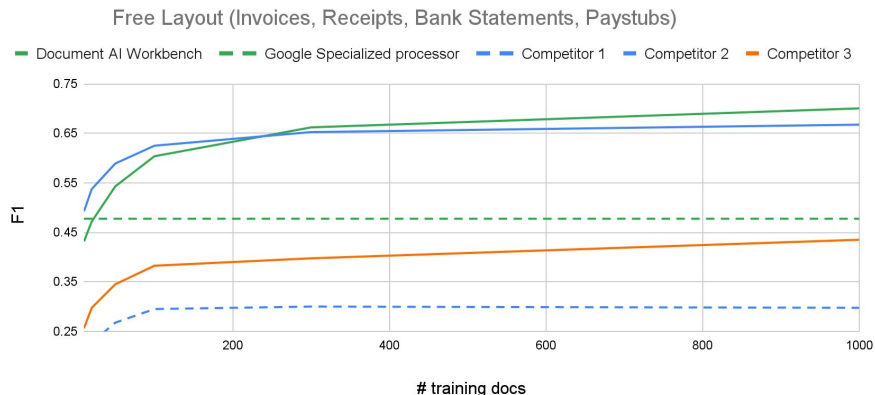


How do we stack up with competitors?

Context: A 3-party agency used Document AI Workbench alongside major competitors' products to automate document processing

Note: The below F1 scores (harmonic mean of precision & recall) estimate model prediction accuracy. Higher accuracy (99+% can be achieved through human in the loop (HITL) review.

What we learned: Workbench extracted data from documents more accurately and with less training data for flexible (W9-2 variants, W2-3 variants) and free layout (invoice, receipt, bank statements, paystubs) document types



Vertex AI has multiple pathways of consumption

offering a unified platform to build, deploy and scale ML models with innovations developed by Google

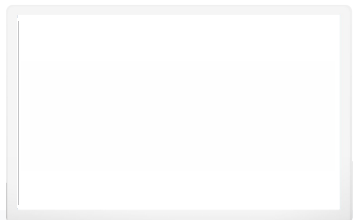
Out of the box

DIY



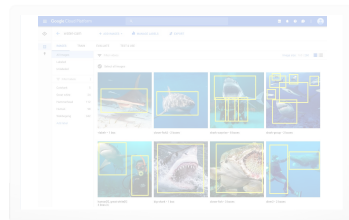
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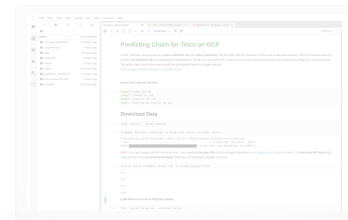
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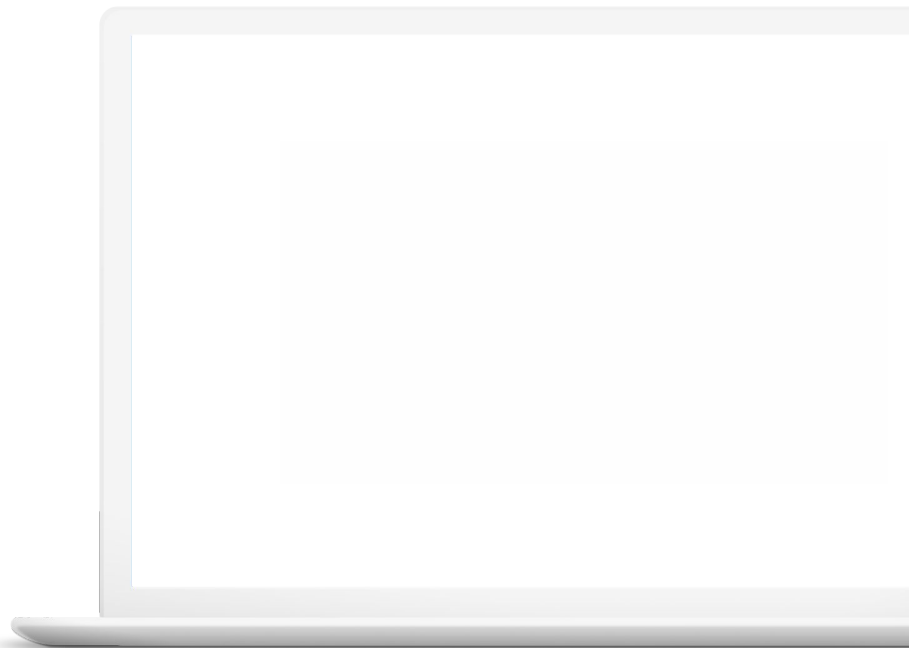
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- Code on managed infra
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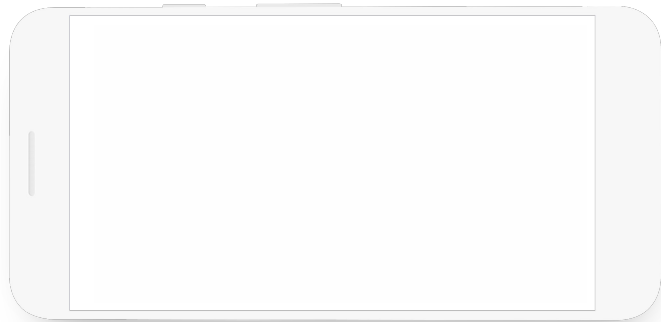
Machine Learning for all Built-in ML with SQL

- Execute, iterate, and automate ML initiatives all within BigQuery using predefined models
- Leverage external models developed in Tensorflow directly from SQL
- Export developed models for use in Vertex AI



BigQuery ML

Train models in SQL; manage, orchestrate, and deploy directly to Vertex AI



Proprietary + Confidential



Classification

- Logistic regression
- DNN classifier (TensorFlow)
- XGBoost
- AutoML Tables
- Wide and Deep NNs

Other Models

- k-means clustering
- Time series forecasting (ARIMA_PLUS)
- Recommendation: Matrix factorization
- Anomaly Detection ^{Preview}

Regression

- Linear regression
- DNN regressor (TensorFlow)
- XGBoost
- AutoML Tables
- Wide and Deep NNs

Model ops

- Importing TensorFlow models for batch prediction
- Exporting models from BigQuery ML for online prediction
- Hyperparameter tuning using Cloud AI Vizier
- Explainable AI



Using Google **Analytics 360**, **BigQuery**, and **BigQuery ML**, Toyota Canada was able to build a prediction model for likely customer converters that resulted in a **6X increase in conversions** and **80% decrease in CPA**.

Google Cloud

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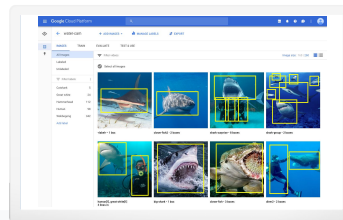


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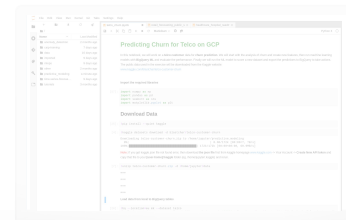
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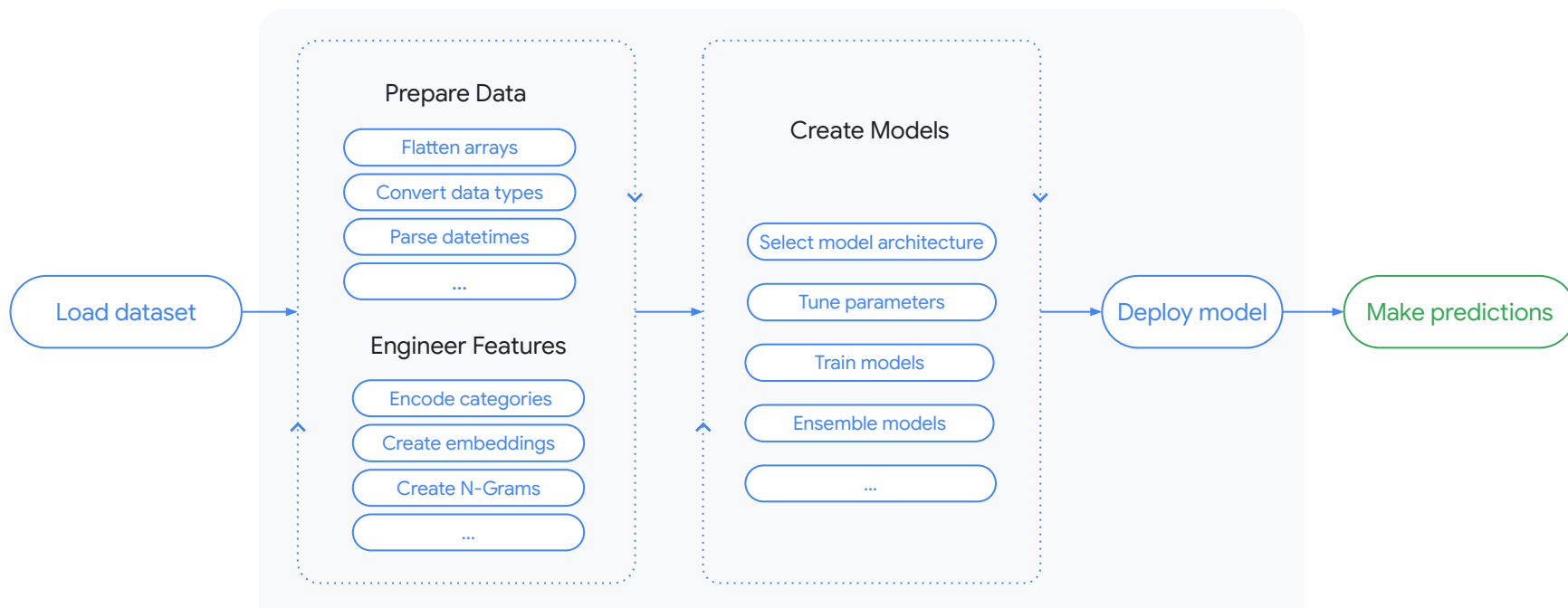


