Monitoreo de salud de un website: El cóctel ganador entre selenium, docker y Opsgenie

Website health check: The winner selenium, docker and Opsgenie cocktail

● ● ●

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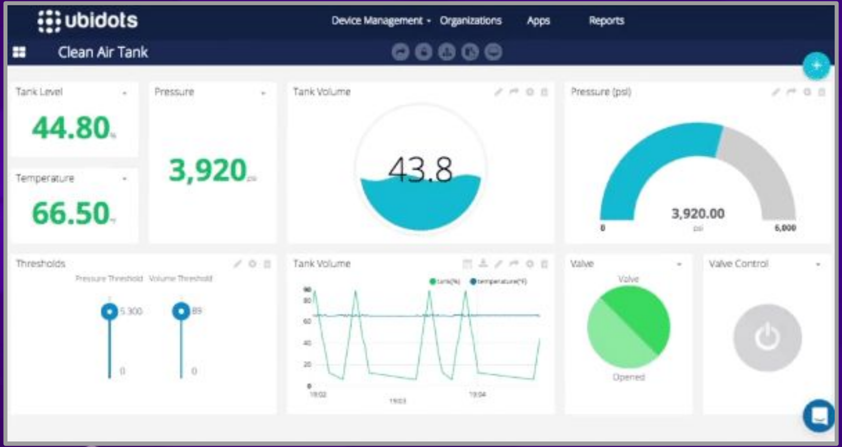
Developer @Ubidots

About the problem: The business

Ubidots is an IoT platform, specialized in data storage, visualization and processing that allows to hardware engineers to create solutions without the need of hiring a software development team in just a few steps.

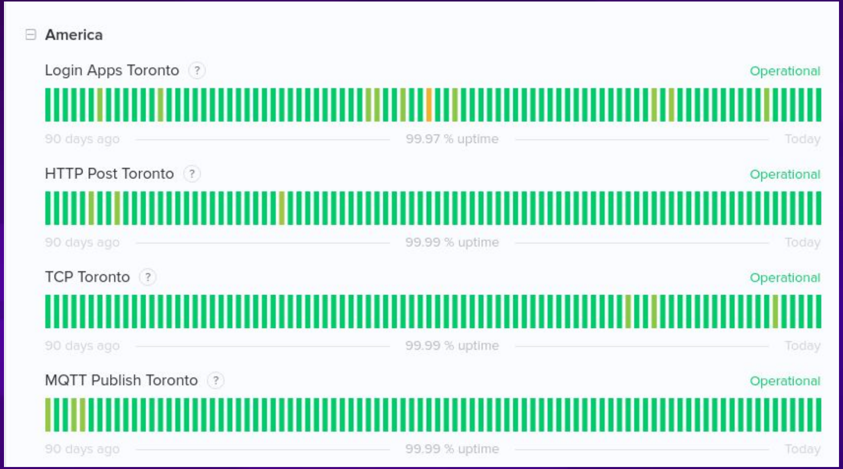
Ubidots processes about 40 millions of dots (data requests) every day, receiving data through MQTT, HTTP, TCP and UDP.

Ubidots also offers events alerts to cell-phones, emails, third Rest-APIs, etc



About the problem: Wath did we want to build?

- A way to show our users the actual status of our services
- A way to create an external service auditory to SLA's agreements
- Traceability of issues solving times

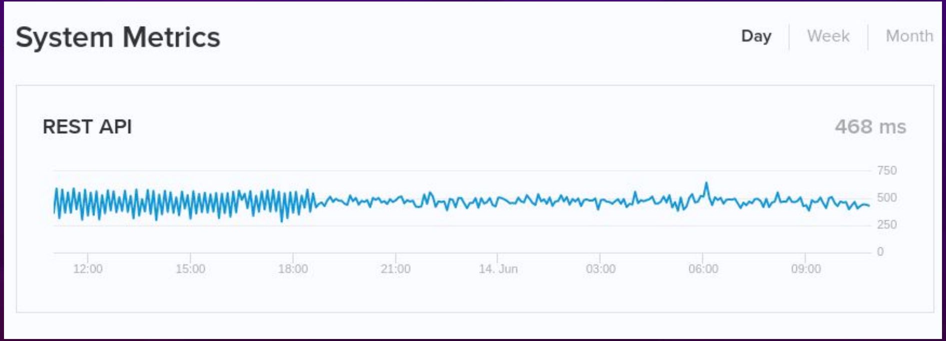

America

Login Apps Toronto ? Operational
90 days ago — 99.97 % uptime — Today

HTTP Post Toronto ? Operational
90 days ago — 99.99 % uptime — Today

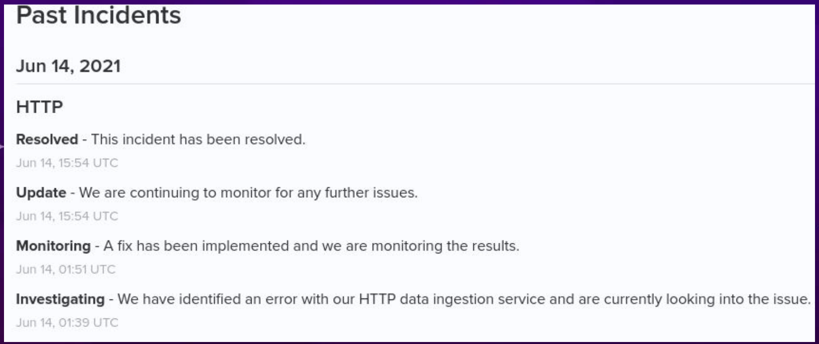
TCP Toronto ? Operational
90 days ago — 99.99 % uptime — Today

MQTT Publish Toronto ? Operational
90 days ago — 99.99 % uptime — Today


System Metrics

Day | Week | Month

REST API 468 ms


Past Incidents

Jun 14, 2021

HTTP

Resolved - This incident has been resolved.
Jun 14, 15:54 UTC

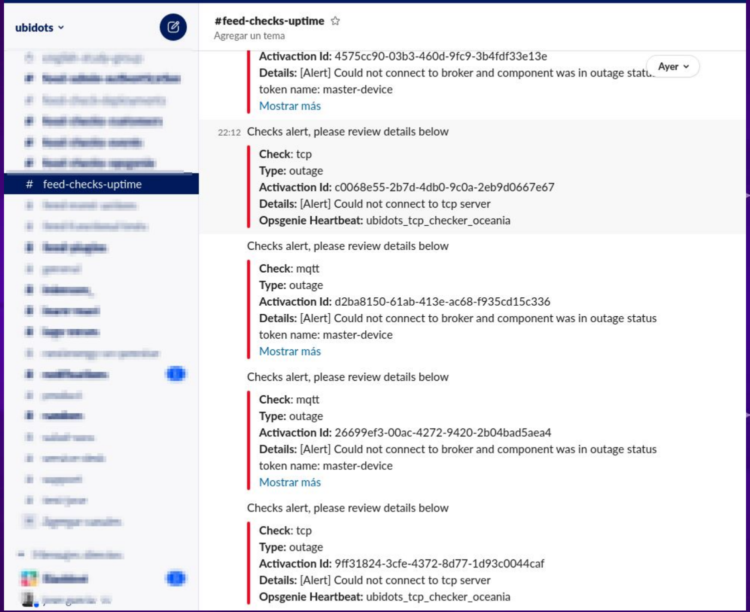
Update - We are continuing to monitor for any further issues.
Jun 14, 15:54 UTC

Monitoring - A fix has been implemented and we are monitoring the results.
Jun 14, 01:51 UTC

Investigating - We have identified an error with our HTTP data ingestion service and are currently looking into the issue.
Jun 14, 01:39 UTC

About the problem: Wath did we want to build?

