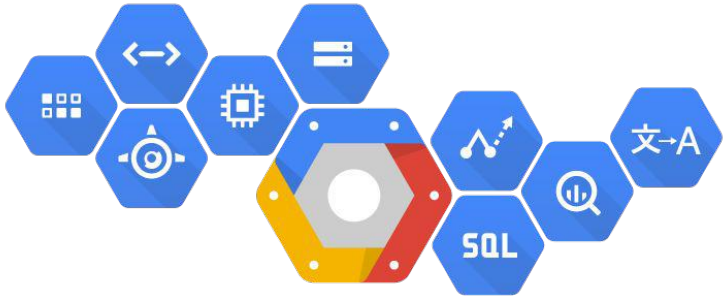


DEVOPS PRO EUROPE

Google Cloud Platform Solutions for DevOps Engineers

Márton Kodok / @martonkodok
Google Developer Expert at **REEA.net - Targu Mures**

March 2019 - Vilnius, Lithuania

About me

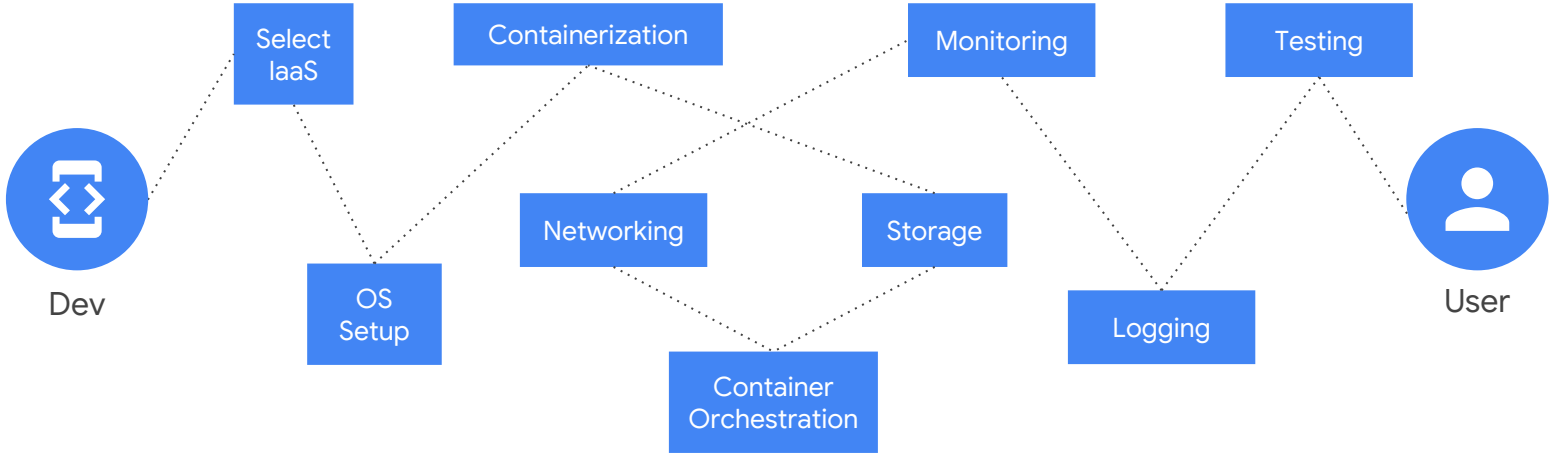
- Geek. Hiker. Do-er.
- Among the Top3 romanians on Stackoverflow 130k reputation
- Google Developer Expert on Cloud technologies
- Crafting Web/Mobile backends at **REEA.net**
- BigQuery/Redis and database engine expert
- Active in mentoring and IT community

StackOverflow: **pentium10**
GitHub: **pentium10**
Slideshare: **martonkodok**
Twitter: **@martonkodok**

Agenda

1. Application development in the Cloud
2. App Engine: Scale your apps seamlessly from zero to planet scale
3. Cloud Functions: your gateway to GCP Services
4. Google Stackdriver: Metrics, logging, alerting are a universal right!
5. BigQuery: federated data access warehouse
6. Doing hybrid cloud mixing on premise with cloud
7. Practical use cases
8. Qwiklabs

What's so hard about traditional app development?



REEA.net uses GCP

Build on the same infrastructure
that powers Google

Google Cloud Platform (GCP)

Compute

Big Data

Identity & Security

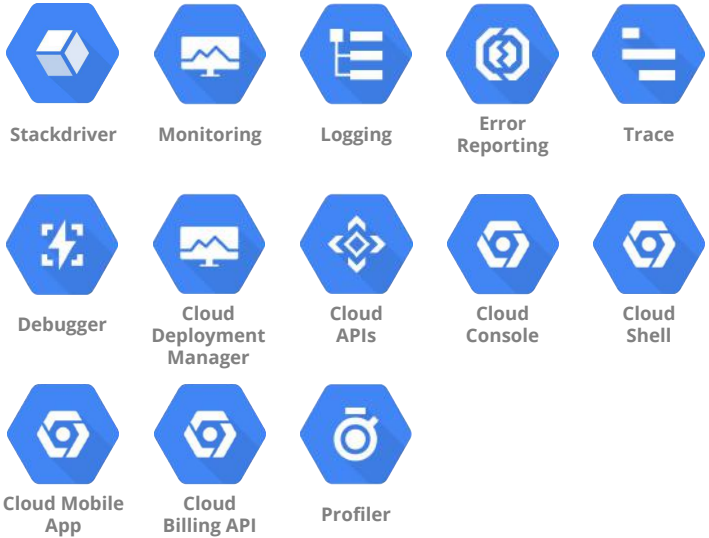
Internet of Things

Machine Learning

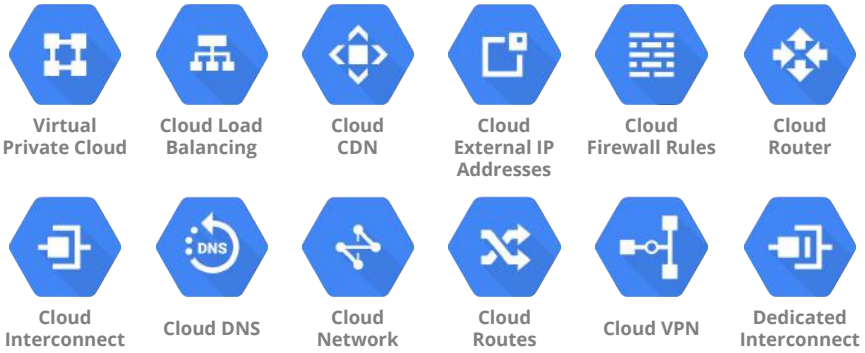
Storage & Databases

Google Cloud Platform (GCP)

