



# Google Cloud Platform Services

Google Cloud Platform



Google Cloud Platform

# Agenda

- 1 Cloud Computing Continuum
- 2 Google Cloud Platform Compute Services
- 3 Demo
- 4 Google Cloud Platform Storage Services
- 5 Google Cloud Platform Big Data Services
- 6 Google Cloud Platform Application Services
- 7 Google Cloud Platform Networking and Management Services

# Google Cloud Platform

## Compute



App Engine



Container Engine



Compute Engine

## Storage



Bigtable



Cloud Storage



Cloud SQL



Cloud Datastore

## Big Data



BigQuery



Pub/Sub



Dataflow



Dataproc



Datalab

## App Services



Prediction API



Cloud Endpoints



Translate API

# Cloud Computing



Compute Engine



App Engine



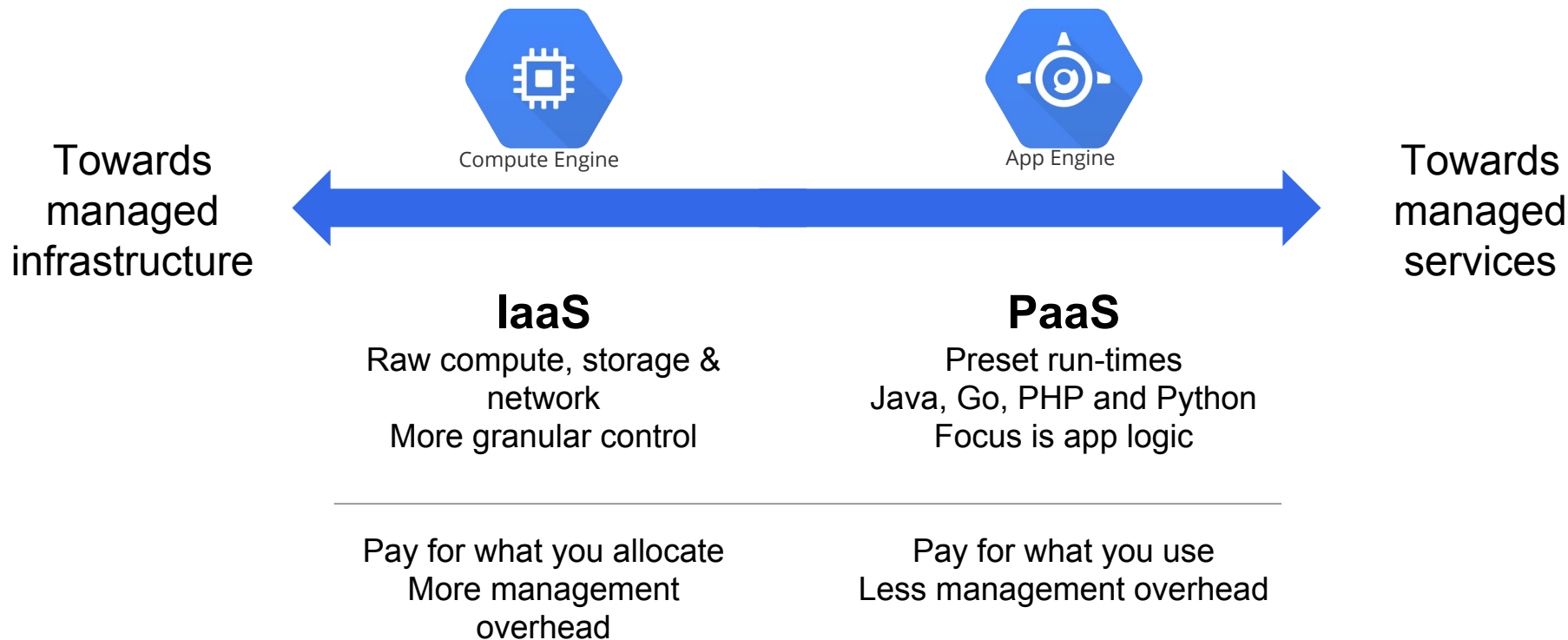
Infrastructure-as-a-Service  
**(IaaS)**

