knowit

knowit

Serverless Edge Computing

Wow, that’s some big words

knowit

Agenda

- Edge computing in a nutshell
- Cloudflare
- Cloudflare Workers
- Workshop
- More features from Cloudflare

knowit

History of cloud computing

VMs – Don’t worry about hardware

Containers – Worry less about the VMs

Serverless – Don’t worry how the code is running

Serverless Edge Computing – Don’t worry how and where the code is running

Edge computing definitions (1/4)

The use of any type of computer program that delivers low latency nearer to the requests – Karim Arabi

Process some or all the data closer to the user – Mikko Luhtasaari 2023

Edge computing definitions (2/4)

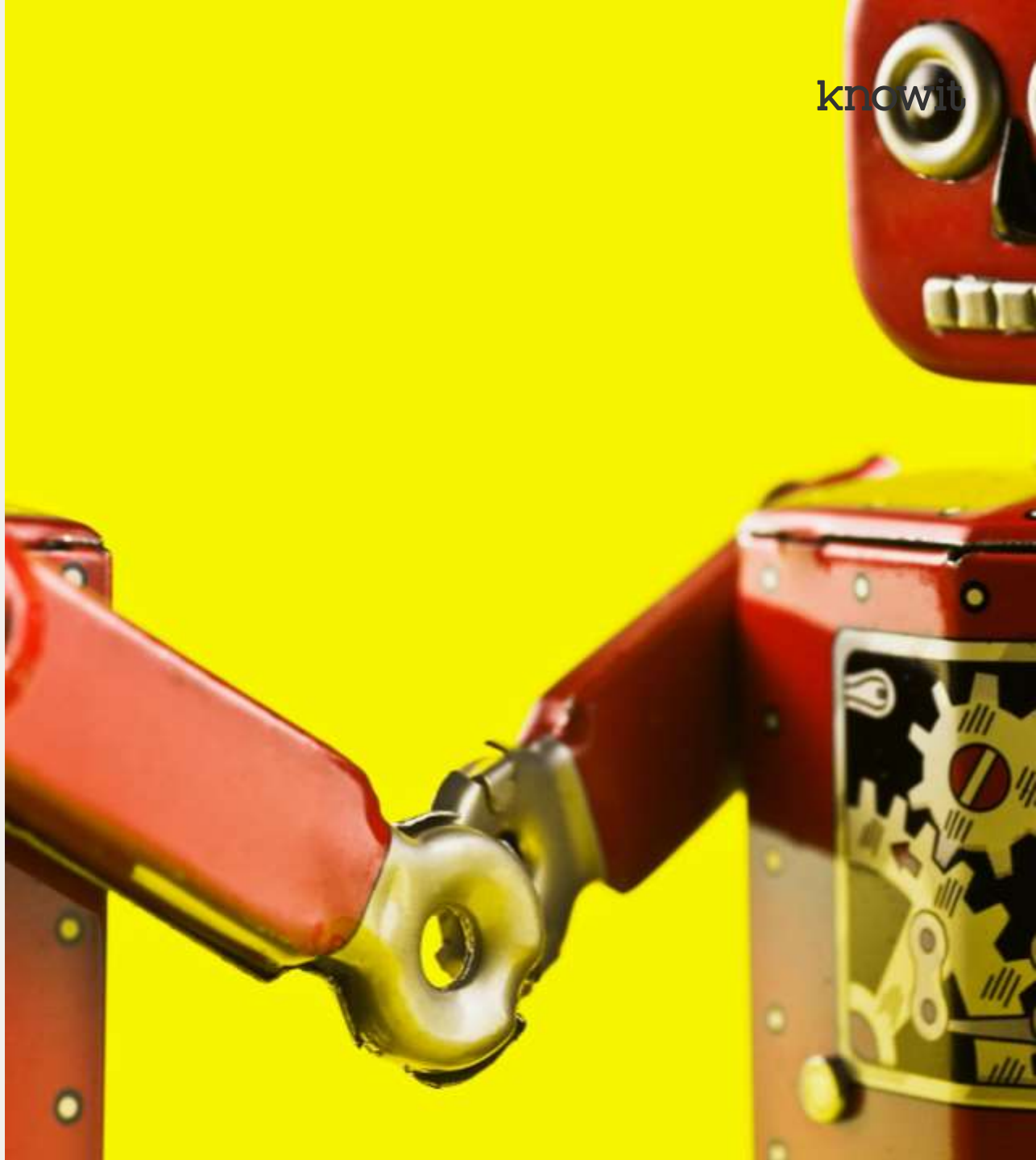
Close / near edge

- A data center closer to the end user
- Edge location

Edge computing definitions (3/4)

