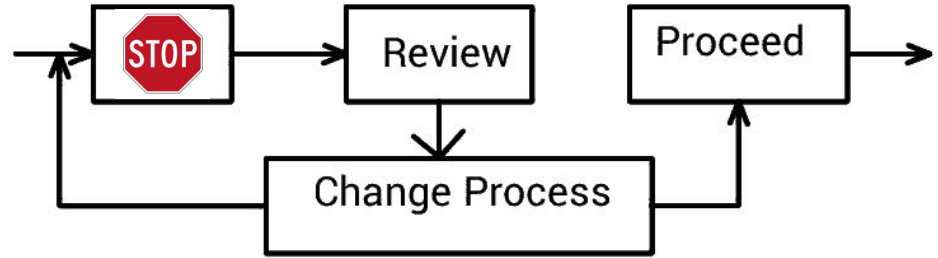
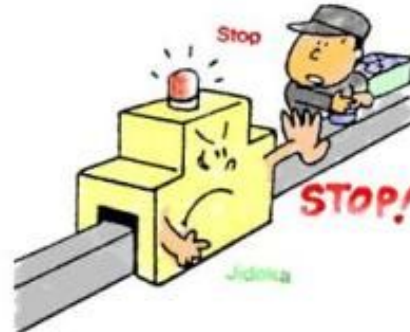
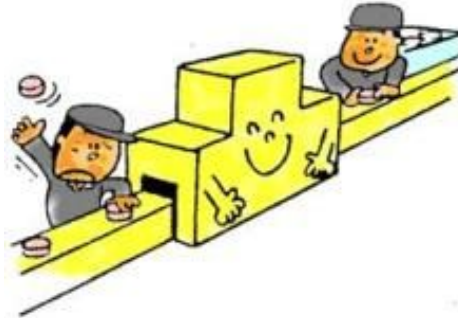


JIDOKA



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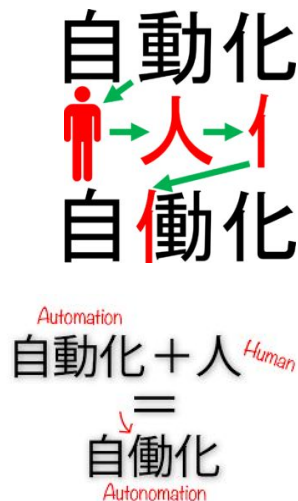


3rd tenet of TPS (Toyota Production System)

... to identify and **stop immediately** when a defect or deviation occurs, triggered by the **quality monitoring system** ...

↓
this process is **autonomous**

ref: <https://www.allaboutlean.com/jidoka-1/>



Toyota

Automotive manufacturer



Toyota Motor Corporation is a Japanese multinational automotive manufacturer headquartered in Toyota, Aichi, Japan. It was founded by Kiichiro Toyoda and incorporated on August 28, 1937. [Wikipedia](#)

Stock price: 7203 (TYO) JP¥7,939 +121.00 (+1.55%)