Platform-as-a-Service  
**(PaaS)**

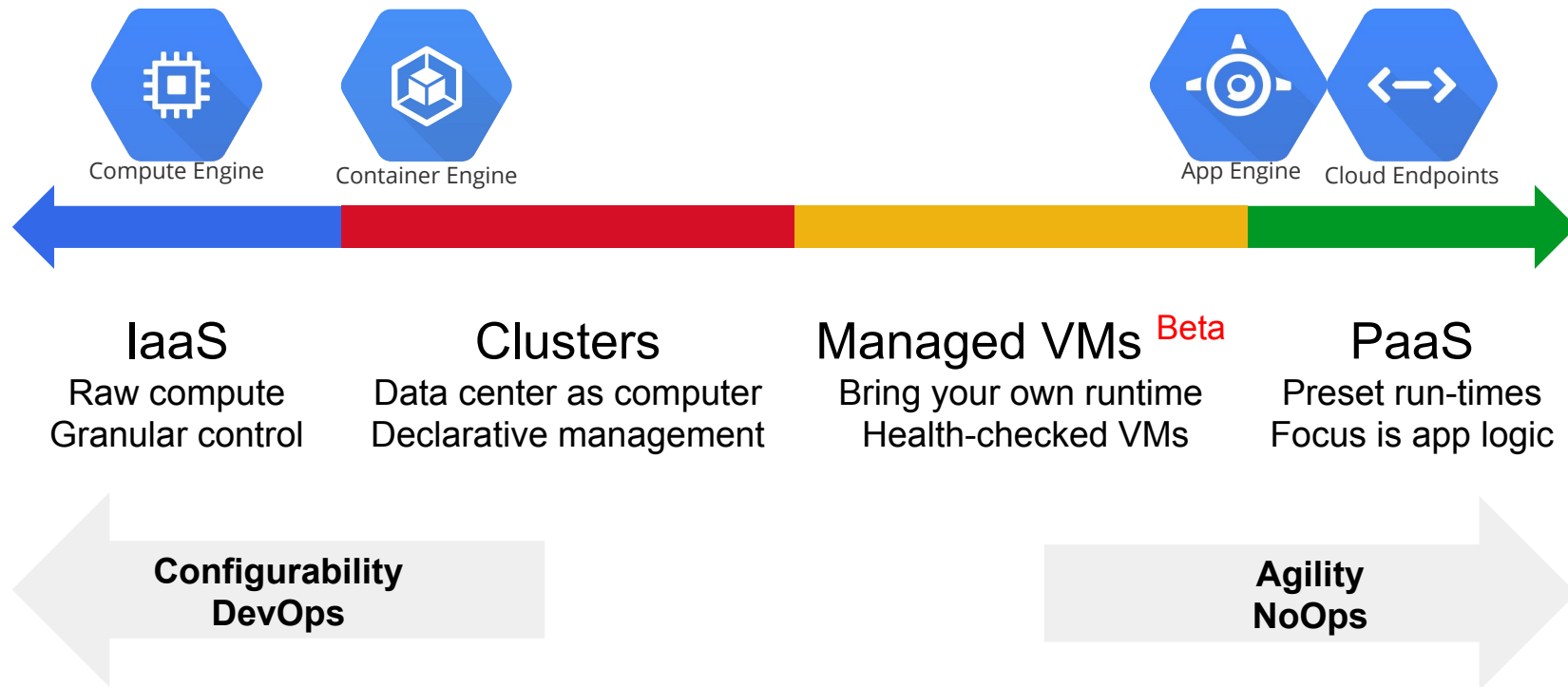
Software-as-a-Service  
**(SaaS)**



# IaaS and PaaS



# Computing Continuum

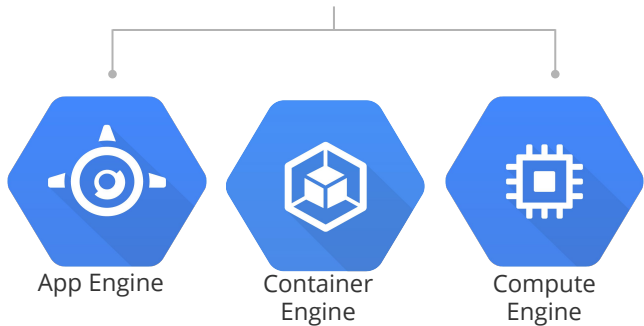


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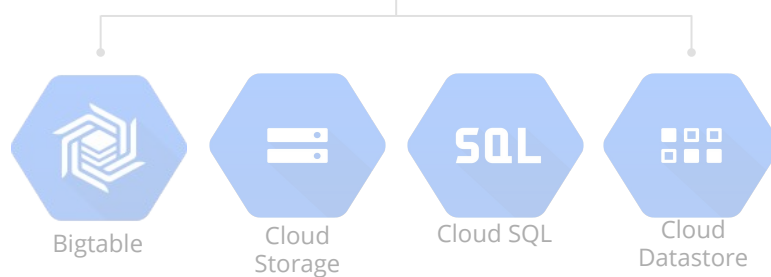
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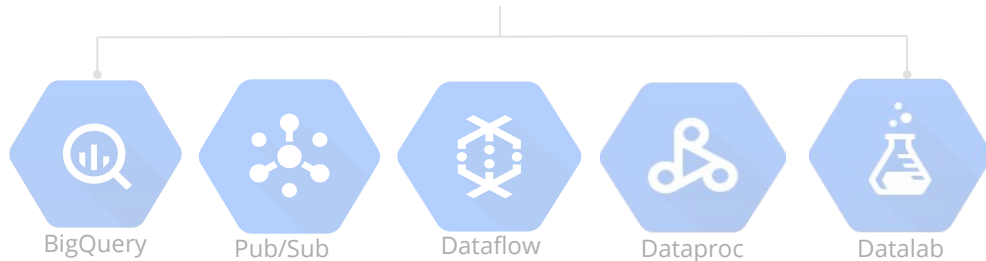
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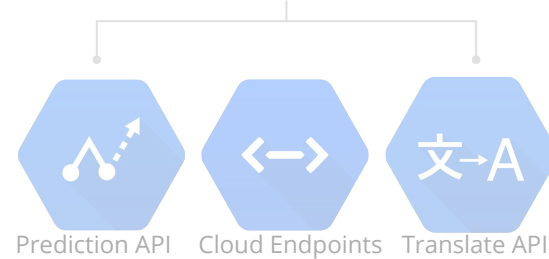
## Storage



## Big Data



## App Services





# Google Compute Engine

- Run large-scale workloads on virtual machines hosted on Google's infrastructure
- Robust networking features
- Instance metadata and startup scripts
- High CPU, high memory, standard and shared-core machine types
- HTTP and network load balancing
- Persistent disk snapshots
- Advanced APIs for auto-scaling and group management



# Google Container Engine

- Based on open source [Kubernetes](#) orchestration system
- Orchestrate and schedule Docker containers
- Consumes Compute Engine instances and resources
- Uses a declarative syntax to manage applications
- Decouple operational and development concerns
- Manages and maintains
  - Logging
  - Health management
  - Monitoring
  - Scaling



# Google App Engine

- Managed runtimes for specific versions of Java, Python, PHP & Go
- Autoscale your web workloads to meet demand
- Free daily quota, usage based [pricing](#)
- Local SDK for development, testing & deployment
- Need to conform to sandbox constraints:
  - No writing to the local filesystem
  - Request timeouts at 60 seconds
  - Limit on 3rd-party software installations

