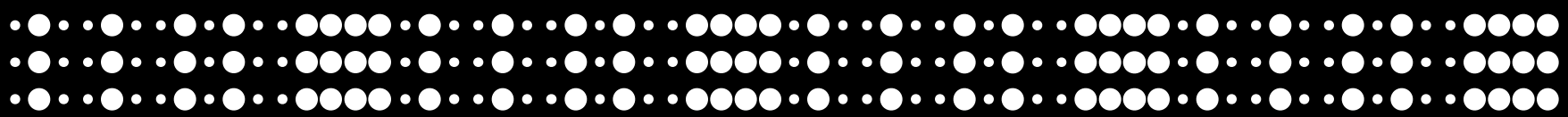

GOOGLE
I/O

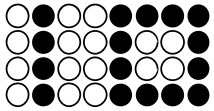


Building Production Quality Apps on App Engine

Ken Ashcraft
5/29/2008

Outline

- Writing code for production
- Testing performance
- Safe deployment after launch



Writing Code for Production

Writing Code for Production

Errors happen

```
movie = Movie()
movie.title = self.request.get('title', None)
movie.director = self.request.get('director', None)
movie.put()
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- Out-of-memory
- DeadlineExceeded
- OverQuotaError
- Server crash

Writing Code for Production

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- Out-of-memory
- DeadlineExceeded
- OverQuotaError
- Server crash
- Datastore crash

Writing Code for Production

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movie.put()
```

- Out-of-memory
- DeadlineExceeded
- OverQuotaError
- Server crash
- Datastore crash
- Identical entity already exists

Writing Code for Production

Use logging for forensics

```
import logging

user = users.get_current_user()
if user:
  q = db.GqlQuery("SELECT * FROM UserPrefs WHERE user = :1",
                  user)
  results = q.fetch(2)
  if len(results) > 1:
    logging.error("Multiple UserPrefs for user %s", user)
  if len(results) == 0:
    logging.debug("Creating UserPrefs for user %s", user)
    userprefs = UserPrefs(user=user)
    userprefs.put()
  else:
    userprefs = results[0]
else:
  logging.debug("Creating dummy UserPrefs for anonymous user")
```

Writing Code for Production

Email upon exception

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```
class BaseRequestHandler(webapp.RequestHandler):
```

Writing Code for Production

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class BaseRequestHandler(webapp.RequestHandler):
  def handle_exception(self, exception, debug_mode):
```

Writing Code for Production

Email upon exception

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class BaseRequestHandler(webapp.RequestHandler):
  def handle_exception(self, exception, debug_mode):
    lines = ''.join(traceback.format_exception(*sys.exc_info
()))
```

Writing Code for Production

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class BaseRequestHandler(webapp.RequestHandler):
  def handle_exception(self, exception, debug_mode):
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```

Writing Code for Production

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class BaseRequestHandler(webapp.RequestHandler):
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    lines = ''.join(traceback.format_exception(*sys.exc_info
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    logging.error(lines)
    mail.send_mail_to_admins(sender='myapp-noreply@gmail.com',
```

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    template_values = {}
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    mail.send_mail_to_admins(sender='myapp-noreply@gmail.com',
                             subject='Caught Exception',
                             body=lines)
    template_values = {}
    if users.is_current_user_admin():
```

Writing Code for Production

Email upon exception

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    template_values = {}
    if users.is_current_user_admin():
      template_values['traceback'] = lines
```

Writing Code for Production

Email upon exception

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```

Writing Code for Production

Using the Python profiler

http://code.google.com/appengine/kb/commontasks.html#profiling

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def real_main():
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def real_main():
  application = webapp.WSGIApplication([
```

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Writing Code for Production

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```
def real_main():
  application = webapp.WSGIApplication([
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```

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Writing Code for Production

Using the Python profiler

```
def real_main():
  application = webapp.WSGIApplication([
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```

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Writing Code for Production

Using the Python profiler

```
def real_main():
  application = webapp.WSGIApplication([
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  ], debug=_DEBUG)
  wsgiref.handlers.CGIHandler().run(application)
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def real_main():
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def profile_main():
```

