DNS as code with Octodns

Versioning and keep track of your dns records changes and automate all the thing via travis-ci

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The problem: “Everything is a DNS Problem”[cit]

The situation one year ago...

- Who have created those records???
- Why those records are created???
- What those records do???
- Are those record used anymore???

The Mission

Assigned task:

- Move current DNS management from a web console based to something more modern, on premise or in the “Cloud”.

Constraints:

- The solution must be versionable and/or programmable
- One day to production


octoDNS

Why octoDNS?

- **Files based configurations:** configurations and zones definition are stored in files and can be easily committed in to a CVS
- **Multi provider**: you don't have to choose only one provider
- **Providers agnostic**: you can use the same zone definition with different providers

Overview

“In the vein of infrastructure as code OctoDNS provides a set of tools & patterns that make it easy to manage your DNS records across multiple providers. The resulting config can live in a repository and be deployed just like the rest of your code, maintaining a clear history and using your existing review & workflow.”

from: https://github.com/github/octodns

- Created and used by GitHub for manage their DNS infrastructure
- Released as OSS project at “Wed Mar 15 15:38:10 2017 -0700”
- YAML configurations files format

Simple step up: config.yaml

```
---
providers:
  config:
    class: octodns.provider.yaml.YamlProvider
    directory: ./zones
    enforce_order: false
  do:
    class: octodns.provider.digitalocean.DigitalOceanProvider
    token: env/DO_TOKEN

zones:
  acme.org.:
    sources:
      - config
    targets:
      - do
```

Simple step up: zones/acme.org.yaml

```yaml
---
'':
  - type: MX
    ttl: 600
    values:
      - priority: 10
            value: mail.acme.org.
  - type: A
    ttl: 600
    value: 1.2.3.4

www:
  ttl: 600
  type: A
  value: 1.2.3.4
```

Usage

- **install**: `$ pip install --user octodns`
- **use**:
  - **verify**: `$ octodns-validate --config-file=config.yaml`
  - **test**: `$ octodns-sync --config-file=config.yaml`
  - **apply**: `$ octodns-sync --config-file=config.yaml --doit`
- **Directory layout:**

```
.
├── config.yaml
└── zones
    └── acme.org.yaml
```


git

Why?

- History of DNS record changes
- Relative easy rollback in case of errors
- Add a **“Who”** and **“Why”** to DNS changes
- Facilitate the review process of proposed DNS changes

Travis CI

Benefit of automation

- **Continuous integration**: run a automatic verification test for every proposed change.
- **Continuous deployment**: automatic apply of change when merge the pull request to master.
- **Avoid credential leak**: make possible for an user to do privileged action without acknowledgment of any secret key or token.

How to travis-ci work: .travis.yml

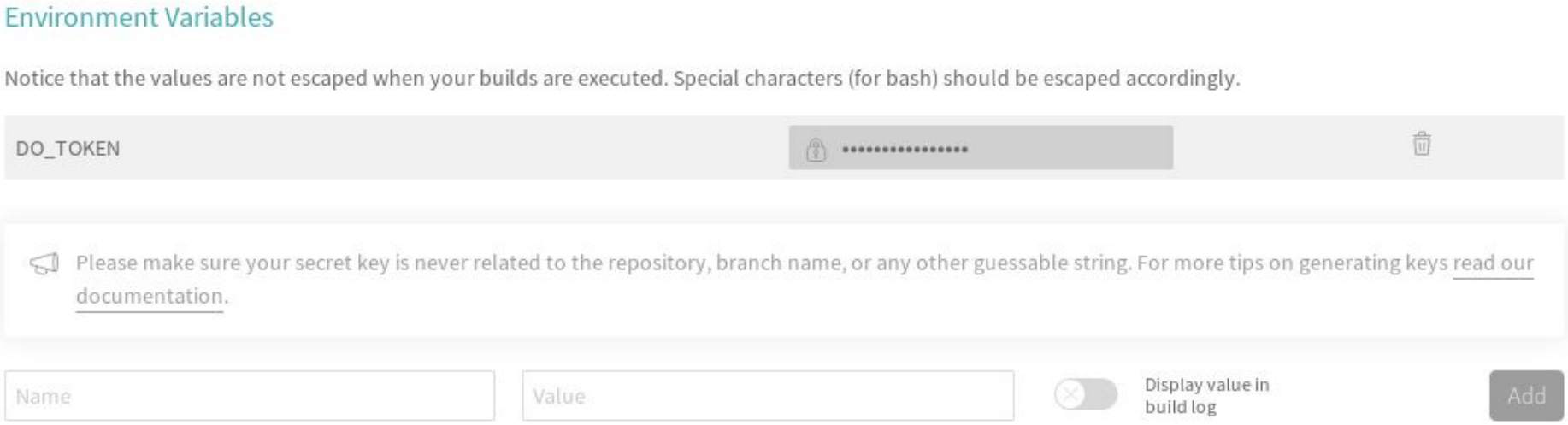
```
language: python
cache: pip

install: pip install octodns

script:
  - octodns-validate --config-file=config.yaml
  - octodns-sync --config-file=config.yaml

deploy:
  provider: script
  script: octodns-sync --config-file=config.yaml --doit
  on:
    branch: master
```