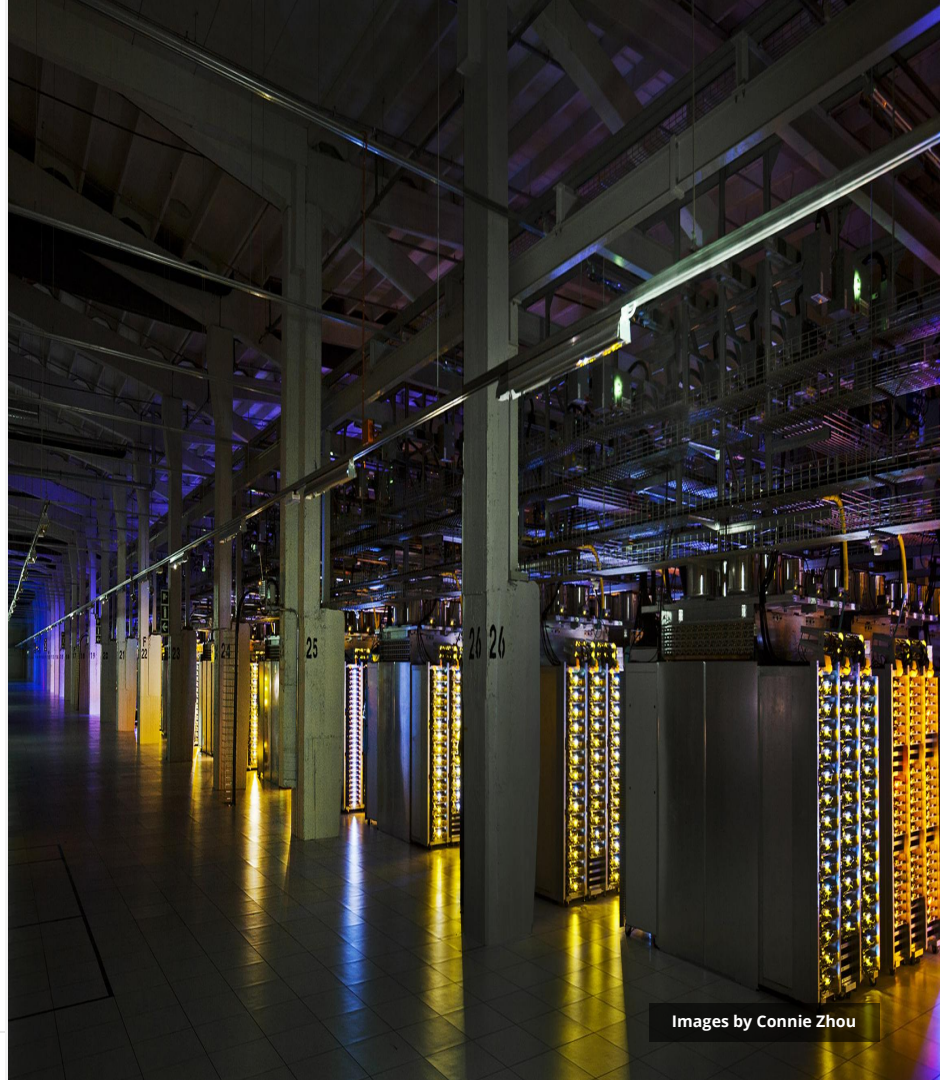


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# Demo

- Getting started with Cloud Launcher
  - <https://cloud.google.com/launcher/explore>