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  ], debug=_DEBUG)
  wsgiref.handlers.CGIHandler().run(application)

def profile_main():
  # Turn on profiling and run real_main()
```

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  …
  logging.info("Profile data:\n%s", profile_data)
```

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Using the Python profiler

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def main():
```

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def main():
  if random.randint(0, 100) == 4:
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  …
  logging.info("Profile data:\n%s", profile_data)

def main():
  if random.randint(0, 100) == 4:
    profile_main()
  else:
```

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def main():
  if random.randint(0, 100) == 4:
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  else:
    real_main()
```

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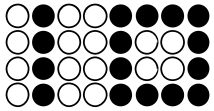
Writing Code for Production

- Errors happen!



Loadtests

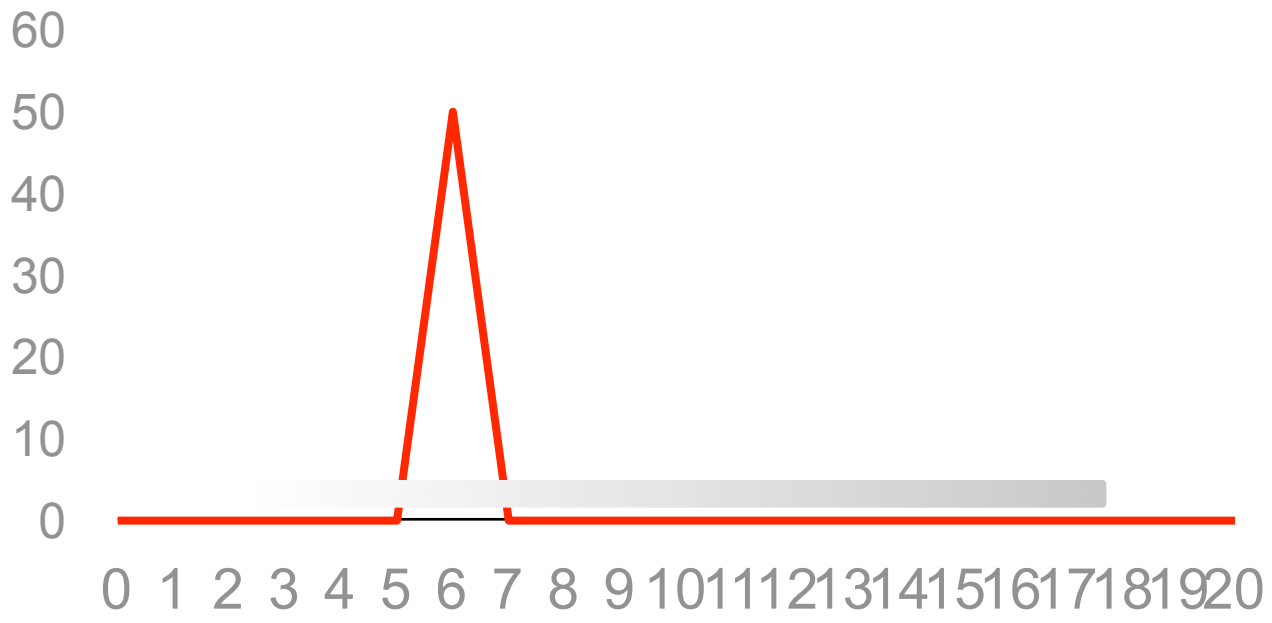
Loadtests

What not to do