4 End-to-end MLOps

- Code on managed infra
- Custom models on pre-built frameworks
- Noops, serverless training with hyperparameter tuning
- Explainability

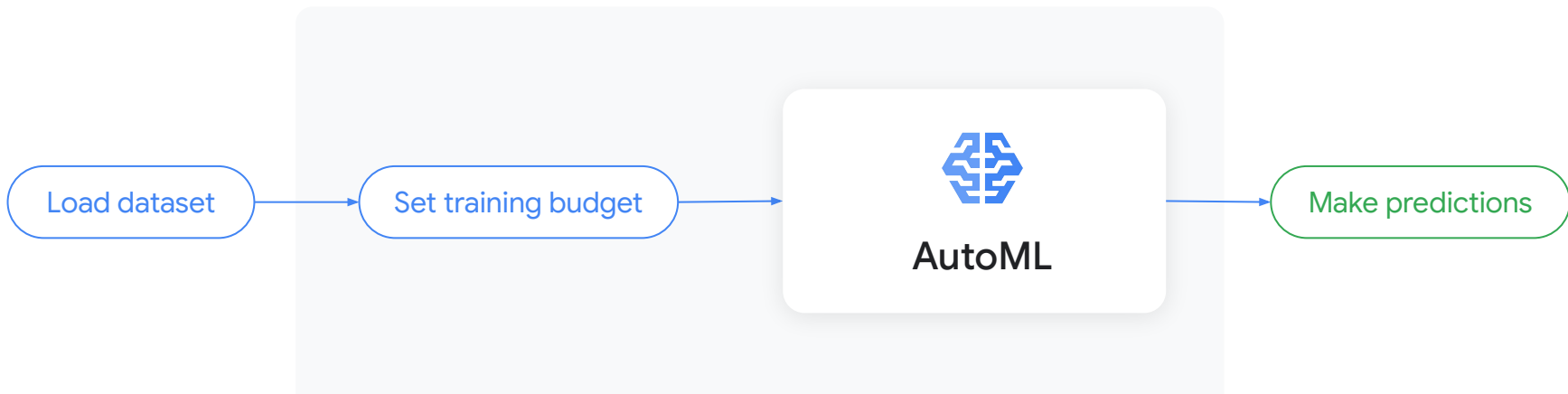
3 AutoML - Fastest path from data to value

Traditional Machine Learning Workflow

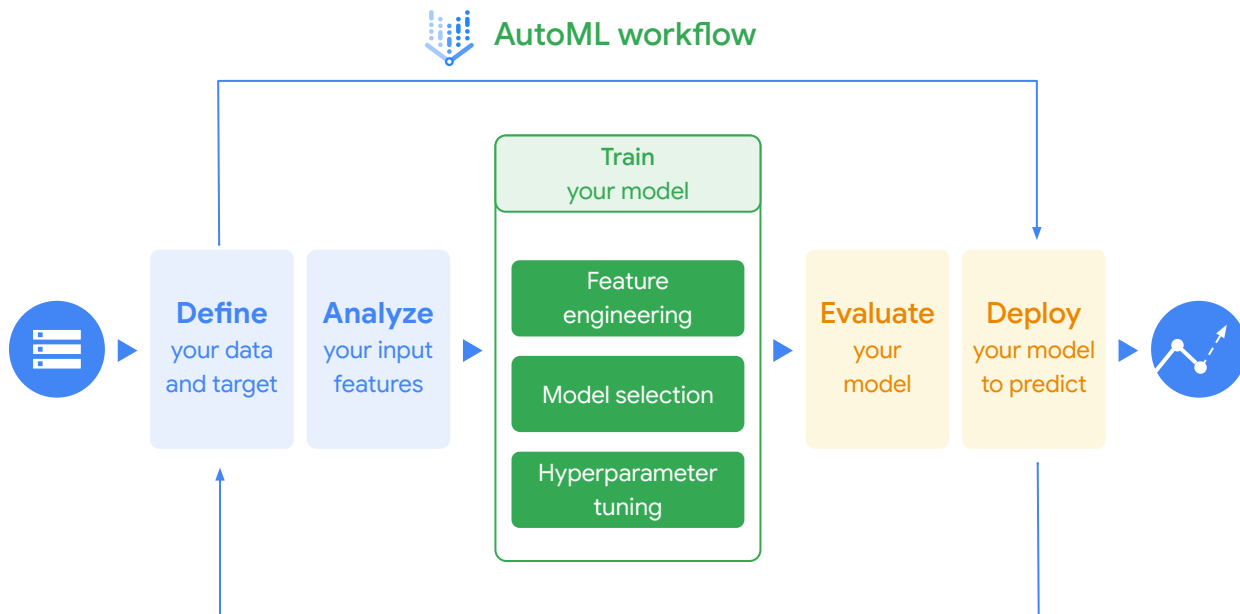


3 AutoML - Fastest path from data to value

AutoML Workflow



3 No Code: Point and click to build custom, high-quality models



Automatically search through Google's whole model zoo...

Linear, logistic

Feedforward DNN

Wide and Deep NN

Gradient Boosted Decision Tree (GBDT)

DNN + GBDT Hybrid

Adanet ensemble

Neural + Tree Architecture Search

...and more!

3 AutoML - Various types of models supported

IMAGE

TABULAR

TEXT

VIDEO




Image classification (Single-label)
Predict the one correct label that you want assigned to an image.




Image classification (Multi-label)
Predict all the correct labels that you want assigned to an image.




Image object detection
Predict all the locations of objects that you're interested in.




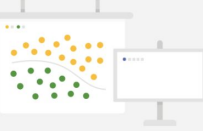
Image segmentation
Predict per-pixel areas of an image with a label.

IMAGE


TABULAR

TEXT

VIDEO



Regression/classification
Predict a target column's value. Supports tables with hundreds of columns and millions of rows.




Forecasting PREVIEW
Predict the likelihood of certain events or demand.

IMAGE

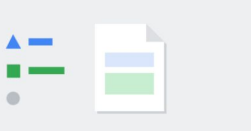
TABULAR

TEXT


VIDEO



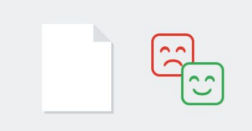
Text classification (Single-label)
Predict the one correct label that you want assigned to a document.



Text classification (Multi-label)
Predict all the correct labels that you want assigned to a document.



Text entity extraction
Identify entities within your text items.



Text sentiment analysis
Understand the overall sentiment expressed in a block of text.

3 AutoML - Case Study



98%

precision with AutoML
compared to 70-80%
with custom models

Source: Google Internal Data, "[Google Cloud and Seagate: Transforming hard-disk drive maintenance with predictive ML](#)", May 2021

1 Pre-trained AI APIs: Vision API

```
import io
import os

# Imports the Google Cloud client library
from google.cloud import vision

# Instantiates a client
client = vision.ImageAnnotatorClient()

# The name of the image file to annotate
file_name = os.path.abspath('resources/wakeupcat.jpg')

# Loads the image into memory
with io.open(file_name, 'rb') as image_file:
    content = image_file.read()

image = vision.Image(content=content)


# Performs label detection on the image file
response = client.label_detection(image=image)
labels = response.label_annotations

print('Labels:')
for label in labels:
    print(label.description)
```