Far edge

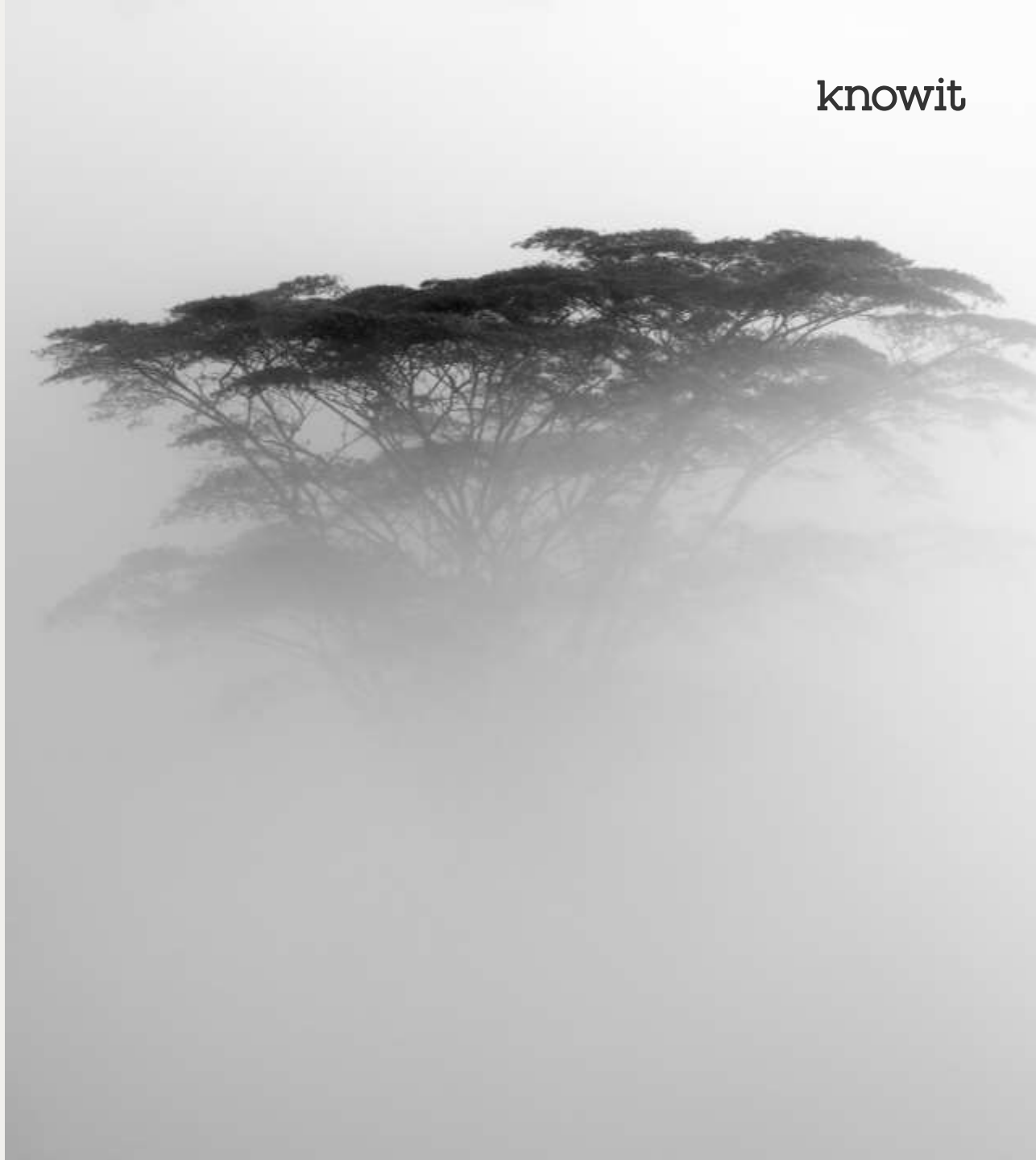
- A device closer to the end user
- A factory robot or internet connected vehicles



Edge computing definitions (4/4)

Fog computing

- Sits between the devices and the cloud
- Processing layer in a smart city before the data is sent to the cloud

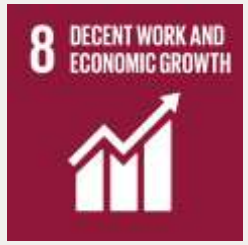


knowit

knowit

Edge computing + sustainability?

