brief introduction to CF-Abacus

what is it, its architecture, and its future

CF-Abacus team

https://github.com/cloudfoundry-incubator/cf-abacus

v0.4.0
Feb. 1st, 2015

agenda

- what is CF-Abacus? and what it’s not
- example of current users of CF-Abacus
- architecture
  - overview - µservices
  - service provider APIs
- team and process
- status
- how you can contribute?
- references

what is CF-Abacus?

what are its main design points?

- pipeline of micro-services (µservices) processing data
- usage format and aggregation functions are customizable
- usages submitted by service providers (anytime)
- usages processed by µservices pipeline for rating, metering, ...

what is it used for? usage reports useful for customer billing

what are some alternatives? none (comprehensive, OSS, for CF)

what CF-Abacus is not

what problem are we not solving

- billing or charging customers (need external billing service)
- making all service brokers usage common

what you should not use it for? bill directly to customers

where is CF-Abacus is being used today

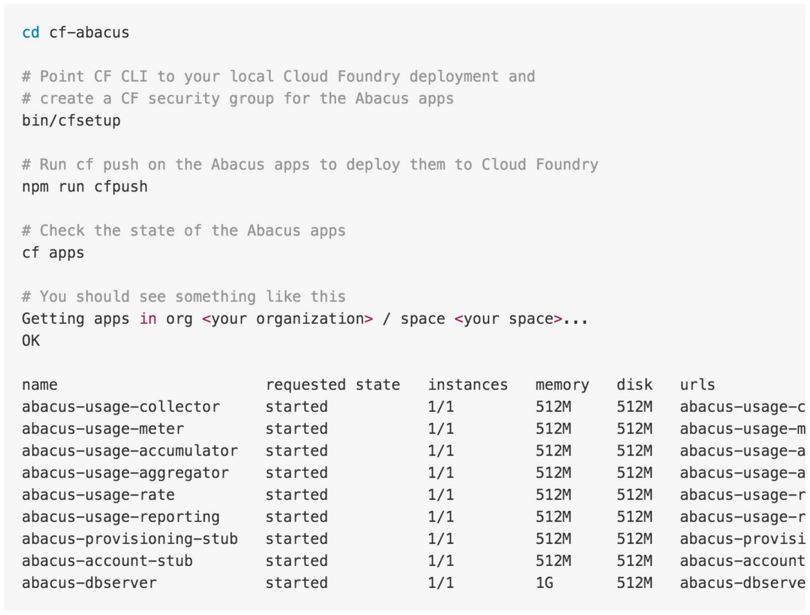
IBM Bluemix

- full public Bluemix (originally extracted from there)
- Bluemix dedicated (sliced of SoftLayer)
- Bluemix local (installed on customer premises)

SAP-Hana - integration prototype moving to production in 2016

Others? various “kicking the tires”