<https://cloud.google.com/vision/docs/drag-and-drop>

Try the API

Objects **Labels** Properties Safe Search



download.jpg

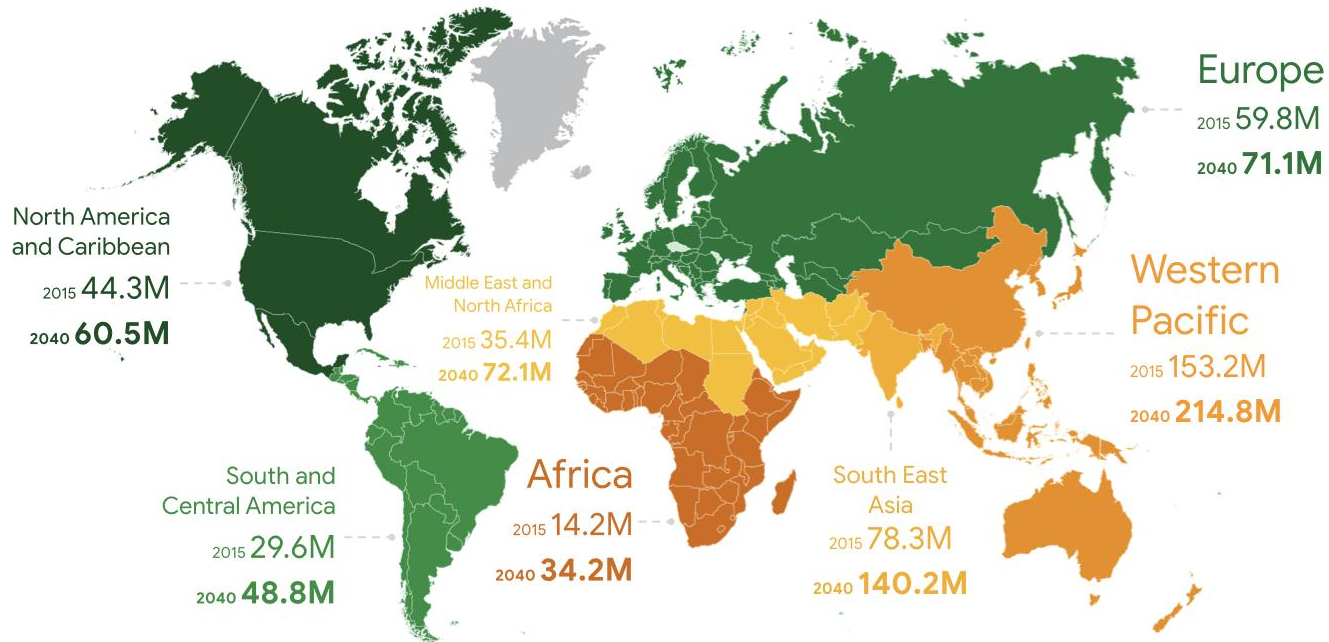
Cat	95%
Carnivore	89%
Felidae	88%
Small To Medium-sized Cats	84%

Show JSON ▾

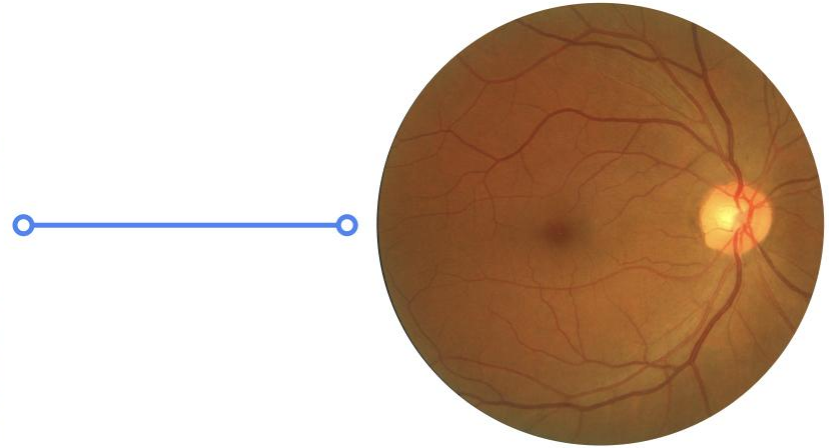
RESET NEW FILE

Diabetic retinopathy: fastest growing cause of blindness

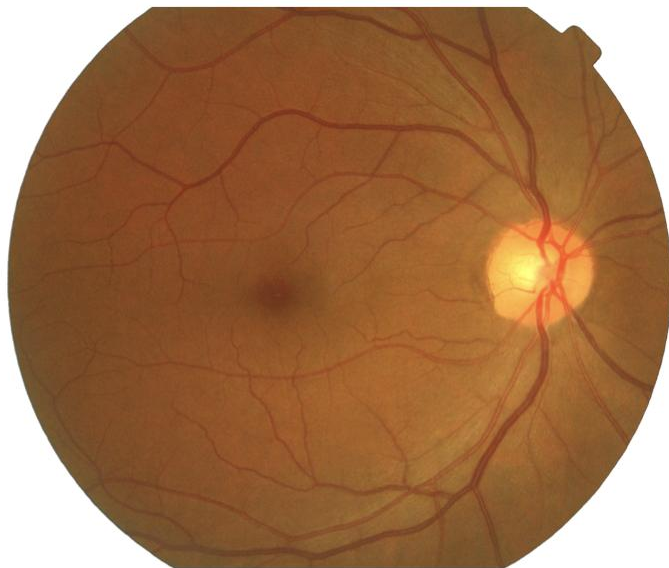
415M people with diabetes



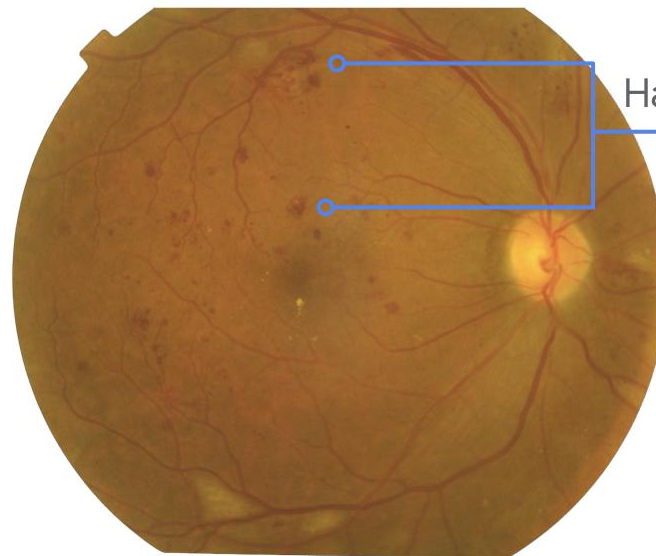
Regular screening is key to preventing blindness



How DR is Diagnosed: Retinal Fundus Images



Healthy



Diseased



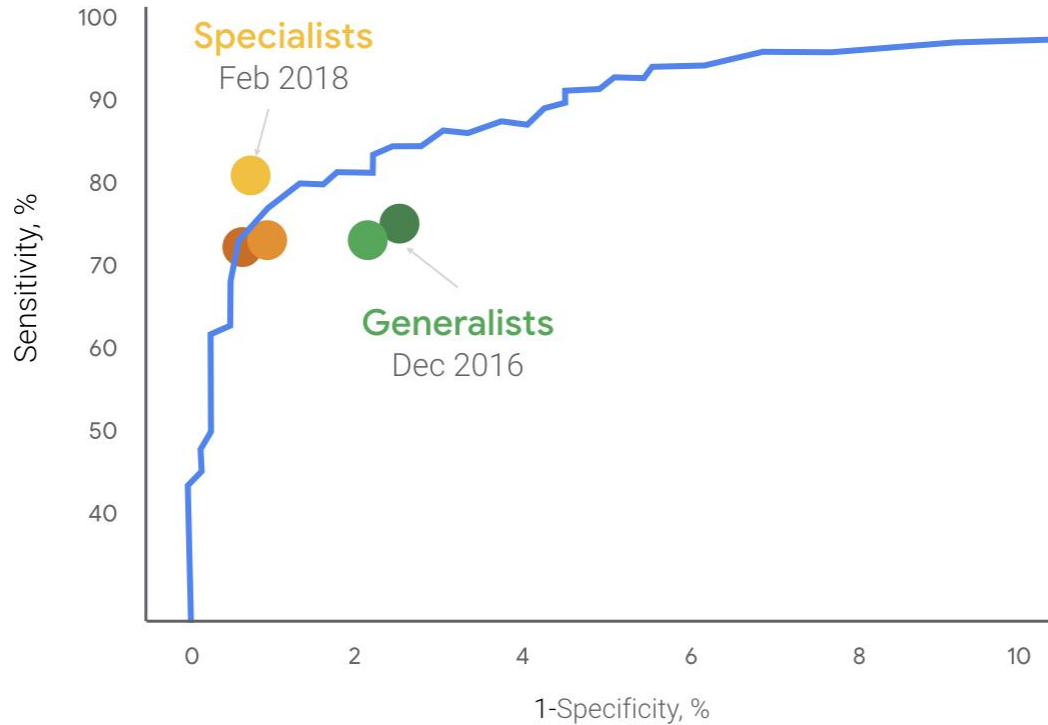


Thailand:

