MASTER & MINIONS
OR THE DREAM OF PYTHON AUTOMATION

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Six Feet Up


CERTAIN THINGS SHOULD BE HAND CRAFTED.

BUT NOT YOUR INFRASTRUCTURE


BEAUTIFUL UNIQUE
SNOWFLAKES ARE NOT
REPRODUCIBLE.

PETS

CATTLE

RULES OF DEVOPS CLUB

» The first rule of DevOps Club is: You do not log into servers

» The second rule of DevOps Club is: You do not log into servers

» Third rule of DevOps Club: If your deployment fails, rollback

» Fourth rule: All artifacts will be stored in source control

» Fifth rule: Only one deployment at a time

» Sixth rule: No one offs, No special cases

» Seventh rule: Deployments will go on as long as they have to

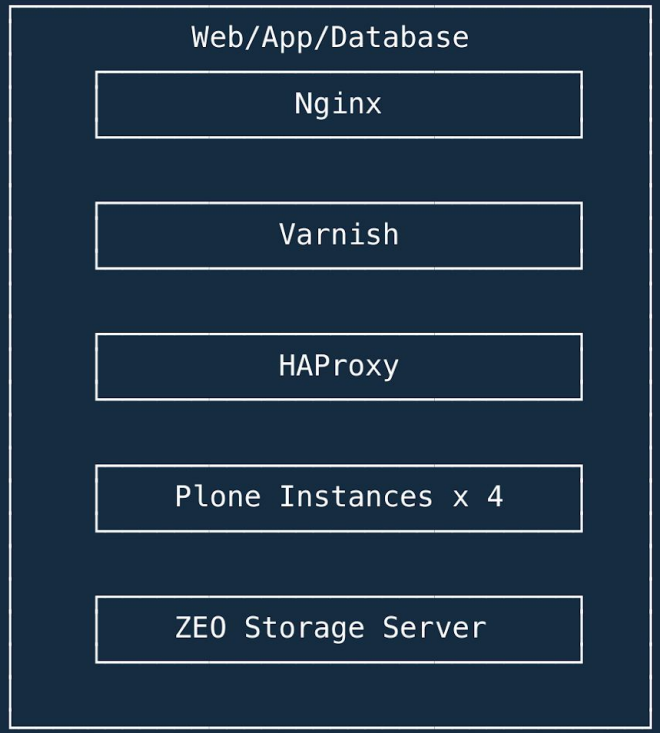
» And the eighth and final rule: If this is your first night at DevOps Club, you have to push to prod.

TOOLS

To enter the DevOps world, you need to know what tools are available to you.

Python has many great tools available to use such as SaltStack and the AWS Boto3 library.

