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Building Observability for Microservices Workloads on **Google Cloud**

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Google Developer Groups
Bandung

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About Me

1. Student in Software Eng, UGM, Jul 2019 – present
2. Cloud Engineer, Btech, Jul 2019 – present
3. Tech background: System, Networking, IaaS & PaaS Cloud, DevOps, a bit of Programming
4. Bangkit Academy Contributor & #RoadToGDE Mentee
5. Open Source Enthusiast and Communities Member
6. https://linktr.ee/misskecupbung

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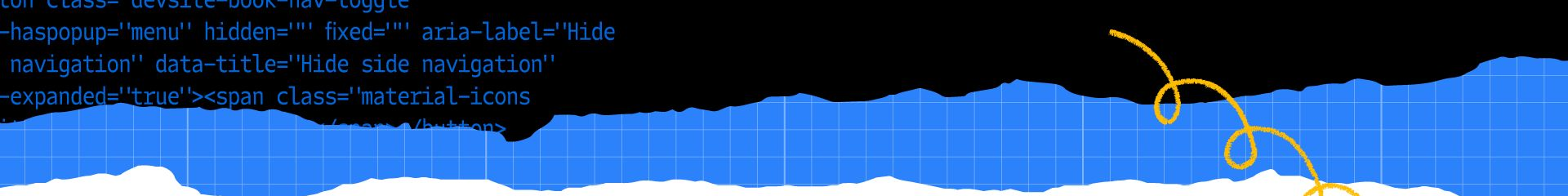
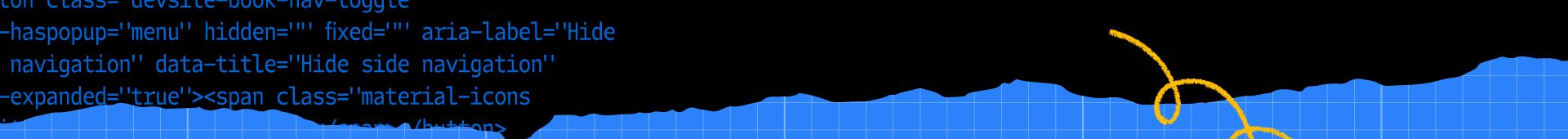
Outline

1. What is Observability?
2. How Important Is it?
3. Implementation?
4. Challenges?

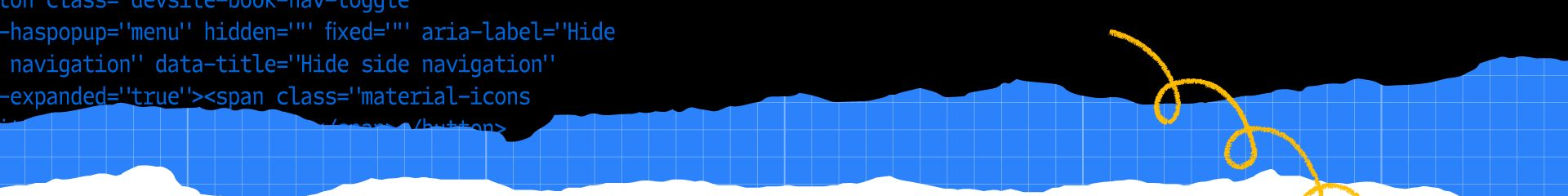


"In control theory, **observability** is a measure of **how well** internal states of a system can be inferred from knowledge of its external outputs."

Source: Wikipedia, "Observability." https://en.wikipedia.org/wiki/Observability



“**Monitoring** tells you whether a system is working; **Observability** lets you understand why isn't working.”