4.5M diabetics

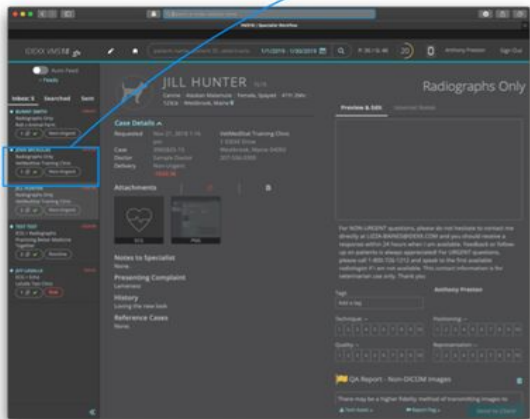
1,400 eye doctors

AI's performance is on par with eye specialists



VetMedStat Telemedicine workflow

Monitor 1



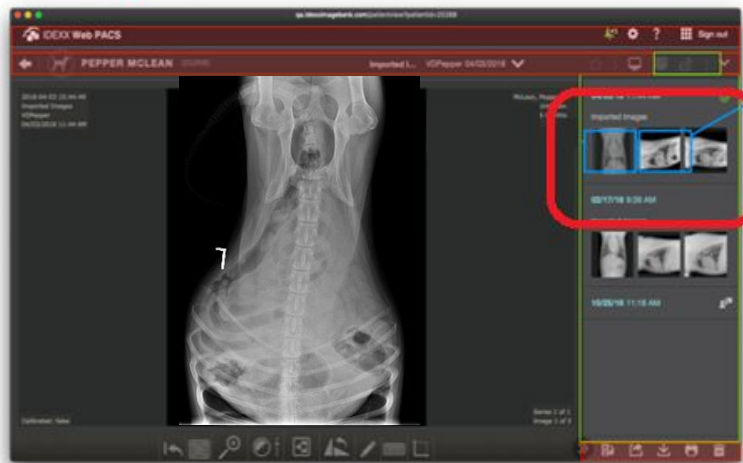
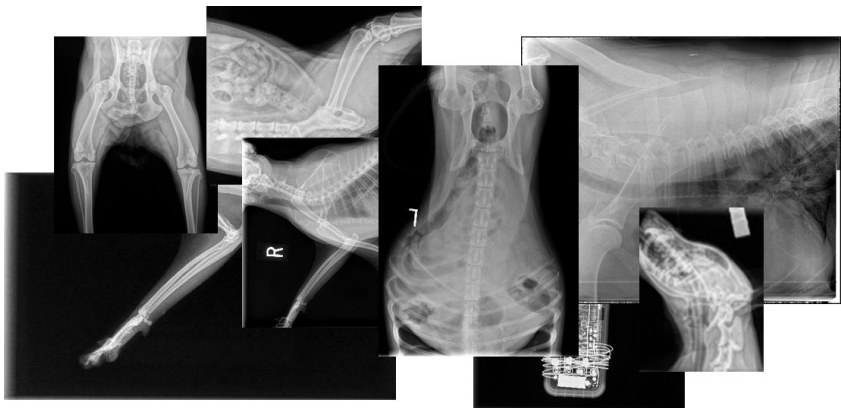
Monitor 2



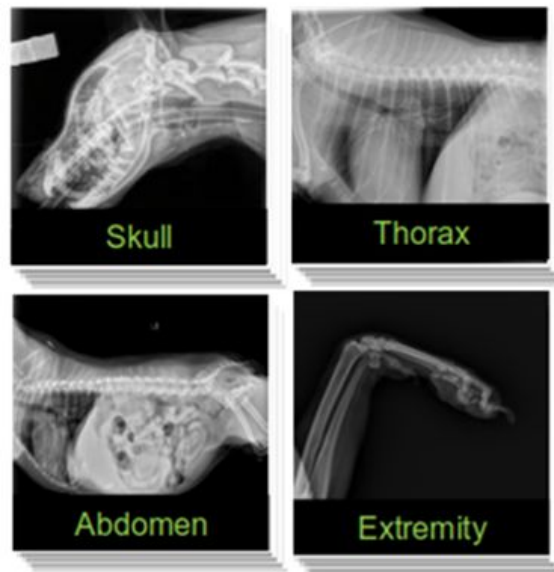
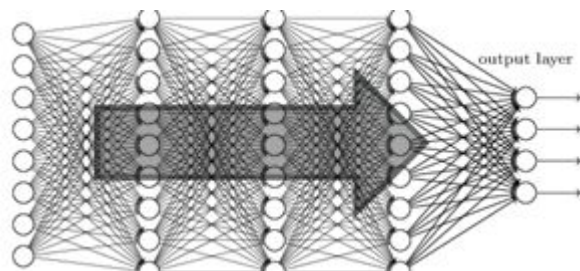
Monitor 3



