Build A Serverless Data Pipeline

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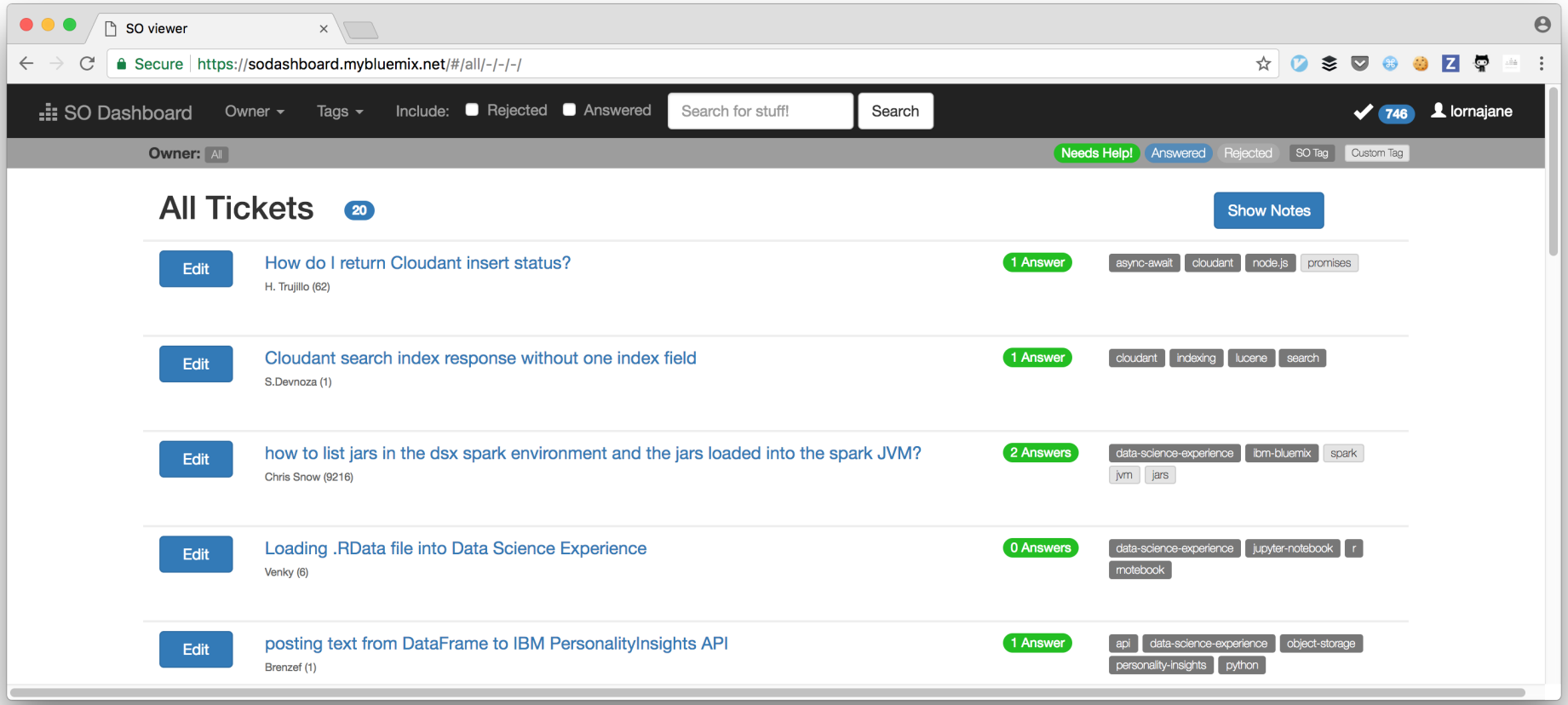
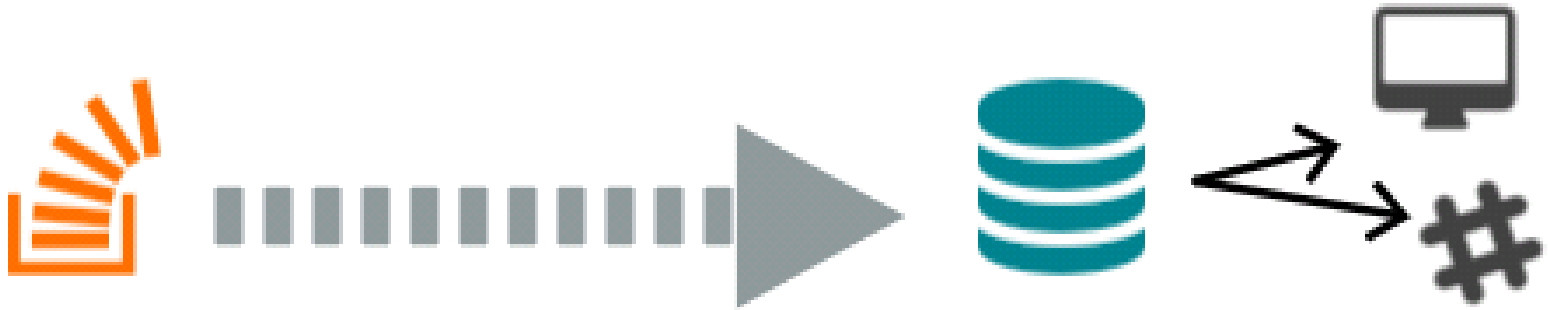
Stackoverflow Dashboard