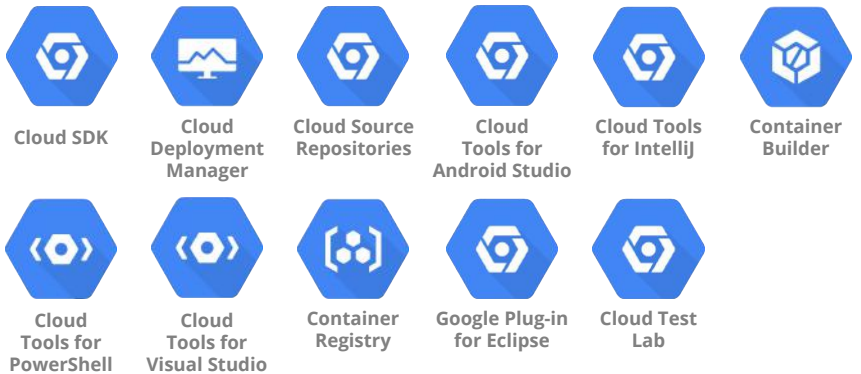
Management Tools



Networking



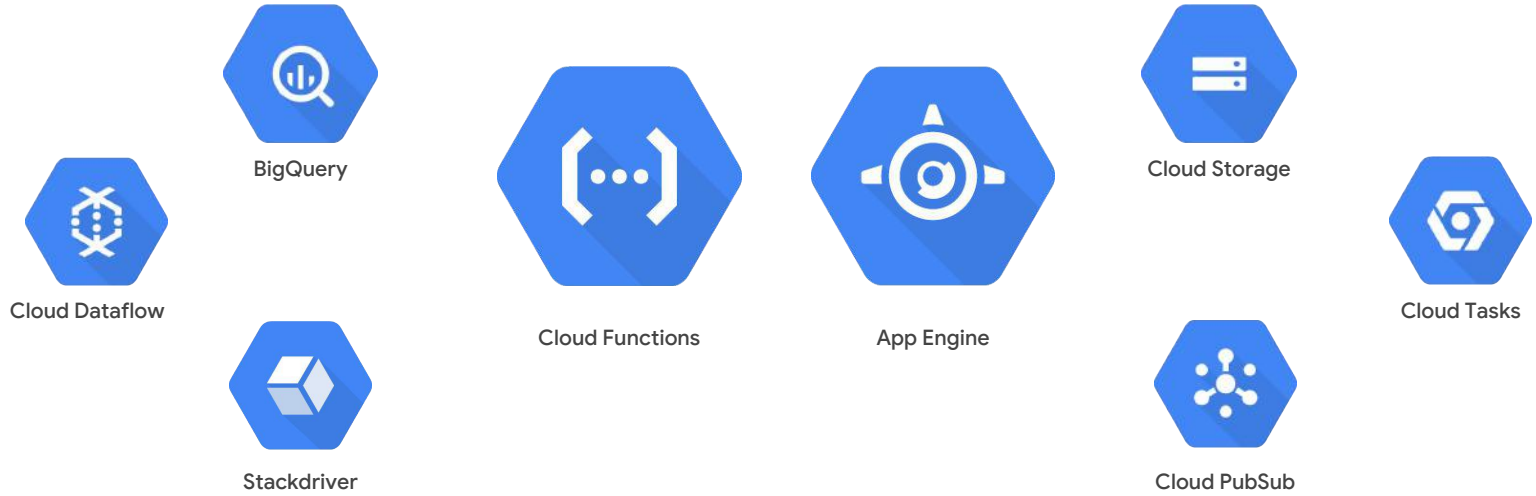
Developer Tools



Google sees serverless as

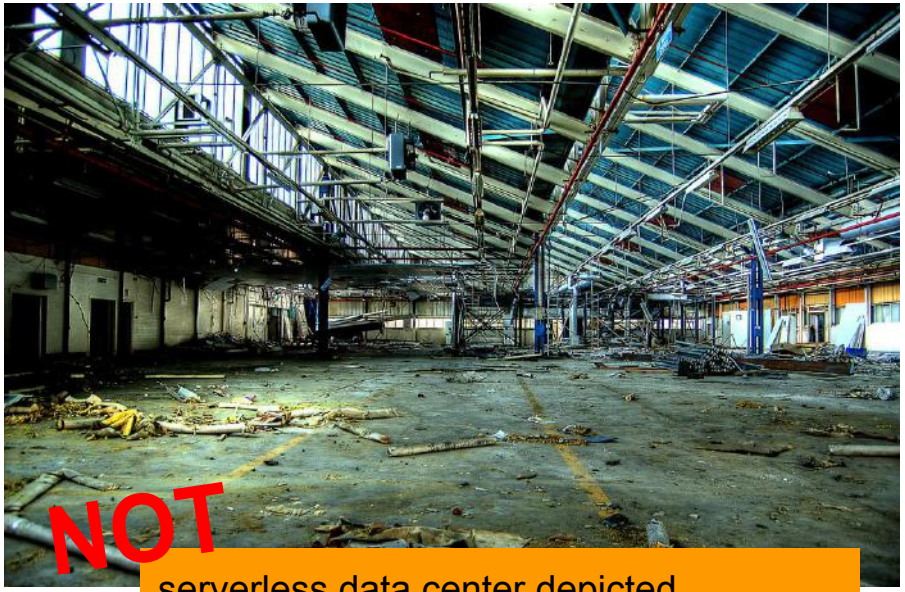
Programming model	Operational model	Billing model
✓ Focus on code	✓ Zero ops	✓ Pay for usage
✓ Event-driven	✓ Automatic scaling	
✓ Stateless	✓ Managed security	
Dev	**Ops**	**$**

Serverless is more than a set of functions



Meet Serverless

- Automatic scaling
- No server management
- Only pay for what you use
- Event-driven



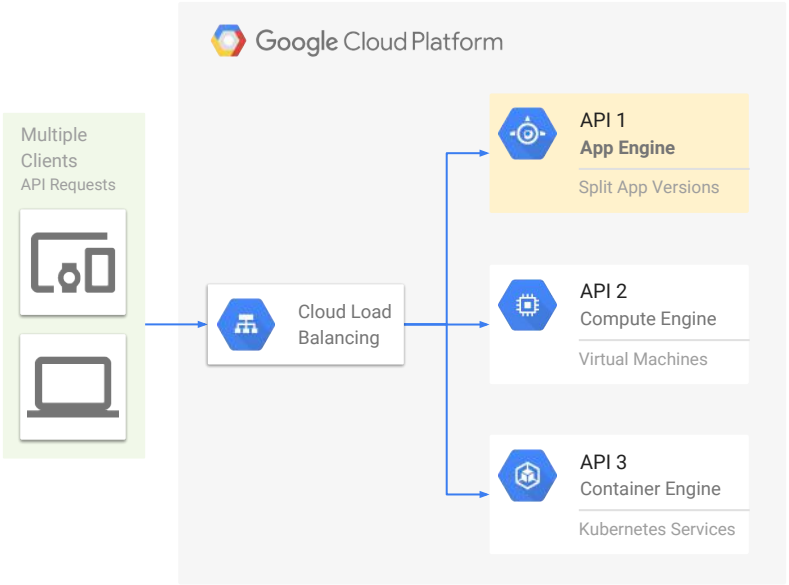
Serverless is about maximizing **elasticity**, **cost savings**, and **agility** of cloud computing.