demo 1



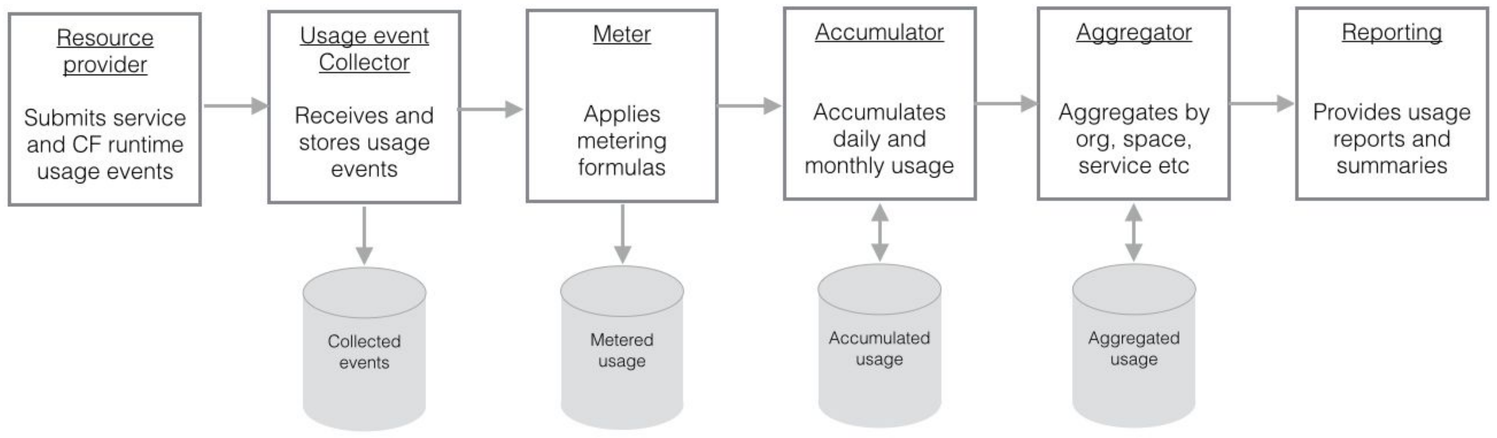
```
cd cf-abacus

# Point CF CLI to your local Cloud Foundry deployment and
# create a CF security group for the Abacus apps
bin/cfsetup

# Run cf push on the Abacus apps to deploy them to Cloud Foundry
npm run cfpush

# Check the state of the Abacus apps
cf apps

# You should see something like this
Getting apps in org <your organization> / space <your space>...
OK

name                        requested state   instances   memory   disk   urls
abacus-usage-collector      started           1/1         512M     512M   abacus-usage-c
abacus-usage-meter          started           1/1         512M     512M   abacus-usage-m
abacus-usage-accumulator    started           1/1         512M     512M   abacus-usage-a
abacus-usage-aggregator     started           1/1         512M     512M   abacus-usage-a
abacus-usage-rate           started           1/1         512M     512M   abacus-usage-r
abacus-usage-reporting      started           1/1         512M     512M   abacus-usage-r
abacus-provisioning-stub    started           1/1         512M     512M   abacus-provisi
abacus-account-stub         started           1/1         512M     512M   abacus-account
abacus-dbserver             started           1/1         1G       512M   abacus-dbserve
```

demo 2

link to Bluemix video

architecture overview

data processing pipeline architecture style


Resource provider
Submits service and CF runtime usage events
Usage event Collector
Receives and stores usage events
Meter
Applies metering formulas
Accumulator
Accumulates daily and monthly usage
Aggregator
Aggregates by org, space, service etc
Reporting
Provides usage reports and summaries
Collected events
Metered usage
Accumulated usage
Aggregated usage

architecture overview (*cont.*)

runtime usage collection

TODO: add diagram showing runtime usage

architecture overview (*cont.*)

service integrator

TODO: add diagram showing how service integrator can
add their service into CF-Abacus

architecture overview (*cont.*)

technology

- JavaScript using Node.js >= 0.10.36 and NPM >= 2.10.1
- development version is self-contained with PouchDB
- JSON for all data representation and output

deployment style

- deploy CF-Abacus µservices as CF apps into your CF env
- need to use a full CouchDB backend service for production