SINGLE SERVER MONOLITH




FROM THE CLOSET TO
THE CLOUD
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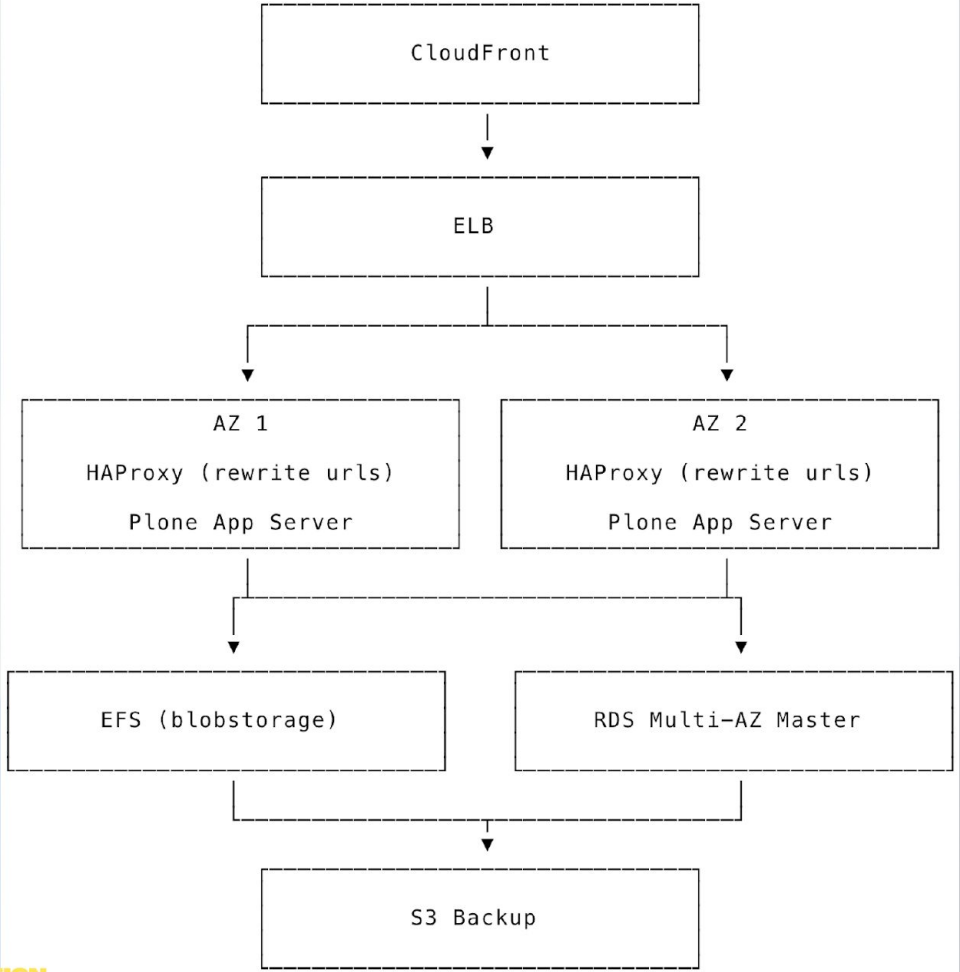
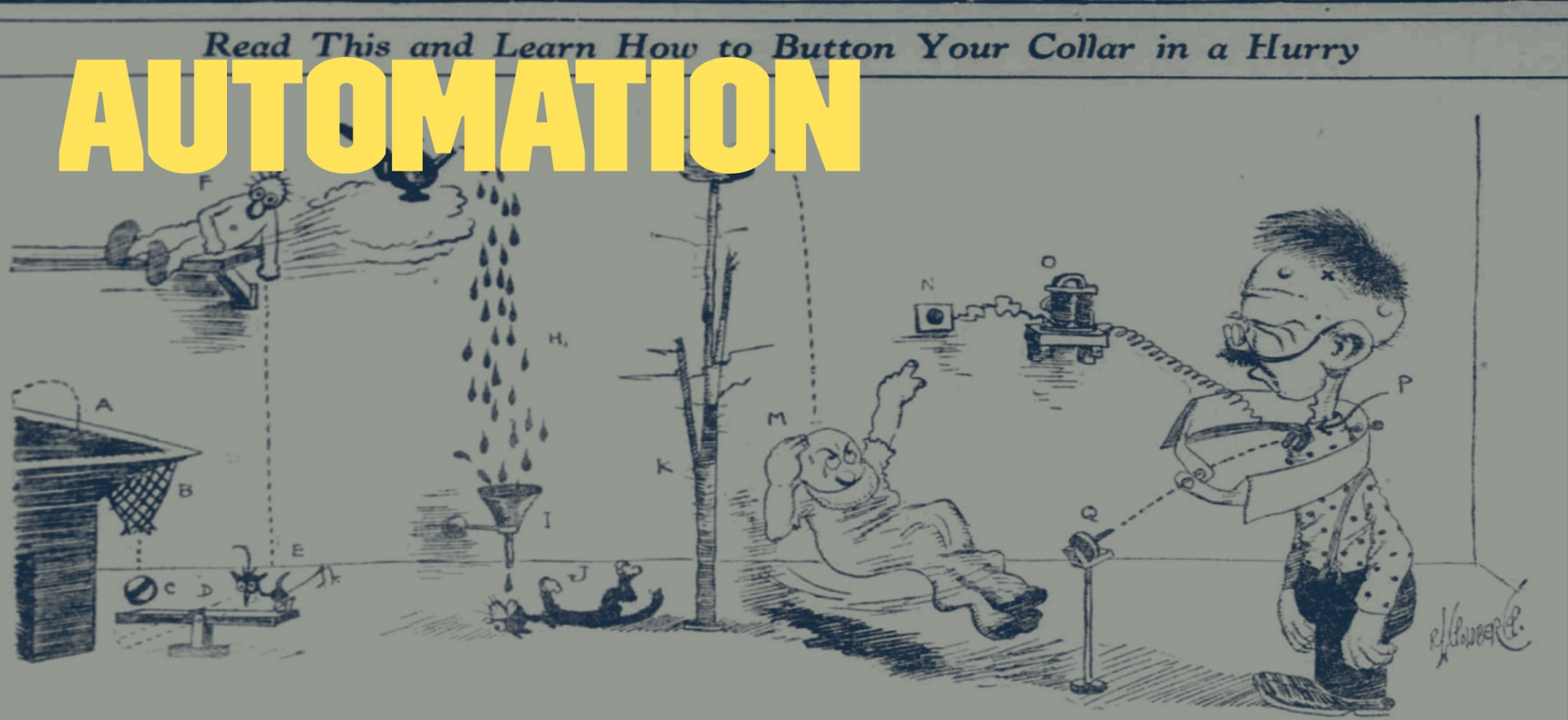
CLOUD OPTIMIZED