Serverless types

Platforms

Triggered Code

App Engine - managed application platform



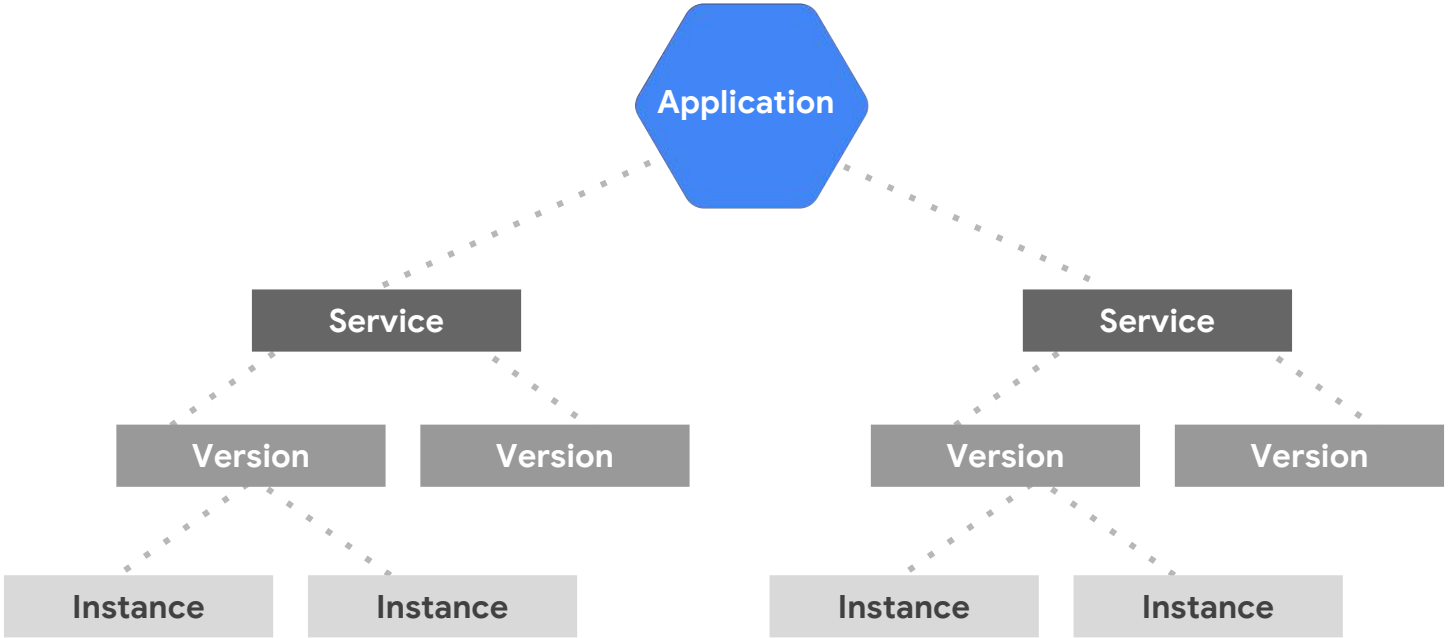
App Engine

- Scale your applications seamlessly from zero to planet scale
- Automatically scales depending on your application traffic
- Traffic Splitting (app versions, A/B tests, incremental rollouts)

Best used:

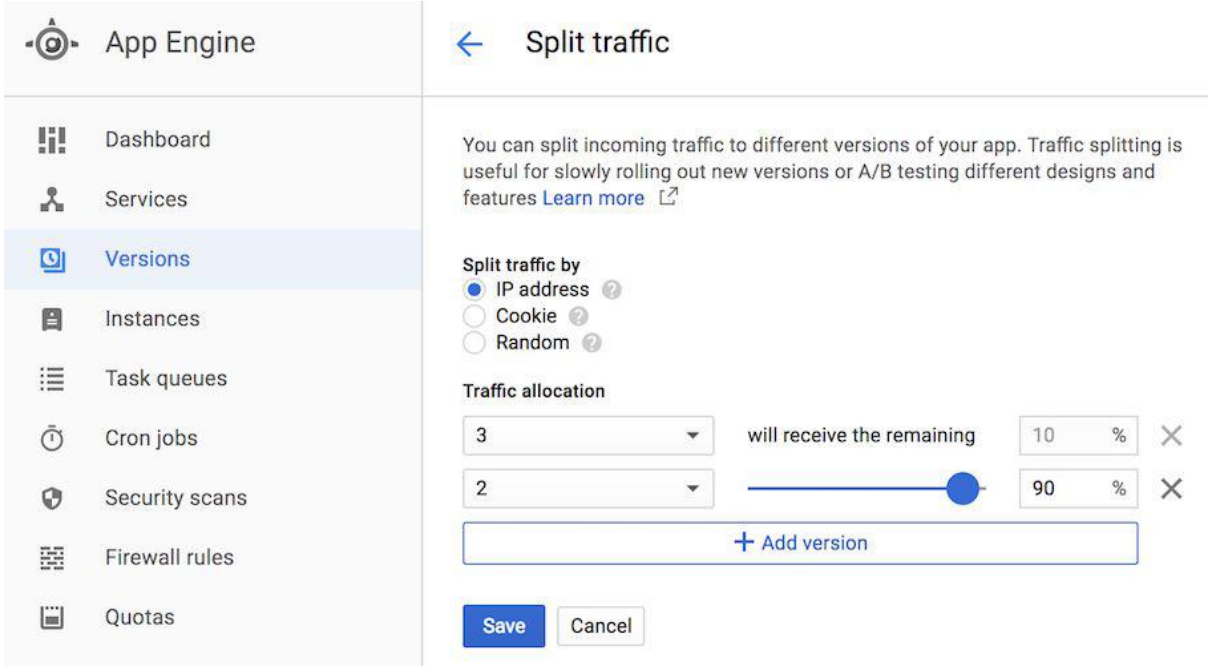
- For HTTP services
- For existing applications

App Engine: Services and versions



App Engine: Traffic splitting

A/B testing and Canary releasing with a few clicks or a single gcloud command



App Engine: Runtimes

Async message processing

Asynchronous task execution

Cloud Tasks

Message queue system
Guaranteed at-least-once delivery
Future Scheduling
Will only be dispatched once on dups

Best used:

- For HTTP services
- For App Engine handlers

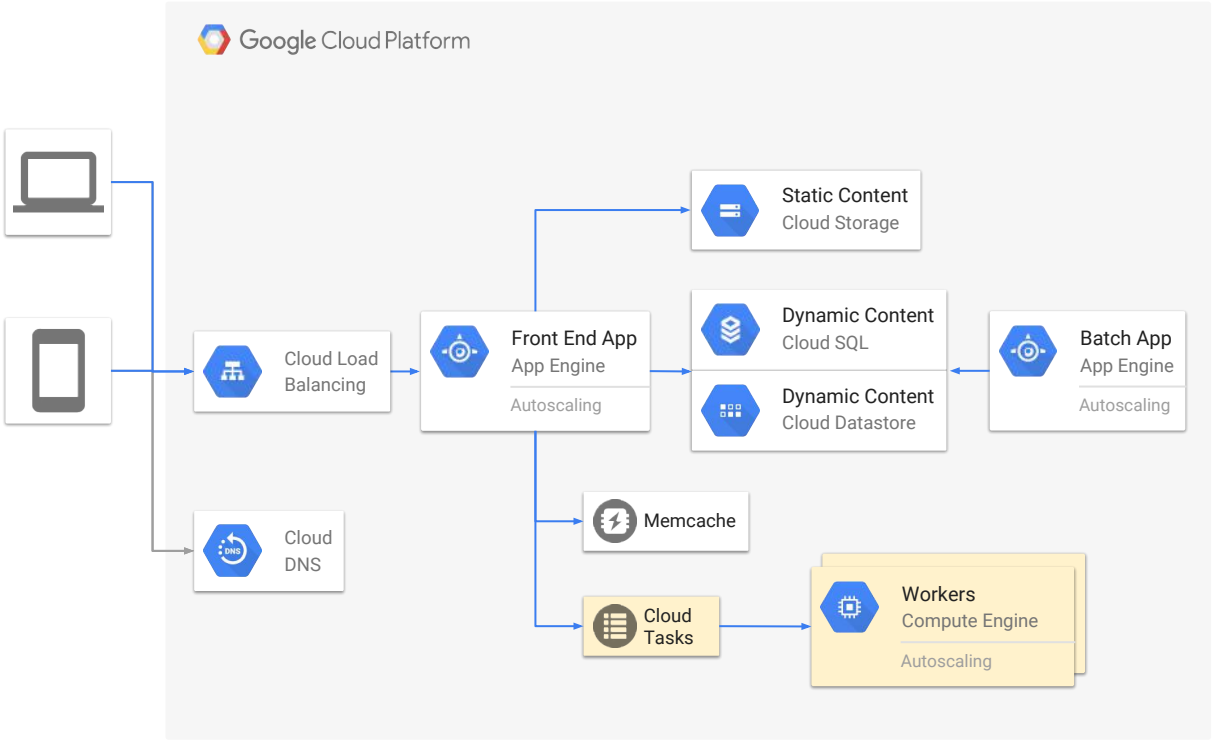
Cloud PubSub

Deliver event data based on topics
Exactly-once processing
Build multi-cloud on premise, hybrid apps
Cross zone message replication