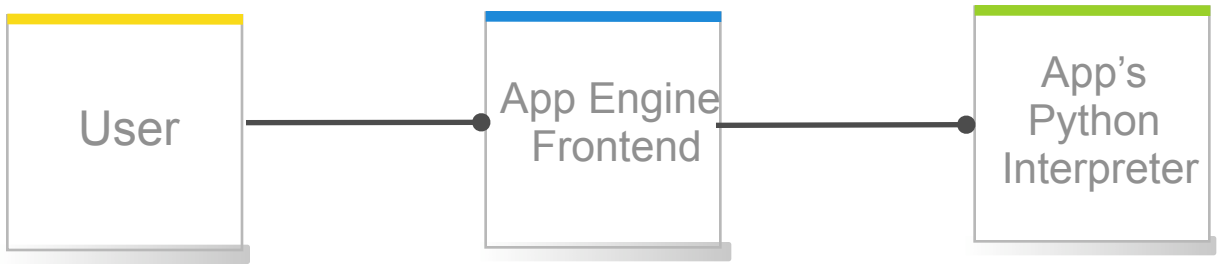
- The dev_appserver is not designed for performance!

Loadtests

What not to do



The Request Path



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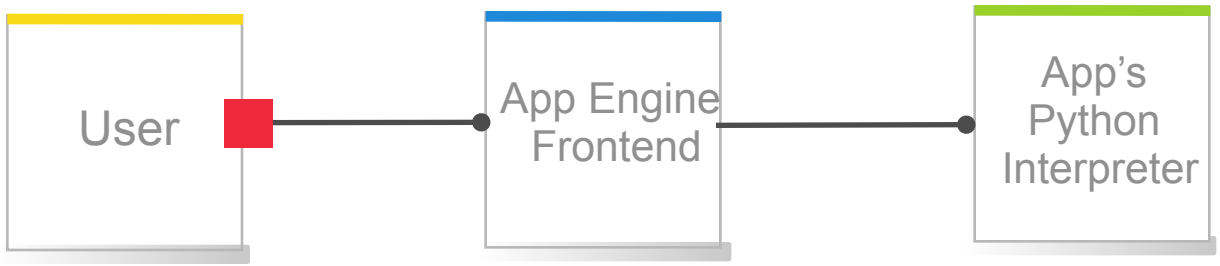

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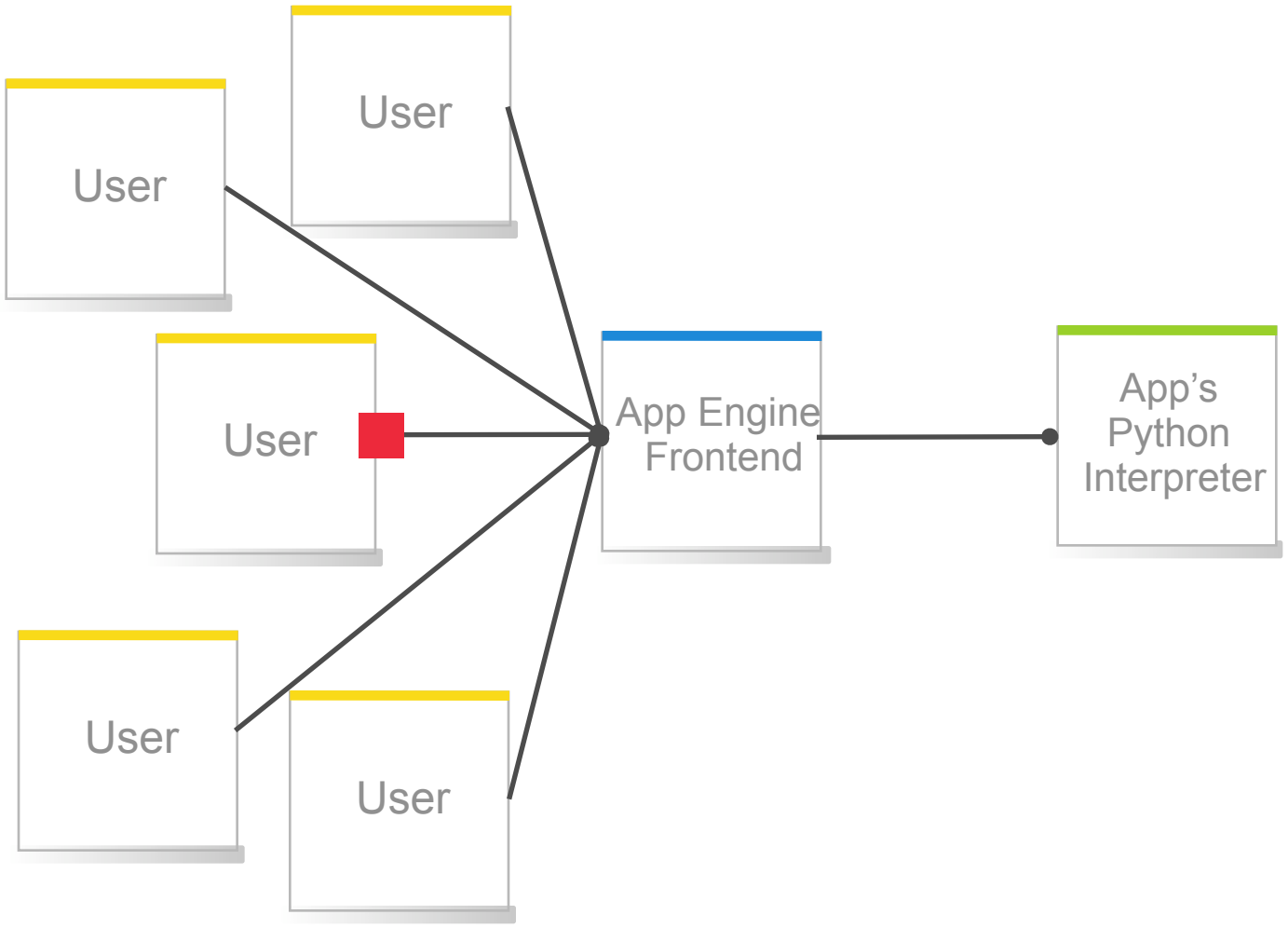

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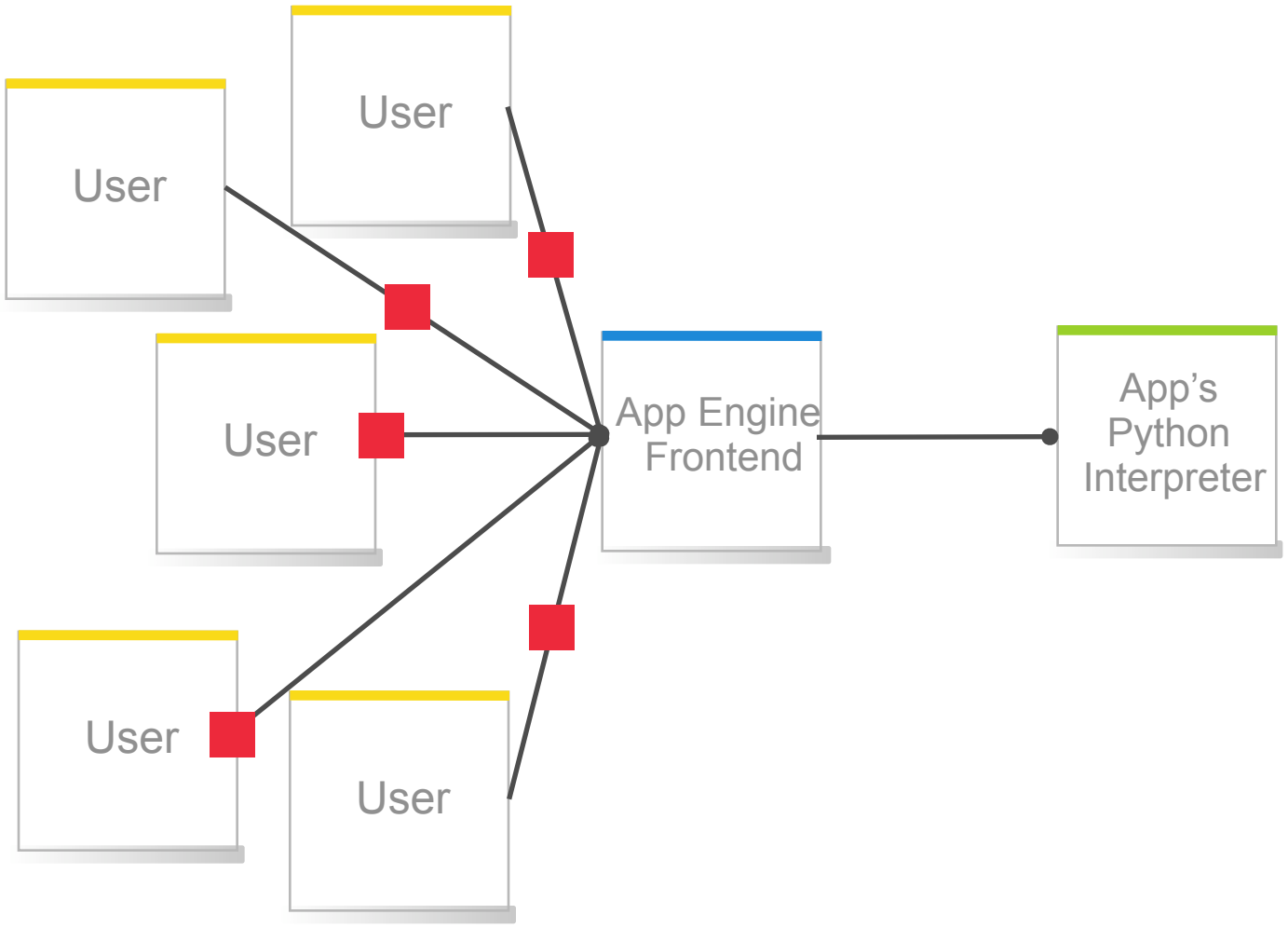