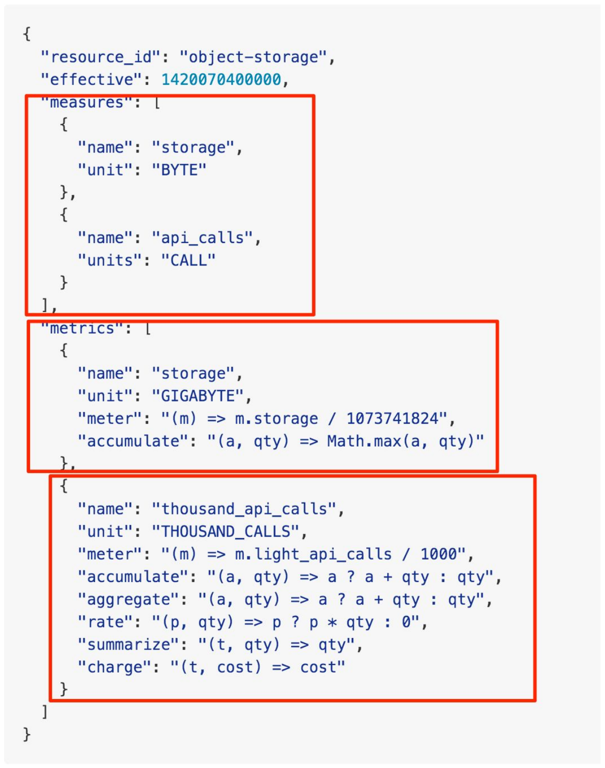
service resource configuration

service brokers

1. onboarding to CF env
2. submit usage config
3. create sec token
4. submit usages

CF env operator

- enable service usage



```
{
  "resource_id": "object-storage",
  "effective": 1420070400000,
  "measures": [
    {
      "name": "storage",
      "unit": "BYTE"
    },
    {
      "name": "api_calls",
      "units": "CALL"
    }
  ],
  "metrics": [
    {
      "name": "storage",
      "unit": "GIGABYTE",
      "meter": "(m) => m.storage / 1073741824",
      "accumulate": "(a, qty) => Math.max(a, qty)"
    },
    {
      "name": "thousand_api_calls",
      "unit": "THOUSAND_CALLS",
      "meter": "(m) => m.light_api_calls / 1000",
      "accumulate": "(a, qty) => a ? a + qty : qty",
      "aggregate": "(a, qty) => a ? a + qty : qty",
      "rate": "(p, qty) => p ? p * qty : 0",
      "summarize": "(t, qty) => qty",
      "charge": "(t, cost) => cost"
    }
  ]
}
```