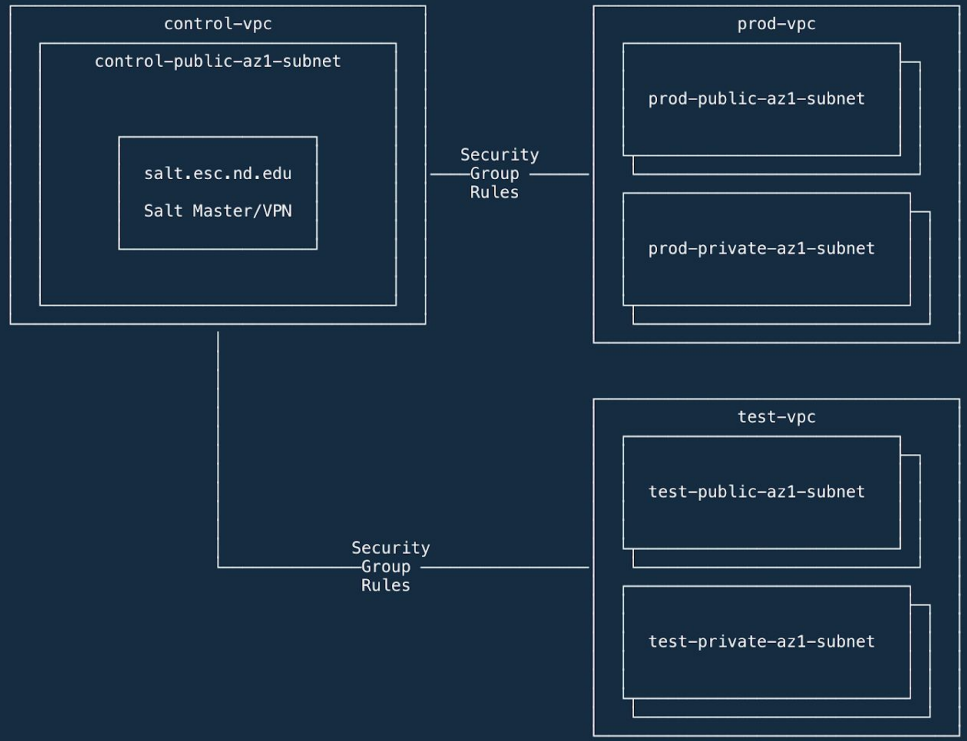


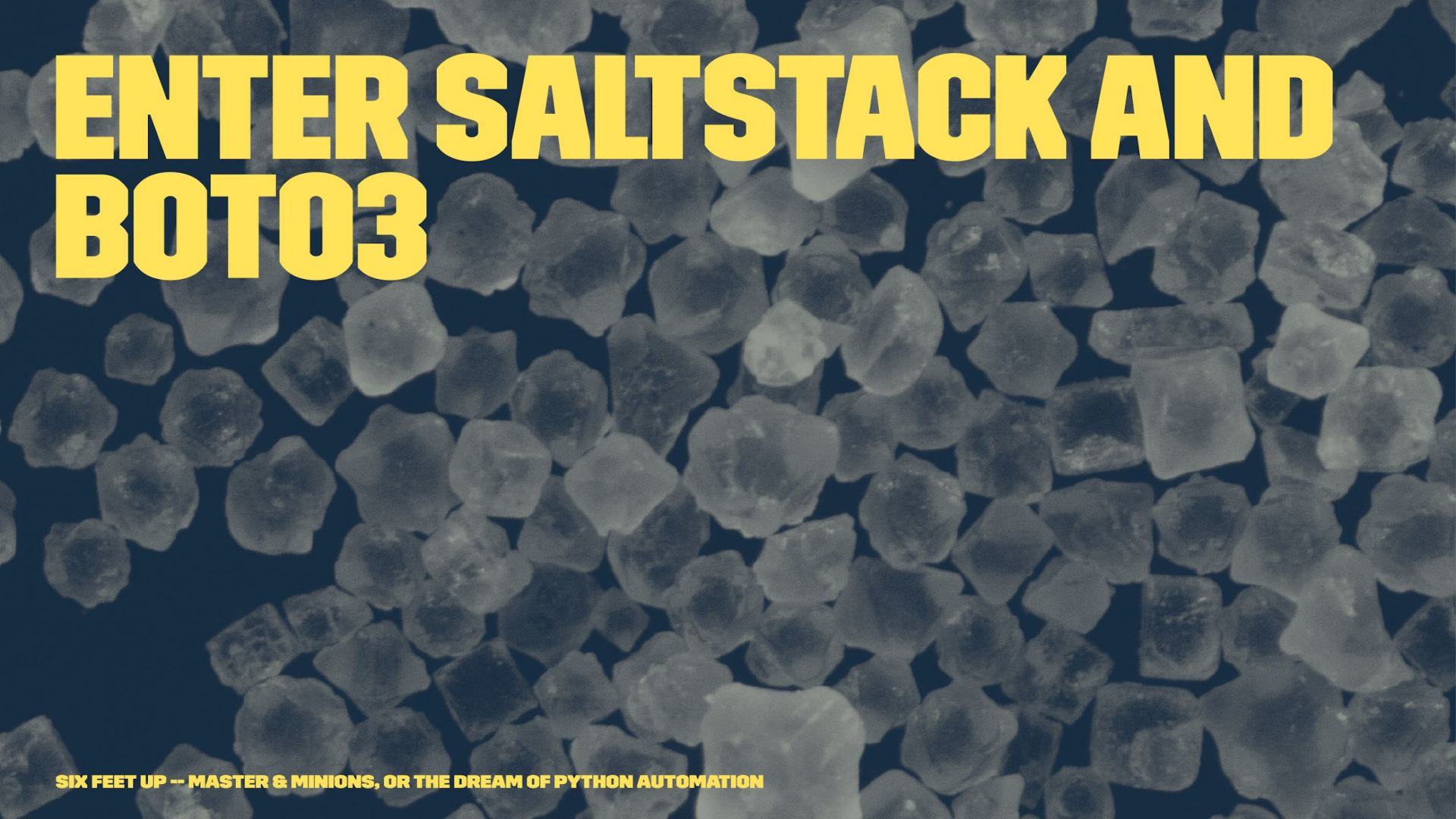
AUTOMATION



STAND NEAR POOL TABLE (A) - BALL (C) FALLS THROUGH POCKET (B) STARTING SEE-SAW (D) AND BOUNCING MEASLES-GERM (E) INTO THE AIR - GERM HITS DOLL (F) WHICH IMMEDIATELY CATCHES MEASLES AND DEVELOPS A HIGH FEVER - FEVER HEATS COFFEE POT (G) AND COFFEE BOILS OVER - DROPPING THROUGH FUNNEL (I) INTO CAT'S MOUTH, GIVING CAT (J) INSOMNIA - CAT CLIMBS TREE (K) FOR DIVERSION AND KNOCKS OFF BRICK (L) - BRICK HITS CHILD (M) IN HEAD - CHILD PRESSES BUTTON (N) THINKING IT WILL SUMMON HELP. BUTTON SETS UP CURRENT IN COIL (O) WHICH CHARGES MAGNET (P) HOLDING COLLAR SECURELY IN POSITION.

NETWORK END GOAL




ENTER SALTSTACK AND BOTO3
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BIT OF A CHICKEN AND EGG PROBLEM

```
# VPC
c = boto.vpc.connect_to_region(region)
vpc = c.create_vpc('172.20.0.0/16')
vpc.add_tag('Name', 'control-vpc')
c.modify_vpc_attribute(vpc.id,enable_dns_hostnames=True)
```

TOOL TIP

```
$ $(lpass-env export 'AWS SFU Calvin')

$ env | grep AWS
AWS_ACCESS_KEY_ID=DEADBEEFCAFE
AWS_SECRET_ACCESS_KEY=123jasdfads0of9akayo5peey0cow
AWS_DEFAULT_REGION=us-east-1
```

BOOTSTRAP CONTINUED

```
# EC2
data_path = os.path.join(os.path.dirname(__file__), 'bootstrap-master.sh')
with open(data_path) as script:
    bootstrap = script.read()

master = ec2.run_instances(
    'ami-55ef662f',
    subnet_id=subnet.id,
    security_group_ids=[group.id],
    key_name=ssh_key,
    instance_type='t2.micro',
    user_data=bootstrap
)

master.instances[0].add_tag('Name', 'Salt Master')
```

WHAT IS SALTSTACK?

WHAT SETS SALT APART?

» Remote Execution

» Event-Driven Orchestration

» Agent or Agent-less Operation

» Cloud Provisioning

» Speed and Scalability

LONELY MINIONS

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NOW WE ORCHESTRATE

```
$ salt-run state.orchestrate orch.deploy-environment pillarenv=prod
```

And build a test environment

```
$ salt-run state.orchestrate orch.deploy-environment pillarenv=test
```