How to travis-ci work: environment variables



Pull Request workflow

1. User make a pull request with the requested changes
2. Travis-ci test the pull request
3. User ask a review of a pull request
4. Administrator start the review
5. Administrator approve the changes
6. User merge the pull request to master
7. Travis-ci apply the pull request changes

Caution!

The YAML file of Octodns is the only source of true,

any records created outside the configuration will be deleted!!!

Advance usages

Add a backup provider

```
---
providers:
  config:
     class: octodns.provider.yaml.YamlProvider
     directory: ./zones
     enforce_order: false
  do:
     class: octodns.provider.digitalocean.DigitalOceanProvider
     token: env/DO_TOKEN
  cf:
     class: octodns.provider.cloudflare.CloudflareProvider
     email: env/CF_EMAIL
     token: env/CF_TOKEN
     cdn: false

zones:
  acme.org.:
     sources:
       - config
     targets:
       - do
       - cf
```

Move the zone between two different providers

```
---
providers:
  do:
    class: octodns.provider.digitalocean.DigitalOceanProvider
    token: env/DO_TOKEN
  cf:
    class: octodns.provider.cloudflare.CloudflareProvider
    email: env/CF_EMAIL
    token: env/CF_TOKEN
    cdn: false

zones:
  acme.org.:
    sources:
      - do
    targets:
      - cf
```

Other useful commands

- **`octodns-dump`**: for dump the zone configuration from a supported provider to YAML format
- **`octodns-compare`**: for check the status of a zone configuration against the actual production configuration (can be useful for periodically checks of the configuration)

Quirks & Recommendations

Quirks

- Travis-ci secure variables are not available to untrusted builds triggered by pull requests from another repository.

```
script:
  - >
      if [ "$TRAVIS_SECURE_ENV_VARS" = "false" ]; then
      export DO_TOKEN="";
      export CF_EMAIL="";
      export CF_TOKEN="";
      fi;
      octodns-validate --config-file=config.yaml
  - if [ "$TRAVIS_SECURE_ENV_VARS" = "true" ]; then octodns-sync --config-file=config.yaml; fi
```

Recommendations

- **Protect the master branch**, permit writes on master only via pull requests
- Make mandatory for a pull request to be **up to date before merge**
- Block merge until almost **one review approve the change**

Mission Accomplishment!

- Move from a web based “point and click” paradigm to a “Infrastructure as Code” paradigm
- Dns management are now versionable
- Start in the morning and to production in the late afternoon! (ok, actually it was fully in production the day after, we want to make sure that all the records are migrated correctly)

What’s happened in one year?

We still use it! :)

59 commit

34 pull request

3 contributors

From **1** to **4** zone managed with octoDNS

88 records (Only!)

Thanks for listening!
Questions?

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