`GET /v1/provisioning/resources/:resource_id/config`

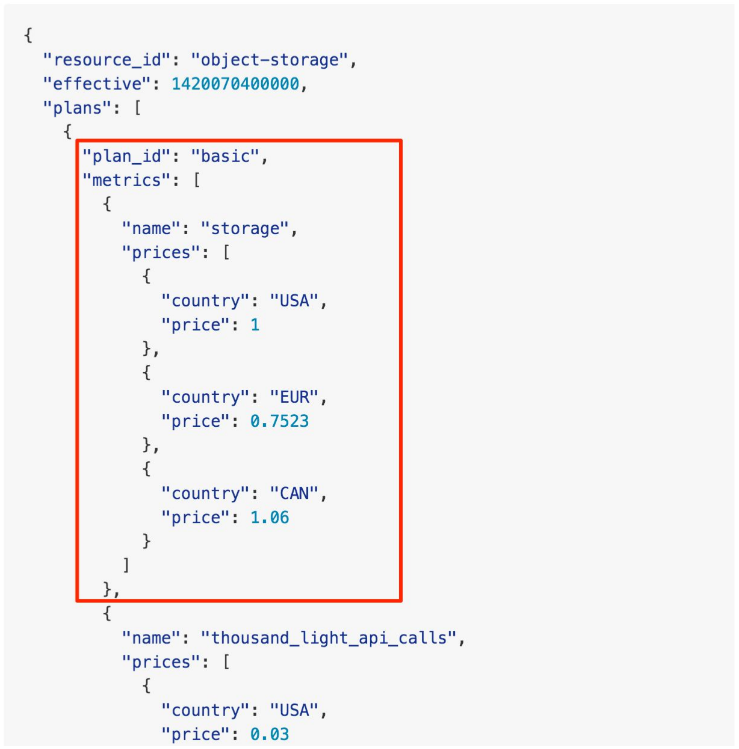
service provider APIs - resource usage

`GET /v1/metering/collected/usage/:usage_document_id`

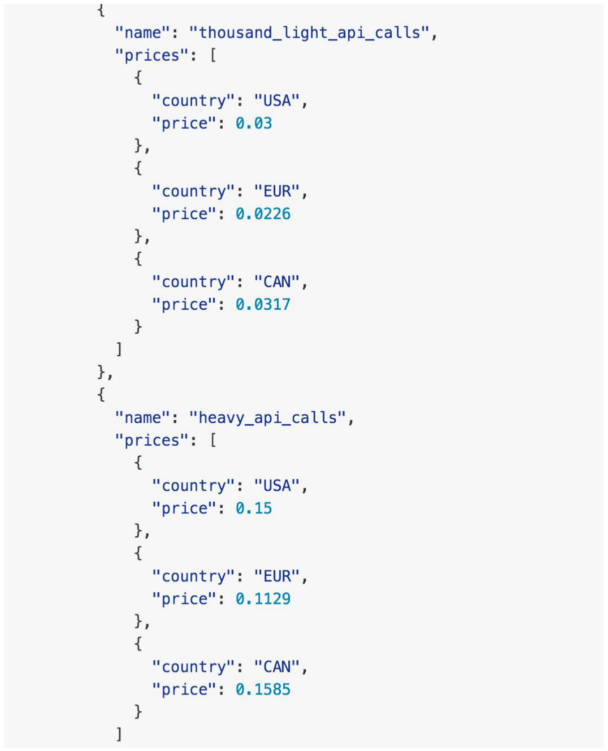
```
{
  "usage": [
    {
      "start": 1396421450000,
      "end": 1396421451000,
      "organization_id": "us-south:54257f98-83f0-4eca-ae04-9ea35277a538",
      "space_id": "d98b5916-3c77-44b9-ac12-04456df23eae",
      "consumer_id": "app:d98b5916-3c77-44b9-ac12-045678edabae",
      "resource_id": "object-storage",
      "plan_id": "basic",
      "resource_instance_id": "d98b5916-3c77-44b9-ac12-04d61c7a4eae",
      "measured_usage": [
        {
          "measure": "storage",
          "quantity": 10
        },
        {
          "measure": "api_calls",
          "quantity": 10
        }
      ]
    }
  ]
}
```

service provider APIs - resource pricing

`GET /v1/pricing/resources/:resource_id/config/:time`



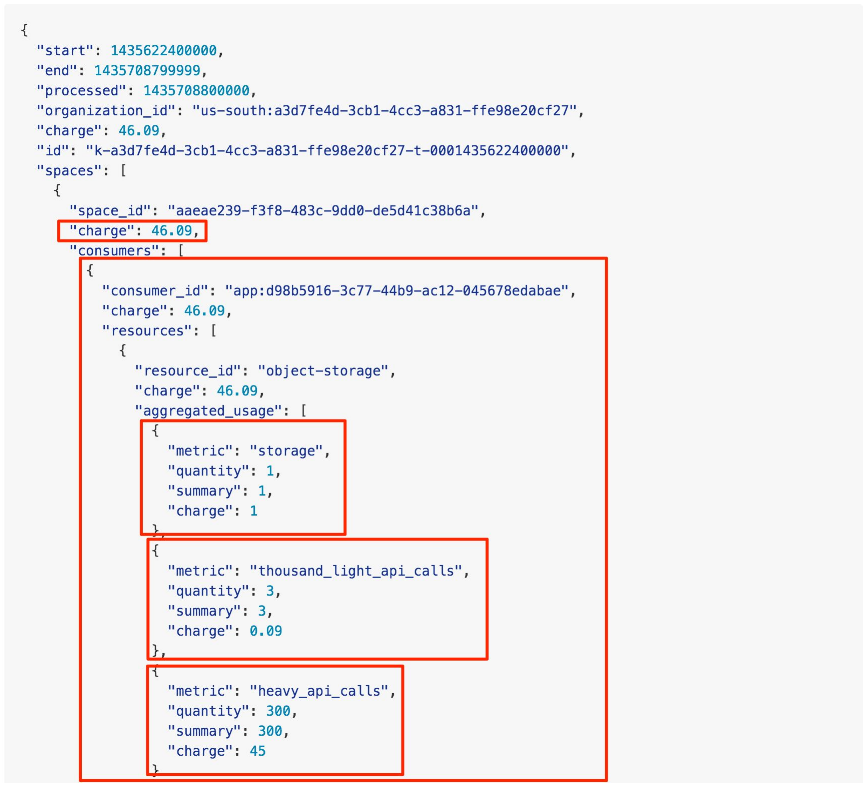
```
{
  "resource_id": "object-storage",
  "effective": 1420070400000,
  "plans": [
    {
      "plan_id": "basic",
      "metrics": [
        {
          "name": "storage",
          "prices": [
            {
              "country": "USA",
              "price": 1
            },
            {
              "country": "EUR",
              "price": 0.7523
            },
            {
              "country": "CAN",
              "price": 1.06
            }
          ]
        },
        {
          "name": "thousand_light_api_calls",
          "prices": [
            {
              "country": "USA",
              "price": 0.03
```