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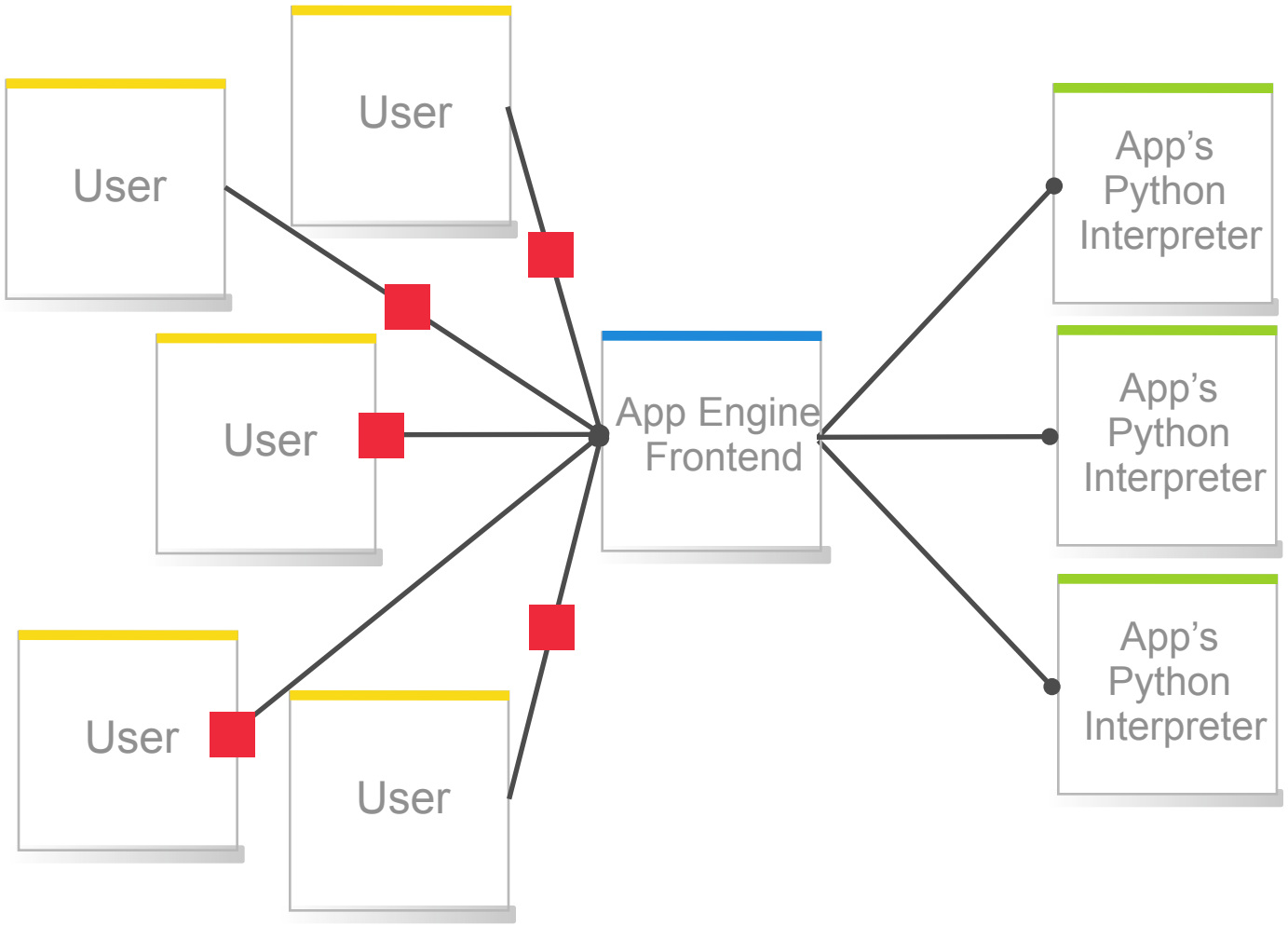
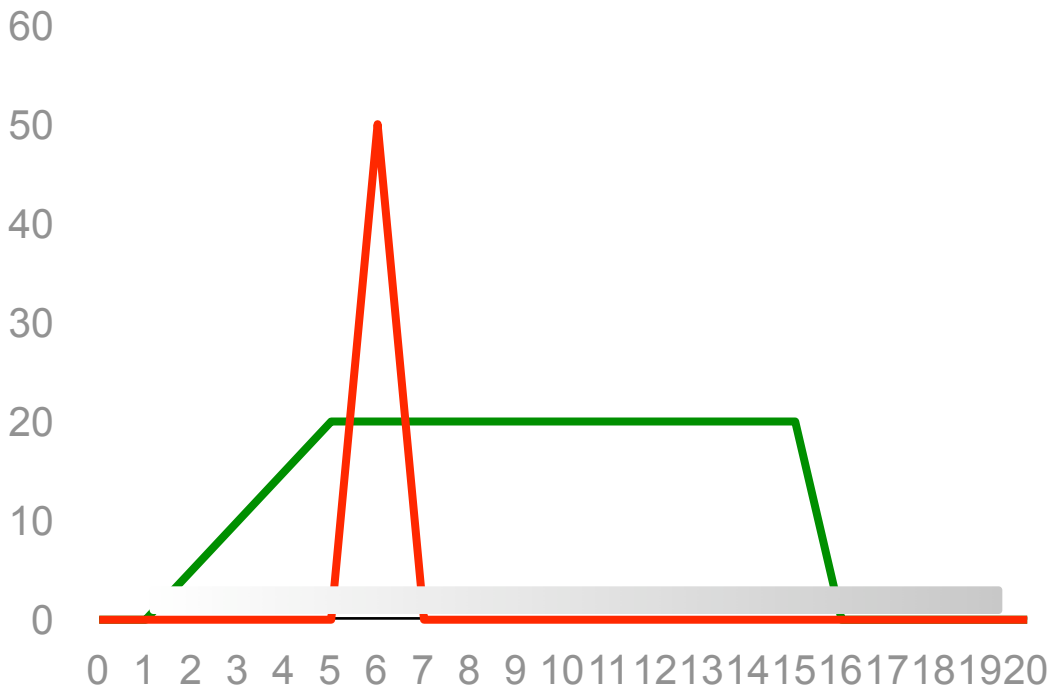


Loadtests

Good vs Bad



Loadtests

Realistic values

Loadtests

Realistic values

- 50,000 users / day

Loadtests

Realistic values

- 50,000 users / day
- 2 pageviews / user

Loadtests

Realistic values

- 50,000 users / day