MASTER AND MINIONS

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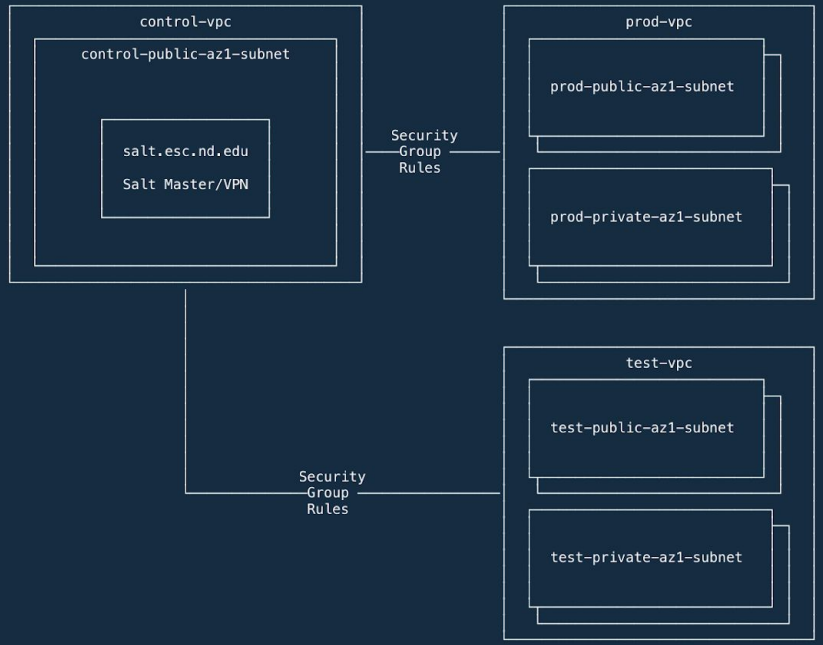
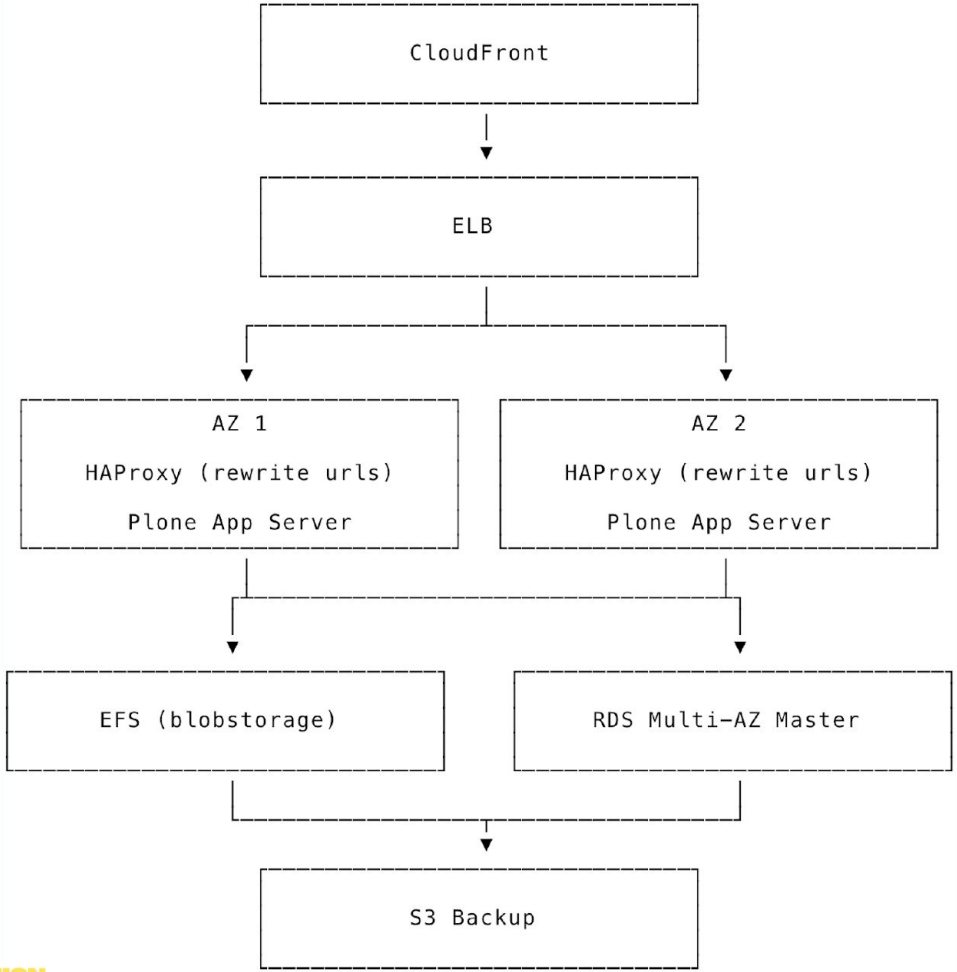
INFRASTRUCTURE (SANS HUMANS)






ORCHESTRATING NEW CODE RELEASES

ZERO DOWNTIME RELEASES

```
{%- for app_server in app_servers %}
...
# Stop Varnish, indirectly removing this app server from the NetScaler
stop-{{ app_server }}-varnish:
  salt.function:
    - name: service.stop
    - arg:
      - {{ varnish.service }}
    - tgt: {{ app_server }}
...
```