Best used:

- For large-scale ingestion of events, streams
- Topics, publish/subscribe patterns, IoT

Cloud Tasks - Message Queue systems



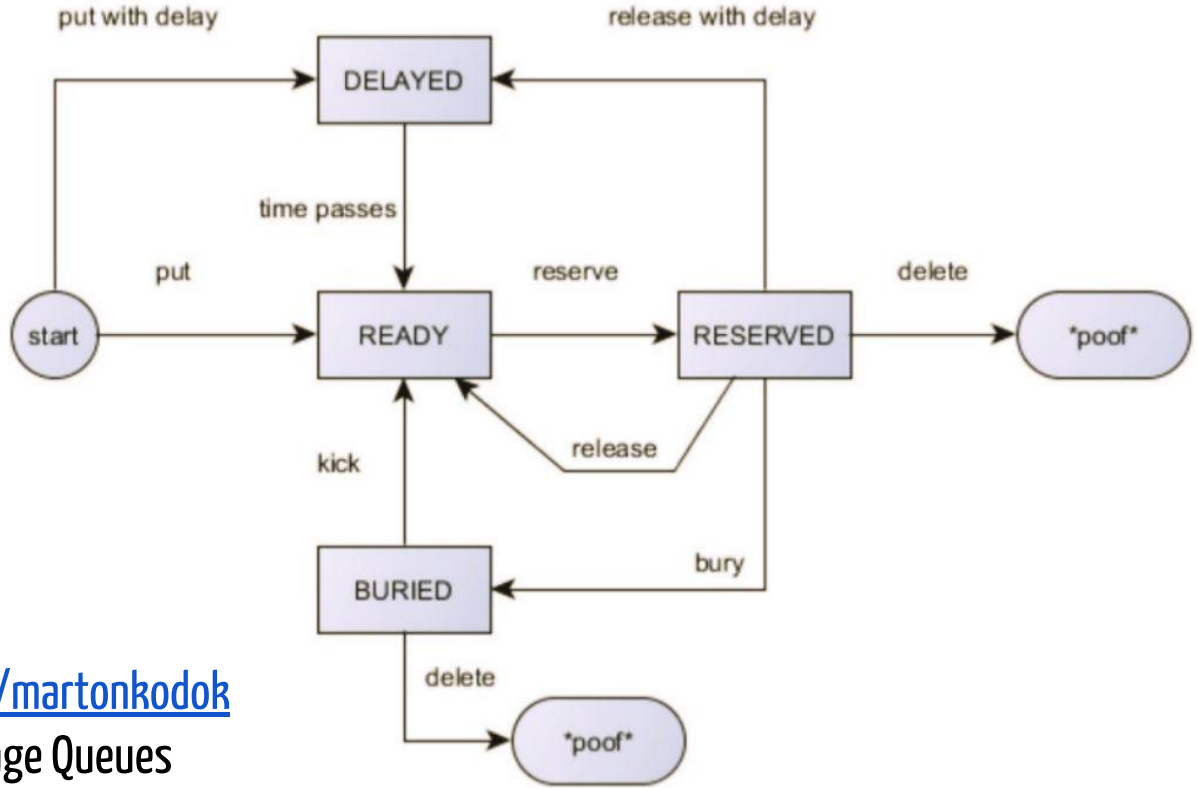
Task Queues

Push queues

- Put with delays

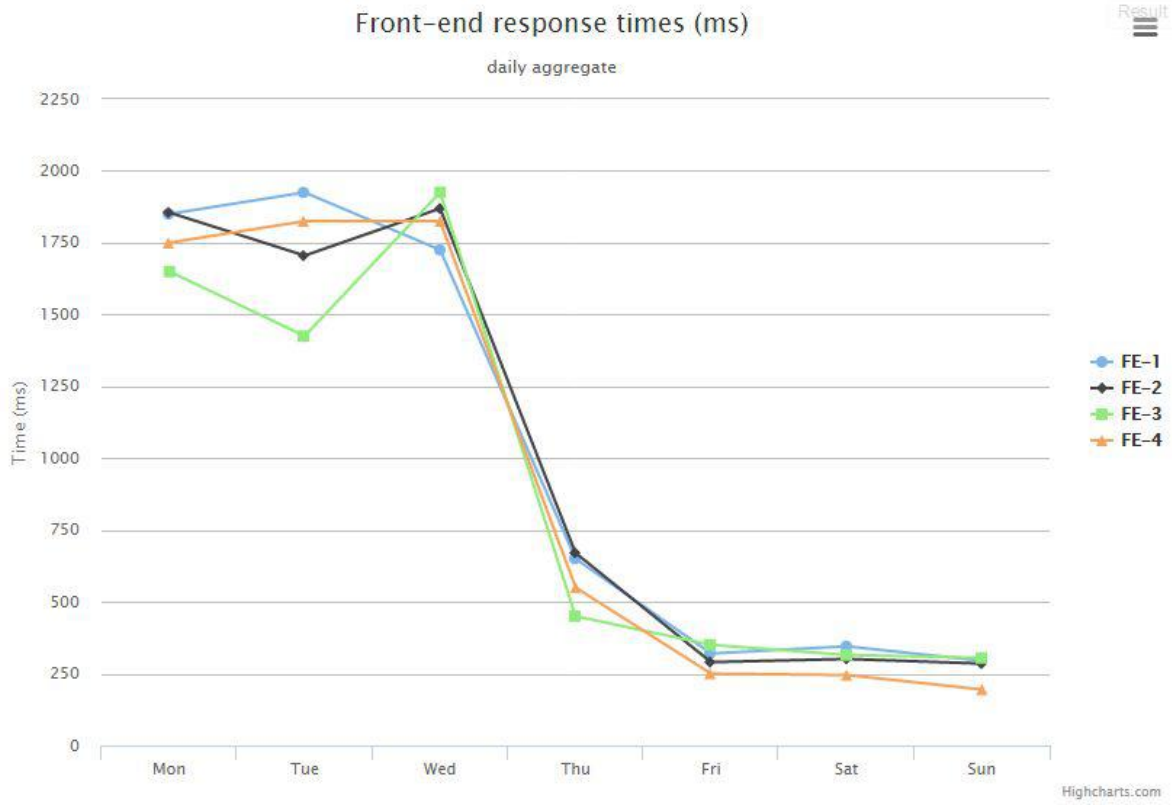
Pull queues

- Ability to “tag”
- Lease multiple eg: gameboard updated, game id as tag.