Pipeline To Shift Data

Bringing data from StackOverflow into the dashboard my advocate team uses



What is Serverless?

Backend functions, deployed to the cloud, scaling on demand. Pay as you go.

The Serverless Revolution

FaaS: Functions as a Service

Developer focus:

- the outputs
- the inputs
- the logic in between

Charges are usually per GBsec

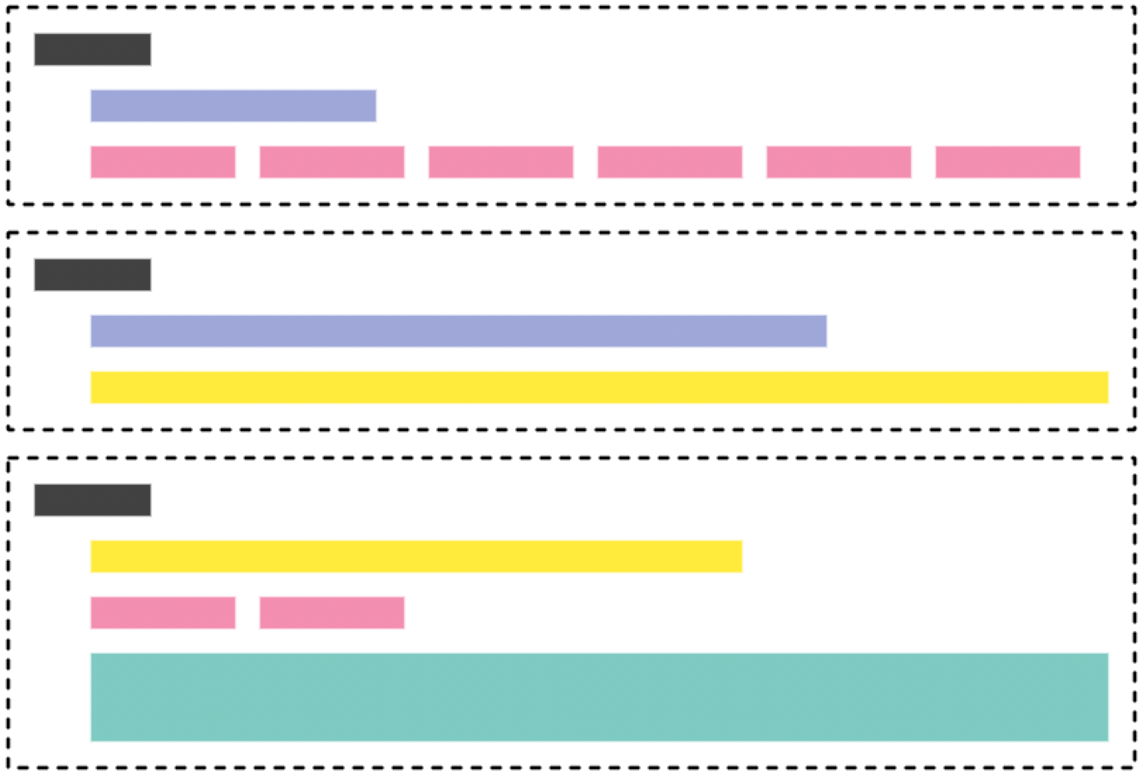
Why Go Serverless?

- Costs nothing when idle
- Small application, simple architecture
- Bursty usage since it runs from a cron
- No real-time requirement
- Easily within free tier

An Aside About Databases

Document Databases

Store collections of schemaless documents, in JSON



Apache CouchDB

Cluster of Unreliable Commodity Hardware

- Modern, robust, scalable document database
- HTTP API
- JSON data format
- Best replication on the planet (probably)

OfflineFirst Applications

This app is OfflineFirst:

- Client side JS
- Client side copy of DB using PouchDB
- Background sync to serverside CouchDB

Writing Serverless Functions

Serverless Platforms

- Amazon Lambda
- IBM Cloud Functions (aka OpenWhisk)
- Twilio Functions
- Azure Functions
- Google Cloud Functions
- ... and more every week

Hello World in JS

All the platforms are slightly different, this is for OpenWhisk

```
exports.main = function(args) {
    return({"message": "Hello, World!"});
};
```