PREPARE FOR THE RELEASE

```
...
# Stop Instances
stop-{{ app_server }}-instances:
  salt.function:
    - name: supervisord.stop
    - arg:
      - all
    - tgt: {{ app_server }}
```

OPTIONAL AD-HOC CODE RELEASES

```
...
# Check out a specific revision
{% set branch = salt['pillar.get']('plone:branch', 'dev') %}
# to specify on the command-line: pillar='{"plone": {"branch": "f5d9859"}}'
checkout-code-{{ app_server }}:
  salt.function:
    - tgt: {{ app_server }}
    - name: git.checkout
    - kwarg:
        user: webuser
        rev: {{ branch }}
    - arg:
      - {{ buildout_dir }}
...
```

HANDLE RELEASE TASKS

```
# Run the buildout on the app server, but only run the generic setup on one server
run-buildout-{{ app_server }}:
  salt.function:
    - tgt: {{ app_server }}
    - name: cmd.run
    - kwarg:
        cwd: {{ buildout_dir }}
        runas: webuser
    - arg:
      - {{ buildout_dir }}/env/bin/buildout -N
```

HANDLE POST RELEASE TASKS

```
# Install Gulp bits
install-gulp-{{ app_server }}:
  salt.function:
    - name: npm.install
    - tgt: {{ app_server }}
    - kwarg:
        runas: webuser
        dir: {{ theme_dir }}

# Run the Gulp Build
run-gulp-{{ app_server }}:
  salt.function:
    - tgt: {{ app_server }}
    - name: cmd.run
    - arg:
      - gulp build
    - kwarg:
        runas: webuser
        cwd: {{ theme_dir }}
```

NOT JUST FOR RELEASES

» Migrating Production Data back to Testing

» Scheduled tasks such as Database Backups

SAVE MONEY WITH PYTHON IN THE CLOUD

```
policies:
  - name: offhours-stop-ec2
    mode:
      type: periodic
      schedule: "rate(1 hour)"
      role: arn:aws:iam::243886768005:role/cloud_custodian
    resource: ec2
    filters:
      - type: offhour
        default_tz: America/Indiana/Indianapolis
        offhour: 16
    actions:
      - stop
```

GRABBING PRODUCTION DATA

```
# Find the dev master db for use later
{% set ns = namespace(dev_master=None) %}
{% for dev_master in dev_db_servers
    if salt.saltutil.cmd(dev_master, 'file.search',
        arg=['/var/run/keepalive.state', 'MASTER']).get(dev_master).get('ret') %}
  {% if loop.first %}
    {% set ns.dev_master = dev_master %}
  {% endif %}
{% endfor %}

# Transfer Prod database
{% for prod_slave in prod_db_servers
    if salt.saltutil.cmd(prod_slave, 'file.search',
        arg=['/var/run/keepalive.state', 'BACKUP']).get(prod_slave).get('ret') %}
  {% if loop.last %}

sync-prod-database-to-dev:
  salt.function:
    - name: cmd.run
    - arg:
      - >
        rsync --delete --password-file=/etc/rsyncd.password.dump
        /u02/prodplonedb_archives/ dump@{{ ns.dev_master }}::postgres_dumps
    - tgt: {{ prod_slave }}
  {% endif %}
{% endfor %}
```

SOUNDS TOO EASY

The road was bumpy for sure.

Satisfying the rules for no special cases was tricky.

MINDFULNESS

“There should be one, and preferably only one, obvious way to do it.
Although that way may not be obvious at first unless you're Dutch.”
The Zen of Python

THE JOURNEY OF 3 OPERATING SYSTEMS

» 2a67758 Editing requirements to run properly on amazon linux

» 472d844 Refactoring to run CentOS 7 machines

» dd67b7a Refactoring for FreeBSD

What happened here?

OTHER RECOMMENDATIONS

» Implement a CI strategy to test your infrastructure with tools like Kitchen-Salt

» Create or use tools to help you trace requests in the cloud https://github.com/sixfeetup/aws-log-tools

LIVING THE DREAM

THANKS!

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