Carbon Black.

CONNECT

POWER OF YOU

Monday June 3, 2019

Developer Day

dev:~$ _

Getting to "Done"
Faster and with Less Effort with Carbon Black APIs

Carbon Black.
CONNECT
POWER OF YOU

Follow along @ https://github.com/redcanaryco/cbconnect-2019

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Bad Thing Happens

1. Receive alert
2. Find process
3. Find endpoint
4. Enrich with external info
5. Isolate endpoint
6. Remediate threat

→ Bad Thing Remediated

Follow along @ https://github.com/redcanaryco/cbconnect-2019

Bad Thing Happens

1. Receive alert
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Bad Thing Remediated

Carbon Black Process Search!

Carbon Black Endpoint Isolation!

Carbon Black Live Response!

first_try.rb

```ruby
#! /usr/bin/env ruby
AlertReceiver.new.when_alert_received do |alert|

  alert_process_name = extract_process_name_from_alert(alert)
  alert_hostname = extract_hostname_from_alert(alert)

  process_info = Actions::FindProcess.call process_name: alert_process_name, hostname: alert_hostname

  endpoint_info = Actions::FindEndpoint.call hostname: process_info['hostname']

  process_info = Actions::EnrichProcessWithPrevalenceInfo.call process_info: process_info

  endpoint_os = endpoint_info['os_environment_display_string'].to_s.downcase
  endpoint_type = if endpoint_os.include?('server') || (endpoint_os.include?('linux') && !endpoint_os.include?('desktop'))
                    'server'
                  else
                    'workstation'
                  end

  case endpoint_type
  when 'server'
    Actions::RemediateProcess.call process_name: process_info['process_name'], sensor_id: endpoint_info['sensor_id']

  when 'workstations'
    Actions::IsolateEndpoint.call sensor_id: endpoint_info['sensor_id']

    Actions::RemediateProcess.call process_name: process_info['process_name'], sensor_id: endpoint_info['sensor_id']
  end
end
```


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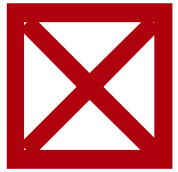
Bad Thing Happens

1. **Receive alert**
2. **Find process**
   a. Can't find it yet!
3. **Find endpoint**
4. **Enrich with external info**
5. **Isolate endpoint**
   a. It's offline!
6. **Remediate threat**
   a. It's still offline!

Bad Thing Remediated



Bad Thing NOT Remediated

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Key requirements for our solution

- Run code
- Expect failure
- Highly resilient
- Easy to deploy

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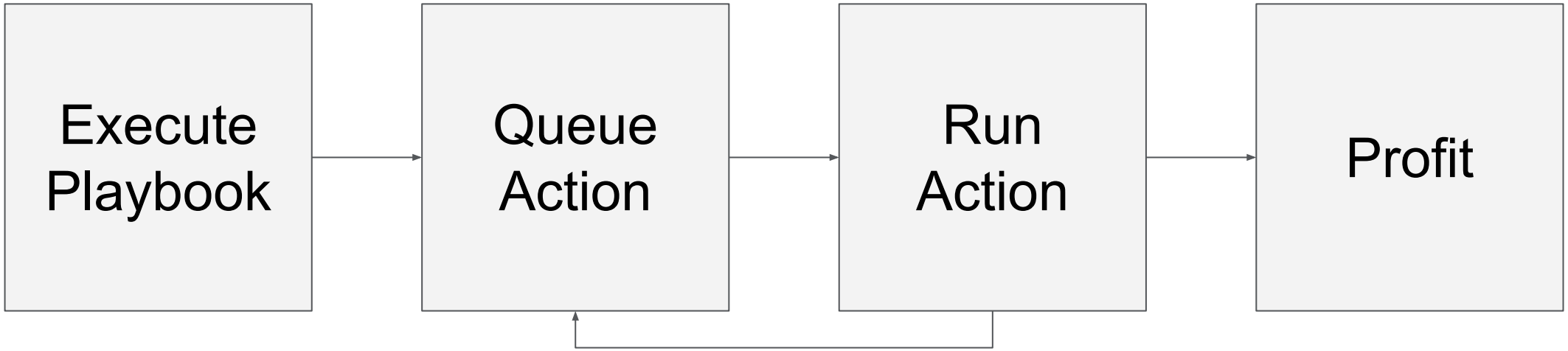
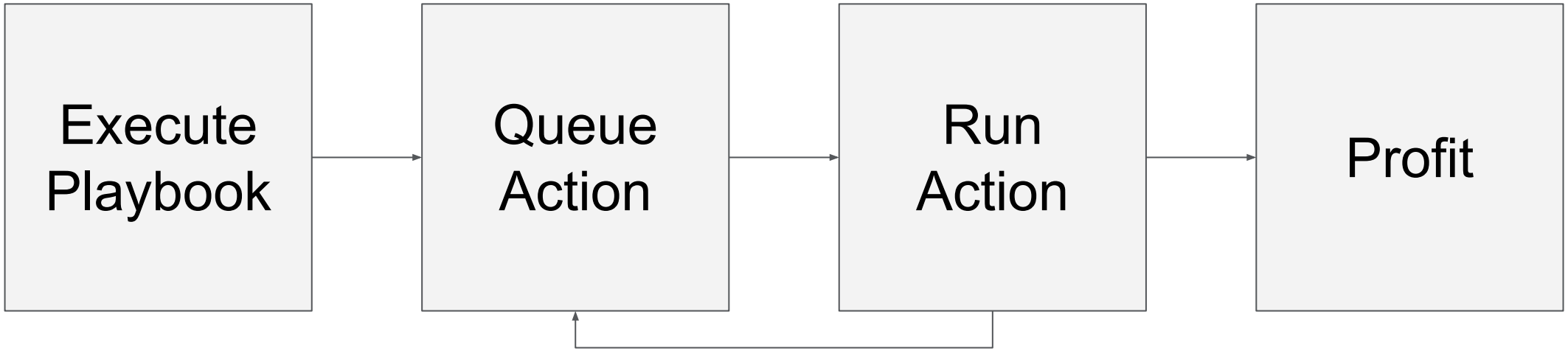
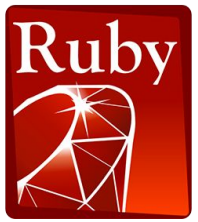
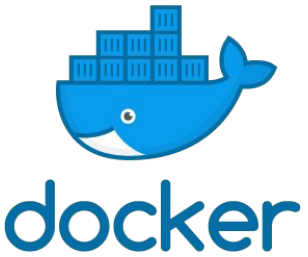
Solve with a simple architecture