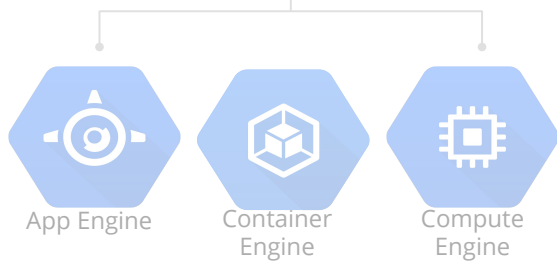
Images by Connie Zhou

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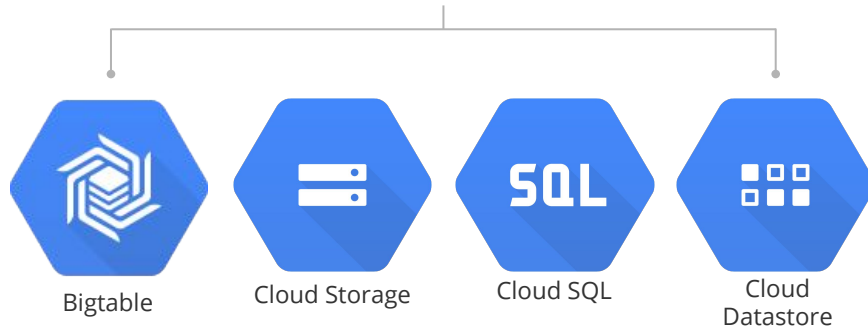
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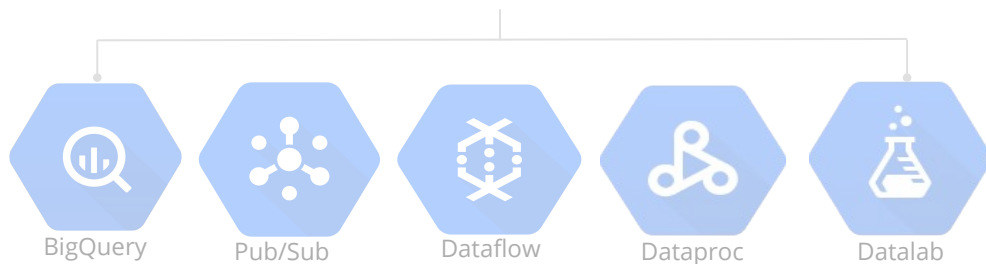
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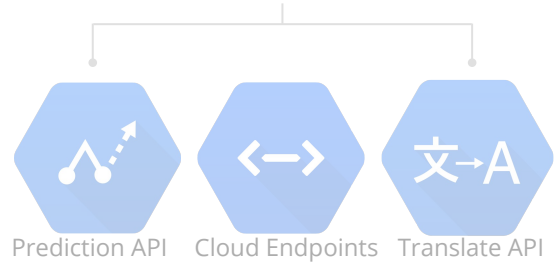
## Storage



## Big Data



## App Services



# Google Cloud Bigtable

- NoSQL database service for web, mobile, and large-workload applications - Terabytes to petabytes
- Currently in **Beta**
- Integrated
  - Accessed using HBase API
  - Native compatibility with big data and Hadoop ecosystems
- Protected
  - Replicated storage
  - Data encryption in-flight and at rest
  - Role-based ACLs
- Proven
  - Drives major applications such as Google Analytics and Gmail





# Google Cloud Storage

- High performance, Internet scale immutable blob storage
- *Not* a file system (but can be accessed as one via 3rd party tools such as GCS Fuse)
- Simple administration and does not require capacity management
- All storage options accessed through the same APIs and include client libraries
  - JSON API
  - XML API



# Google Cloud SQL

- Google-managed MySQL
- Pay-per-use model
- REST API for management
- Affordability and performance
- Google security
- Vertical scaling (read and write)
- Horizontal scaling (read)
- Seamless integration with App Engine and Compute Engine



# Google Cloud Datastore

- [NoSQL](#) store for billions of rows
- Schemaless access, no need to think about underlying data structure
- Local development tools
- Automatic scaling and fully managed
- Built-in redundancy
- Support for [ACID](#) transactions
- Includes a free daily quota
- Access from anywhere through a [RESTful interface](#)