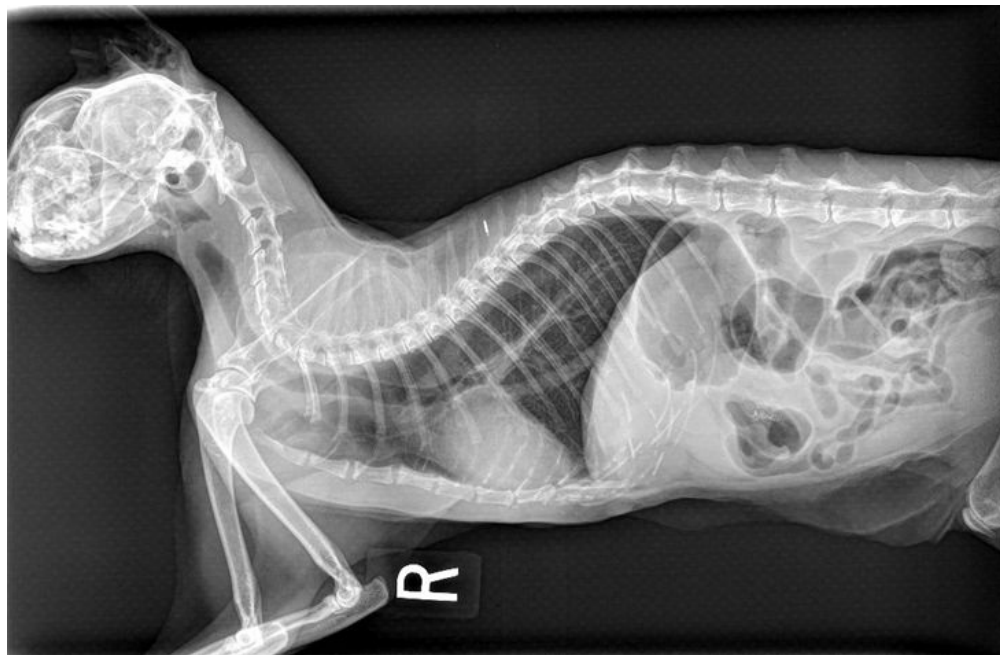
Challenge: Images come in unorganized



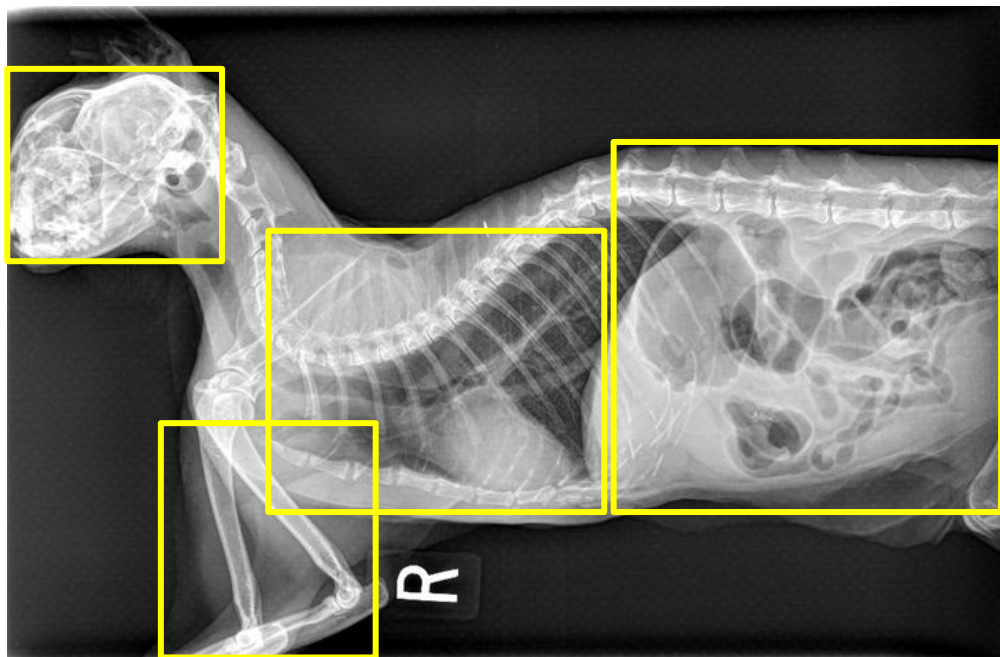
Use Machine Learning to Organize Data



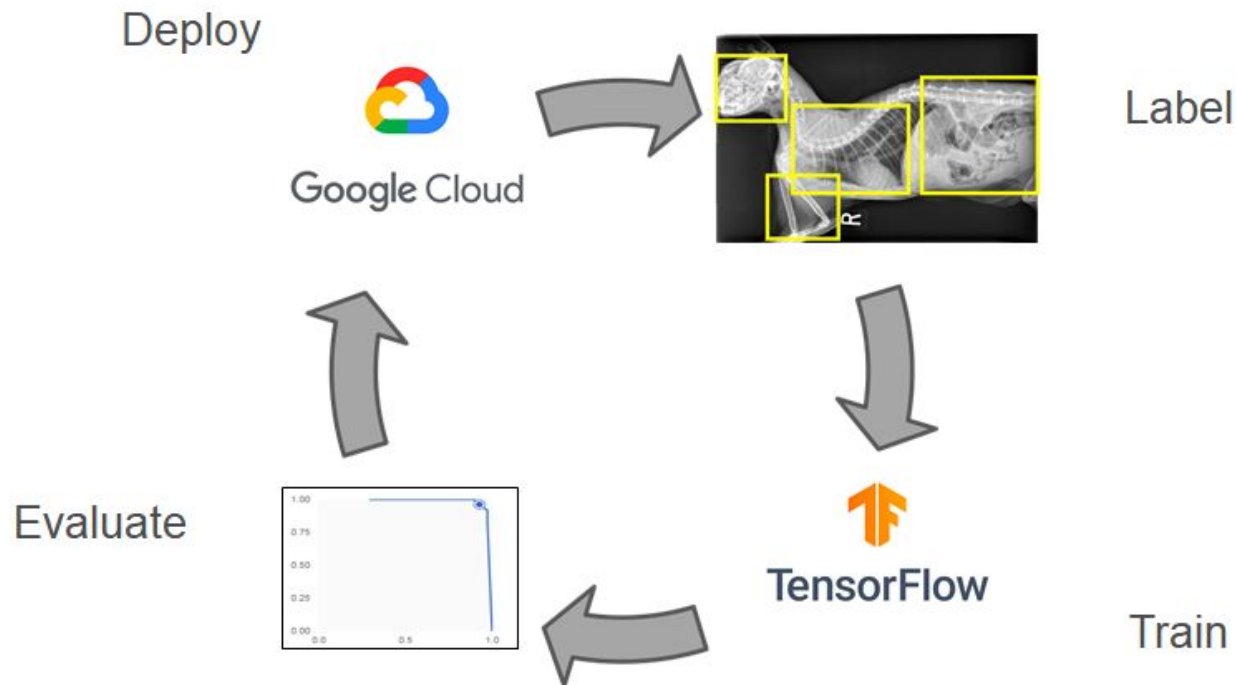
What kind of image is this? Skull? Thorax?



Object Detection gives us flexibility



Typical ML project cycle is long





Vertex AI Vision

Reduce time to build computer vision applications from
days to minutes at one tenth the cost of current offerings

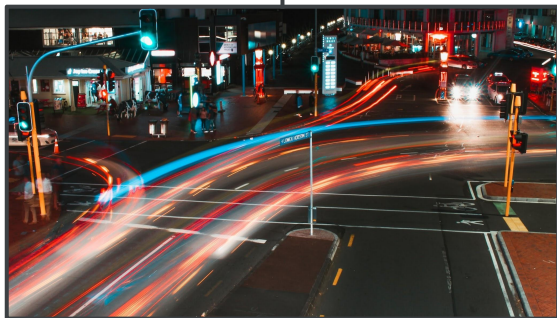
Public preview

An explosion of connected cameras and AI is transforming industries



Enterprise

- Retail
- Financial services
- Manufacturing
- Transportation
- Food & beverages
- Healthcare & hospitality
- Construction
- Education



Public sector

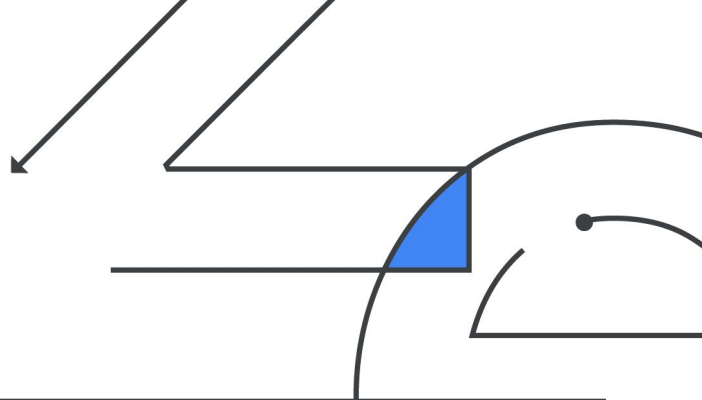
- Smart Cities
- Traffic management Systems
- Government Infrastructures



Consumer

- Smart Homes
- Fitness
- Media, entertainment
- Gaming

Building Computer Vision apps isn't easy.



Computer Vision Today



Complex



Expensive



Untrusted

Vertex AI Vision



Easy to use



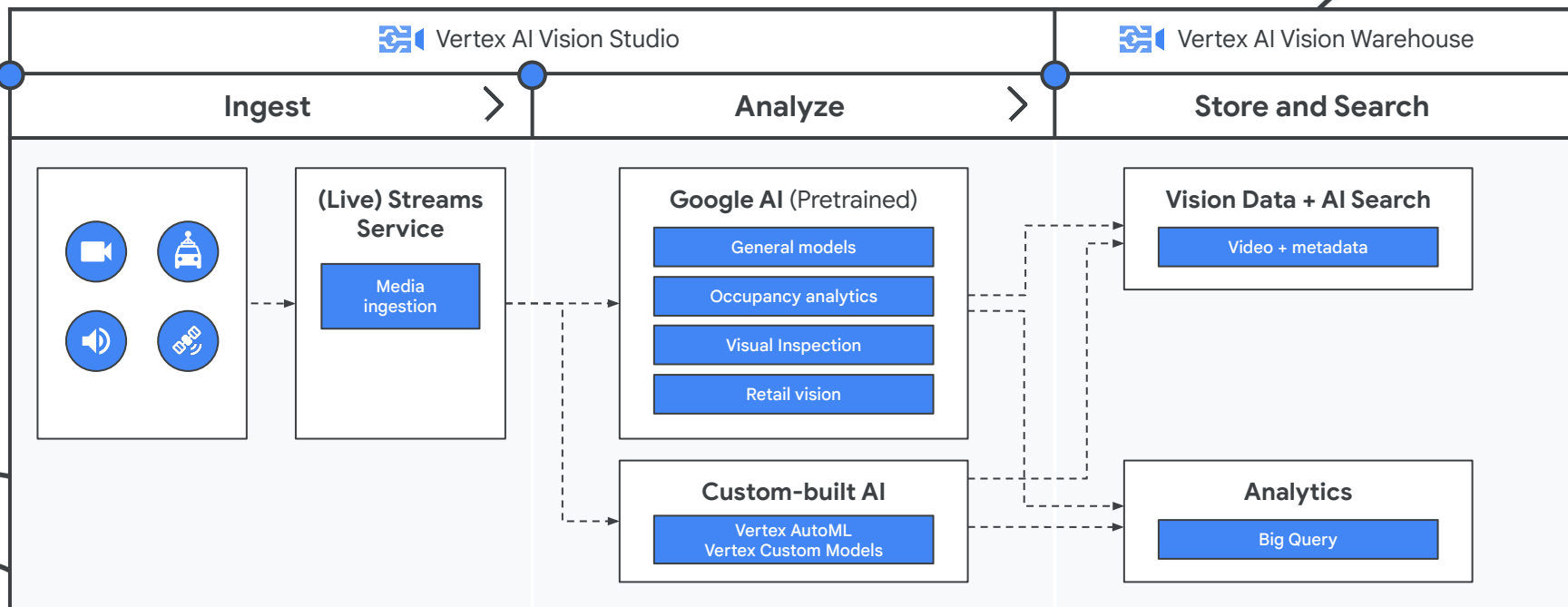
Low cost



Responsible AI

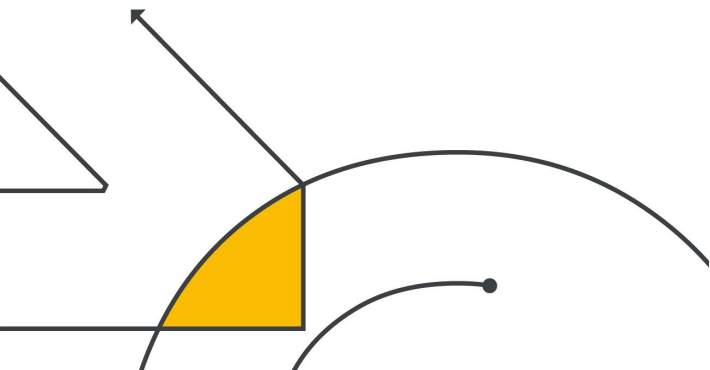
What is Vertex AI Vision?