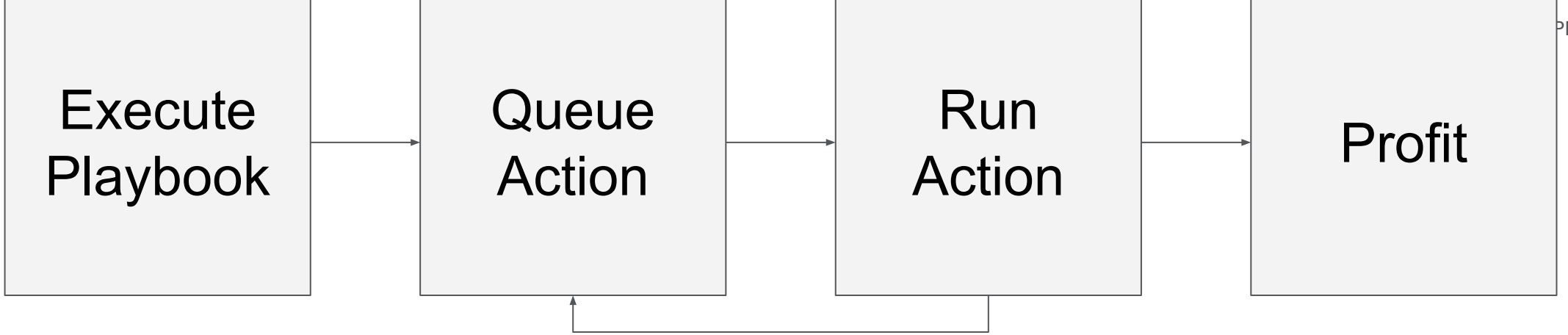
Solve with a simple architecture… all open source!