“**Good Observability** allows you to answer the questions you didn't know that you needed to ask”

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Goals

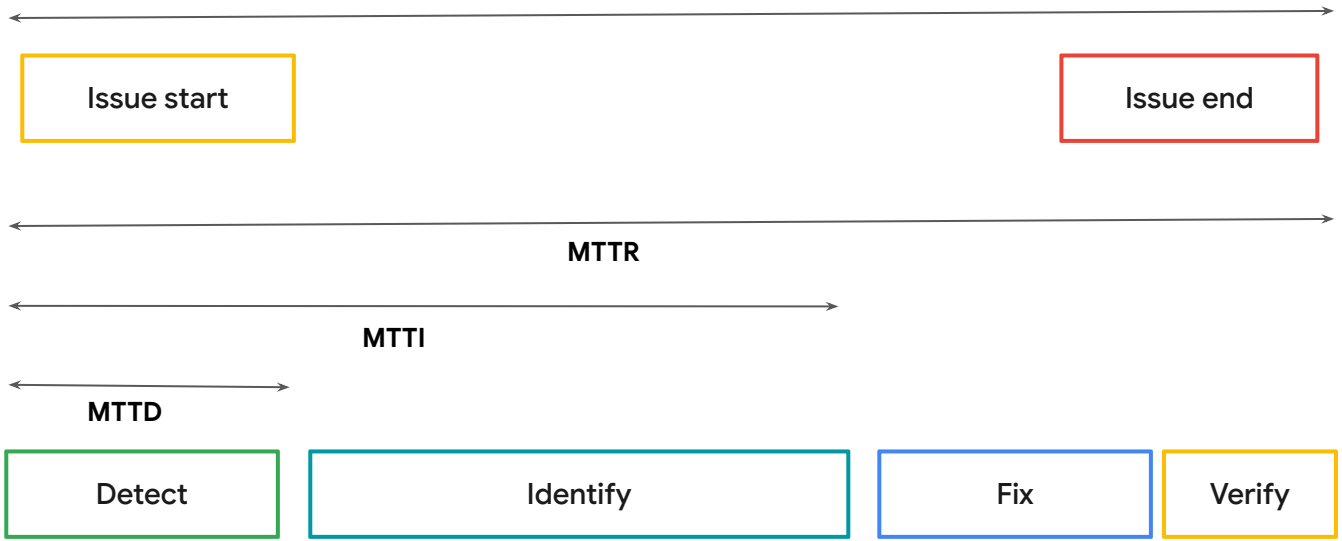
1. Provide leading indicators of an outage or service degradation.
2. Help **debug** and **detect** outages, service degradations, bugs, and unauthorized activity.
3. Identify long-term trends for capacity planning and business purposes.
4. Expose unexpected side effects of changes

How to Measuring

- Changes made to monitoring configuration
- "Out of hours" alerts
- Team alerting balance
- False positives & negatives

- Alert creation
- Alert acknowledgement
- Alert silencing and silence duration
- Unactionable alerts
- Usability: alerts, runbooks, dashboards
- MTTD, MTTR, impact

Issue Timeline



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Tools

Cloud provider: GCP

1. **Cloud Monitoring:** Full-stack monitoring for Google Cloud Platform and Amazon Web Services.
2. **Cloud Logging**: Real-time log management and analysis.
3. **Error Reporting**; Identify and understand your application errors.
4. **Cloud Debugger**: Investigate your code's behavior in production.
5. **Cloud Trace:** Find performance bottlenecks in production.
6. **Cloud Profiler:** Identify patterns of CPU, time, and memory consumption in production.

Cloud Operations

#GCPSketchnote

@PVERGADIA THECLOUDGIRL.DEV

9.28.2020

We need to know how our cloud deployments are behaving!

IT OPS SAM

We need a tool that helps

Monitor Troubleshoot Scale

And if something is broken, find the root cause easily!

SRE ERIN

Cloud Ops!

What is Cloud Ops?

MONITORING
Metrics, dashboards, uptime checks, alerts

LOGGING
Logs ingestion, analysis error reporting

ADVANCED OBSERVABILITY
Distributed tracing, live debugging, continuous profiling

How does Cloud Ops work?

APPLICATIONS & INFRASTRUCTURE
Logging or Monitoring Agents
Open Telemetry

GOOGLE CLOUD
Out of the Box
Always-on

OTHER ENVIRONMENTS
Logging & Monitoring APIs
Partners (e.g. Blue Medora)

CLOUD Ops

CLOUD LOGGING

CLOUD MONITORING

PUB/SUB
Route logs to external systems

BIG QUERY
Business analysis

CLOUD STORAGE
Log archival

EXTERNAL SYSTEMS
APIs and Adapters - Export metrics to partners products like Grafana, Dynatrace, New Relic, etc.