- A way to alert to our customers about possible website or services issues
- A way to alert ourselves if something goes wrong



ubidots

#feed-checks-uptime
Agregar un tema

Ayer

Activaction Id: 4575cc90-03b3-460d-9fc9-3b4fdf33e13e
Details: [Alert] Could not connect to broker and component was in outage statu
token name: master-device
Mostrar más

22:12 Checks alert, please review details below

Check: tcp
Type: outage
Activaction Id: c0068e55-2b7d-4db0-9c0a-2eb9d0667e67
Details: [Alert] Could not connect to tcp server
Opsgenie Heartbeat: ubidots_tcp_checker_oceania

Checks alert, please review details below

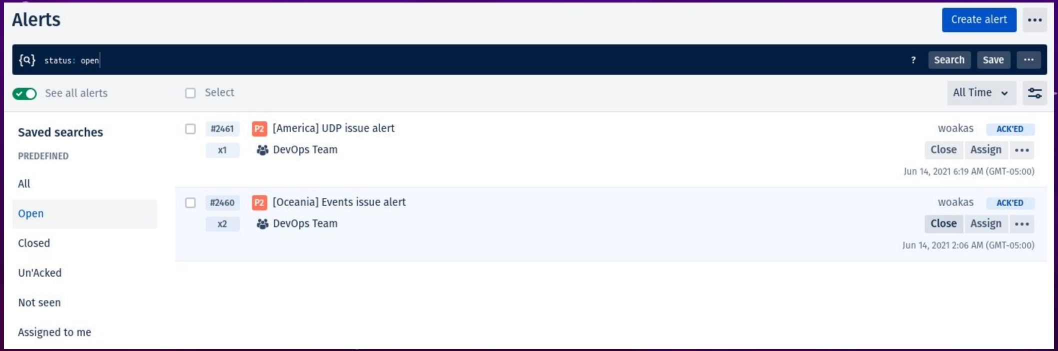
Check: mqtt
Type: outage
Activaction Id: d2ba8150-61ab-413e-ac68-f935cd15c336
Details: [Alert] Could not connect to broker and component was in outage status
token name: master-device
Mostrar más

Checks alert, please review details below

Check: mqtt
Type: outage
Activaction Id: 26699ef3-00ac-4272-9420-2b04bad5aea4
Details: [Alert] Could not connect to broker and component was in outage status
token name: master-device
Mostrar más

Checks alert, please review details below

Check: tcp
Type: outage
Activaction Id: 9ff31824-3cfe-4372-8d77-1d93c0044caf
Details: [Alert] Could not connect to tcp server
Opsgenie Heartbeat: ubidots_tcp_checker_oceania



Alerts

Create alert

status: open

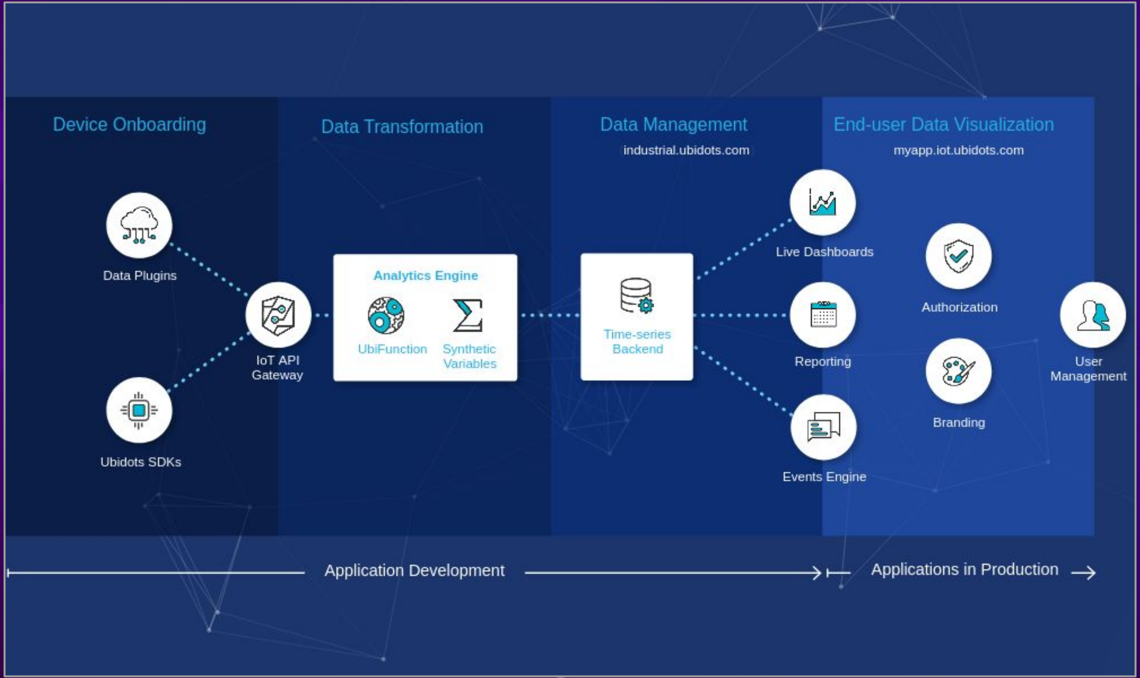
See all alerts | Select | All Time

Saved searches
PREDEFINED
All
Open
Closed
Un'Acked
Not seen
Assigned to me

#2461 x1	P2 [America] UDP issue alert	DevOps Team	woakas ACK'ED · Close · Assign · Jun 14, 2021 6:19 AM (GMT-05:00)
#2460 x2	P2 [Oceania] Events issue alert	DevOps Team	woakas ACK'ED · Close · Assign · Jun 14, 2021 2:06 AM (GMT-05:00)

About the problem: Identifying the critical modules

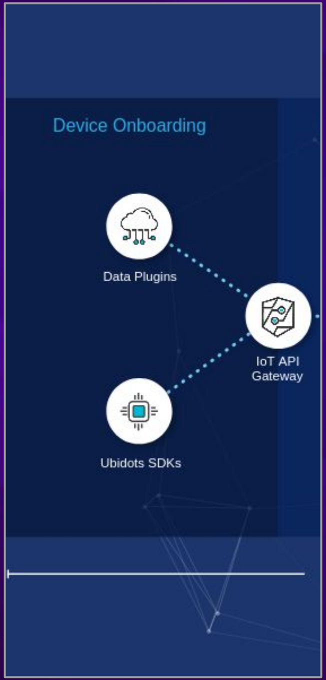
- Data ingestion/retrieval
- Data transformation
- Data management
- Data visualization



