Deploying Plone and Volto – the Hard Way

Plone Conference 2020

Asko Soukka

9.12.2020

JYVÄSKYLÄN YLIOPISTO
UNIVERSITY OF JYVÄSKYLÄ

+

I DON'T ALWAYS
DEPLOY OUR PLONES
BUT WHEN I DO, ...

Author

Asko Soukka

Software architect at University of Jyväskylä Digital Services

Background

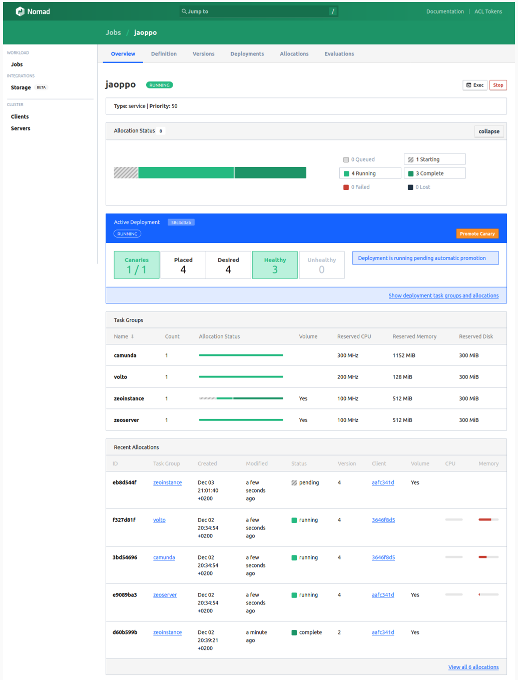
- Python developer since 2002
- Plone developer since 2004
- Full-time professional since 2008
- Nix / NixOS user since 2015

Taking the Red Pill...

- ✗ Buildout
- ✗ WSGI
- ✗ Docker
- ✗ Registry

- ✓ Pip
- ✓ TxZServer
- ✓ Nomad
- ✓ Nix

Nomad wonderland



jaoppo RUNNING

Type: service | **Priority:** 50

Allocation Status 8

0 Queued · 1 Starting · 4 Running · 3 Complete · 0 Failed · 0 Lost

Active Deployment 58c4d3ab RUNNING

Canaries	Placed	Desired	Healthy	Unhealthy
1 / 1	4	4	3	0

Deployment is running pending automatic promotion

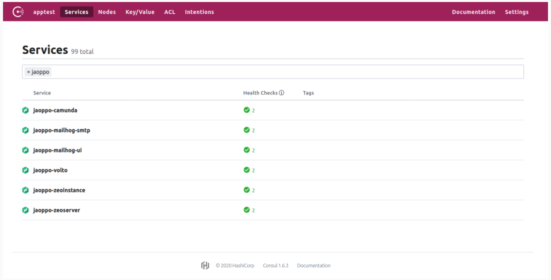
Task Groups

Name	Count	Allocation Status	Volume	Reserved CPU	Reserved Memory	Reserved Disk
camunda	1			300 MHz	1152 MiB	300 MiB
volto	1			200 MHz	128 MiB	300 MiB
zeoinstance	1		Yes	100 MHz	512 MiB	300 MiB
zeoserver	1		Yes	100 MHz	512 MiB	300 MiB

Recent Allocations

ID	Task Group	Created	Modified	Status	Version	Client	Volume	CPU	Memory
eb8d544f	zeoinstance	Dec 03 21:01:40 +0200	a few seconds ago	▨ pending	4	aafc341d	Yes		
f327d81f	volto	Dec 02 20:34:54 +0200	a few seconds ago	🟩 running	4	3646f8d5			
3bd54696	camunda	Dec 02 20:34:54 +0200	a few seconds ago	🟩 running	4	3646f8d5			
e9089ba3	zeoserver	Dec 02 20:34:54 +0200	a few seconds ago	🟩 running	4	aafc341d	Yes		
d60b599b	zeoinstance	Dec 02 20:39:21 +0200	a minute ago	🟩 complete	2	aafc341d	Yes		