How can I troubleshoot my app with Cloud Ops?

CLOUD MONITORING
- Collect metrics
- Analyze trends
- Set alert thresholds
- Outlier activity
- SLO Alerts

CLOUD LOGGING
- Analyze logs for outliers
- Troubleshoot those apps

CLOUD TRACE
- Instrument apps with cloud trace libraries
- Analyze latency across services in the apps

CLOUD PROFILER
CLOUD DEBUGGER
- Profile performance
- Production debugging
- Accelerate app troubleshooting & optimization

What about security?

Data at rest and in transit is encrypted

Audit Logs: Who did what when

What are Advanced Observability features?

CLOUD TRACE
Visualize & Analyze
- Request flow
- Latency issues

CLOUD PROFILER
Analyze app performance
- Improve speed
- Reduce cost
- Run in production - no performance impact

CLOUD DEBUGGER
Inspect production app
- Live troubleshooting

What does Cloud Logging and Cloud Monitoring include?

CLOUD LOGGING

LOG VIEWER: View, query & analyze logs box

CREATE: Log-based metrics & set up alerts

LOG SINKS: Manage retention & set up policies

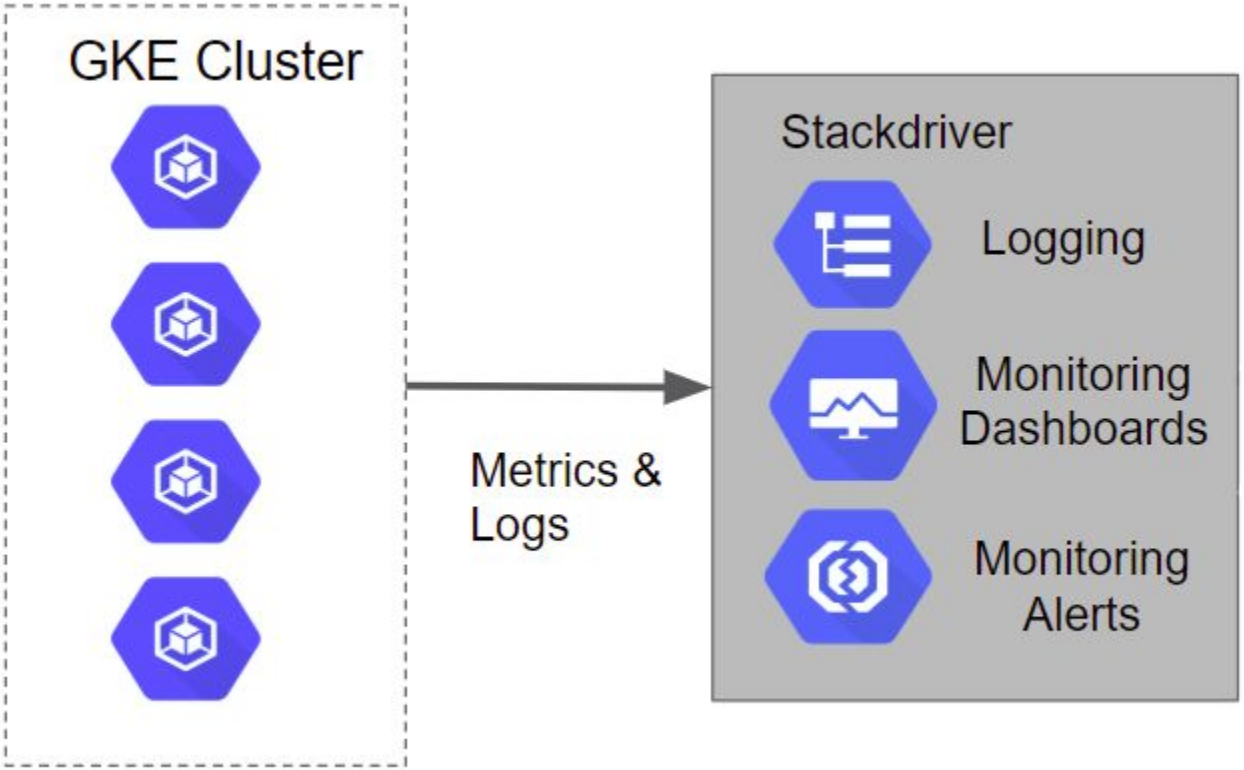
ERRORS: Identify & analyze errors

CLOUD MONITORING

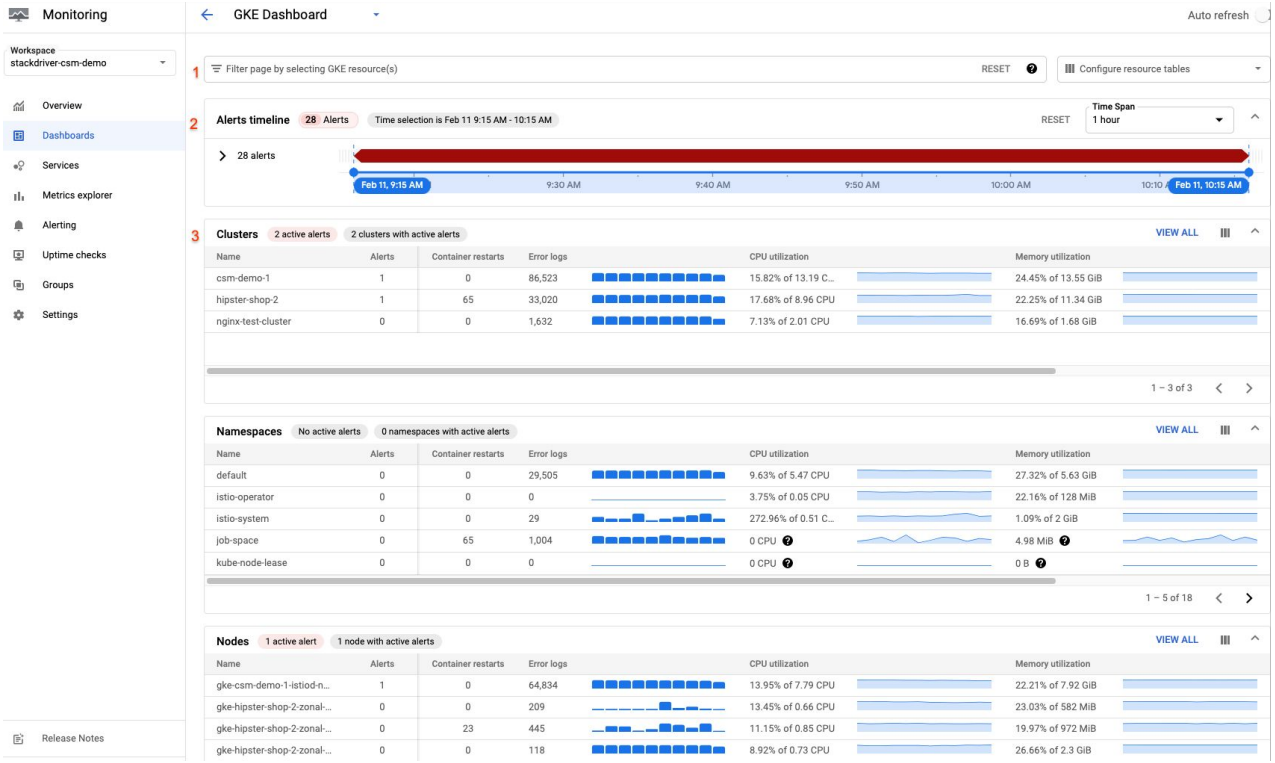
Charts and dashboards

Alerts and notifications

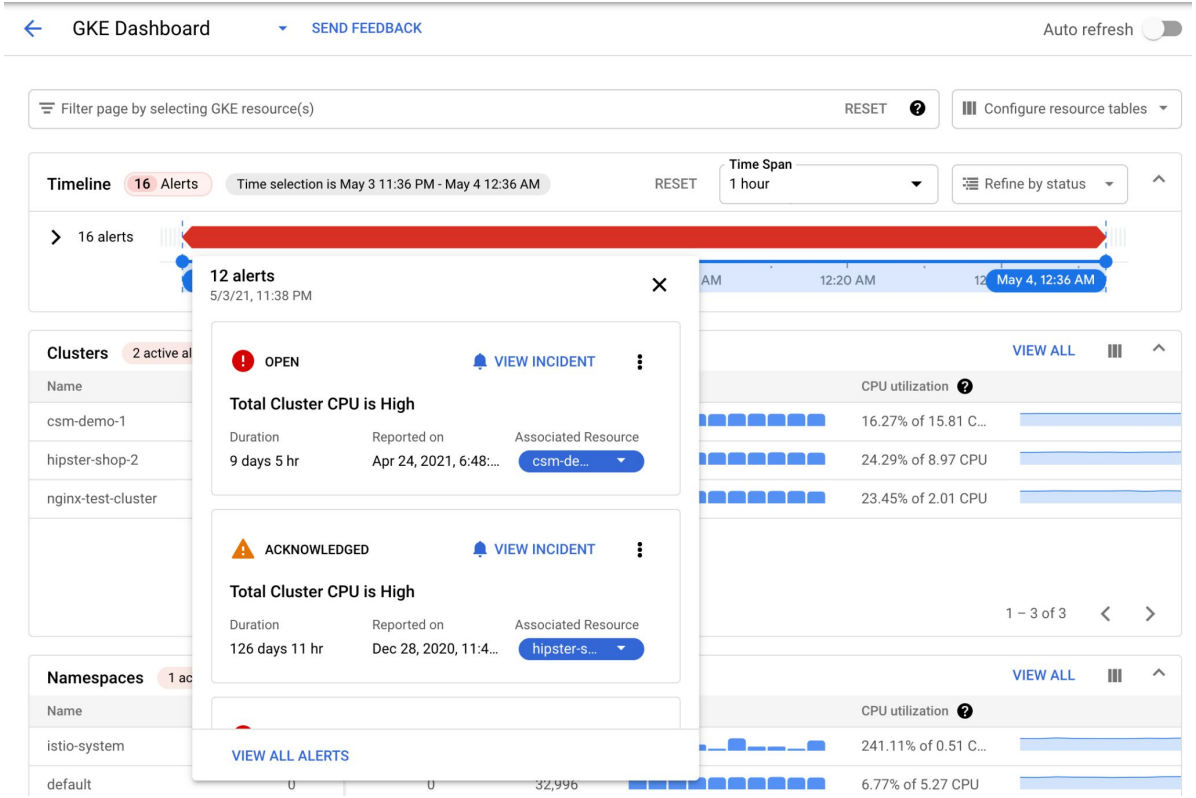
SLO monitoring and uptime checks


GKE Cluster
Metrics &
Logs