About the problem: Identifying the critical modules

Data ingestion/retrieval

- Ubidots offers a standard HTTP Rest API
- Ubidots receives data through MQTT
- Ubidots receives data through TCP
- Ubidots receives data through UDP
- Ubidots offers uptime and SLA’s time above of 99%



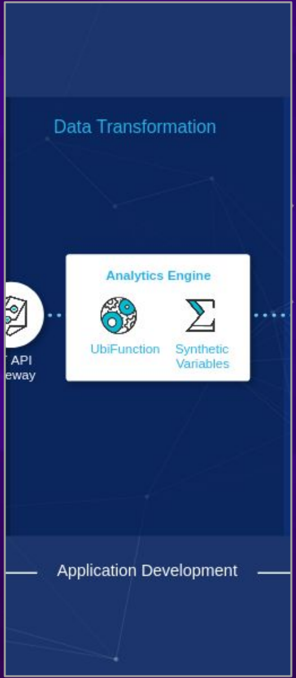
About the problem: Identifying the critical modules

Data transformation

- Synthetic variables allows to users to transform their data, i.e, to transform Fahrenheit to Celsius

$$(32\ °F - 32) \times 5/9 = 0\ °C$$

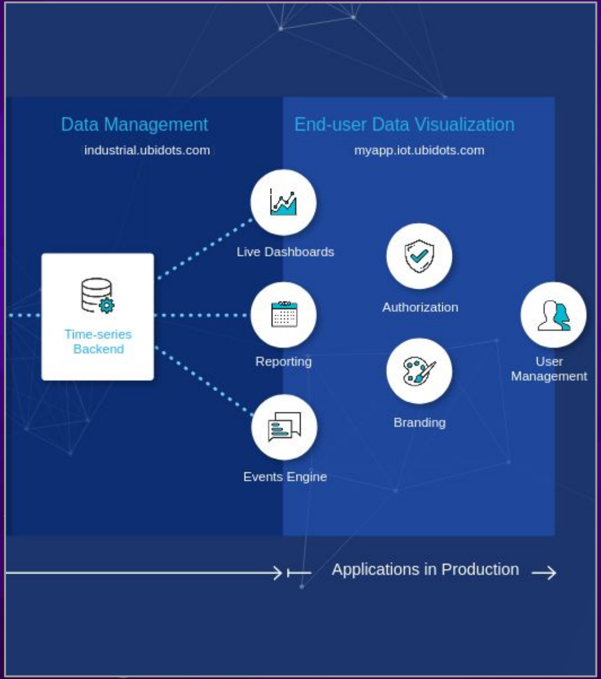
- Serverless cloud function for general purpose scripts



About the problem: Identifying the critical modules

Data management and visualization

- Live dashboards
- Events and alerts engine
- Branding: End-user portal



About the problem: Metric to be measured

Module	Should check	Should measure
Data Ingestion	Availability through: HTTP, MQTT, TCP, UDP	Data dots rejected / not ingested every minute
Data transformation	Serverless functions availability	Availability every minute
Data transformation	Synthetic variables	Time series update every minute
Data management and visualization	Events and alerts engine	Events triggered every minute
Data management and visualization	Live dashboard access	Website access every minute

About the dev: Build it by ourselves or search in the market?

Module	Should check	Should measure	Market tools
Data Ingestion	Availability through: HTTP, TCP, UDP	Data dots rejected/ not ingested every minute	Pingdom, uptimerobot, dotcom-monitor

Advantages:

REST APIs monitor, script heartbeats, third party integrations, worldwide tests

Disadvantages:

Focused on server's availability, we needed to check the data ingestion service

About the dev: Build it by ourselves or search in the market?

Module	Should check	Should measure	Market tools
Data Ingestion	Availability through: MQTT	Data dots rejected / not ingested every minute	--

We did not find a tool to monitor services through MQTT

About the dev: Build it by ourselves or search in the market?

Module	Should check	Should measure	Market tools
Data transformation	Serverless functions availability	Availability every minute	Pingdom, uptimerobot, dotcom-monitor

To monitor serverless functions, we just needed to check their availability. Any service would fit properly this task

About the dev: Build it by ourselves or search in the market?

Module	Should check	Should measure	Market tools
Data transformation	Synthetic variables	Time series update every minute	--
Data management and visualization	Events and alerts engine	Events triggered every minute	--

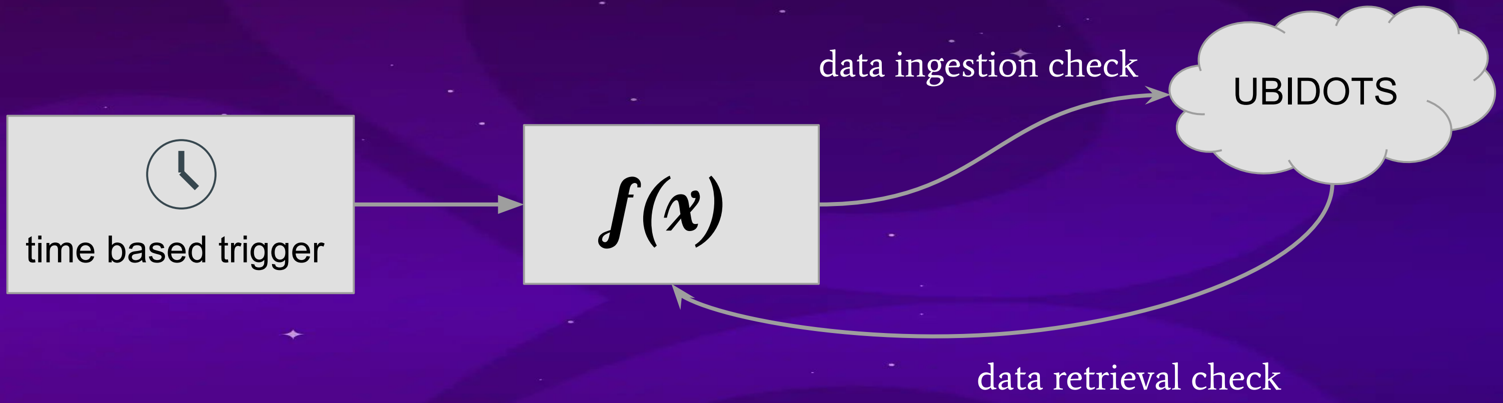
These modules requires a very specific check logic, i.e, the events engine should check if every minute an already deployed alert is triggered. We did not find an out of the box tool for this custom logic in the market.

About the dev: Build it by ourselves or search in the market?