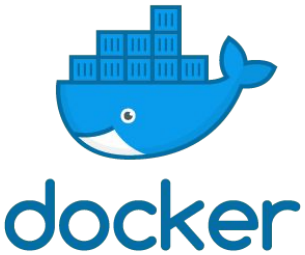






PER DAY dev:~$ _

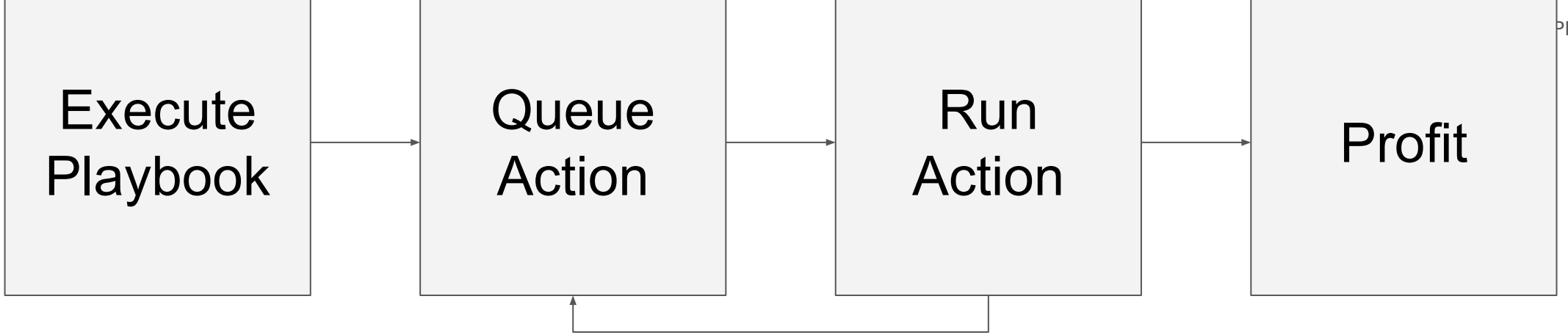


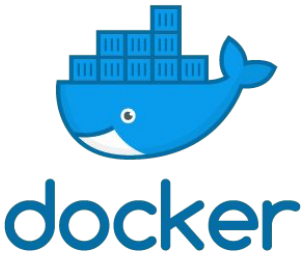


Highly readable

Easy to learn

PER DAY dev:~$ _





Fast key/value store

Lightweight

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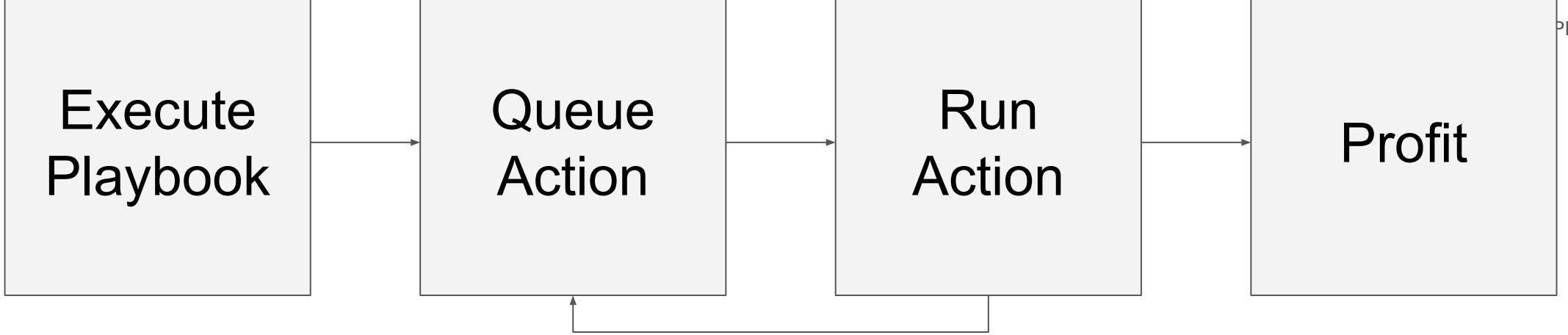
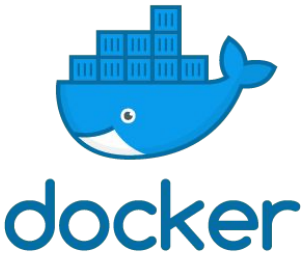
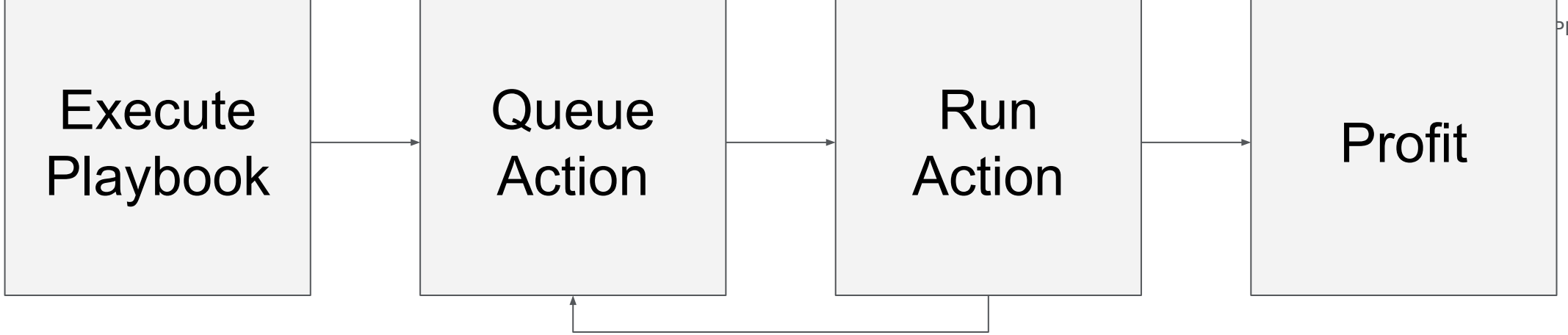