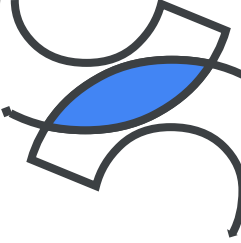
One Stop shop - Simple interface, serverless and scalable platform to quickly build and deploy Vision AI applications



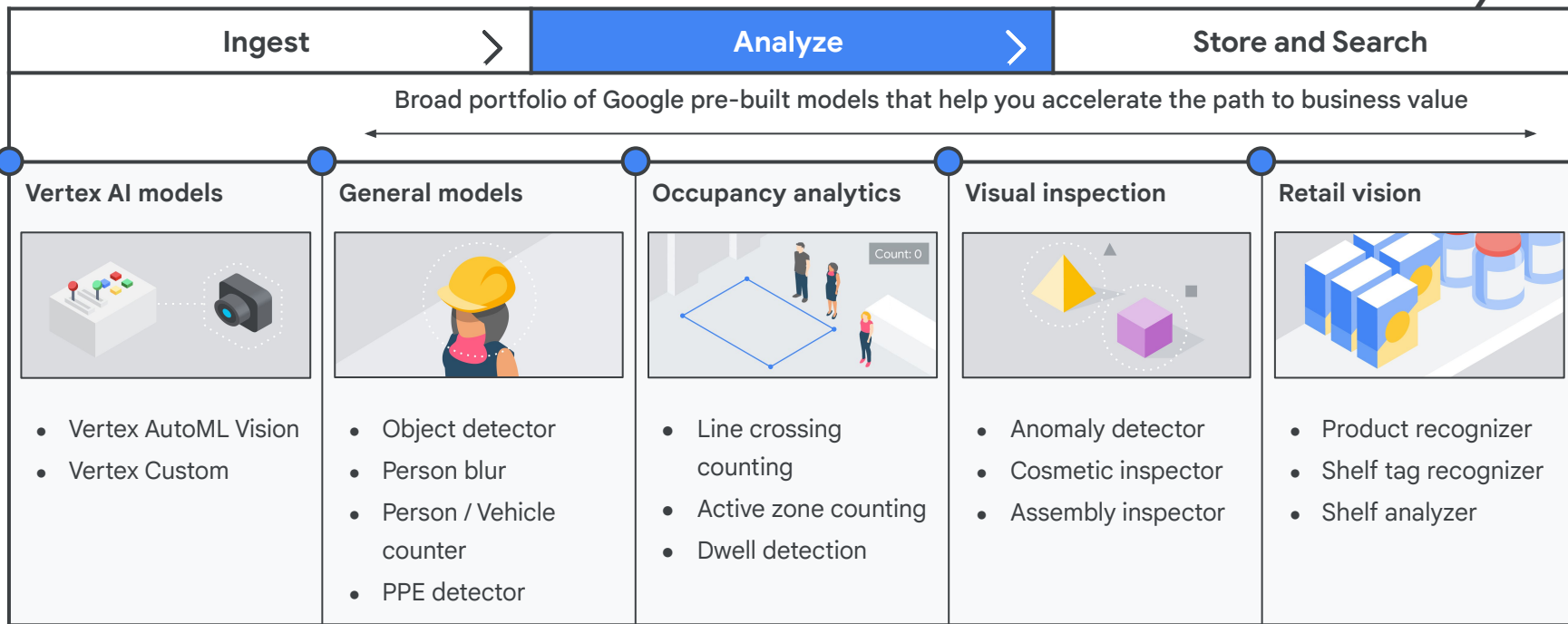
MISSISSAUGA

Demo



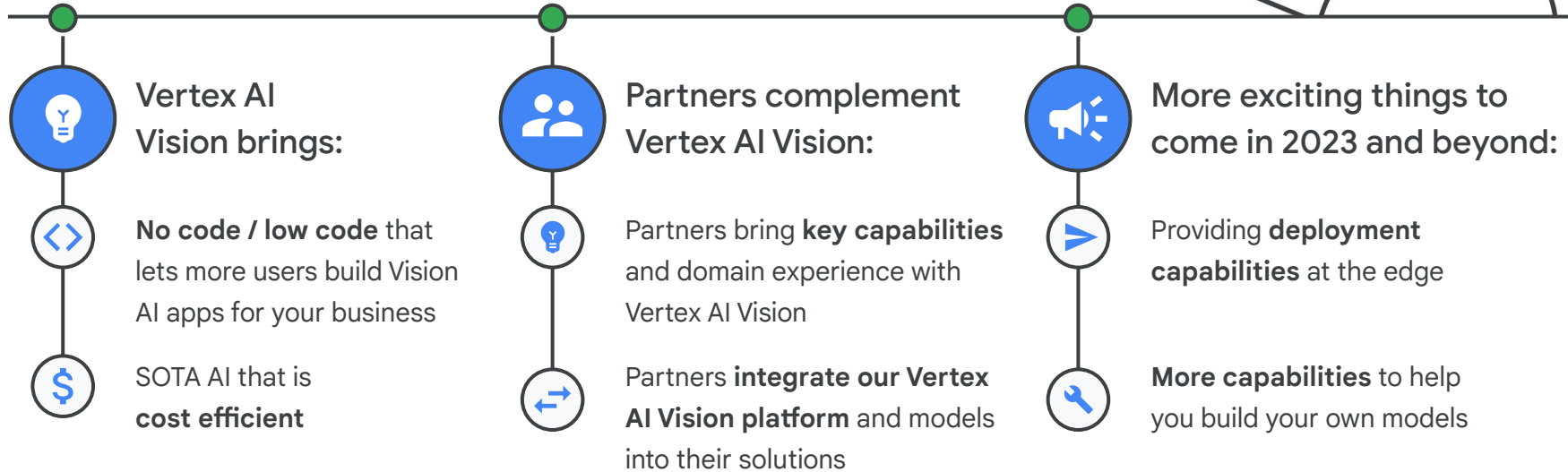
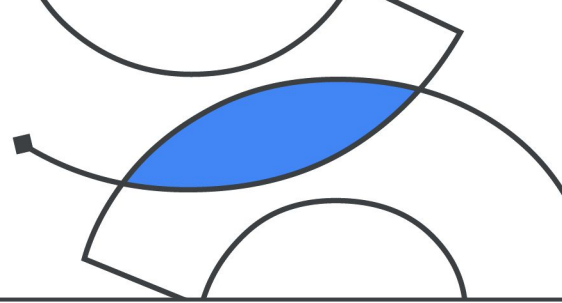


Vertex AI Vision makes it easy to build your own AI models or leverage Google prebuilt models



Looking forward & conclusion

Vertex AI Vision: Next generation business insights



Vertex AI has multiple pathways of consumption

offering a unified platform to build, deploy and scale ML models with innovations developed by Google

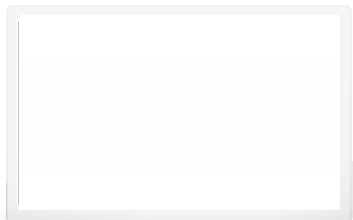
Out of the box

DIY



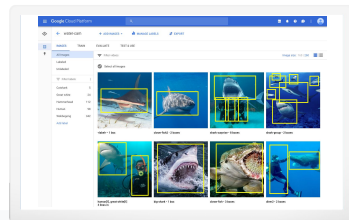
1 Pre-trained APIs & AI Solutions

- Call API to predict
- Pre-trained
- No training data needed
- Get started right away



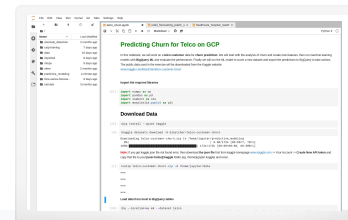
2 BigQuery ML

- Simple SQL code
- Descriptive and predictive modeling on structured data
- Hyper-parameter tuning
- Feature engineering
- Explainability



3 AutoML in Vertex AI

- No code, form-driven
- Structured & unstructured data
- Hyper-parameter tuning
- Feature engineering
- Explainability



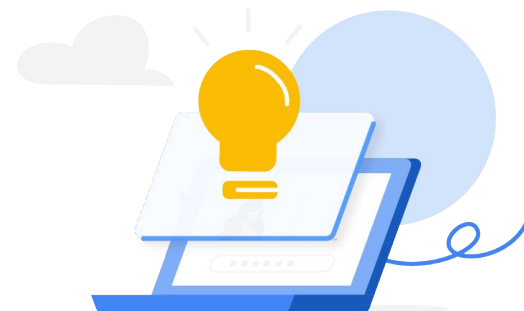
4 End-to-end MLOps

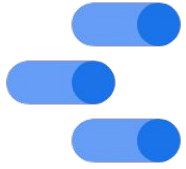
- Code on managed infra
- Custom models on pre-built frameworks
- Noops, serverless training with hyperparameter tuning
- Explainability