Module	Should check	Should measure	Market tools
Data management and visualization	Live dashboard access	Website access every minute	uptime, dotcom-monitor

To monitor data visualization, we just needed to check a simple web site access and frontend modules load. Any service would fit properly this task

About the dev: Options to build it by ourselves

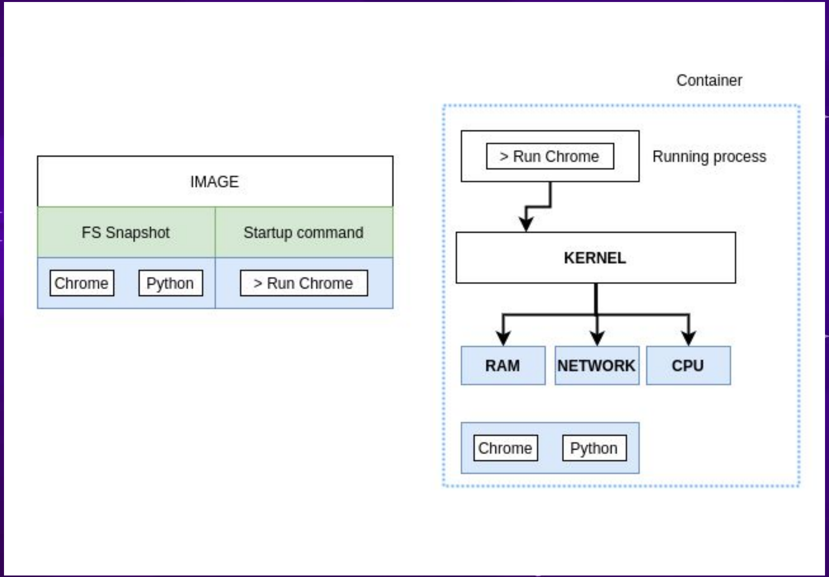


Serverless cloud functions were another option. It allowed us to develop scripts to with custom check logic. Scripts should be triggered in a time-based cron. We chose IBM instead of AWS, because of the ability to deploy docker based cloud functions

About the dev: Options to build it by ourselves, docker

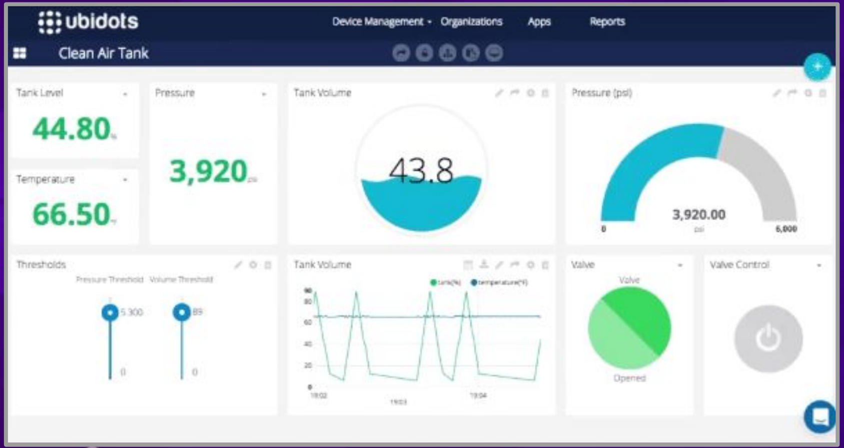
Why Docker?

- We needed several python packages to run our checks logic like paho-mqtt or selenium.
- We wanted to add any other needed package or library at will
- IBM allowed us to trigger python scripts in a docker container with a time-based trigger