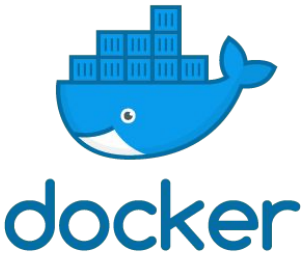


Job runner

Production grade

PER DAY dev:~$ _





Dead simple deployments in dev AND production

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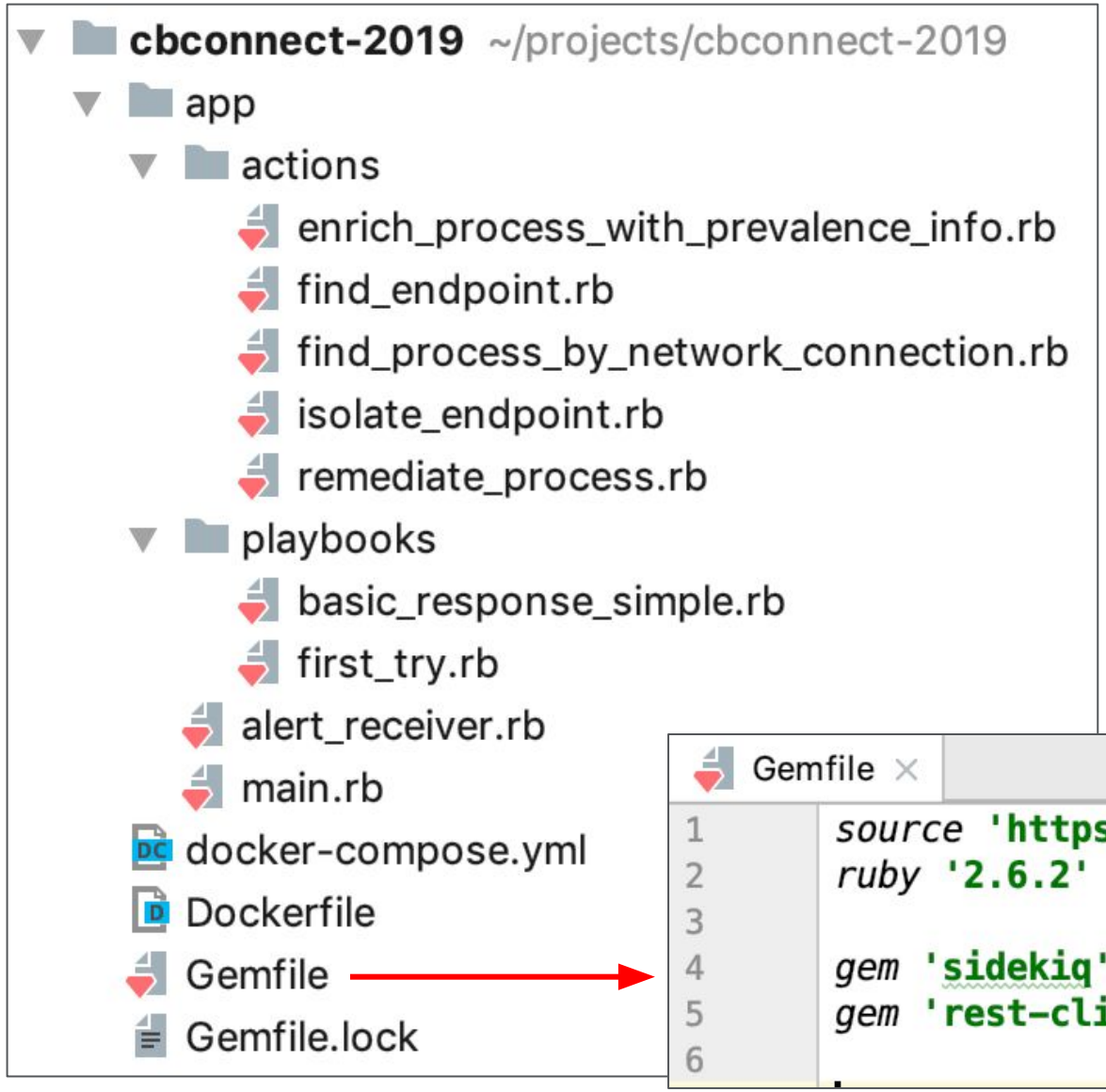
Step 0: Setup our project




```
~/projects/cbconnect-2019 $ bundle install
Fetching gem metadata from https://rubygems.org/.........
Fetching gem metadata from https://rubygems.org/.
Resolving dependencies...
Using bundler 1.17.2
Using unf_ext 0.0.7.6
Using mime-types-data 3.2019.0331
Using netrc 0.11.0
Fetching connection_pool 2.2.2
Fetching redis 4.1.1
Fetching rack 2.0.7
Using unf 0.1.4
Using mime-types 3.2.2
Using domain_name 0.5.20180417
Using http-cookie 1.0.3
Using rest-client 2.0.2
Installing connection_pool 2.2.2
Installing redis 4.1.1
Installing rack 2.0.7
Fetching rack-protection 2.0.5
Installing rack-protection 2.0.5
Fetching sidekiq 5.2.7
Installing sidekiq 5.2.7
Bundle complete! 2 Gemfile dependencies, 14 gems now installed.
Use `bundle info [gemname]` to see where a bundled gem is installed.
~/projects/cbconnect-2019 $
```