Function must return an object or a Promise

OpenWhisk Vocabulary

- **trigger** an event, such as an incoming HTTP request
- **rule** map a trigger to an action
- **action** a function, optionally with parameters
- **package** collect actions and parameters together
- **sequence** more than one action in a row
- **cold start** time to run a fresh action

Working With Actions

Deploy code:

```
zip hello.zip index.js

bx wsk action update --kind nodejs:6 demo/hello1 hello.zip
```

Then run it:

```
bx wsk action invoke --blocking demo/hello1
```

Web-Enabled Actions

Deploy code:

```
zip hello.zip index.js

bx wsk action update --kind nodejs:6 --web true demo/hello1 hello.
```

Then curl it:

```
curl https://openwhisk.ng.bluemix.net/api/v1/web/.../hello1.json
```

Build the Data Pipeline

Designing for Serverless

- **Independent functions**
  - single purpose
  - testable
  - distributable

Start with Security

Need an API key or user creds for `bx wsk` tool

Web actions: we know how to secure HTTP connections, so do it!

- Auth standards e.g. JWT
- Security in transmission: use HTTPS

Logging Considerations

- Standard, configurable logging setup
- Use a `trace_id` to link requests between services
- Aggregate logs to a central place, ensure search functionality
- Collect metrics (invocations, execution time, error rates)
    - display metrics on a dashboard
    - have appropriate, configurable alerting

Pipeline Actions

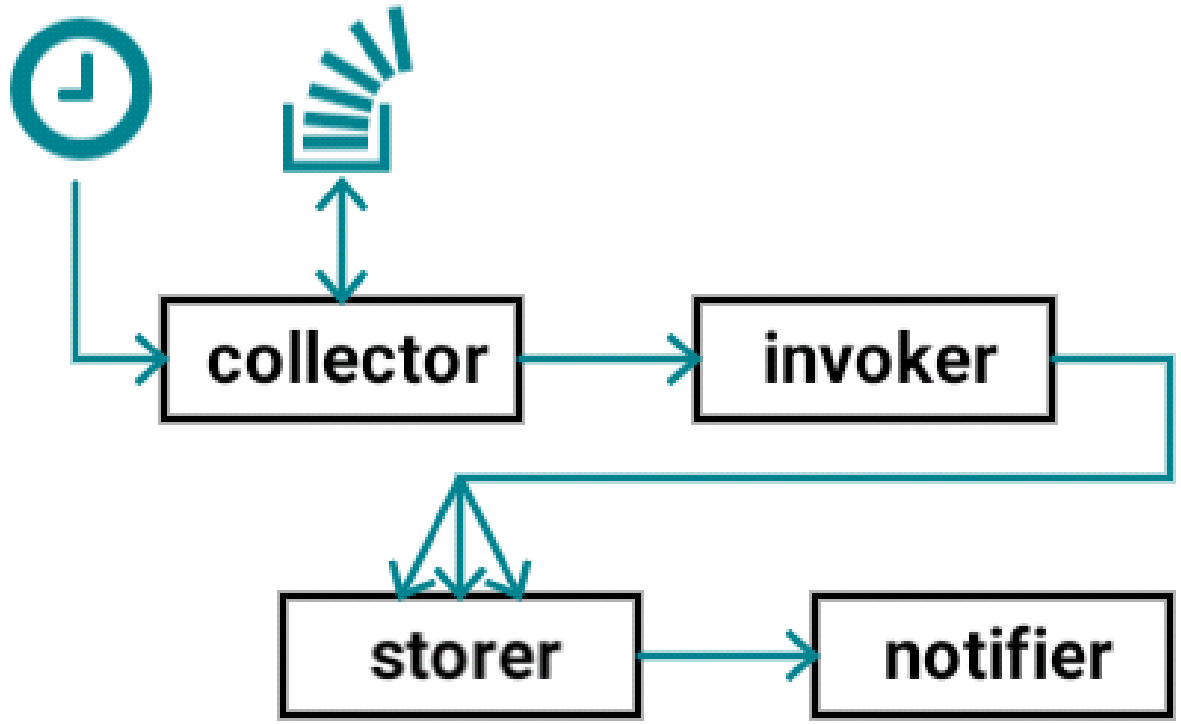
Sequence `socron`

- `collector` makes an API call, passes on data
- `invoker` fires many actions: one for each item

Sequence `qhandler`

- `storer` inserts or updates the record
- `notifier` sends a webhook to slack or a bot

Pipeline Actions



Serverless And Data

Resources

- Cloud Functions: https://console.bluemix.net/openwhisk/
- Code https://github.com/ibm-watson-data-lab/soingest
- My blog: https://lornajane.net/
- OpenWhisk: https://openwhisk.org/
- CouchDB: https://couchdb.apache.org/
- Offline First: https://offlinefirst.org/