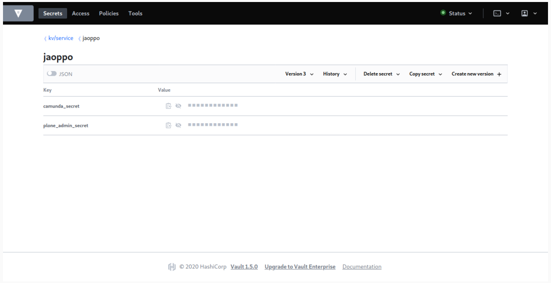
View all 6 allocations



Services 99 total

× jaoppo

Service	Health Checks	Tags
jaoppo-camunda	✓ 2	
jaoppo-mailhog-smtp	✓ 2	
jaoppo-mailhog-ui	✓ 2	
jaoppo-volto	✓ 2	
jaoppo-zeoinstance	✓ 2	
jaoppo-zeoserver	✓ 2	



jaoppo

Key	Value
camunda_secret	▪▪▪▪▪▪▪▪▪▪▪▪
plone_admin_secret	▪▪▪▪▪▪▪▪▪▪▪▪

One Job File to Rule Them All

- task groups
- instance count
- update policy
- server resources
- volume mounts
- ...

- tasks
- consul services
- vault secrets
- env variables
- exec artifacts
- ...

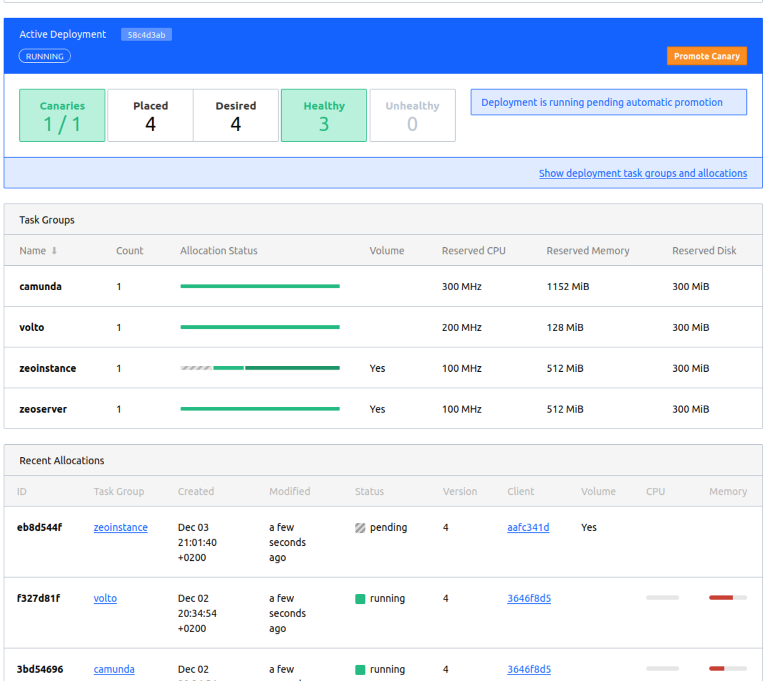
Nomad Isolated Fork/Exec Driver

Nix-built artifact

```
artifact {
  source = "https://...app-[[ .app.version ]].tar.gz"
  destination = "/"
}
```

Runs on minimal chroot

```
/etc/group
/etc/passwd
/etc/nsswitch.conf
/etc/resolv.conf
/etc/ssl/certs
```



Active Deployment 58c4d3ab

RUNNING

Promote Canary

Canaries	Placed	Desired	Healthy	Unhealthy
1 / 1	4	4	3	0

Deployment is running pending automatic promotion

Show deployment task groups and allocations

Task Groups

Name ⬇	Count	Allocation Status	Volume	Reserved CPU	Reserved Memory	Reserved Disk
camunda	1			300 MHz	1152 MiB	300 MiB
volto	1			200 MHz	128 MiB	300 MiB
zeoinstance	1		Yes	100 MHz	512 MiB	300 MiB
zeoserver	1		Yes	100 MHz	512 MiB	300 MiB

Recent Allocations

ID	Task Group	Created	Modified	Status	Version	Client	Volume	CPU	Memory
eb8d544f	zeoinstance	Dec 03 21:01:40 +0200	a few seconds ago	▨ pending	4	aafc341d	Yes		
f327d81f	volto	Dec 02 20:34:54 +0200	a few seconds ago	🟩 running	4	3646f8d5			
3bd54696	camunda	Dec 02	a few	🟩 running	4	3646f8d5			