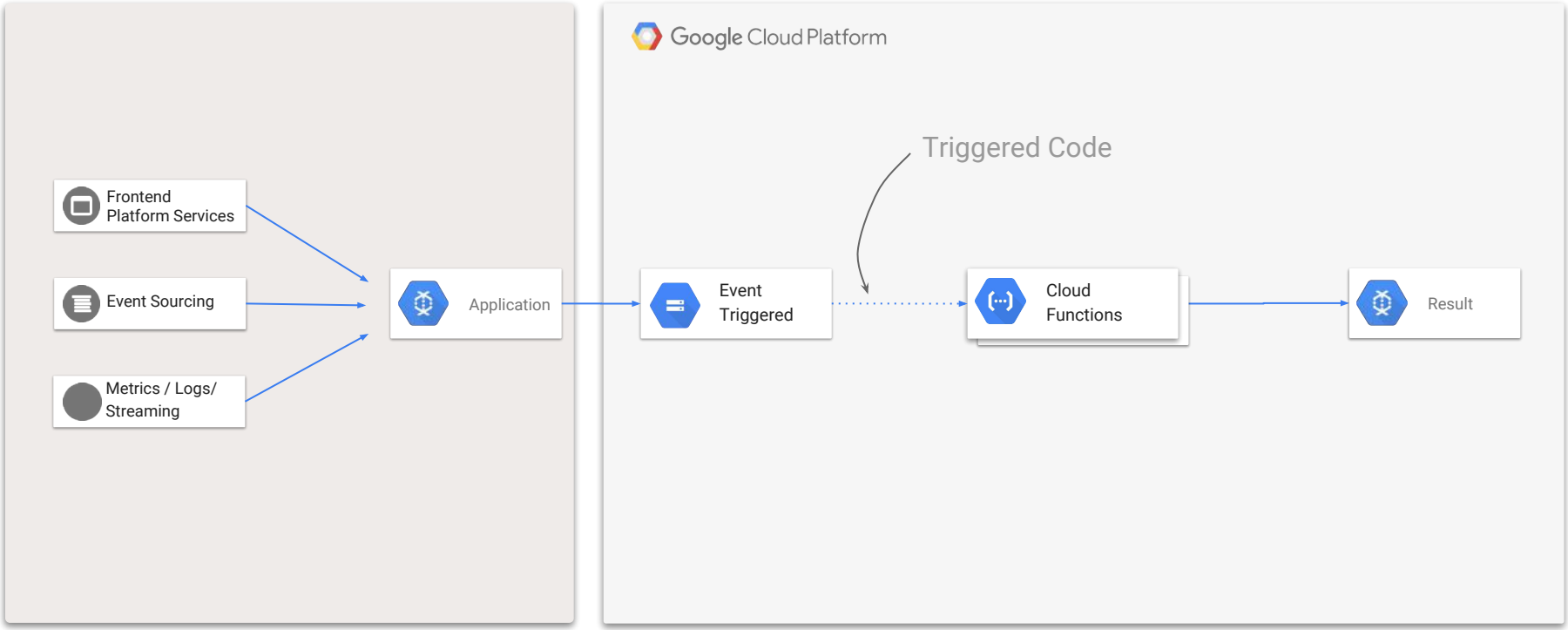
Slides: https://www.slideshare.net/martonkodok
Title: Architectural Patterns - Message Queues

Reduce request latency



Cloud Functions

Cloud Functions



Cloud Functions

Unit: Function
Trigger: Events and HTTP

Best used:

- For Events & Async workloads
- For single-purpose microservices

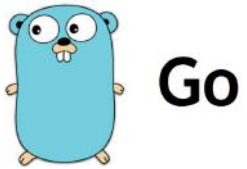
Cloud Functions - Event-driven - FaaS

- Simplest way to run your code in the cloud - just deploy
- Automatically scales, highly available and fault tolerant
- No servers to provision, manage, patch or update
- Pay only while your code runs
- Connects and extends cloud services

(In alpha: Java)

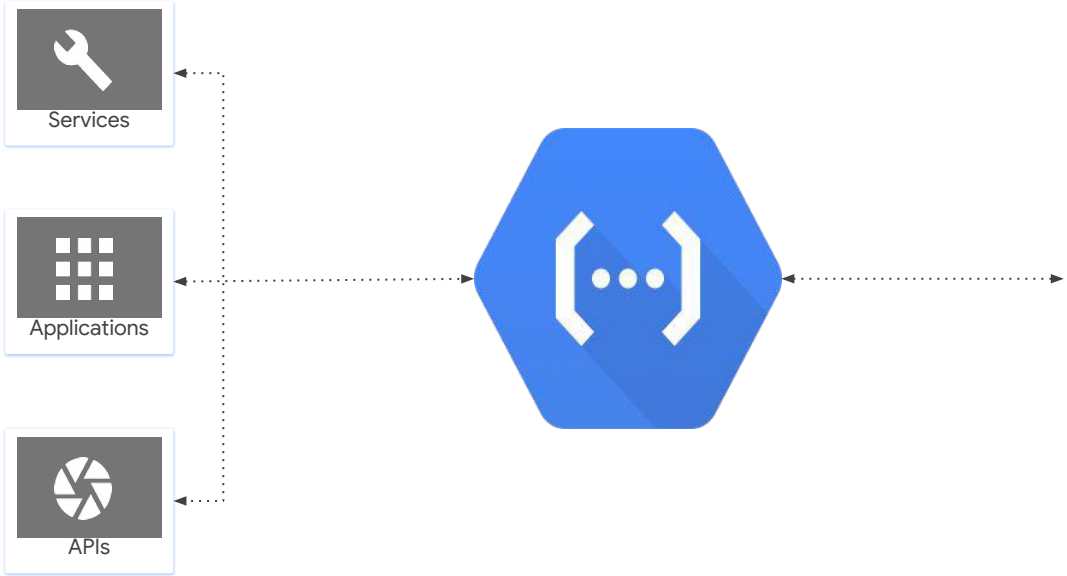
- Node 8.11
- Support for async/await

- Python 3.7.1
- Flask microframework



- Go 1.11
- Familiar building blocks

Functions: your gateway to GCP Services



Access 20+ Google services from GCF

BigQuery
Cloud Pub/Sub
Cloud Storage
Cloud Bigtable
Cloud Datastore
Cloud Machine Learning
Cloud Vision API
Cloud Speech API
Cloud Spanner
Cloud Natural Language API
Cloud Translation API
Stackdriver
Firebase
Assistant
Dialogflow

Cloud Functions Trigger

Cloud Storage

Finalize/Create

Delete

Archive

Metadata Update

Compute Engine EAP

Instance

Instance Group

Autoscaler

Firewall

Set Labels

Cloud Pub/Sub

Topic

Cloud Functions Trigger

Firebase

Realtime DB change

Authentication

Remote config

Google Analytics log

BigQuery

Job create

Job complete

Cloud Firestore

Create

Update

Write

Delete

Summary: When to use what

Cloud Functions

Smallest unit of computing

Event driven architecture

Connect & extend services

App Engine

Unit of computing is apps

HTTP request/response

Large scalable backends

Serverless add-on

Run functions, apps & containers on GKE

Full portability of your artifacts

Run on your own cluster

The unit of computing is yours to chose!

Slice and dice your application any way you think it makes sense to be more agile, to build better apps that deliver value.

How I Learned How to Stop Worrying and Dig Hosted Monitoring

What to do for monitoring?

- In-house or hosted?
- Modern vs proven?
- Specialized or general?
- Paid vs free?

Let’s be honest:

- Not enough time
- Small environment
- More important work to do
- Everyone else is doing it

Google Stackdriver

Intelligent monitoring and management for services, containers, applications, and infrastructure.