Google Data Studio

Hands-on training





About Looker Studio

All businesses manage data the same way

Databases
CSVs
APIs

Excel
SQL

PowerBI
Tableau
R

Powerpoint
PDF
JPG

Monitor
Email
Mobile

Collect

Prepare

Analyze

Report

Share

ability to access all
data regardless of
location

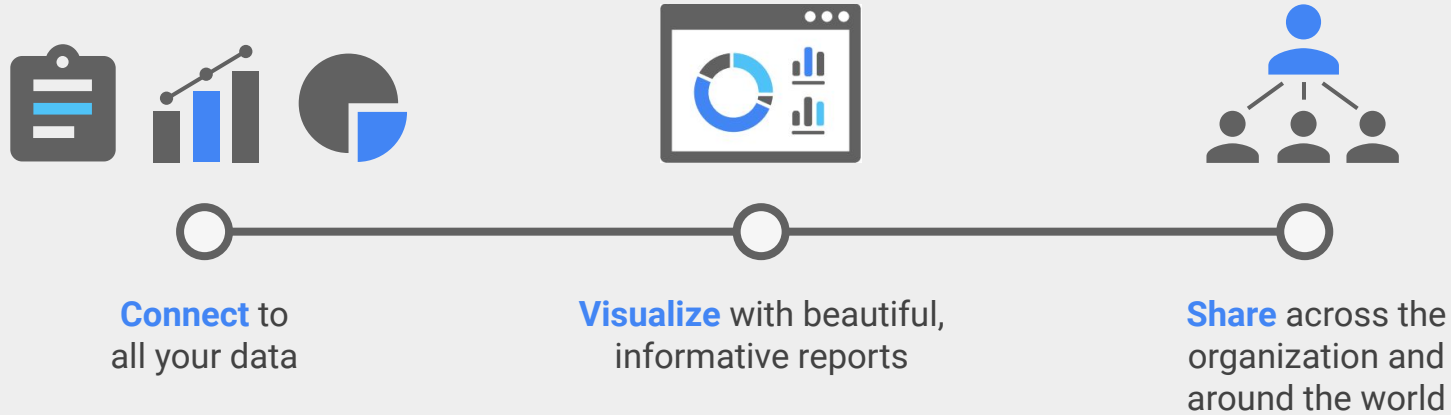
ability to cleanse,
transform,
manipulate, and join
data

ability to quickly answer
business questions and
derive insights

a flexible way to
communicate data and
insights

a simple way to
share data, reports
and insights

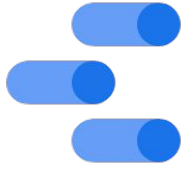
Looker Studio: Google's BI/Reporting tool available externally



Why DLookerata Studio?

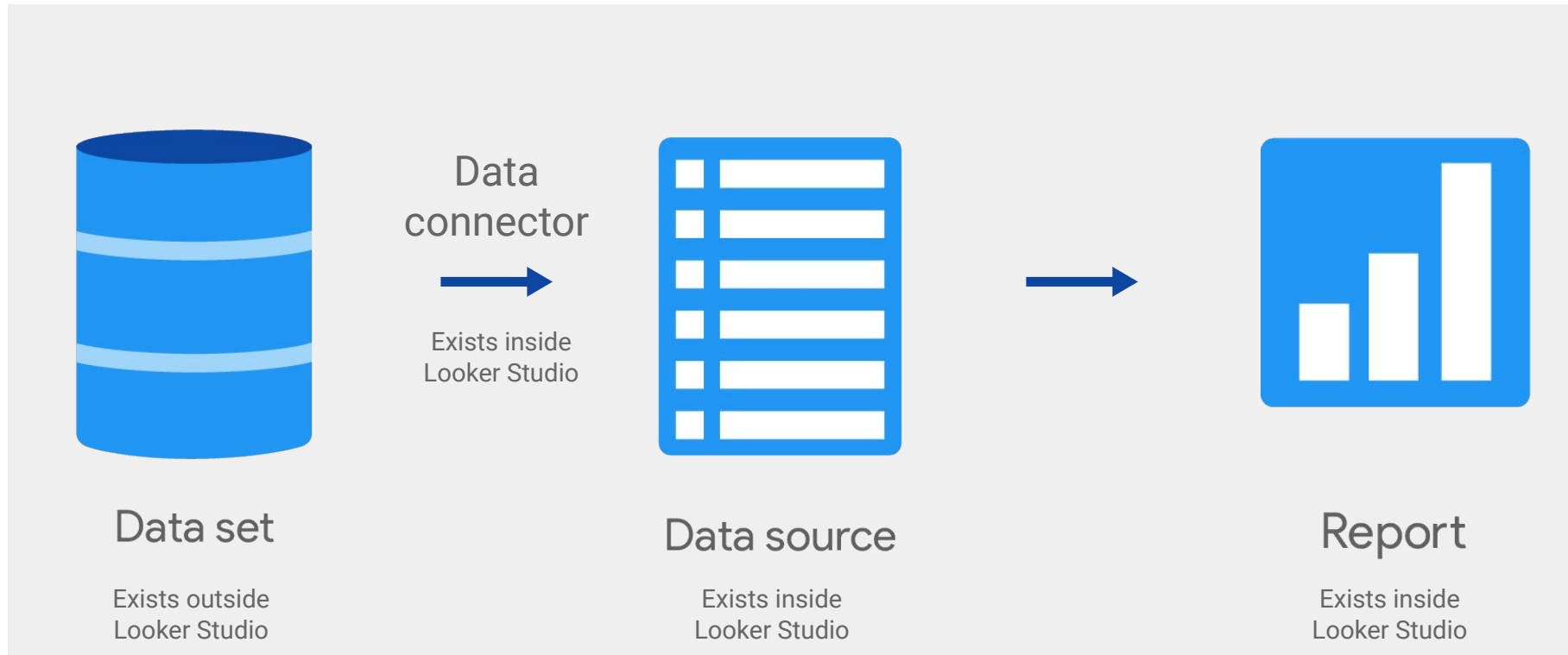
Looker Studio provides tools to create **beautiful reports** & perform **powerful ad-hoc analysis**.

- Large number of data connectors
- Easy to maintain
- Easy to use
- Tech skills not mandatory
- Easy sharing and collaboration
- Free & globally available



Looker Studio building blocks

Data entity relationship



Data sources connect to underlying data sets

2 basic types of data sets:

Fixed schema

We understand the data before we ingest it

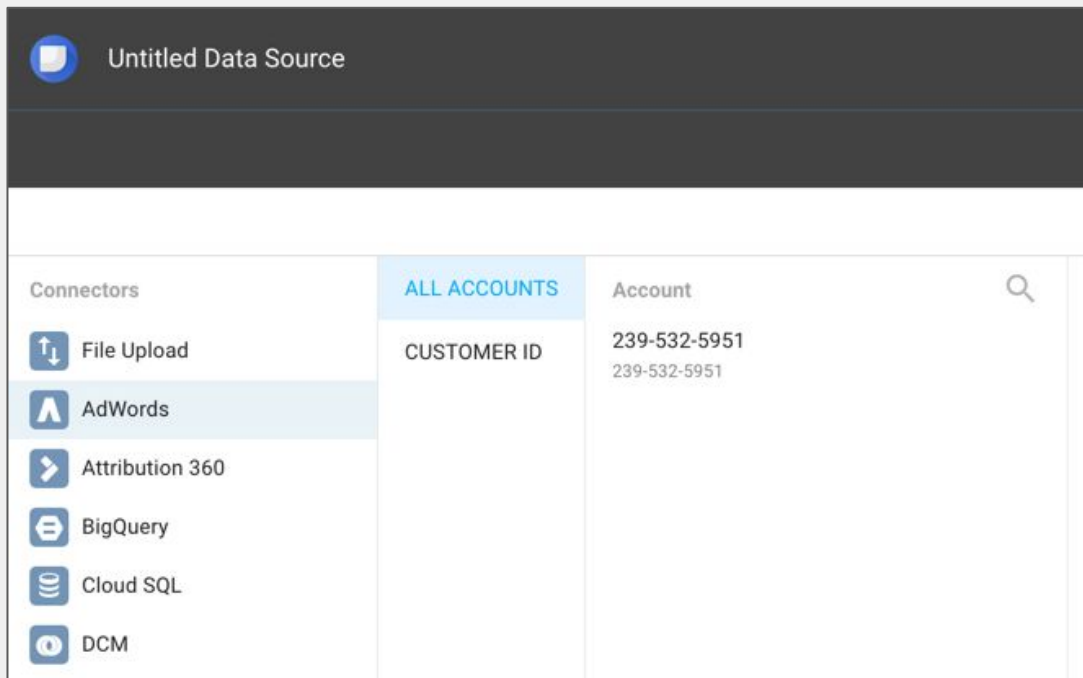
- Google Ads
- Search Ads 360
- Google Analytics
- Search Console
- YouTube Analytics
- Display & Video 360

Flexible schema

No idea what the data is before we ingest it

- BigQuery
- File upload (CSV)
- Google Cloud Storage
- Google Sheets
- SQL connectors (MySQL, PostgreSQL)

