Cloud Native New Horizon Technology

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Building Cloud Native Application with Knative and Community Update

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cloud native applications

- **what is cloud native?**
  - “modern” web applications and APIs
  - follows (more or less) 12factor.net principles
  - stateless, image-based, external configuration, container deployed and managed, scale up horizontally

- **example cloud native platforms?**
  - CF —Cloud Foundry is a complete PaaS solution
  - Kubernetes (Kube) — flexible OSS container orchestrator
  - Other — Heroku, Mesos, Docker Swarm, and homegrown

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serverless

- **what is serverless?**
  - pay-as-you use computing
  - dynamic allocation of required resources for execution
  - functional decomposition of your application's features
  - event-driven computing — react to events for execution flow
- **advantages?**
  - pay only for what you use (?)
  - scale when needed, and down to 0, when no use
  - consume events expressly in application code and config
- **drawbacks —** may require
  - re-architecture of app or at least some features
  - new management of services (functions)

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the case for Knative

- **what is Knative?** set of Kube components to facilitate
  - running serverless workloads (as images)
  - manage serverless workloads
  - build serverless workloads => now Tekton Pipeline
- **architecture**
  - collection of Kube CRDs (custom resource definitions)
  - `Service` -> `Configuration` -> `Revision` -> `Route`
  - `Event Source` -> `Broker` -> `Trigger`
- **current state**
  - monthly release cadence — now at version 0.14
  - good pace of contributions from various companies

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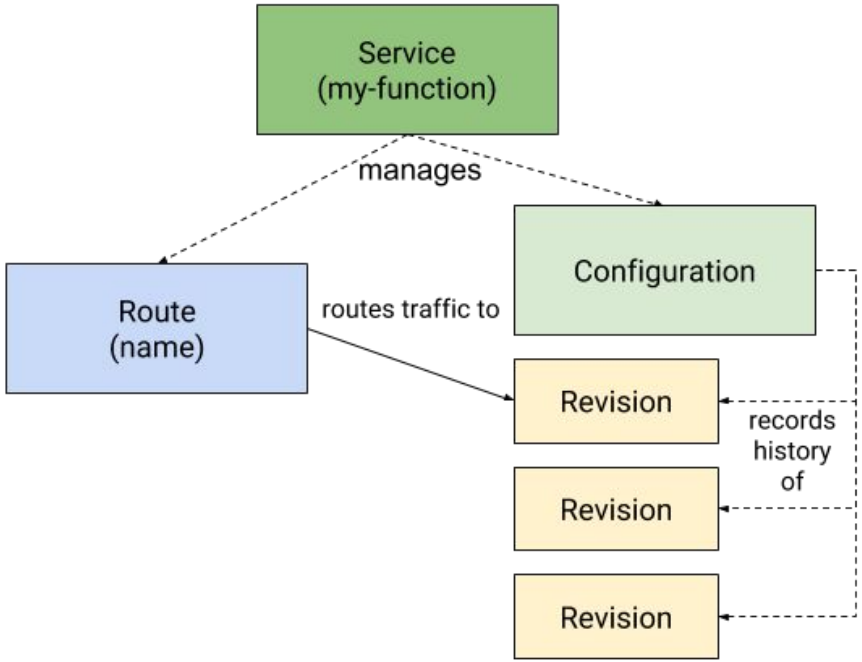
knative overview



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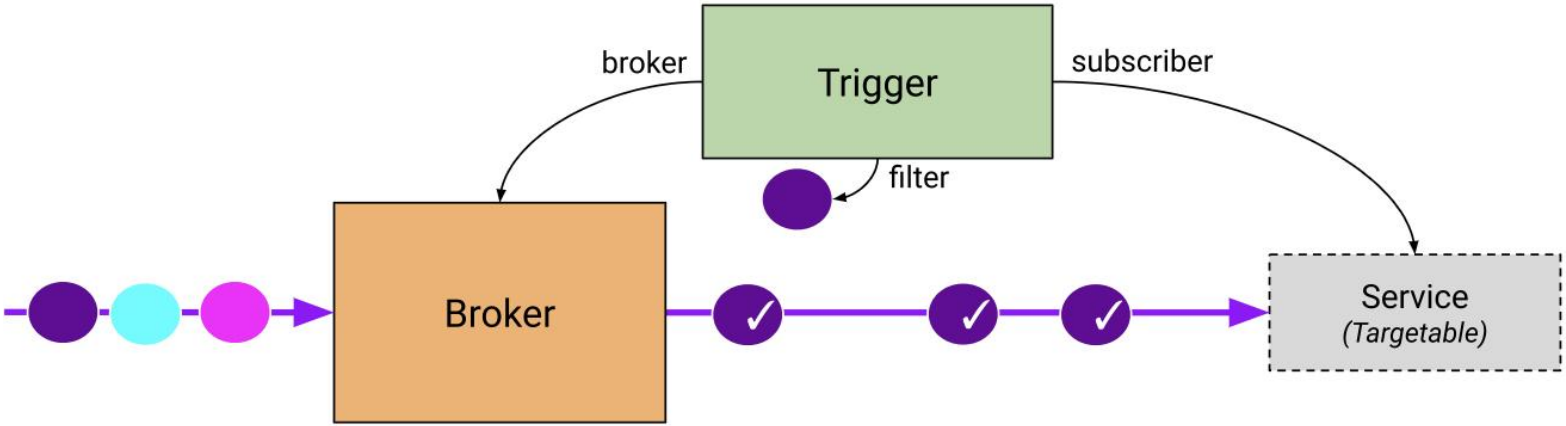
knative overview (*cont.*)



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community update

- **key repositories**
  - github.com/knative/serving (also includes scaling)
  - github.com/knative/eventing
  - github.com/knative/eventing-contrib
  - github.com/knative/client
  - github.com/knative/client-contrib
  - github.com/knative/pkg and github.com/knative/docs

- **workgroup meetings**
  - open to all, weekly meetings for different groups
  - TOC == technical oversight committee
  - monthly community calls for demo, elections, etc.