Jan. 8, 3:00 p.m. GMT+9 - Disclaimer

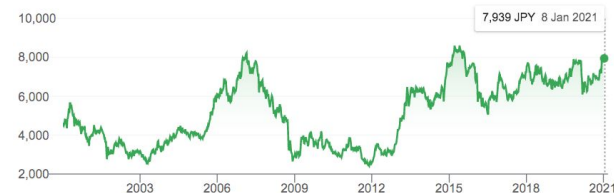
Customer service: 1 (888) 869-6828

Founder: Kiichiro Toyoda

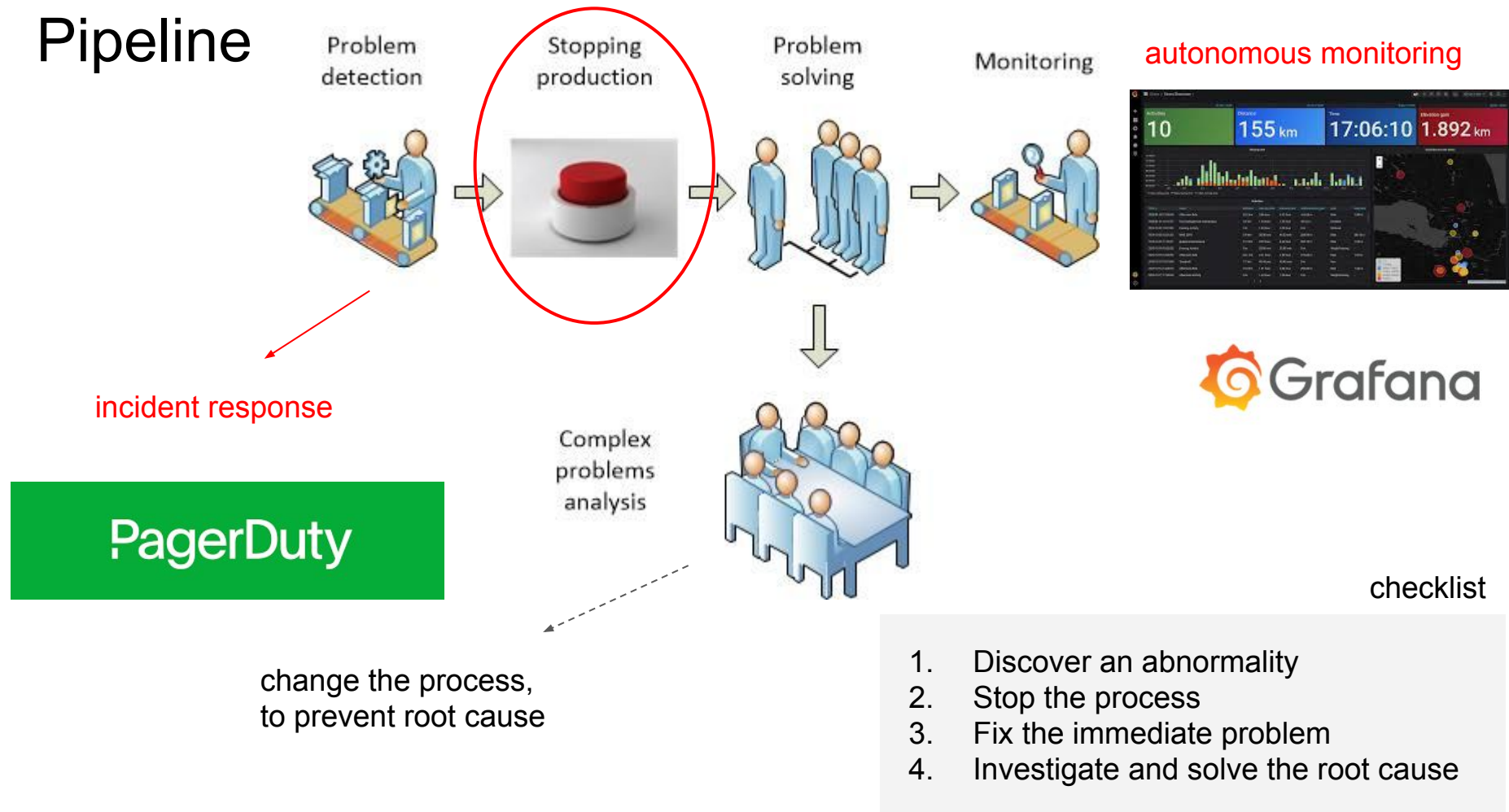
Founded: August 28, 1937, Japan

Subsidiaries: Lexus, Daihatsu, Subaru Corporation, Hino Motors, [MORE](#)

Parent organization: Toyota Group



Pipeline





jidoka = autonomous

When to stop?



TRIGGERS

Quality Issues

Process Issues

Material Supply Issues



Anomaly detection in Jidoka



**IF anomaly or low quality
THEN stop and inspect production**

Machine Learning Algorithms

Supervised

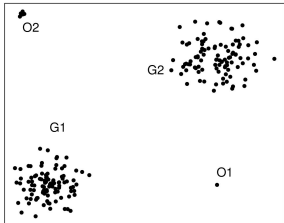
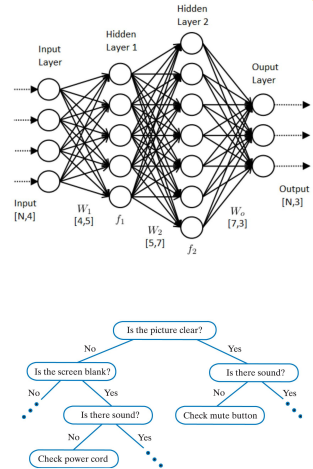
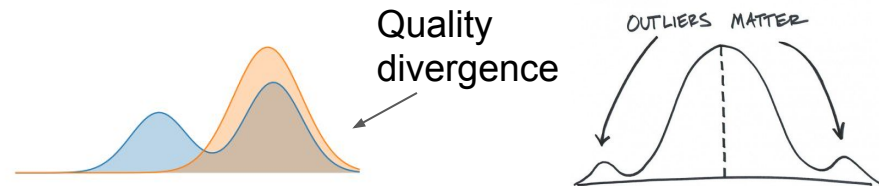
- Neural Network Classifier
- Decision trees