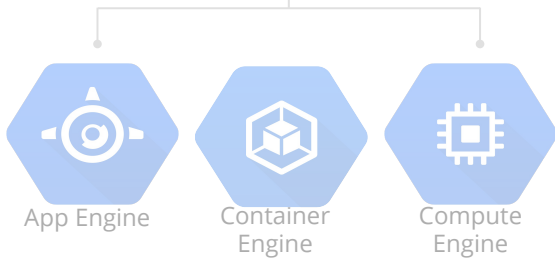


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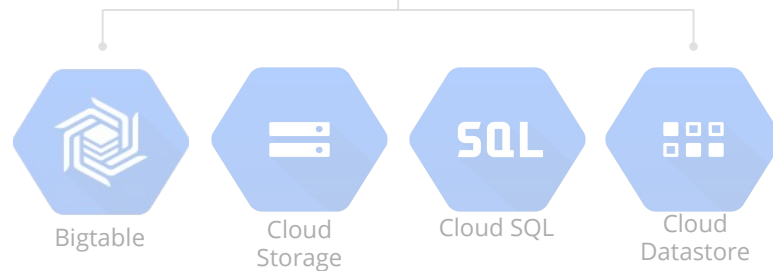
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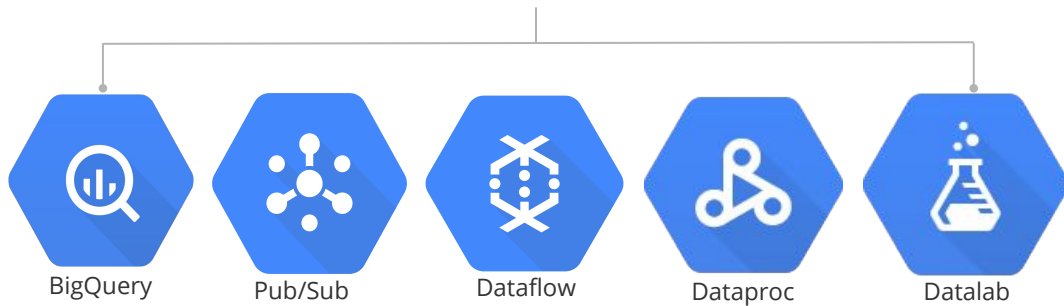
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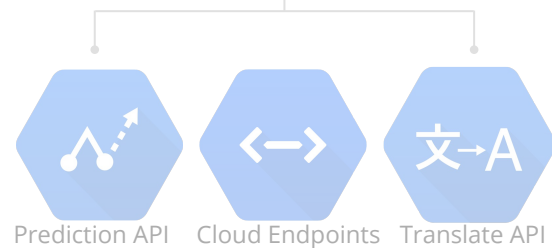
## Storage



## Big Data



## App Services



# Big Data Services



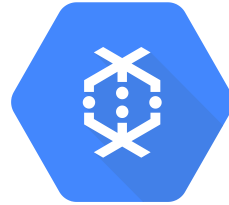
## BigQuery

Ingest data at 100,000  
rows per second



## Pub/Sub

Scalable & flexible  
enterprise messaging



## Dataflow

Stream & batch  
processing, unified and  
simplified



## Dataproc

Managed Hadoop  
MapReduce, Spark, Pig,  
and Hive service

# Fully Managed, No-Ops Services

# Google BigQuery

- BigQuery provides a service for near real-time interactive analysis of massive datasets (hundreds of TBs)
- Based on a columnar structure for high performance
- Query using a SQL-like syntax
- Only pay for storage, processing used
- Zero administration for performance and scale
- Supports open standards



# Google Cloud Pub/Sub

- Scalable and reliable messaging for Google Cloud Platform and beyond
- Supports many-to-many asynchronous messaging
- Includes support for offline consumers
- Based on proven Google technologies
- Integrates with Cloud Dataflow for data processing pipelines





# Google Cloud Dataflow

- Construct scalable and reliable data pipelines
- Executes data processing on Compute Engine instances
- Provides support for:
  - ETL
  - Analytics
  - Real-time computation
  - Process orchestration
- Integrates with GCP services
  - Cloud Storage
  - Cloud Pub/Sub
  - BigQuery
- Open source [Java SDK](#) available



# Google Cloud Dataproc

- Currently in **Beta**
- Fast, easy, managed way to run Hadoop and Spark on Google Cloud Platform
- Benefit from cloud integration
  - Cloud Storage
  - Cloud Monitoring
  - Cloud Logging
- Dataproc clusters are billed minute-by-minute
- Anytime scaling - Manually scale clusters up and down even when jobs are running
- Developer tools
  - RESTful API
  - Integration with Google Cloud SDK



# Google Cloud Datalab

- Currently in **Beta**
- Interactive tool for large-scale data exploration, transformation, analysis, visualization
  - Analyze data in Google BigQuery, Google Compute Engine, and Google Cloud Storage using Python, SQL, and JavaScript (for BigQuery user-defined functions)
  - Easily deploy transformation, analysis models to BigQuery
- Integrated and open source
  - Runs on Google App Engine
  - Built on Jupyter (formerly IPython)
  - Use Google Charts or matplotlib for easy visualizations
- Code, documentation, results, and visualizations combined in an intuitive notebook format