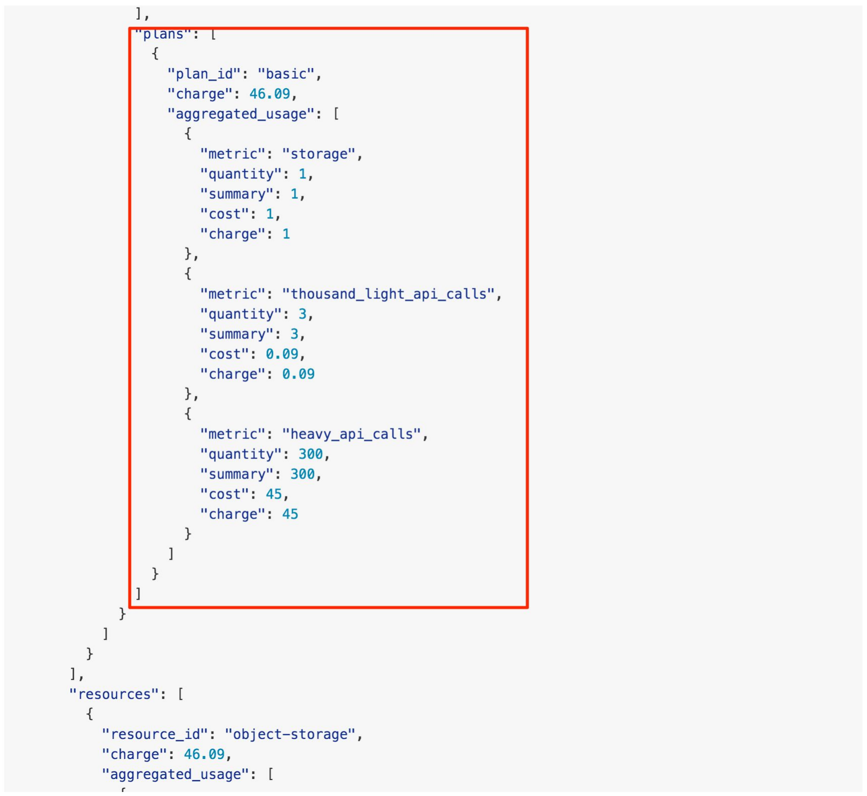
```
        {
          "name": "thousand_light_api_calls",
          "prices": [
            {
              "country": "USA",
              "price": 0.03
            },
            {
              "country": "EUR",
              "price": 0.0226
            },
            {
              "country": "CAN",
              "price": 0.0317
            }
          ]
        },
        {
          "name": "heavy_api_calls",
          "prices": [
            {
              "country": "USA",
              "price": 0.15
            },
            {
              "country": "EUR",
              "price": 0.1129
            },
            {
              "country": "CAN",
              "price": 0.1585
            }
          ]
```