- Less network hops
  - / Generally lower latency
  - / Can use less electricity to transmit the data
- Reuse existing hardware
  - / No need to purchase new hardware
  - / Reduces carbon emissions
- Improved Resilience
  - / No need for a reliable and fast internet connection
  - / Allows work to be done more reliably and in more distant locations



knowit

Cloudflare

Previously just a CDN

- 300 cities, 100 countries, 50ms latency for 95% of the people

Lots of locations → Lots of servers → Lots of spare capacity

- Generally closer to the end user

New services released

- No longer just a CDN

knowit

Cloudflare Workers

- Deploy serverless code without thinking about regions
- Supports JS, TS, C, C++ and Rust
- 0ms cold starts (paid tier)
- First 100 000 requests per day are free
- Free workers.dev subdomain
- Super easy to get started with
  - Using CLI tool Wrangler made publishing easy
- But not a lot of up-to-date tutorials

knowit

How it works

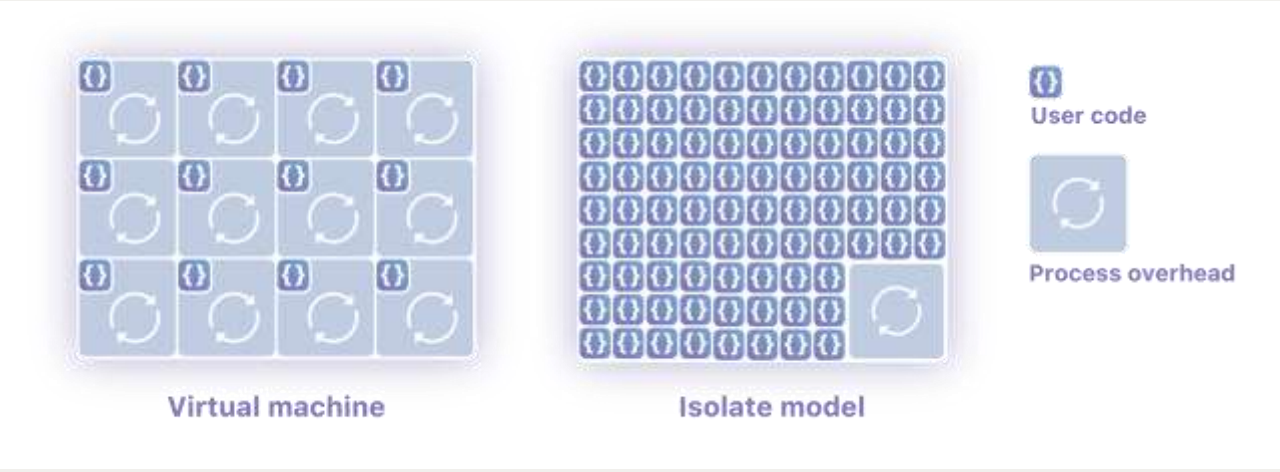
Traditionally code is run in containers

- More overhead

Workers utilize V8 isolates

- A bit like running code in Chrome tabs
- **Not** a Node.js

Limited set of standard APIs supported by browsers



knowit

Cloudflare Workers free tier services

Workers (duh)

- Utilize existing infrastructure to run your code
- Deploy code to +275 network locations with one command