Unsupervised

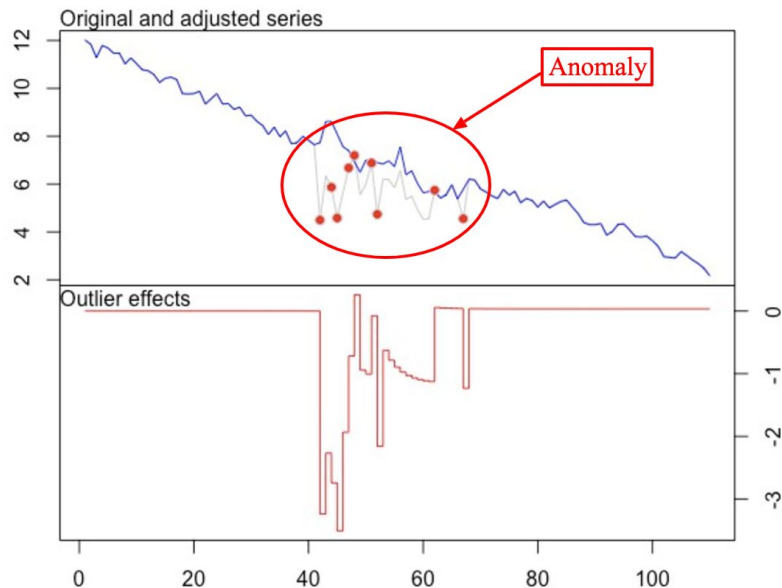
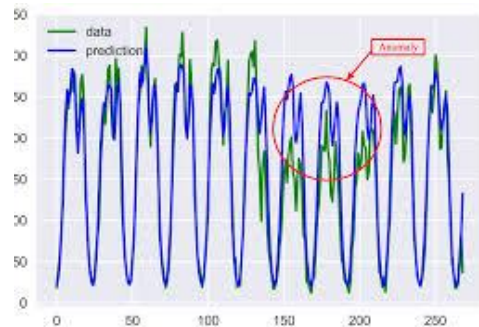
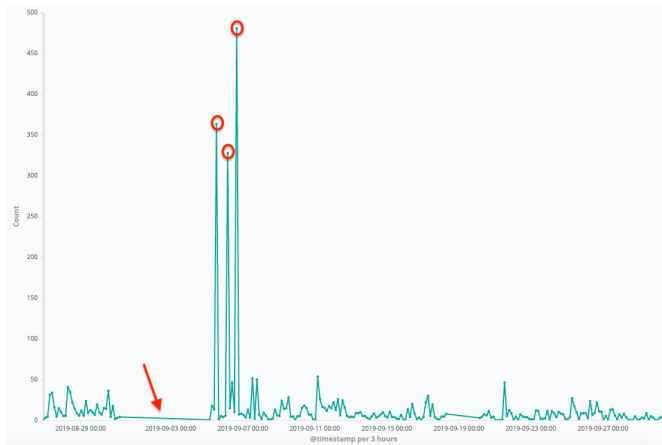
- LOF
- IsolationForest
- Autoencoders
- Cluster analysis

Rule-Based Algorithms

- Bayesian networks
- Decision trees
- Fuzzy logic
- Expert rules



Process/supply issues - examples



Quality issues - data-driven analysis

High divergence - automatically computed

$$D_{\text{KL}}(P \parallel Q) = \int_{x_a}^{x_b} P(x) \log \left(\frac{P(x)}{Q(x)} \right) dx$$

$$= \int_{y_a}^{y_b} P(y) \log \left(\frac{P(y) \frac{dy}{dx}}{Q(y) \frac{dy}{dx}} \right) dy = \int_{y_a}^{y_b} P(y) \log \left(\frac{P(y)}{Q(y)} \right) dy$$

Expected distribution

Actual distribution



Salted pretzel height



Some pretzels have shapes from a different distribution

- Quality issue

Possible causes:

- Some machines in the pipeline are malfunctioning
-> multimodal distributions

faulty process

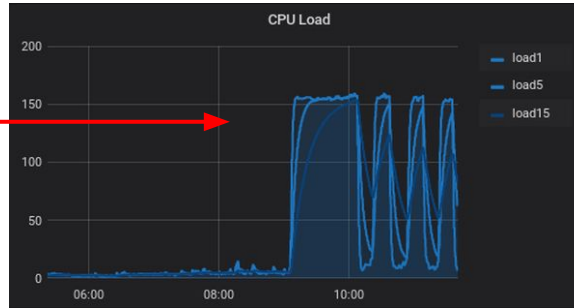
Example in IT - distributed systems (service-mesh + kubernetes = self-healing)