Stackdriver
Logging
Monitoring
Dashboards
Monitoring
Alerts

Cloud Operation for GKE



Cloud Operation for GKE



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Tools and Challenges

1. Want to be able to get a 360◦ view of a problem
2. Need to correlate logs, metrics and traces to get deeper insights
3. Repetitive troubleshooting process
4. Data introspection

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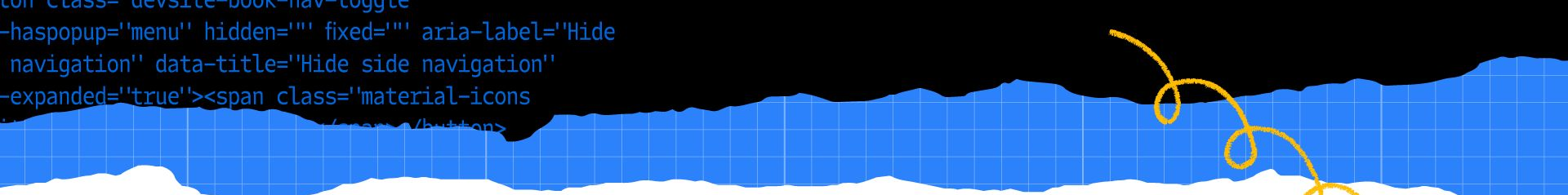
References

1. https://cloud.google.com/architecture/devops/devops-measurement-monitoring-and-observability
2. https://sre.google/resources/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