Connectors are pipes to the data set



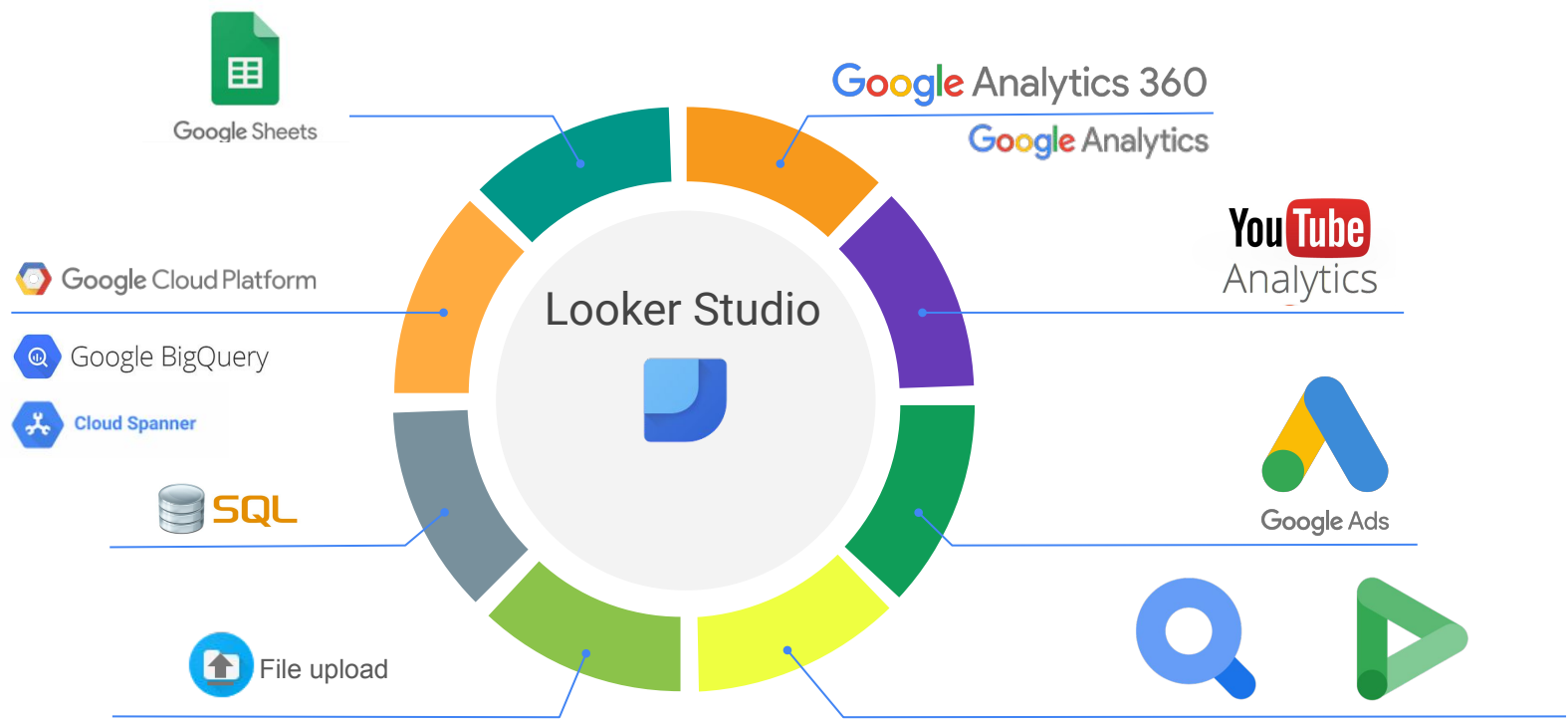
The screenshot shows a web interface for selecting a data source connector. At the top, there is a dark header with a blue icon and the text "Untitled Data Source". Below this is a white area with a table of connectors. The table has three columns: "Connectors", "ALL ACCOUNTS", and "Account". The "Connectors" column lists several options: File Upload, AdWords, Attribution 360, BigQuery, Cloud SQL, and DCM. The "ALL ACCOUNTS" column is currently empty. The "Account" column shows two entries for "CUSTOMER ID": "239-532-5951" and "239-532-5951". A search icon is visible in the top right corner of the table area.

Connectors	ALL ACCOUNTS	Account
File Upload		
AdWords		
Attribution 360		
BigQuery		
Cloud SQL		
DCM		
	CUSTOMER ID	239-532-5951
		239-532-5951

Connecting is easy-peasy!

















- Select the connector
- Select the account, file, project, etc.
- Provide credentials
- Access via OAuth

Looker Studio connectors

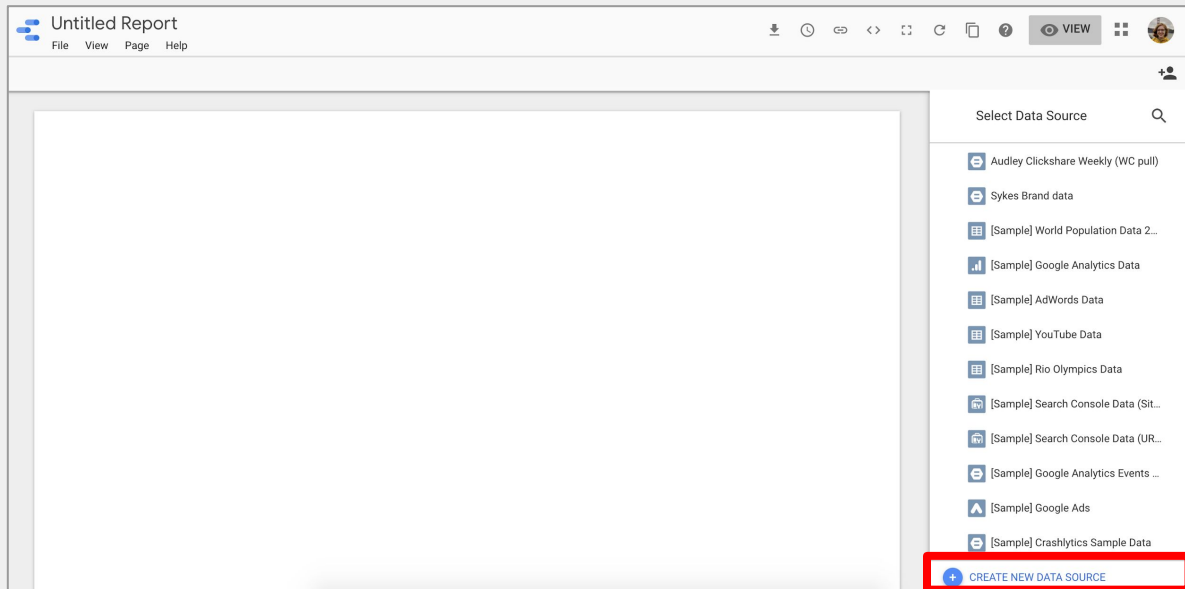


... and more!

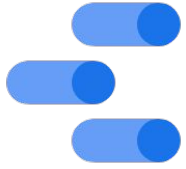
Explore Connectors

 Adform By Supermetrics <p>Fetch Adform data into Google Data Studio</p> <p>ADD CONNECTOR</p>	 Adobe Analytics By Supermetrics <p>Fetch Adobe Analytics (SiteCatalyst) data into Google Data Studio</p> <p>ADD CONNECTOR</p>	 AdStage Connector: Search & ... By AdStage <p>Connect and sync your Google AdWords, Bing Ads, Facebook Ads, Twitter Ads, and LinkedIn Ads accounts with Google Data Studio from a single connector. Start...</p> <p>ADD CONNECTOR</p>	 AdWords By Supermetrics <p>Multi-account AdWords reporting in Google Data Studio</p> <p>ADD CONNECTOR</p>
 All Advertising Data By Funnel <p>Funnel connects 250+ advertising platforms in a single source. Free trial. Any new advertising platform not yet supported added without additional cost.</p> <p>ADD CONNECTOR</p>	 Amazon Seller - Products By Power My Analytics <p>Click 'LEARN MORE' below to activate - Analytics Importer Amazon Product Performance Connector connects Data Studio with Amazon seller data. Free 14-day t...</p> <p>ADD CONNECTOR</p>	 Amazon Seller - Sales By Power My Analytics <p>Click 'LEARN MORE' below to activate - Analytics Importer Amazon Orders Connector connects Data Studio with Amazon seller data. Free 14-day trial. Import...</p> <p>ADD CONNECTOR</p>	 Amazon Sponsored Products By Power My Analytics <p>Click 'LEARN MORE' below to activate - Analytics Importer Amazon Sponsored Products Connector connects Data Studio with Amazon seller data. Free 14-day tr...</p> <p>ADD CONNECTOR</p>
 Analytics Canvas By nModal Solutions Inc. <p>Join data sets, get unsampled data from multiple GA accounts, connect to SQL Server, Redshift, Oracle and more, then automate it all.</p> <p>ADD CONNECTOR</p>	 Bing Ads By Power My Analytics <p>Click 'LEARN MORE' below to activate - Analytics Importer Bing Ads Connector connects Data Studio with Bing Ads data. Free 14-day trial. Import Bing Ads ...</p> <p>ADD CONNECTOR</p>	 Bing Ads By Supermetrics <p>Fetch Bing Ads data into Google Data Studio</p> <p>ADD CONNECTOR</p>	 CallRail: Calls Summary By CallRail <p>Create custom reports using the call attribution data from your online campaigns through CallRail's integration with Google Data Studio.</p> <p>ADD CONNECTOR</p>
 data.world By data.world, Inc.	 DoubleClick Search By Supermetrics	 eBay Seller Center By Power My Analytics	 Facebook Ads By Supermetrics

Reports are built from data sources



- You can create a new report then add a data source
- Or, you can create a report directly from a data source



Looker Studio
home page

lookerstudio.google.com