Log streaming

- Start a WebSocket connection to get logs from your application

KV

- Key-value data store
- Eventually consistent read-optimized edge cache

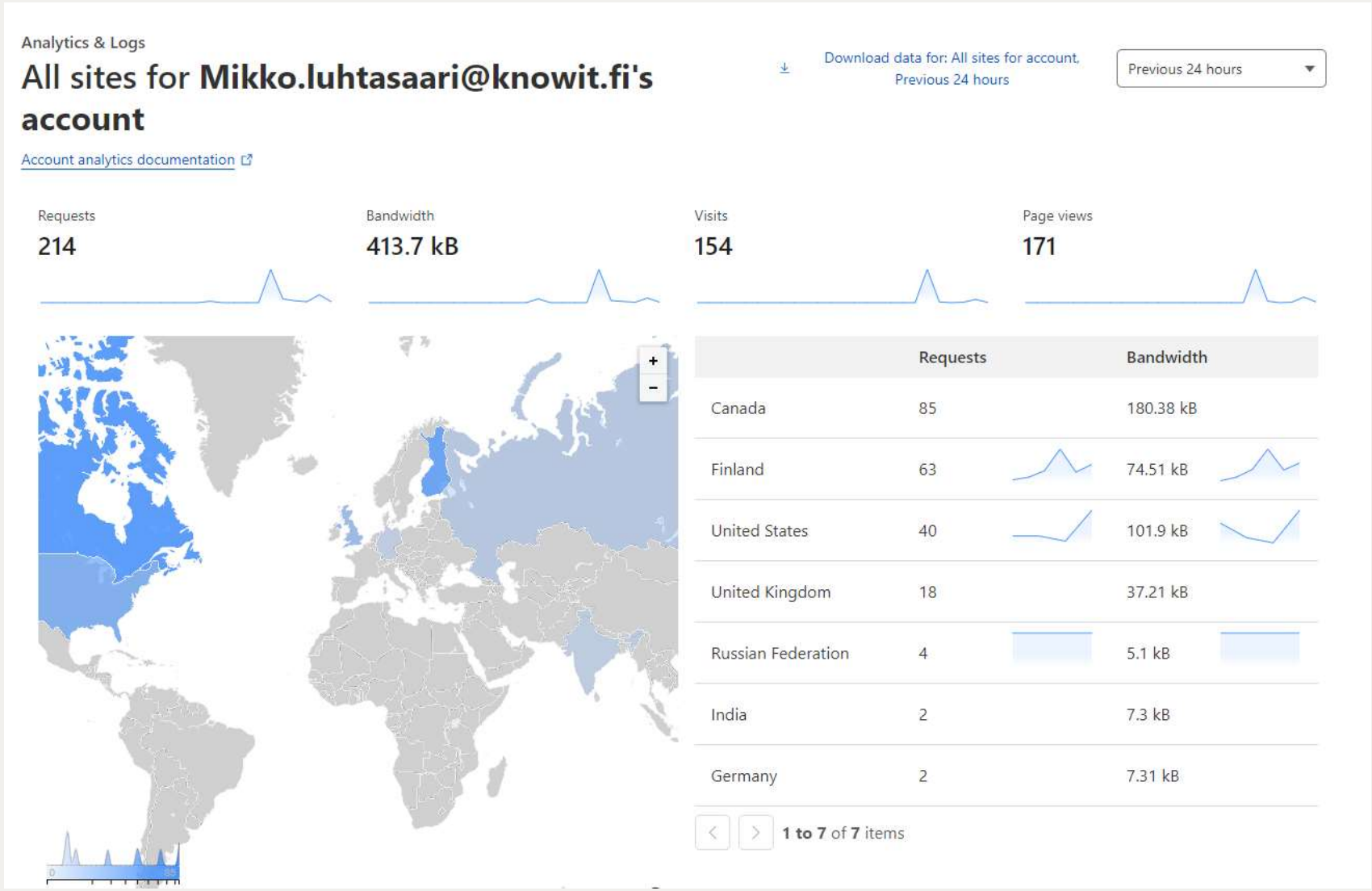
knowit

Workshop!

- Sign up at: https://dash.cloudflare.com/sign-up/workers-and-pages
  - No credit card required
- Navigate to Workers Overview, Click *create application*, Select To-do list app and deploy it. Go visit your new application
- Try out the Wrangler by building a QR code generator: https://developers.cloudflare.com/workers/tutorials/build-a-qr-code-generator/
- Bonus: Set up a new Hello World project and add unit tests for the worker.js
  - Testing: https://developers.cloudflare.com/workers/get-started/guide/#5-write-tests
  - I used Mocha and Chai, so the example code required some changes

knowit

Traffic on my sites during the first few hours



knowit

Services in paid tier

- CDN & smart CAPTCHA & domain management
- Web Analytics
- Zero Trust
  - / Security solutions for hybrid teams
- Area 1
  - / Security solutions for email

knowit

Services in paid tier

- Workers:
  - Queues
  - D1 – relational database
  - Constellation – ML models in workers
  - Log history
  - Durable objects – Store state e.g., authentication
- R2 – S3 compatible object storage
- Stream – videos and images
- Images – store, deliver and resize images
- Bulk redirects – cheap redirects based on HTTP status codes

knowit

Links for more information

- https://www.rtinsights.com/edge-computings-undeniable-role-in-sustainability/
- https://sustainability-success.com/how-can-edge-computing-be-used-to-improve-sustainability/
- https://developers.cloudflare.com/workers/get-started/guide/
- https://developers.cloudflare.com/workers/learning/how-kv-works/
- https://developers.cloudflare.com/workers/learning/how-workers-works/
- https://developers.cloudflare.com/workers/learning/security-model/
- https://avassa.io/articles/defining-the-edge-of-edge-computing/
- https://www.techtarget.com/searchdatacenter/definition/edge-computing

knowit