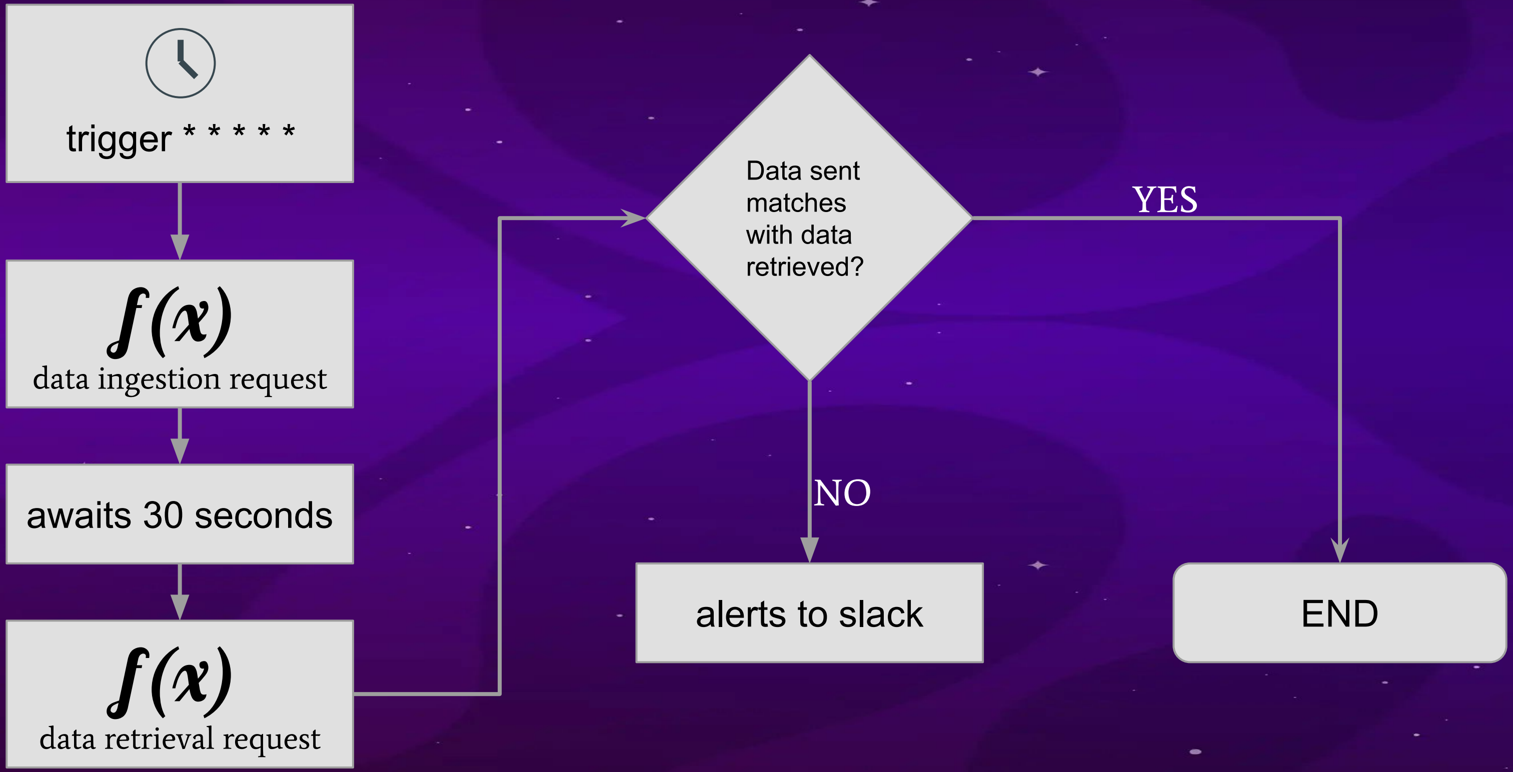


About the dev: Options to build it by ourselves, selenium

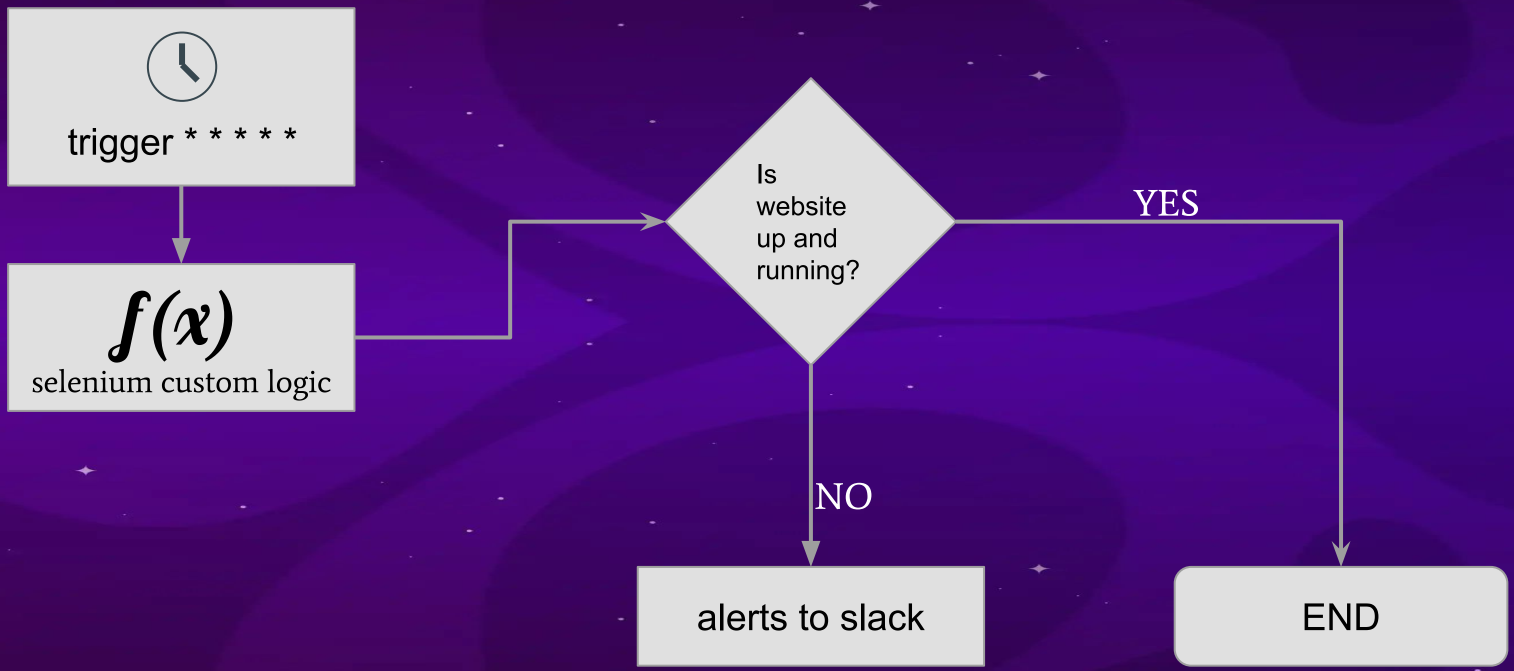
- Why selenium?
  - Allows you to interact with a website in several ways
  - Allows you to deploy several test scripts with different browsers
  - Can be triggered inside a docker container



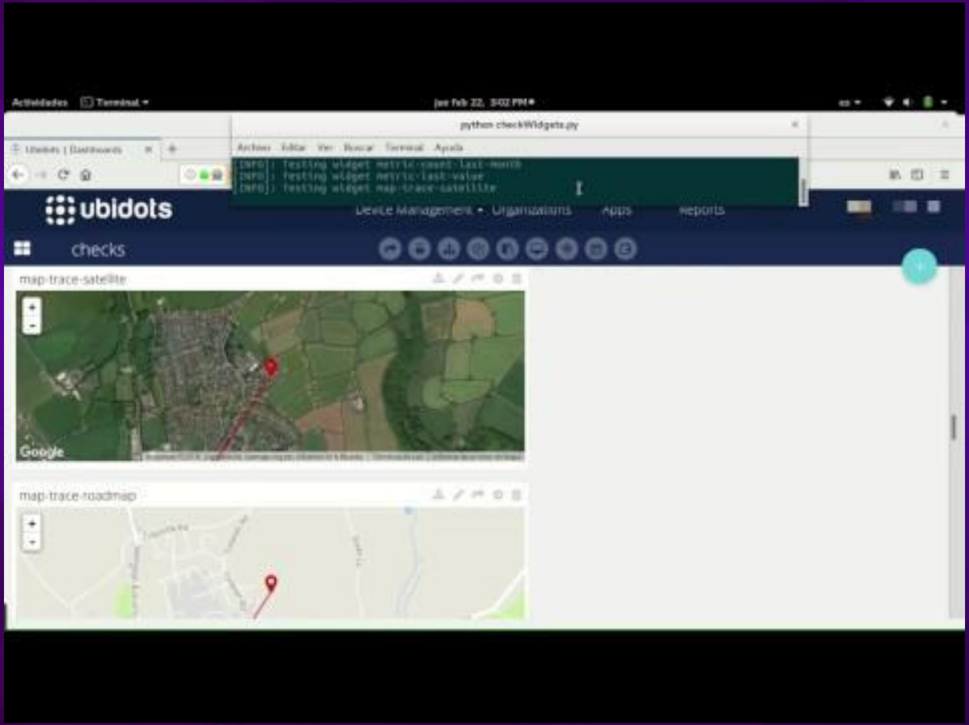
About the dev: The first developed workflow



About the dev: The first developed workflow



About the dev: The first developed workflow


python checkWidgets.py
Archivo Editar Ver Buscar Terminal Ayuda
ubidots
Device Management Organizations Apps Reports
checks
map-trace-satellite
map-trace-roadmap
Google

```
[INFO]: Testing widget metric-count-last-month
[INFO]: Testing widget metric-last-value
[INFO]: Testing widget map-trace-satellite
```

About the dev: long-time results

What went well:

- Serverless cloud functions were an easy way to deploy custom script solutions for our problem using Docker.
- Custom tests were triggered in a time-based cron, with an easy way to manage them from a web interface already offered by IBM
- There were 4 tests deployed, all them monitored at slack

What went bad:

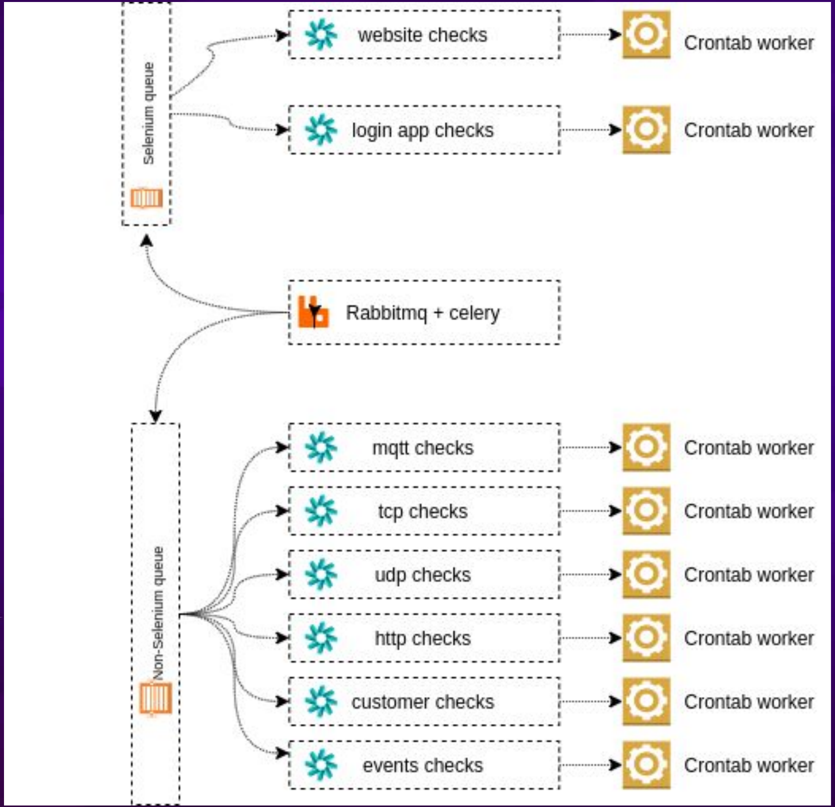
- Our tests were very sensible to data ingestion/retrieval times. Sometimes, IBM crons were triggered delayed, and thus, fake positive alerts arrived.
- Sometimes, the cloud serverless function suffered downtimes, and thus, we did not notice if something were wrong with our website

About the dev: The second attempt, build and devops by ourselves

We began to lose trust in our cloud serverless function provider cron triggers, and hence, decided to deploy by ourselves our development.

New tools to achieve the goal:

- Redis
- Celery
- Rabbitmq

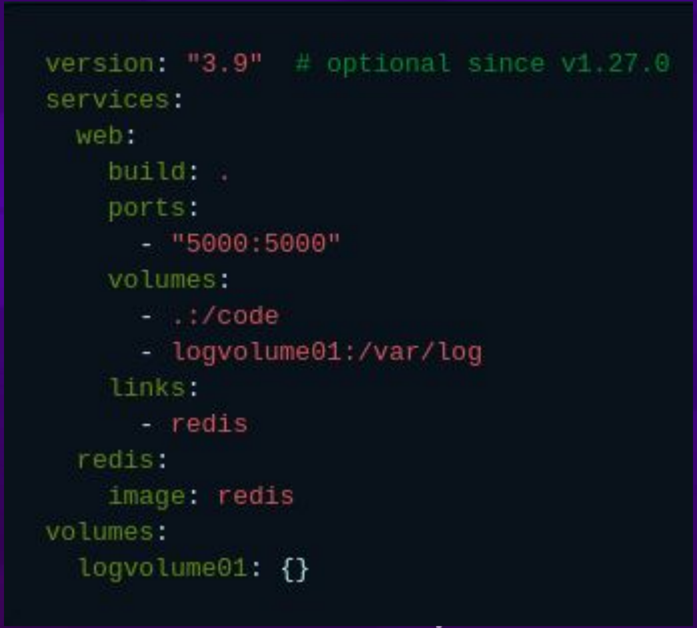


About the dev: The second attempt, build and devops by ourselves

A single docker container was not enough to achieve this goal, so we decided to create a docker compose solution to add services at will.

"Compose is a tool for defining and running multi-container Docker applications. With Compose, you use a YAML file to configure your application's services. Then, with a single command, you create and start all the services from your configuration."

source: Docker docs



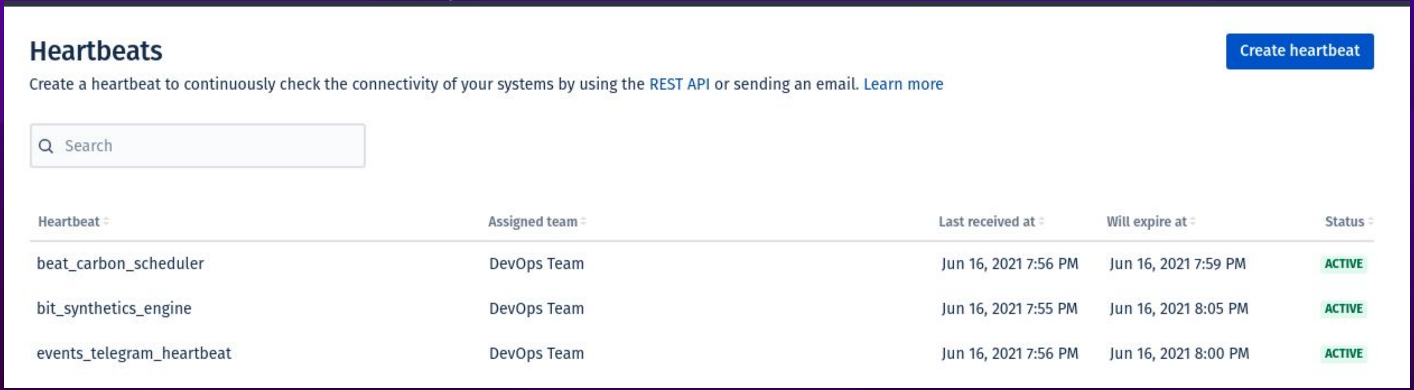
```
version: "3.9"  # optional since v1.27.0
services:
  web:
    build: .
    ports:
      - "5000:5000"
    volumes:
      - .:/code
      - logvolume01:/var/log
    links:
      - redis
  redis:
    image: redis
volumes:
  logvolume01: {}
```

About the dev: The second attempt, build and devops by ourselves

How do you monitor that your checks are up and running?

We decided to use Opsgenie to monitor that our tests are running every x minutes.

Opsgenie Heartbeats offer a way to to continuously check the connectivity of your systems, using a simple ping http GET request.