failure /
anomaly

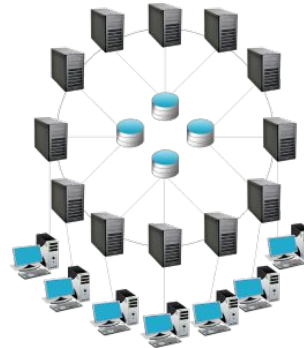


Heartbeat detector

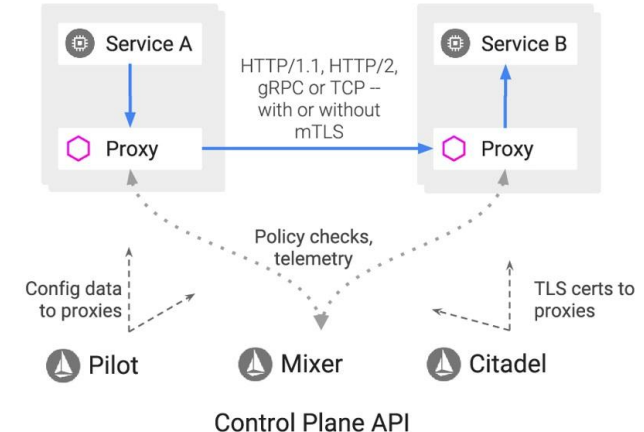
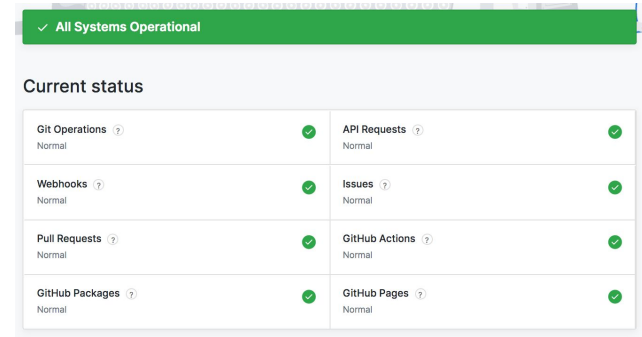
- Continuously ping instances
- Self-heal if not responding



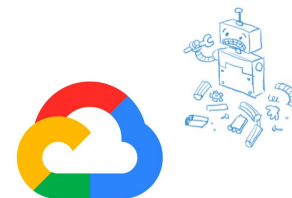
Name	Status	Restarts	Age	Cluster IP	CPU (cores)	Memory (bytes)		
dash-demo...	Running	0	2 days	10.148.0.3	0.002	23.418 Mi		
ewa-app-j26...	Running	805	2 days	10.148.0.11	-	-		
ewa-app-xm...	Running	804	2 days	10.148.1.3	-	-		
frontend-ml...	Running	0	2 days	10.148.0.5	0	5.844 Mi		
integration-t...	Running	0	2 days	10.148.0.4	0	5.734 Mi		
maxmaxma...	Pending	0	2 days	10.148.0.14	-	-		
mysql	Pending	0	19 days	-	-	-		



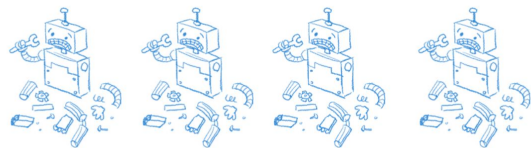
kubernetes



Example in IT - Google service outage



2020-12-14
04->06 AM US/Pacific



Something went wrong...



New quota system introduced a bug

Automatic security checks failed

Service outage

Problem solving



hackerone

January 09, 2021 All services available

Google Cloud Status Dashboard > Incidents > Google Cloud Infrastructure Components

Google Cloud Status Dashboard

This page provides status information on the services that are part of Google Cloud Platform. Check back here to view the current status of the services listed below. If you are experiencing an issue not listed here, please [contact Support](#). Learn more about what's posted on the dashboard in [this FAQ](#). For additional information on these services, please visit [cloud.google.com](#).

Google Cloud Infrastructure Components Incident #20013

Google Cloud services are experiencing issues and we have an other update at 5:30 PDT

Incident began at **2020-12-14 04:07** and ended at **2020-12-14 06:23** (all times are **US/Pacific**).



DATE	TIME	DESCRIPTION
✓ Dec 22, 2020	16:49	The following is a correction to the previously posted amendment. All services that require sign-in via a Cloud service accounts experienced elevated error rates on oauth2.googleapis.com. Impact varied based on the service impacted and have further questions.
✓ Dec 18, 2020	11:37	

ISSUE SUMMARY

On Monday 14 December, 2020, for a duration of approximately 2 hours, Cloud Service accounts access were unavailable. Cloud Service accounts apologize to our customers whose services or business steps to improve the platform's performance and



Thank you for your attention :)

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