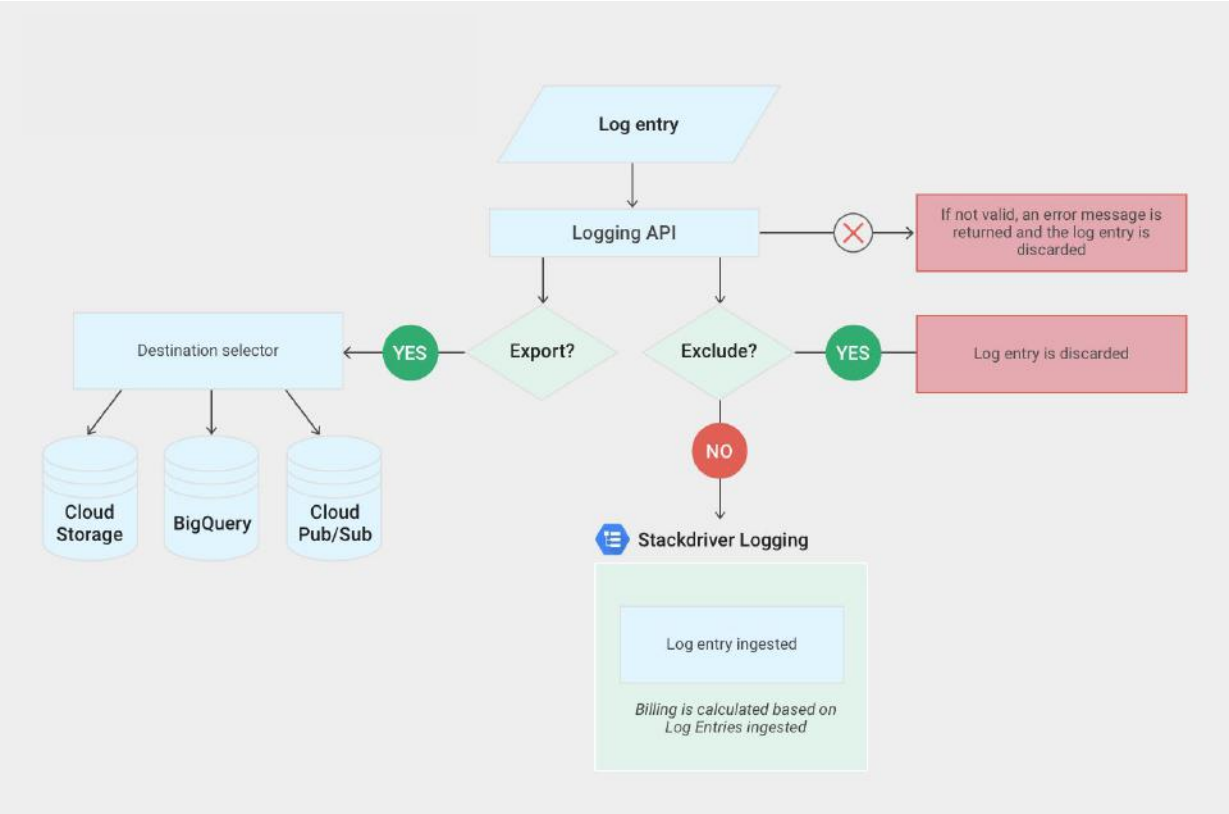
- Works with GCP, AWS, on prem
- Logging, tracing, alerts
- Collectd agent
- Cost per resource
- Easy point and click alerting policy
- Debugger, Error reporting, profiler *free
- Uptime checks *free

Google Stackdriver: Uptime check (offered free)

- Check Type: HTTP, TCP
- Resource Type: URL, Instance, App Engine, Load Balancer
- Global Locations
- Custom Headers (encrypted)
- Authentication
- Whitelisted source IPs
- Alerting policy: Email, SMS, Slack, PagerDuty, Hipchat, Campfire, Webhooks

Google Stackdriver: Uptime check

Life of a log


Log entry
Logging API
If not valid, an error message is returned and the log entry is discarded
Destination selector
YES
Export?
Exclude?
YES
Log entry is discarded
Cloud Storage
BigQuery
Cloud Pub/Sub
NO
Stackdriver Logging
Log entry ingested
Billing is calculated based on Log Entries ingested

Google Stackdriver

Metrics, logging, alerting are a universal right!

Google BigQuery

What is BigQuery?

Analytics-as-a-Service - Data Warehouse in the Cloud

Scales into Petabytes on Managed Infrastructure - load up to 5TB large files

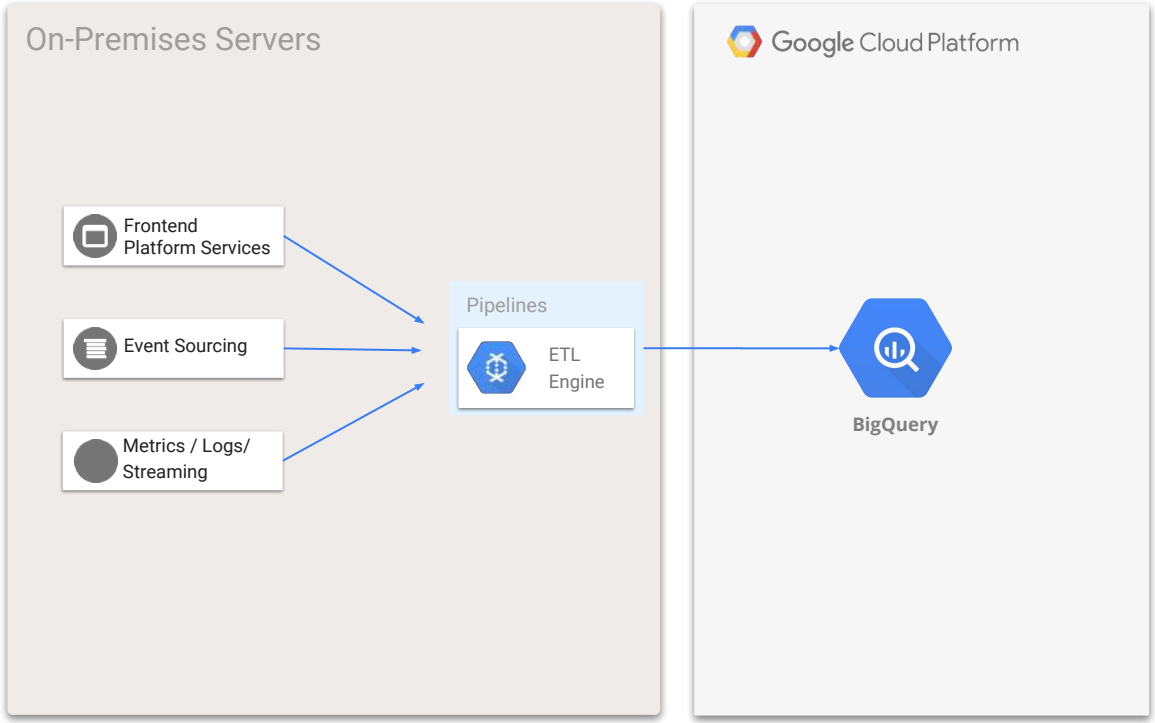
SQL 2011 + Javascript UDF (User Defined Functions)

Familiar DB Structure (table, columns, views, struct, nested, JSON)