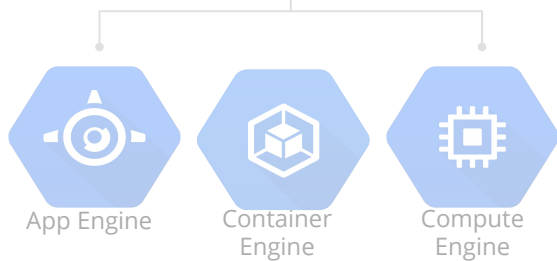


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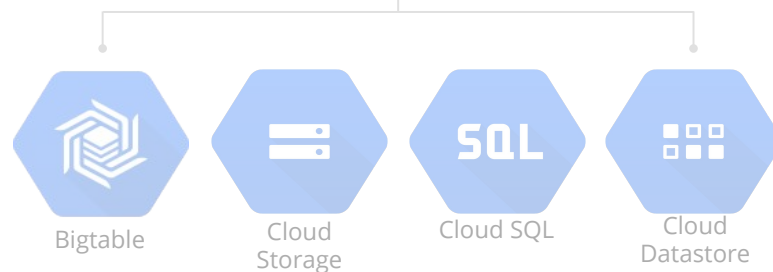
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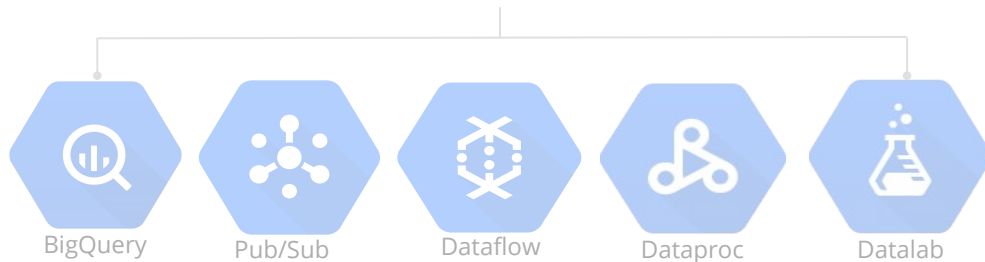
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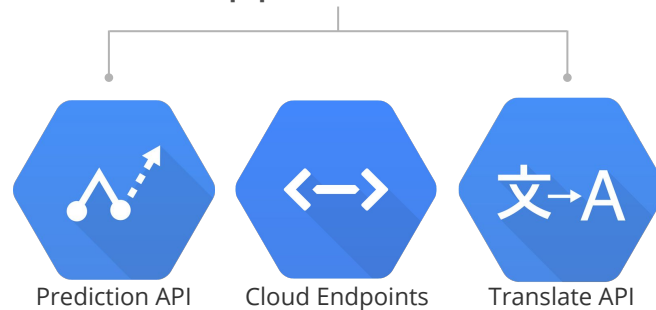
## Storage



## Big Data



## App Services



# Google Cloud Endpoints

- Build your own API running on App Engine
- Expose your API using a RESTful interface
- Includes support for OAuth 2.0 authorization
- Generate client libraries
- Support for both Java and Python server-side code
- Includes App Engine features
  - Scaling
  - Denial of service protection
  - High availability
- Supports iOS, Android, and JavaScript clients



# Google Translate API

- Translate arbitrary strings between thousands of language pairs
- Programmatically detect a document's language
- Support for dozens of languages
- Supports the standard [Google API Client Libraries](#)
  - Python
  - Java
  - Ruby
  - Objective-C
  - And many more

Try it [in your browser](#)



# Google Prediction API

- Predict trends based on historical data
- Use cases include spam detection and product recommendations
- Data replicated using Cloud Storage
- Integrates with other Google Cloud Platform services including:
  - App Engine
  - BigQuery
  - Cloud Storage

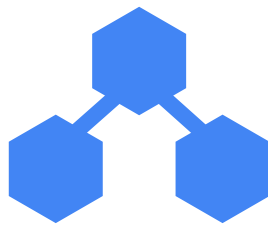




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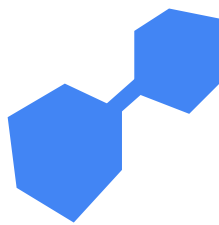
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# Networking Services (1 of 3)



## Carrier Interconnect

Enterprise-grade connections provided by carrier service providers



## Direct Peering

Connect your business directly to Google



## Cloud VPN

Secure connection over the internet



Google Cloud Interconnect

# Networking Services (2 of 3)

## Google Cloud DNS

- Highly available and scalable DNS serving
- Programmatically manage zones and records
  - RESTful API
  - Command-line interface
- Migrate existing BIND zones to Cloud DNS