Gemfile

```
1  source 'https://rubygems.org'
2  ruby '2.6.2'
3
4  gem 'sidekiq'
5  gem 'rest-client'
6
```

Step 1: Define our actions

```ruby
module Actions
  class FindProcessByNetworkConnection
    def call(sensor_id:, destination_ip:, destination_port:)
      puts "  ** FindProcessByNetworkConnection"
      query = {
          'q' => ["ipaddr:#{destination_ip} ipport:#{destination_port} sensor_id:#{sensor_id}"],

          'sort' => 'last_update desc',
          'facet' => ['false', 'false'],
          'rows' => 10,
          'cb.urlver' => ['1'],
          'start' => 0,
          'timeAllowed' => 60000
      }

      url = "#{cb_url}/api/v1/process"
      response = RestClient::Resource.new(url, headers: {'X-Auth-Token' => cb_auth_token, accept: :json}).
          post query.to_json, content_type: :json

      results = JSON.parse response.body
    end
  end
end
```

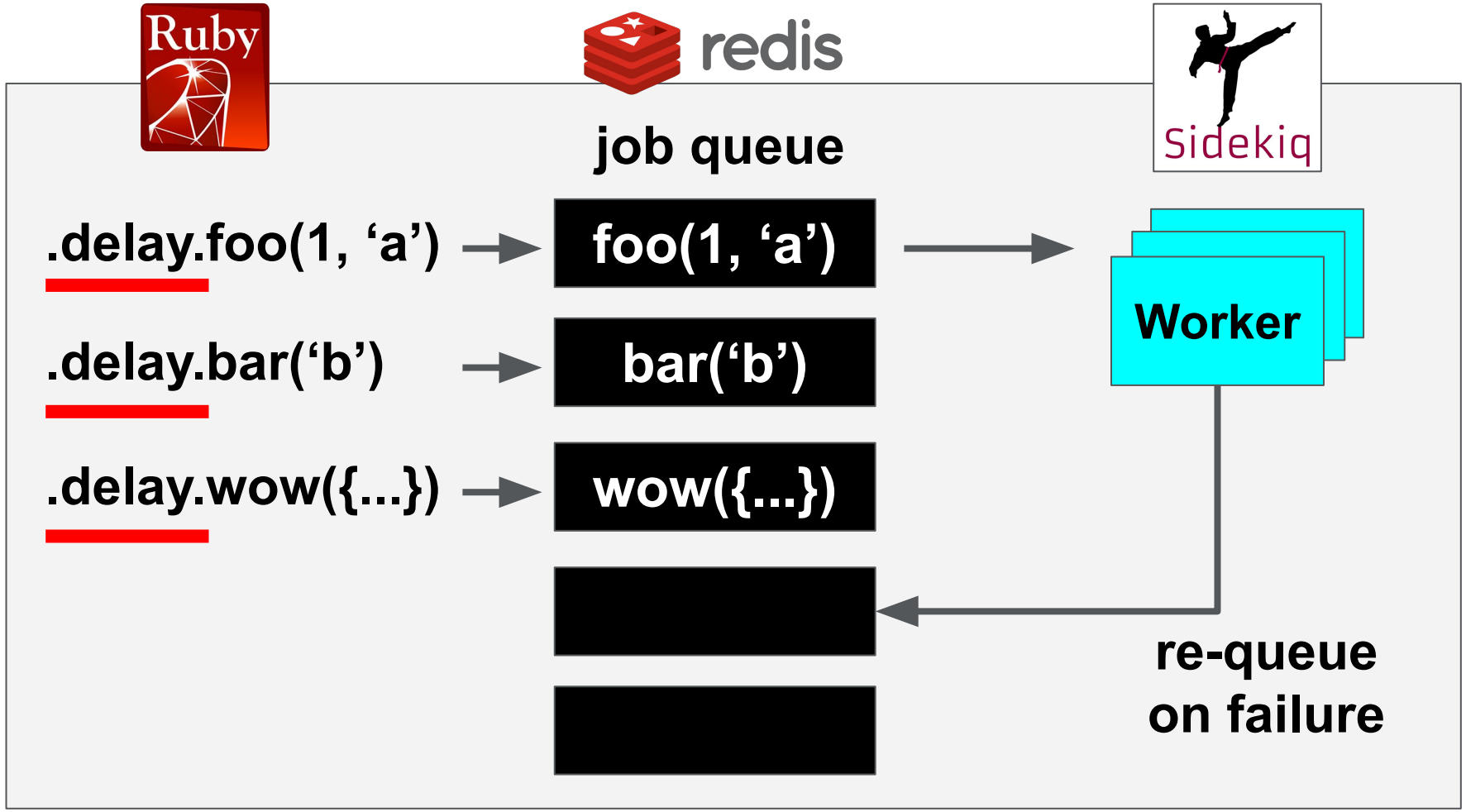
Step 1: Define our actions (cont)

```ruby
module Actions
  class IsolateEndpoint
    def call(cb_url:, cb_auth_token:, sensor_id:)

      # get current information about the sensor
      url = "#{cb_url}/api/v1/sensor/#{sensor_id}"
      response = RestClient::Resource.new(url, headers: {'X-Auth-Token' => cb_auth_token, accept: :json}).get
      sensor_info = JSON.parse response.body

      # set isolation flag to true
      sensor_info['network_isolation_enabled'] = true

      # apply it
      RestClient::Resource.new(url, headers: {'X-Auth-Token' => cb_auth_token, accept: :json}).
          put(sensor_info.to_json, content_type: :json)
    end
  end
end
```