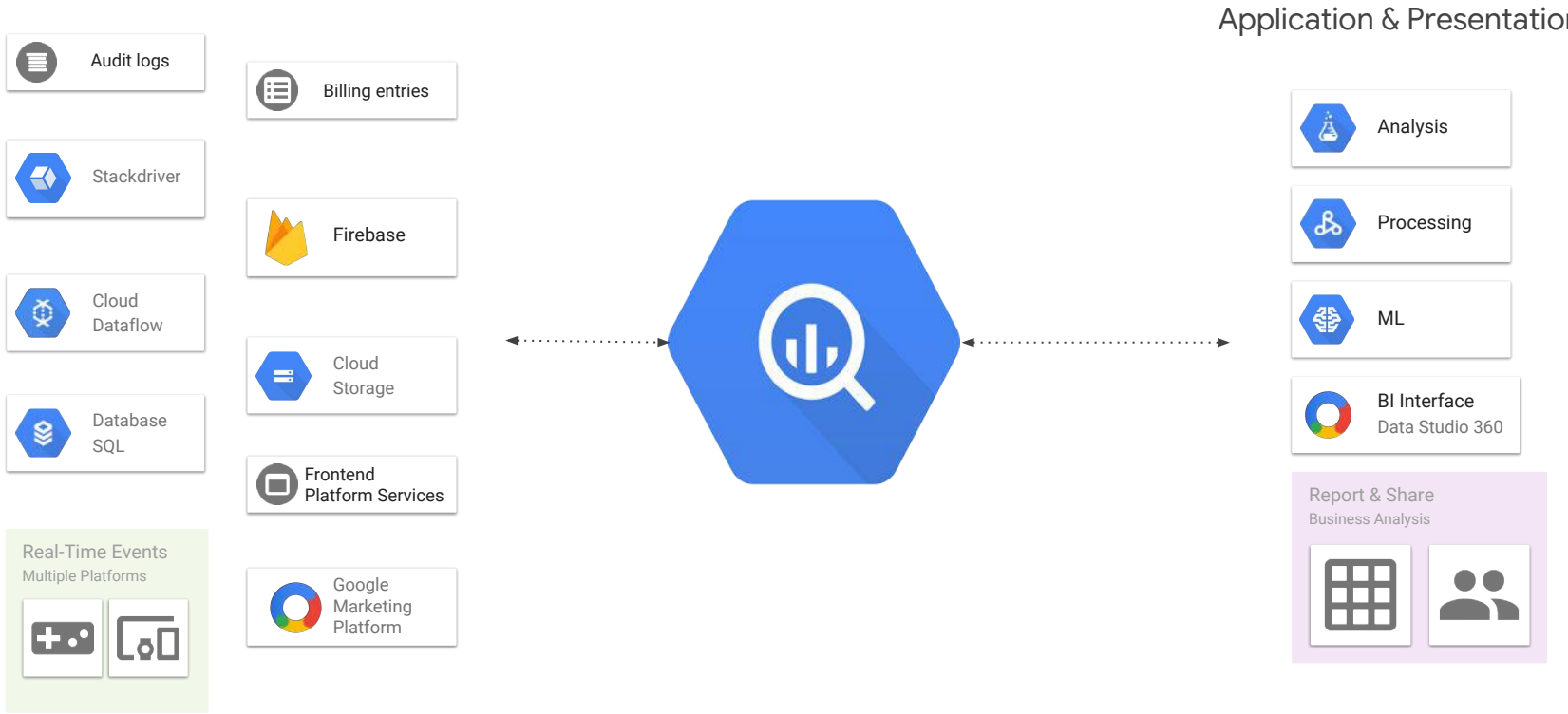
Integrates with Google Sheets + Cloud Storage + Pub/Sub connectors