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demo

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demo goals

- **micro-services**
  - creating micro-services (micro-functions) that you can test locally
  - creating docker images for your micro-functions
  - running your micro-service as a function

- **serverless**
  - using `kn` to create, delete, and update services or functions
  - using `kn` to connect functions together
  - using `kn` to debug functions

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demo design sketch

- **TwitterFn search function (via Twitter APIs)**
  in: hashtags or string
  in: count - max number of tweets
  out: image URLs from recent tweets

- **WatsonFn image analysis function (via Watson APIs)**
  in: image URLs
  out: image features with probability

- **SummaryFn function**
  - *in:* search string and TwitterFn and WatsonFn
  - *out*: HTML page displaying summary

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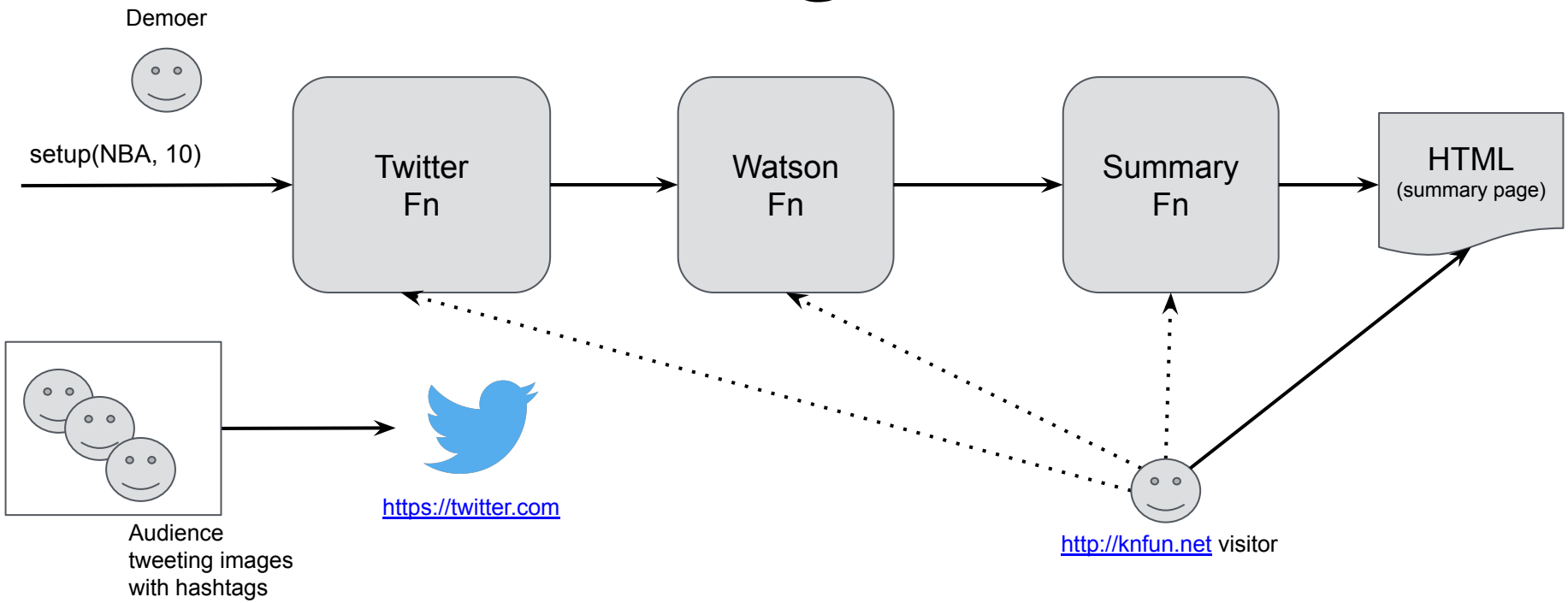
demo design sketch



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demo steps

- **build**

```
$ git clone git:github.com/maximilien/knfun.git
$ cd knfun
$ ./hack/build.sh
```

- **test**

```
$ ./twitter-fn search NBA -c 10 -o json -S -p 8080 --twitter-api-key ...
$ ./watson-fn vr classify http://<image>.jpg -o json -S -p 8081 --watson-api-key
$ ./summary-fn NBA -c 10 -S -p 8082 --twitter-fn-url … --watson-fn-url ...
```

- **image**

```
$ docker build -v -f ./funcs/twitter/Dockerfile -u drmax/twitter-fn
$ docker push drmax/twitter-fn
    ...
```

- **functions**

```
$ ./kn service create twitter-fn --image docker.io/drmax/twitter-fn --env
twitter-api-key ...
...
```

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summary

- **cloud native applications to serverless**
  - cloud native as 12-factor applications
  - serverless takes 12-factor to its natural progression
  - users pay only for what they use!

- **Knative takeaways**
  - builds on popular container orchestrator: Kubernetes
  - provides building blocks for serverless workloads on Kube
    - serve, scale, manage services (functions)
    - source, broker, trigger, and consume events

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summary (*cont.*)

- **IBM's contributions —** ~15 active developers
  - leads for Tekton, eventing, and Knative operator
  - contributing to major components
    - scale to 0, cold-start, vanity URLs, operators
    - kn client (initial), kn plugin, 4 plugins, eventing
    - more coming

- **Knative @ IBM**
  - Knative add-on to the IBM Kubernetes Service (IKS)
  - Knative + Kubernetes as base for our application cloud

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questions?

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