Nix-built Nomad artifacts

One Package Manager to Rule Them All

Nix-built Nomad deployment artifacts

Advantages

- 100 % reproducible
- production equals development
- sandboxed offline builds
- full dependency graph
- standalone tarballs
- no Dockerfile
- no base images
- no surprises

Disadvantages

- no conventions
- no metadata
- no shared layers
- no documentation

One Package Manager to Rule Them All

Nix-built Nomad deployment artifacts

Advantages

- 100 % reproducible
- production equals development
- sandboxed offline builds
- full dependency graph
- standalone tarballs
- no Dockerfile
- no base images
- no surprises

Disadvantages

- no conventions
- no metadata
- no shared layers
- ~~no documentation~~

Some documentation

- https://nixos.org
- https://nix.dev

volto.tar.gz

```nix
{ pkgs ? import ../nix { nixpkgs = sources."nixpkgs-20.09"; }
, sources ? import ../nix/sources.nix
, volto ? import ./default.nix { inherit pkgs; }
, name ? "artifact"
}:

with pkgs;

let

  env = buildEnv {
    name = "env";
    paths = [
      bashInteractive
      coreutils
      volto
    ];
  };

  closure = (writeReferencesToFile env);

in

runCommand name {
  buildInputs = [ makeWrapper ];
} ''
mkdir -p local/bin
makeWrapper ${bashInteractive}/bin/sh local/bin/sh \
  --prefix PATH : ${coreutils}/bin \
  --prefix PATH : ${volto}/bin
tar czvhP \
  --hard-dereference \
  --exclude="${env}" \
  --exclude="*ncurses*/ncurses*/ncurses*" \
  --exclude="/nix/store/*-node_my-volto-project-git*" \
  --files-from=${closure} \
  --transform="s|^local/||" \
  local > $out || true
''
```

/bin/volto

```
pkgs.stdenv.mkDerivation rec {
  name = "volto";
  src = pkgs.lib.cleanSource ./.;
  buildPhase = ''
    source $stdenv/setup;
    mkdir -p $out/bin $out/lib
    cp -a $src $out/lib/volto && chmod u+w -R $out/lib/volto
    cd $out/lib/volto
    cp -a ${node_modules} node_modules
    HOST=CUSTOM_RAZZLE_SERVER_HOST \
    PORT=CUSTOM_RAZZLE_SERVER_PORT \
    RAZZLE_API_PATH=CUSTOM_RAZZLE_API_PATH \
    node_modules/.bin/razzle build
    chmod u+w -R node_modules && rm -r node_modules
  '';
  installPhase = ''
    source $stdenv/setup;
    cat > $out/bin/volto << EOF
    #!/usr/bin/env sh
    RUNTIME="\$(mktemp -d)"
    cp -R $out/lib/volto/build/* "\$RUNTIME"
    chmod u+w -R "\$RUNTIME"
    find "\$RUNTIME" -name "*.js"|xargs sed -i "s|CUSTOM_RAZZLE_SERVER
    find "\$RUNTIME" -name "*.js"|xargs sed -i "s|CUSTOM_RAZZLE_SERVER
    find "\$RUNTIME" -name "*.js"|xargs sed -i "s|CUSTOM_RAZZLE_API_PA
    find "\$RUNTIME" -name "*.js"|xargs sed -i "s|$out/lib/volto/build
    chmod u-w -R "\$RUNTIME"
    cd $out/lib/volto && node "\$RUNTIME/server.js" \$@
    EOF
    chmod u+x $out/bin/volto
  '';
  postFixup = ''
    wrapProgram $out/bin/volto \
      --prefix PATH : ${pkgs.lib.makeBinPath propagatedBuildInputs} \
      --suffix NODE_ENV : production \
      --suffix NODE_PATH : ${node_modules}
  '';
  buildInputs = with pkgs; [ makeWrapper bindfs ];
  propagatedBuildInputs = with pkgs; [
    coreutils findutils gnused nodejs-14_x node_modules
  ];
}
```

datakurre

Don’t Try This at Home™

Nix – the assorted ugly parts

- every language has their own Nix-conventions
- Nix dependency generator ecosystem is complex
- Nix does not support cyclic dependencies
- no storage device is big enough for `/nix/store`
- many NPM packages want to call Internet on install
- some NPM packages ship with pre-built binaries
- ...