Step 2: Execute playbook

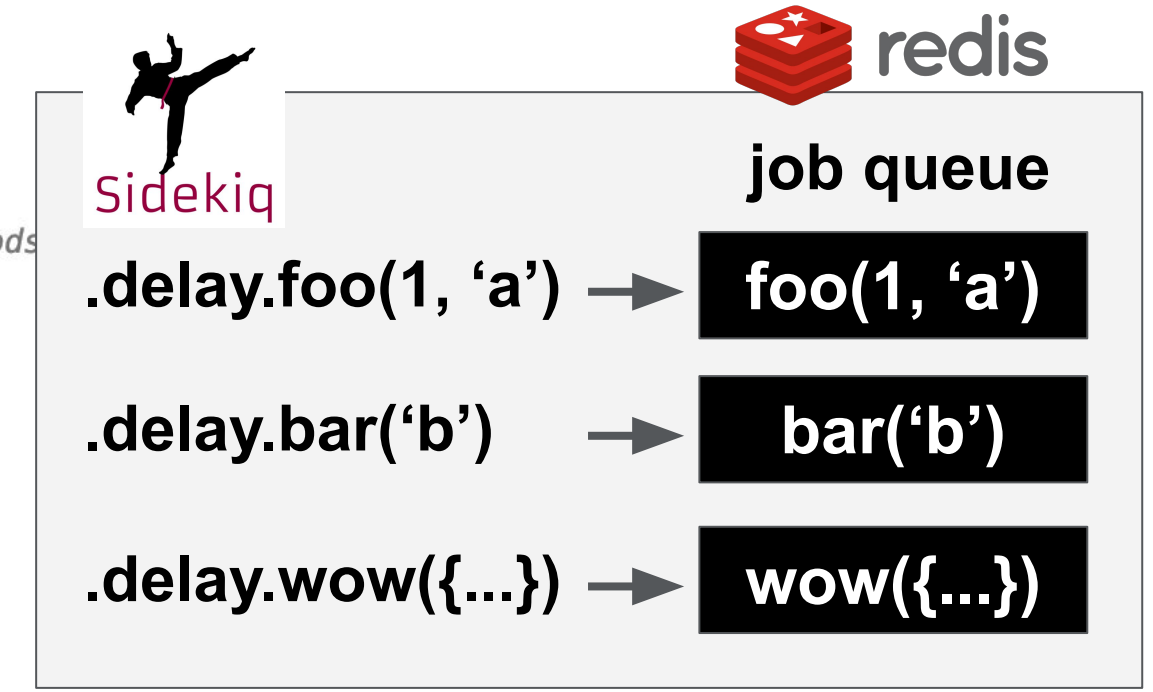
```
 9  module Playbooks
10    class BasicResponseSimple
11      def run!
12        puts "Starting playbook BasicResponseSimple"
13        AlertReceiver.new.get_alerts.each do |alert|
14          puts "- Processing alert #{alert['id']}"
15          self.class.delay.step0_parse_alert(alert: alert)
16        end
17      end
18
19      def self.step0_parse_alert(alert:) ... end
30
31      def self.step1_find_endpoint(source_hostname:, alert_ip_connection:) ... end
40
41      def self.step2_find_process(endpoint_info:, src_ip:, dest_ip:, dest_port:) ... end
51
52      def self.step3_enrich_process(endpoint_info:, process_info:) ... end
59
60      def self.step4_isolate_and_remediate(endpoint_info:, process_info:) ... end
87    end
88  end
```