service provider APIs - usage reporting

```
GET /v1/metering/organizations/:organization_id/aggregated/usage/:time
```



```
{
  "start": 1435622400000,
  "end": 1435708799999,
  "processed": 1435708800000,
  "organization_id": "us-south:a3d7fe4d-3cb1-4cc3-a831-ffe98e20cf27",
  "charge": 46.09,
  "id": "k-a3d7fe4d-3cb1-4cc3-a831-ffe98e20cf27-t-0001435622400000",
  "spaces": [
    {
      "space_id": "aaeae239-f3f8-483c-9dd0-de5d41c38b6a",
      "charge": 46.09,
      "consumers": [
        {
          "consumer_id": "app:d98b5916-3c77-44b9-ac12-045678edabae",
          "charge": 46.09,
          "resources": [
            {
              "resource_id": "object-storage",
              "charge": 46.09,
              "aggregated_usage": [
                {
                  "metric": "storage",
                  "quantity": 1,
                  "summary": 1,
                  "charge": 1
                },
                {
                  "metric": "thousand_light_api_calls",
                  "quantity": 3,
                  "summary": 3,
                  "charge": 0.09
                },
                {
                  "metric": "heavy_api_calls",
                  "quantity": 300,
                  "summary": 300,
                  "charge": 45
                }
```



```
              ],
              "plans": [
                {
                  "plan_id": "basic",
                  "charge": 46.09,
                  "aggregated_usage": [
                    {
                      "metric": "storage",
                      "quantity": 1,
                      "summary": 1,
                      "cost": 1,
                      "charge": 1
                    },
                    {
                      "metric": "thousand_light_api_calls",
                      "quantity": 3,
                      "summary": 3,
                      "cost": 0.09,
                      "charge": 0.09
                    },
                    {
                      "metric": "heavy_api_calls",
                      "quantity": 300,
                      "summary": 300,
                      "cost": 45,
                      "charge": 45
                    }
                  ]
                }
              ]
            }
          ]
        }
      ],
      "resources": [
        {
          "resource_id": "object-storage",
          "charge": 46.09,
          "aggregated_usage": [
```

project process and current team

incubation project - created to explore and test (optional to core)

distributed commit process

IBM engineers (@jsdelfino, @sasrin, @betafood, @kruely)

SAP engineers (@hsiliev & @georgethebeatle)

Own tracker for all work items and Github issues

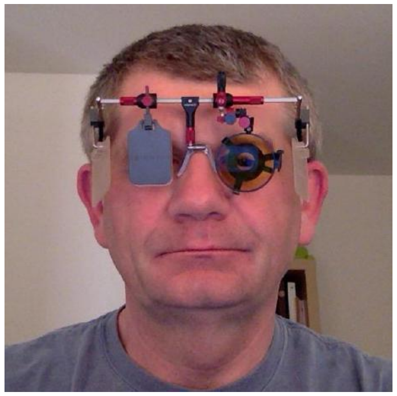
team

Jean-Sebastien Delfino (IBM)

Benjamin Cheng (IBM)

Saravanakumar Srinivasan (Assk) (Independent)

Kevin Yudhiswara (IBM)



Piotr Przybylski (IBM, Bluemix)

Hirsto Iliev (SAP)

Georgi Sabev (SAP)

status

recent updates

- dynamic query of resulting data using GraphQL
- flexible metering and rating configuration

near-term

- Mongo-DB support
- async buffering for multi-datacenter
- failed event management
- dynamic slack window

status (*cont.*)

near-term (*cont.*)

- switching to concourse for pipeline

distant

- built-in default UIs (on-boarding and reporting)
- CF-Abacus-as-a-Service (via service broker)
- listening and providing notifications
- dynamic slack window

how can you contribute

integrator

- “kick the tires” - try deploying CF-Abacus into your env
- create UI for onboarding and report presentation
- integrate with your CF service brokers that report usages

service developer

- support submitting usage to CF-Abacus
- implement the broker usage submission API

how can you contribute (*cont.*)

developer

- "kick the tires" - try deploying CF-Abacus into your env
- create any new issues you find on Github
- write code, tests, and submit a pull requests

tester and documentation

- test with other brokers
- all aspects of documentation needs improvements

information

https://github.com/cloudfoundry-incubator/cf-abacus

CF-Abacus Tracker project

IRC channel, Slack and Gitter, and CF mailing list

project README and FAQs

Design doc for overview of design

APIs doc for integration overview

thank you

credit: http://knowyourmeme.com/photos/522333-language