Plone without buildout

Plone 5.2.1 without Buildout

Our (legacy) approach for Plone with pip

- generated requirements.txt with buildout
- created Python environment with pip / Nix
- used pip-branch of z3c.autoinclude
- disabled `<includeDependencies />`
- generated instance skeleton with Nix
- forked `plone.recipe.zope2instance` into `plonectl`

zope.conf

```
{ pkgs ? import <nixpkgs> {}
, generators ? import ./generators.nix {}
, instancehome ? import ./instancehome.nix {}
, var ? "$(PLONE_VAR)"
}:

let configuration = generators.toZConfig {

 # ...

  zodb_db = {
    main = {
      cache-size = 40000;
      mount-point = "/";
      zeoclient = {
        read-only = false;
        read-only-fallback = false;
        blob-dir = "${var}/blobstorage";
        shared-blob-dir = true;
        server = "$(PLONE_ZEOSERVER_ADDRESS)";
        storage = 1;
        name = "zeostorage";
        var = "${var}";
        cache-size = "128MB";
      };
    };
    temporary = {
      temporarystorage = {
        name = "temporary storage for sessioning";
      };
      mount-point = "/temp_folder";
      container-class = "Products.TemporaryFolder.TemporaryContainer";
    };
  };
}; in

pkgs.stdenv.mkDerivation {
  name = "zope.conf";
  builder = builtins.toFile "builder.sh" ''
    source $stdenv/setup
    cat > $out << EOF
    $configuration
    EOF
  '';
  inherit configuration;
}
```

/bin/plonectl-zeoinstance

```
plonectl-zeoinstance = stdenv.mkDerivation {
  name = "plonectl-zeoinstance";
  phases = [ "installPhase" "fixupPhase" ];
  zope_conf = import ./zconfig/zeoinstance.nix {};
  plonesite_py = ./zconfig/plonesite.py;
  installPhase = ''
    source $stdenv/setup
    mkdir -p $out/bin
    cat > $out/bin/plonectl-zeoinstance << EOF
    #!/usr/bin/env sh
    mkdir -p \$PLONE_VAR/filestorage
    if [ ! -f \$PLONE_VAR/.sentinel ]; then
        $env/bin/python -m plonectl.cli instance -C $zope_conf run $plonesite_py
        touch \$PLONE_VAR/.sentinel
    fi
    ${plonePython}/bin/python -m plonectl.cli instance -C $zope_conf \$@
    EOF
    chmod a+x $out/bin/plonectl-zeoinstance
  '';
  buildInputs = [ plonePython ];
};
```

Plone 6 without Buildout

✓ Plone 6 is pip installable (hearsay)

```
$ python3 -m venv py
$ ./py/bin/pip install Plone Paste -c ...
$ ./py/bin/mkwsgiinstance -d .
$ ./py/bin/runwsgi -v etc/zope.ini
```

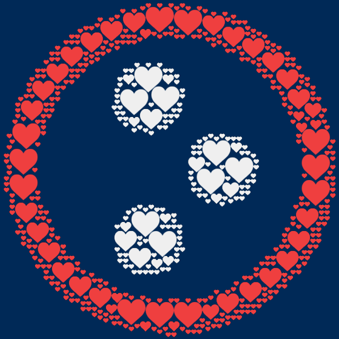
✗ instance templates and scripts are still maintained in `plone.recipe.zope2instance`

TxZServer in Production

Plone 5.2.1 / Zope 4.1.3 / Twisted / WebSockets + ZMQ PubSub

```
[sources]
ZServer =  git git@github.com:datakurre/ZServer
           branch=datakurre/master
collective.wsevents =
           git git@github.com:datakurre/collective.wsevents
plonectl = git git@github.com:datakurre/plonectl
```

- ✓ in production since March 2020 without known issues
- ✗ upgrade to Plone $>$ 5.2.1 and Zope $>$ 4.1 still pending



datakurre.github.io/ploneconf2020/alt