Step 3: Queue action



Step 3: Queue action

```ruby
def run!
  # we want simpler code by calling `.delay` on methods
  Sidekiq::Extensions.enable_delay!

  puts "Starting playbook BasicResponseSimple"
  AlertReceiver.new.when_alert_received do |alert:|
    puts "- Processing alert #{alert['id']}"
    self.class.delay.step0_parse_alert(alert: alert)
  end
end

def self.step0_parse_alert(alert:)
  puts "- Step0", alert, alert.keys
  delay.step1_find_endpoint source_hostname: alert_source_hostname, alert_ip_connection: alert_ip_connection
end

def self.step1_find_endpoint(source_hostname:, alert_ip_connection:)
  puts "- Step1"
  endpoint_info = Actions::FindEndpoint.new.call hostname: source_hostname

  delay.step2_find_process endpoint_info: endpoint_info, src_ip: alert_ip_connection['src_ip'],
                           dest_ip: alert_ip_connection['dest_ip'], dest_port: alert_ip_connection['dest_port']
end
```



Step 4: Run action

```
sidekiq-container_1 | 2019-06-03T05:48:19.851Z JID-4dd7c9cd52ad38d0505c1938 INFO: start
sidekiq-container_1 | - Step0
sidekiq-container_1 | 2019-06-03T05:48:19.856Z JID-8c6db9c67c91fd9c1f64614a INFO: start
sidekiq-container_1 | - Step1
sidekiq-container_1 |   ** FindEndpoint hostname=ChrissMacBook2
sidekiq-container_1 | 2019-06-03T05:48:19.862Z JID-4dd7c9cd52ad38d0505c1938 INFO: done: 0.011 sec
sidekiq-container_1 | 2019-06-03T05:48:19.862Z JID-8c6db9c67c91fd9c1f64614a INFO: done: 0.007 sec
sidekiq-container_1 | 2019-06-03T05:48:19.864Z JID-3c5535a9a68d405416f9192d INFO: start
sidekiq-container_1 | - Step2
sidekiq-container_1 |   ** FindProcessByNetworkConnection sensor_id=123 destination_ip=192.168.1.64
sidekiq-container_1 | 2019-06-03T05:48:19.867Z JID-c902321f24ca202e7c104418 INFO: start
sidekiq-container_1 | 2019-06-03T05:48:19.867Z JID-3c5535a9a68d405416f9192d INFO: done: 0.004 sec
sidekiq-container_1 | - Step3
sidekiq-container_1 |   ** EnrichProcessWithPrevalenceInfo
sidekiq-container_1 | 2019-06-03T05:48:19.870Z JID-c902321f24ca202e7c104418 INFO: done: 0.003 sec
sidekiq-container_1 | 2019-06-03T05:48:19.871Z JID-2957c78b50b77206fcd9c5fa INFO: start
sidekiq-container_1 | - Step4
sidekiq-container_1 |   ** IsolateEndpoint isolating sensor_id=123
sidekiq-container_1 |   ** RemediateProcess
sidekiq-container_1 |     - terminating process_pid=374 on sensor_id=123
sidekiq-container_1 |     - banning md5=7c1a00c878eb89cb03be9b8133141b1b
sidekiq-container_1 | 2019-06-03T05:48:19.873Z JID-2957c78b50b77206fcd9c5fa INFO: done: 0.002 sec
```

Step 5: Run it!

Dockerfile

```
1  FROM ruby:2.6.2
2
3  RUN gem install bundler
4
5  ENV LC_ALL=C.UTF-8 \
6      LANG=en_US.UTF-8 \
7      LANGUAGE=en_US.UTF-8 \
8      APP_HOME=/app
9
10 RUN mkdir $APP_HOME
11 WORKDIR $APP_HOME
12
13 COPY Gemfile Gemfile.lock $APP_HOME/
14 RUN bundle install
15
16 # bring over our app
17 COPY . $APP_HOME
18
19 CMD ["bundle", "exec", "sidekiq", "-r",
```

```
~/projects/cbconnect-2019 $ docker build .
Sending build context to Docker daemon  20.99kB
Step 1/9 : FROM ruby:2.6.2
 ---> 8d6721e9290e
Step 2/9 : RUN gem install bundler
 ---> Using cache
 ---> 145410a55739
Step 3/9 : ENV LC_ALL=C.UTF-8     LANG=en_US.UTF-8     LANGUAGE=en_US.UTF-8
APP_HOME=/app
 ---> Using cache
 ---> a4905dd469a8
Step 4/9 : RUN mkdir $APP_HOME
 ---> Using cache
 ---> b8e357c39f46
Step 5/9 : WORKDIR $APP_HOME
 ---> Using cache
 ---> 136d4f0912d6
Step 6/9 : COPY Gemfile Gemfile.lock $APP_HOME/
 ---> Using cache
 ---> 0e4533c9fbe6
Step 7/9 : RUN bundle install
 ---> Using cache
 ---> a96e777325e1
Step 8/9 : COPY . $APP_HOME
 ---> aac5e00d559d
Step 9/9 : CMD ["bundle", "exec", "sidekiq", "-r", "/app/app/main.rb"]
 ---> Running in a1da45f0435f
Removing intermediate container a1da45f0435f
 ---> b5855186c3c5
Successfully built b5855186c3c5


~/projects/cbconnect-2019 $ docker run b5855186c3c5
Starting playbook BasicResponseSimple
```