Decent pricing (storage: `$20/TB` cold: `$10/TB`, queries `$5/TB`) `*March 2019`

Architecting for The Cloud

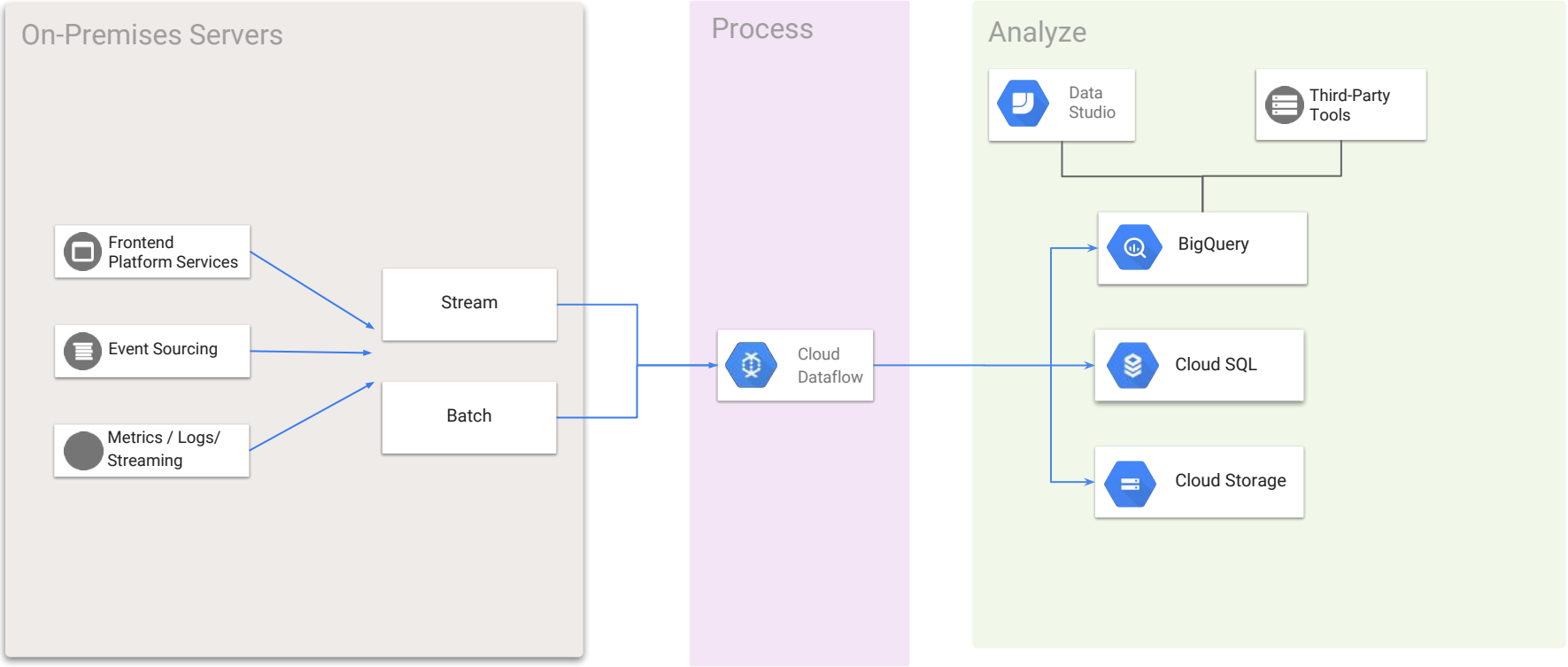


BigQuery: federated data access warehouse



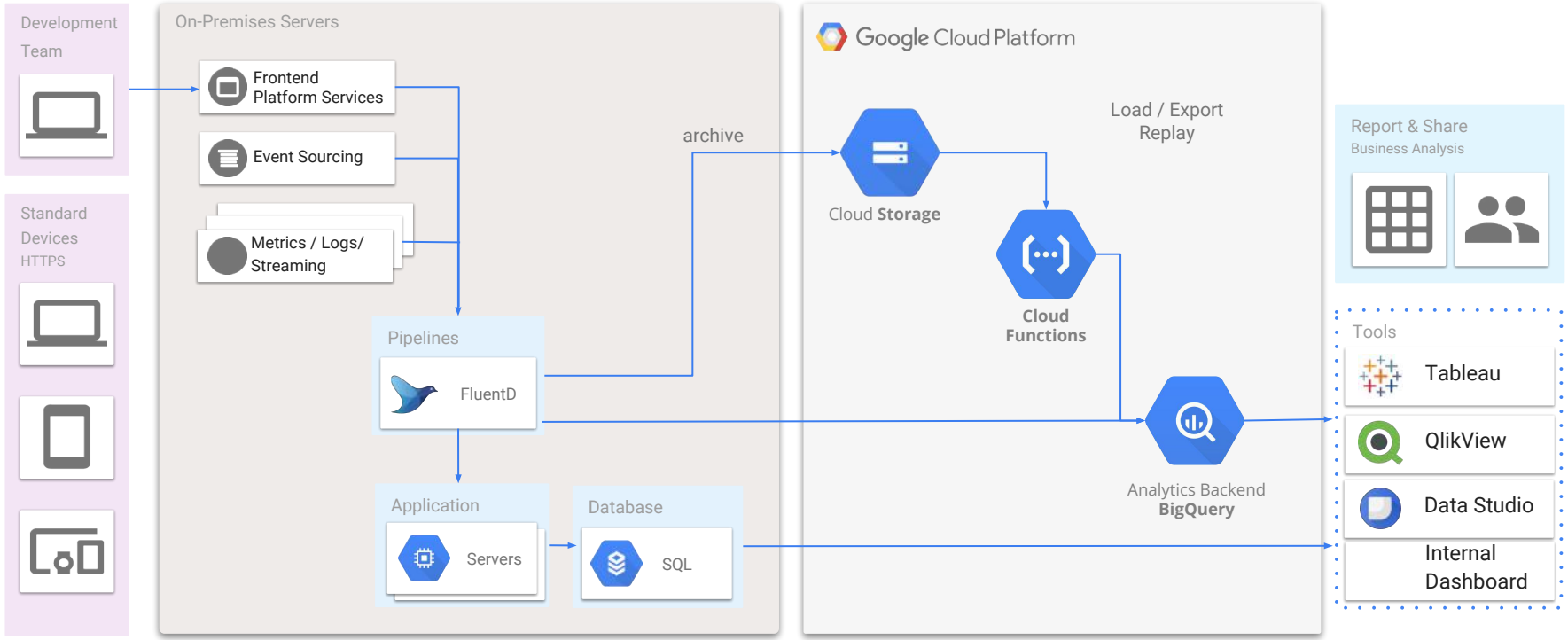
Data needs to be processed in multiple services.
How can we pipe to multiple places?

Architecting for The Cloud



We have our app outside of GCP.
How can we use the benefits of BigQuery?

Data Pipeline Integration at REEA.net



The following slides will present a sample Fluentd configuration to:

1. Transform a record
2. Copy event to multiple outputs
3. Store event data in File (for backup/log purposes)
4. Stream to BigQuery (for immediate analyses)

```
<filter frontend.user.*>
  @type record_transformer
 </filter>

<match frontend.user.*>
   @type copy
   <store>
         @type forest
         subtype file
   </store>
   <store>
         @type bigquery
   </store>

   …

</match>
```

1. Filter plugin mutates incoming data. Add/modify/delete event data **transform attributes without a code deploy**.

2. The copy output plugin copies events to multiple outputs. File(s), multiple databases, DB engines.
Great to ship same event to multiple subsystems.

3.

4. The Bigquery output plugin on the fly streams the event to the BigQuery warehouse. **No need to write integration.** Data is available immediately for querying.

Whenever needed other output plugins can be wired in: Kafka, Google Cloud Storage output plugin.

1 record_transformer 2 copy 3 file 4 BigQuery

```
<filter frontend.user.*>
  @type record_transformer
  enable_ruby
  remove_keys host
  <record>
    bq {"insert_id":"${uid}","host":"${host}",
          "created":"${time.to_i}"}
    avg ${record["total"] / record["count"]}
  </record>
</filter>
```

syntax: Ruby, easy to use.

Great for:
- date transformation,
- quick normalizations,
- calculating something on the fly, and store in clear log/analytics db
- renaming without code deploy.

1 record_transformer 2 copy 3 file 4 BigQuery

```
<match frontend.user.*>
  @type copy
  <store>
   @type forest
   subtype file
   <template>
            path /tank/storage/${tag}.*.log
            time_slice_format %Y%m%d
   </template>
  </store>
</match>
```

1 record_transformer 2 copy 3 file 4 BigQuery

```
<match frontend.user.*>
  @type bigquery
  method insert
  auth_method json_key
  json_key /etc/td-agent/keys/key-31da042be48c.json
  time_field timestamp
  time_slice_format %Y%m%d
  table user$%{time_slice}
  ignore_unknown_values
  schema_path /etc/td-agent/schema/user_login.json
</match>
```

Connector uses:
- JSON key auth file
- JSON table schema

Pro features:
- streaming to Partitioned tables
- ignore unknown values

(not reflected in schema)

Our benefits using BigQuery

- SQL+JSON (big costs saving with partitioning/clustering)
- run raw ad-hoc queries (either by analysts/sales or Devs)
- ability to throw in / join all kind of data
- pricing model 1TB free every month
- no more throwing away-, expiring-, aggregating old data
- no provisioning/deploy
- no running out of resources
- no more focus on large scale execution plan

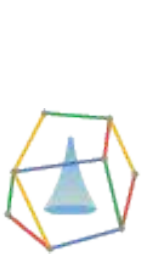
Qwiklabs - Find Your Topic and Skill Level

	Kubernetes	Machine Learning	Certification
Introductory For GCP newcomers 1 hour duration, 2 labs	Enroll in the Baseline: Infrastructure Quest. 1. **Kubernetes Engine**: Qwik Start (lab) (video) - Deploy a containerized application with Kubernetes Engine. 2. **IoT: Qwik Start** (lab) - Learn about GCP's Cloud IoT Core service, where almost any IoThing is possible!	Enroll in the Baseline: Data, ML, AI Quest. 1. **Cloud ML Engine**: Qwik Start (lab) (video) - Train and deploy a TensorFlow model to Cloud ML Engine. 2. **Cloud Natural Language API**: Qwik Start (lab) - Perform sentiment analysis on a block of text. For fun, paste in the last email you sent!	Enroll in the Cloud Architecture Quest. 1. **Stackdriver Qwik Start**: Web UI (lab) What's up with your VM? Learn to install monitoring and logging agents to collect info about your GCP resources. 2. **Getting Started with Cloud KMS** (lab) - Create your first KeyRing and CryptoKey with GCP.
Experienced Qwiklabs alumni 1 hour, 2 labs	Enroll in the Kubernetes Quest. 1. **Kubernetes Engine: Qwik Start** (lab) (video) - Deploy a containerized application with Kubernetes Engine. 2. **Intro to Docker** (lab) Are your containers running? Create, run, and debug containers, then pull and push images to and from Google Container Registry.	Enroll in the Machine Learning APIs Quest. 1. **Cloud ML Engine**: Qwik Start (lab) (video) - Train and deploy a TensorFlow model to Cloud ML Engine. 2. **Detect Labels, Faces, and Landmarks in Images with the Cloud Vision API** (lab) - How do you feel about self-driving cars? Learn what's behind the AI making the future possible.	Enroll in the Cloud Architecture Quest. 1. **Stackdriver Qwik Start**: Web UI (lab) - What's up with your VM? Learn to install monitoring and logging agents to collect info about your GCP resources. 2. **Application Performance Management (APM) with Stackdriver** (lab) - Dig deeper into Stackdriver with a problematic environment - can you identify the issues?

Thank you.

Slides available on: **slideshare.net/martonkodok**

Reea.net - Integrated web solutions driven by creativity to deliver projects.



IT MURES