Heartbeats

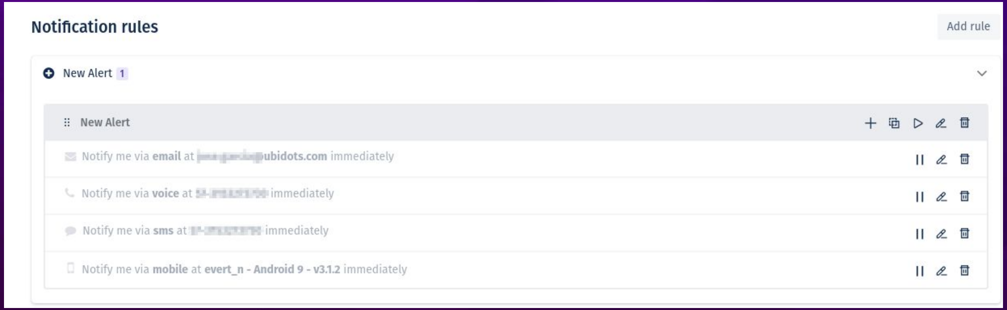
Create a heartbeat to continuously check the connectivity of your systems by using the REST API or sending an email. Learn more

Heartbeat	Assigned team	Last received at	Will expire at	Status
beat_carbon_scheduler	DevOps Team	Jun 16, 2021 7:56 PM	Jun 16, 2021 7:59 PM	ACTIVE
bit_synthetics_engine	DevOps Team	Jun 16, 2021 7:55 PM	Jun 16, 2021 8:05 PM	ACTIVE
events_telegram_heartbeat	DevOps Team	Jun 16, 2021 7:56 PM	Jun 16, 2021 8:00 PM	ACTIVE

About the dev: The second attempt, build and devops by ourselves

Opsgenie also offered us additional features:

- Issue scale policy
- Automatic alerts through its mobile app
- Third party notification



Notification rules

Add rule

New Alert 1

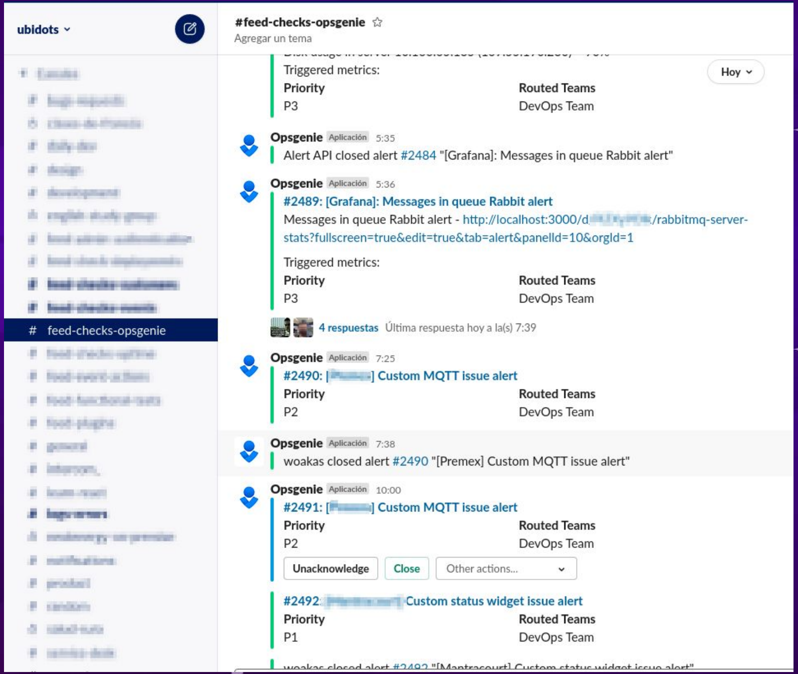
New Alert

Notify me via **email** at [redacted]**ubidots.com** immediately

Notify me via **voice** at [redacted] immediately

Notify me via **sms** at [redacted] immediately

Notify me via **mobile** at **evert_n - Android 9 - v3.1.2** immediately



ubidots

[redacted]

feed-checks-opsgenie

#feed-checks-opsgenie
Agregar un tema

Hoy

Triggered metrics:
Priority — Routed Teams
P3 — DevOps Team

Opsgenie Aplicación 5:35
Alert API closed alert #2484 "[Grafana]: Messages in queue Rabbit alert"

Opsgenie Aplicación 5:36
#2489: [Grafana]: Messages in queue Rabbit alert
Messages in queue Rabbit alert - http://localhost:3000/d[redacted]/rabbitmq-server-stats?fullscreen=true&edit=true&tab=alert&panelId=10&orgId=1

Triggered metrics:
Priority — Routed Teams
P3 — DevOps Team

4 respuestas Última respuesta hoy a la(s) 7:39

Opsgenie Aplicación 7:25
#2490: [[redacted]] Custom MQTT issue alert
Priority — Routed Teams
P2 — DevOps Team

Opsgenie Aplicación 7:38
woakas closed alert #2490 "[Premex] Custom MQTT issue alert"

Opsgenie Aplicación 10:00
#2491: [[redacted]] Custom MQTT issue alert
Priority — Routed Teams
P2 — DevOps Team

Unacknowledge | Close | Other actions...

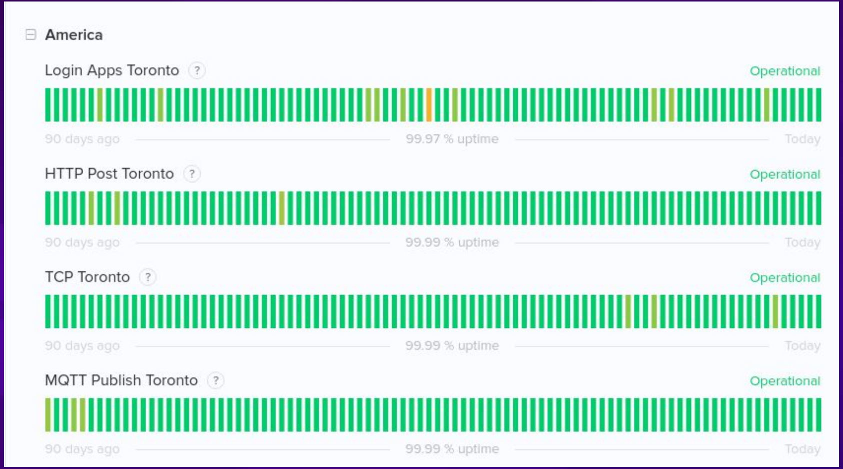
#2492: [[redacted]] Custom status widget issue alert
Priority — Routed Teams
P1 — DevOps Team

woakas closed alert #2492 "[Mantracourt] Custom status widget issue alert"

About the dev: The visualization tool

Status Page offered us through its REST API:

- Uptime visualization
- Incident history
- System metrics
- White label customer business status as a service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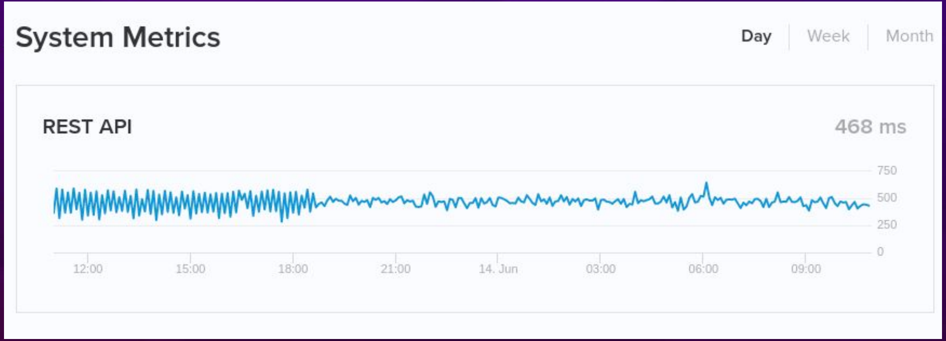
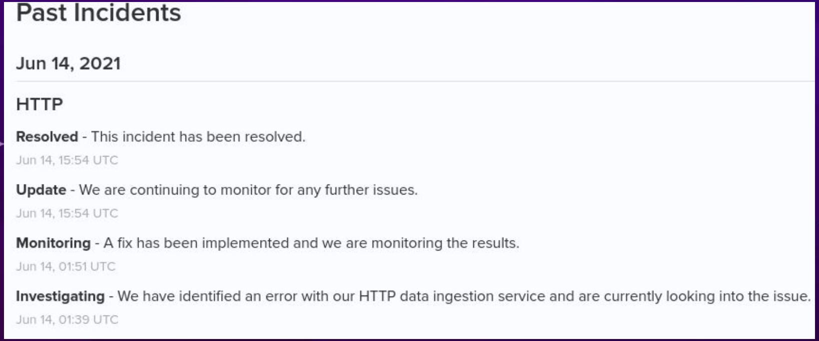
90 days ago 99.99 % uptime Today