Step 5: Run it!

docker-compose.yml

```
1   version: '3'
2   services:
3     sidekiq-container:
4       build:
5         context: .
6       command: ["bundle", "exec", "sidekiq", "-r", "/app/app/main.rb"]
7       environment:
8         - REDIS_PROVIDER=REDIS_URL
9         - REDIS_URL=redis://redis-container
10      volumes:
11        - .:/app
12      depends_on:
13        - redis-container
14
15    redis-container:
16      image: redis:3.2.8
17      expose:
18        - 6379
```

```
redis-container_1    | 1:C 03 Jun 04:33:14.932 # Warning: no config file specified, using the default config. In order to specif
er /path/to/redis.conf
redis-container_1    |
redis-container_1    |                 _.-``__ ''-._
redis-container_1    |            _.-``    `.  `_.  ''-._           Redis 3.2.8 (00000000/0) 64 bit
redis-container_1    |        .-`` .-```.  ```\/    _.,_ ''-._
redis-container_1    |       (    '      ,       .-`  | `,    )     Running in standalone mode
redis-container_1    |       |`-._`-...-` __...-.``-._|'` _.-'|     Port: 6379
redis-container_1    |       |    `-._   `._    /     _.-'    |     PID: 1
redis-container_1    |        `-._    `-._  `-./  _.-'    _.-'
redis-container_1    |       |`-._`-._    `-.__.-'    _.-'_.-'|
redis-container_1    |       |    `-._`-._        _.-'_.-'    |           http://redis.io
redis-container_1    |        `-._    `-._`-.__.-'_.-'    _.-'
redis-container_1    |       |`-._`-._    `-.__.-'    _.-'_.-'|
redis-container_1    |       |    `-._`-._        _.-'_.-'    |
redis-container_1    |        `-._    `-._`-.__.-'_.-'    _.-'
redis-container_1    |            `-._    `-.__.-'    _.-'
redis-container_1    |                `-._        _.-'
redis-container_1    |                    `-.__.-'
redis-container_1    |
redis-container_1    | 1:M 03 Jun 04:33:14.933 # WARNING: The TCP backlog setting of 511 cannot be enforced because /proc/sys/ne
 lower value of 128.
redis-container_1    | 1:M 03 Jun 04:33:14.933 # Server started, Redis version 3.2.8
redis-container_1    | 1:M 03 Jun 04:33:14.933 # WARNING you have Transparent Huge Pages (THP) support enabled in your kernel. T
mory usage issues with Redis. To fix this issue run the command 'echo never > /sys/kernel/mm/transparent_hugepage/enabled' as ro
.local in order to retain the setting after a reboot. Redis must be restarted after THP is disabled.
redis-container_1    | 1:M 03 Jun 04:33:14.933 * The server is now ready to accept connections on port 6379
sidekiq-container_1  | Starting playbook BasicResponseSimple
sidekiq-container_1  | Waiting for alerts
sidekiq-container_1  | .
sidekiq-container_1  | .
sidekiq-container_1  | .
sidekiq-container_1  | Got an alert!
sidekiq-container_1  | - Processing alert
sidekiq-container_1  | 2019-06-03T04:33:18.997Z  INFO: Booting Sidekiq 5.2.7 with redis options {:id=>"Sidekiq-server-PID-1", :u
sidekiq-container_1  | 2019-06-03T04:33:19.002Z  INFO: Running in ruby 2.6.2p47 (2019-03-13 revision 67232) [x86_64-linux]
sidekiq-container_1  | 2019-06-03T04:33:19.002Z  INFO: See LICENSE and the LGPL-3.0 for licensing details.
sidekiq-container_1  | 2019-06-03T04:33:19.002Z  INFO: Upgrade to Sidekiq Pro for more features and support: http://sidekiq.org
sidekiq-container_1  | 2019-06-03T04:33:19.003Z  WARN: Sidekiq 6.0 will require Redis 4.0+, you are using Redis v3.2.8
sidekiq-container_1  | 2019-06-03T04:33:19.003Z  INFO: Starting processing, hit Ctrl-C to stop
sidekiq-container_1  | 2019-06-03T04:33:19.011Z JID-2e9b14c5697e9909c42577d7 INFO: start
sidekiq-container_1  | - Step0
sidekiq-container_1  | 2019-06-03T04:33:19.022Z JID-a1300474dd06dc57af3d5585 INFO: start
sidekiq-container_1  | 2019-06-03T04:33:19.023Z JID-2e9b14c5697e9909c42577d7 INFO: done: 0.012 sec
```


Carbon Black.

www.CarbonBlack.com

Thank you.

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