[Learn more](https://cloud.google.com/dns/) at [cloud.google.com](https://cloud.google.com/)



# Networking Services (3 of 3)

## HTTP(S) and network load balancing

- HTTP(S) load balancing:
  - Balance HTTP-based traffic across multiple Compute Engine regions
  - Simple DNS setup: Your app uses one global, external IP address
  - Scalable, requires no pre-warming and provides resilience, fault tolerance
- Network load balancing:
  - Spread TCP and UDP based traffic over a pool of instances within a Compute Engine region
  - Ensures only healthy instances handle traffic
  - Scalable, requires no pre-warming



# Cloud Management Services (1 of 2)

- Google Cloud Monitoring <sup>Beta</sup>
  - Dashboards and alerts for cloud applications
  - Review metrics for cloud services, virtual machines, common open source applications
- Google Cloud Deployment Manager
  - Infrastructure management service
  - Create a template describing your environment and use Deployment Manager to create resources



# Cloud Management Services (2 of 2)

- Google Cloud Launcher
  - Launch software packages on Compute Engine in a few clicks
  - WordPress, Lamp Stack, Jenkins and many others
- Google Cloud Logging <sup>Beta</sup>
  - Collect and store logs from Compute Engine and App Engine
  - [View your logs](#) with the Logs Viewer
  - [Export your logs](#) to Google Cloud Storage or Google BigQuery
  - [Integrate third-party logs](#) from your virtual machine instances



# Quiz

*Match the service to the appropriate use case.*

## Service

## Use case

- |                            |  |
|----------------------------|--|
| 1. Google BigQuery         | <input type="checkbox"/> High performance, Internet scale immutable blob storage                             |
| 2. Google Cloud Pub/Sub    | <input type="checkbox"/> Google-managed relational database service  |
| 3. Google Cloud Storage    | <input type="checkbox"/> Build your own API  |
| 4. Google Container Engine | <input type="checkbox"/> Run large-scale workloads on virtual machines hosted on Google's infrastructure     |
| 5. Google Cloud Endpoints  | <input type="checkbox"/> Large-scale NoSQL data store with support for transactions and SQL-like queries     |
| 6. Google Cloud Dataflow   | <input type="checkbox"/> NoSQL database service for storing very large amounts of data with very low latency |
| 7. Google App Engine       | <input type="checkbox"/> Easily build and run applications using Google's infrastructure                     |
| 8. Google Compute Engine   | <input type="checkbox"/> Construct scalable and reliable data pipelines                                      |
| 9. Google Cloud Datastore  | <input type="checkbox"/> Run containers on Google Cloud Platform   |
| 10. Google Cloud Bigtable  | <input type="checkbox"/> Scalable and reliable messaging   |
| 11. Google Cloud SQL       | <input type="checkbox"/> Real-time interactive analysis of massive datasets                                  |

# Resources

- Bringing together the best of PaaS and IaaS  
<http://googlecloudplatform.blogspot.com/>
- Google Cloud Platform product overview  
<http://cloud.google.com/products/>
- Google Cloud Platform solutions  
<http://cloud.google.com/solutions/>
- Map Google Cloud Platform services to AWS  
<https://cloud.google.com/free-trial/docs/map-aws-google-cloud-platform>



# Quiz Answers

*Match the service to the appropriate use case.*

## Service

## Use case

1. Google BigQuery
2. Google Cloud Pub/Sub
3. Google Cloud Storage
4. Google Container Engine
5. Google Cloud Endpoints
6. Google Cloud Dataflow
7. Google App Engine
8. Google Compute Engine
9. Google Cloud Datastore
10. Google Cloud Bigtable
11. Google Cloud SQL

3. High performance, Internet scale immutable blob storage
11. Google-managed relational database service
5. Build your own API
8. Run large-scale workloads on virtual machines hosted on Google's infrastructure
9. Large-scale NoSQL data store with support for transactions and SQL-like queries
10. NoSQL database service for storing very large amounts of data with very low latency
7. Easily build and run applications using Google's infrastructure
6. Construct scalable and reliable data pipelines
4. Run containers on Google Cloud Platform
2. Scalable and reliable messaging
1. Real-time interactive analysis of massive datasets



cloud.google.com