System Metrics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Jun 14, 2021

HTTP

Resolved - This incident has been resolved.
Jun 14, 15:54 UTC

Update - We are continuing to monitor for any further issues.
Jun 14, 15:54 UTC

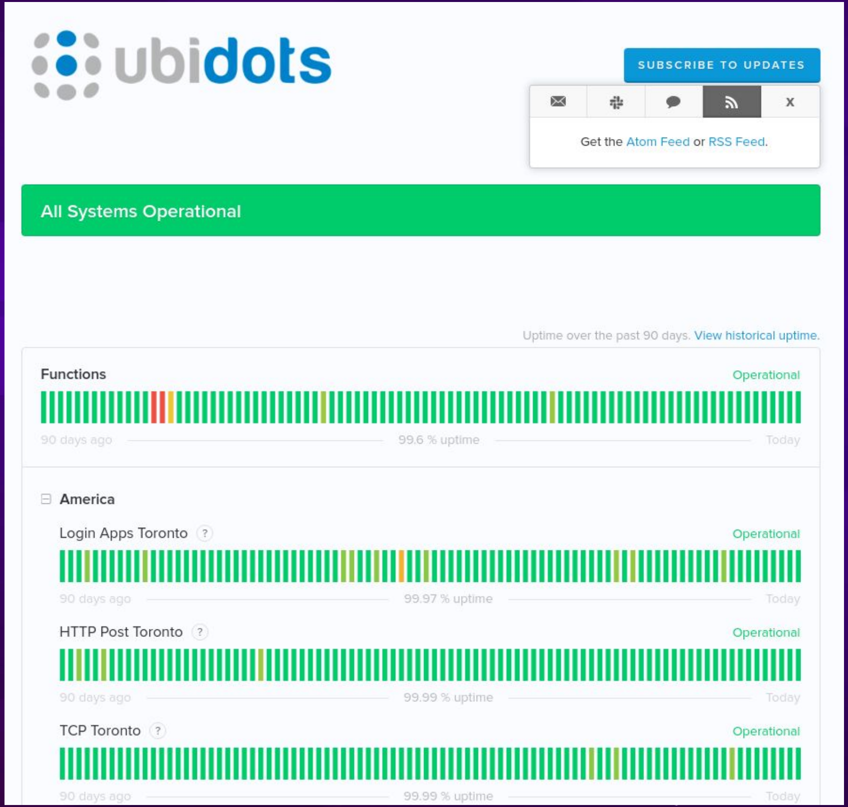
Monitoring - A fix has been implemented and we are monitoring the results.
Jun 14, 01:51 UTC

Investigating - We have identified an error with our HTTP data ingestion service and are currently looking into the issue.
Jun 14, 01:39 UTC

About the dev: The visualization tool

Status Page offered us through its REST API:

- An easy way to subscribe to our service system status notifications



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All Systems Operational

Uptime over the past 90 days. View historical uptime.

Functions — Operational — 90 days ago — 99.6 % uptime — Today

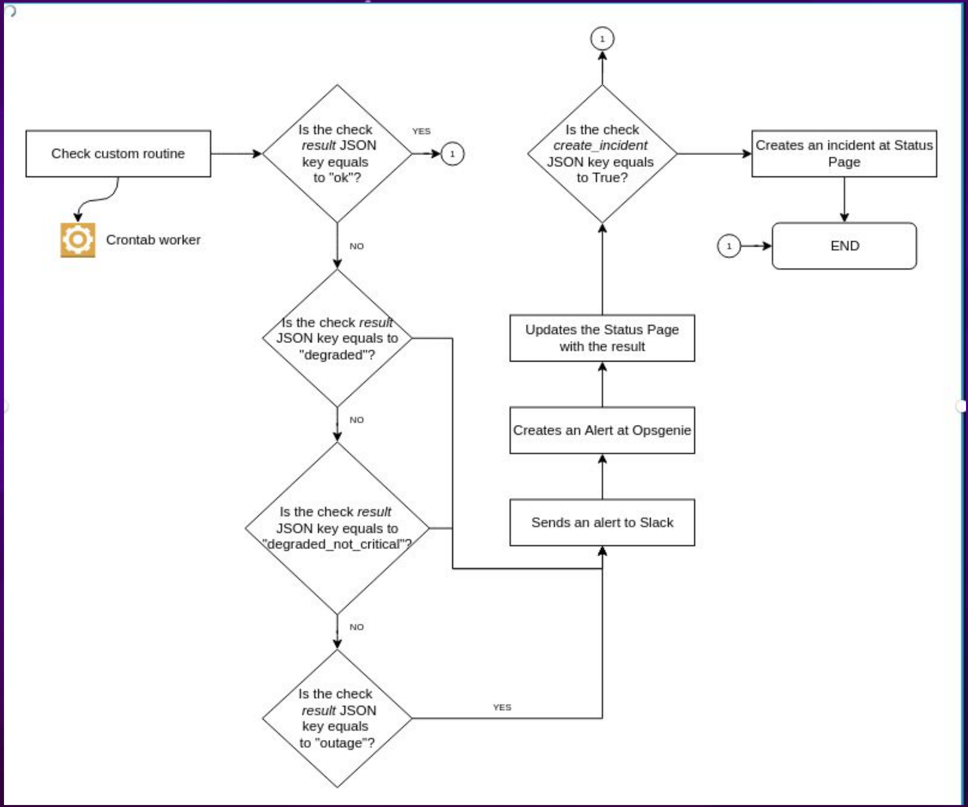
America

Login Apps Toronto — Operational — 90 days ago — 99.97 % uptime — Today

HTTP Post Toronto — Operational — 90 days ago — 99.99 % uptime — Today

TCP Toronto — Operational — 90 days ago — 99.99 % uptime — Today

About the dev: Generalities about the final workflow


Check custom routine
Crontab worker
Is the check *result* JSON key equals to "ok"?
YES
1
NO
Is the check *result* JSON key equals to "degraded"?
NO
Is the check *result* JSON key equals to "degraded_not_critical"?
NO
Is the check *result* JSON key equals to "outage"?
YES
Sends an alert to Slack
Creates an Alert at Opsgenie
Updates the Status Page with the result
Is the check *create_incident* JSON key equals to True?
1
Creates an incident at Status Page
1
END

Questions