- 2 pageviews / user
- **100,000 pageviews / day**

Loadtests

Realistic values

- 50,000 users / day
- 2 pageviews / user
- **100,000 pageviews / day**
- 5 requests / pageview

Loadtests

Realistic values

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- 2 pageviews / user
- **100,000 pageviews / day**
- 5 requests / pageview
- 500,000 requests / day

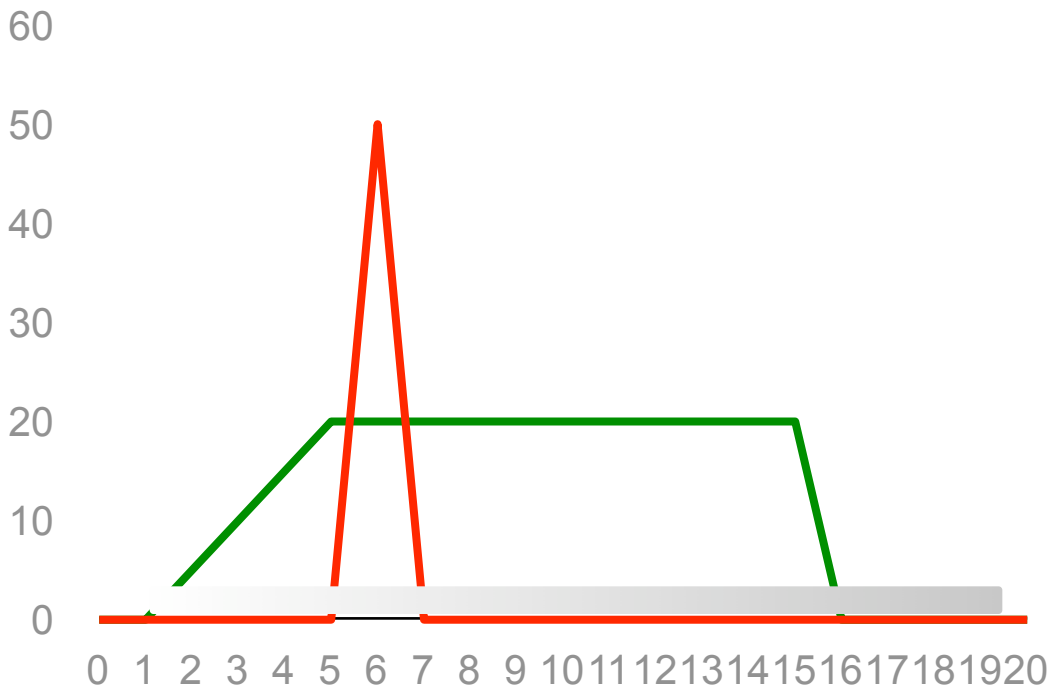
Loadtests

Realistic values

- 50,000 users / day
- 2 pageviews / user
- **100,000 pageviews / day**
- 5 requests / pageview
- 500,000 requests / day
- **5.8 requests / second**

Loadtests

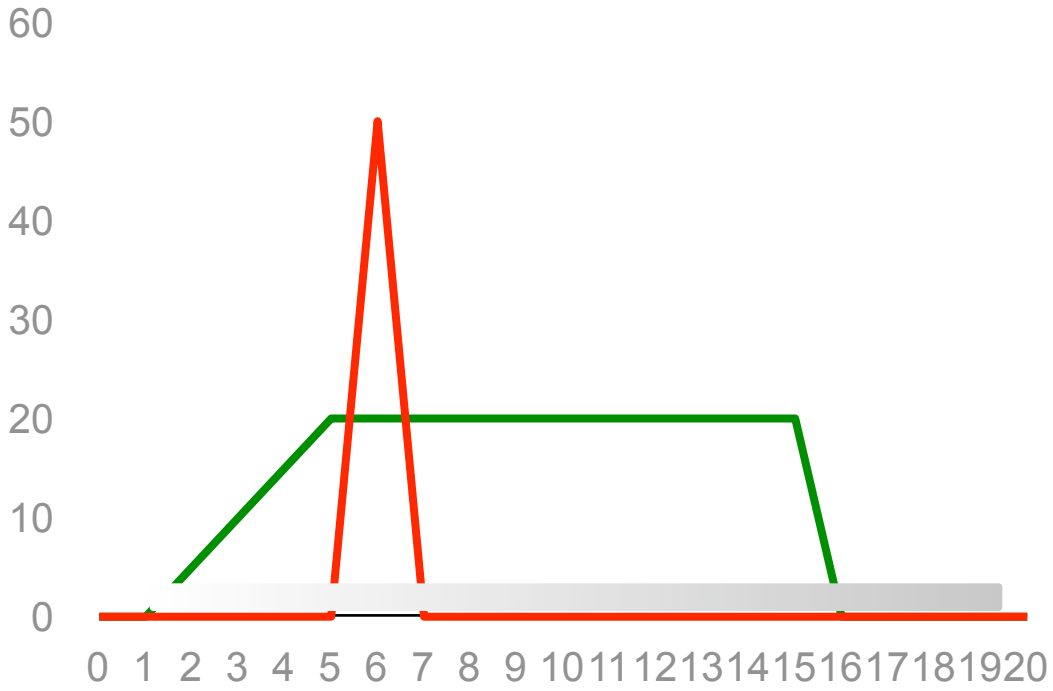
Good vs Bad



Loadtests

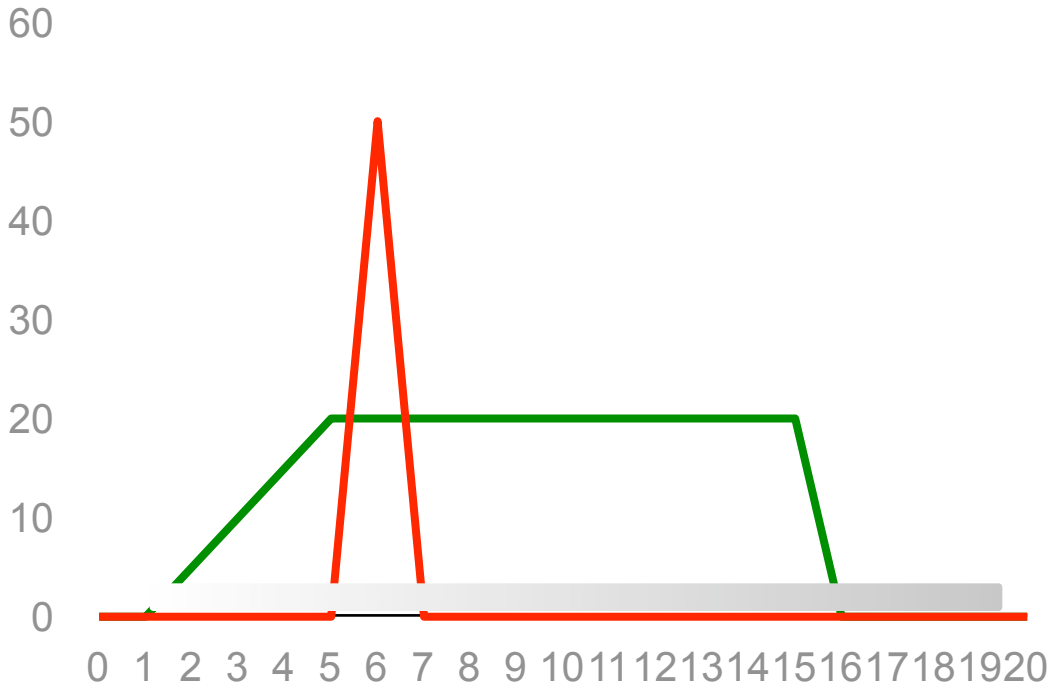
Good vs Bad

- Qualities of a good load test:



Loadtests

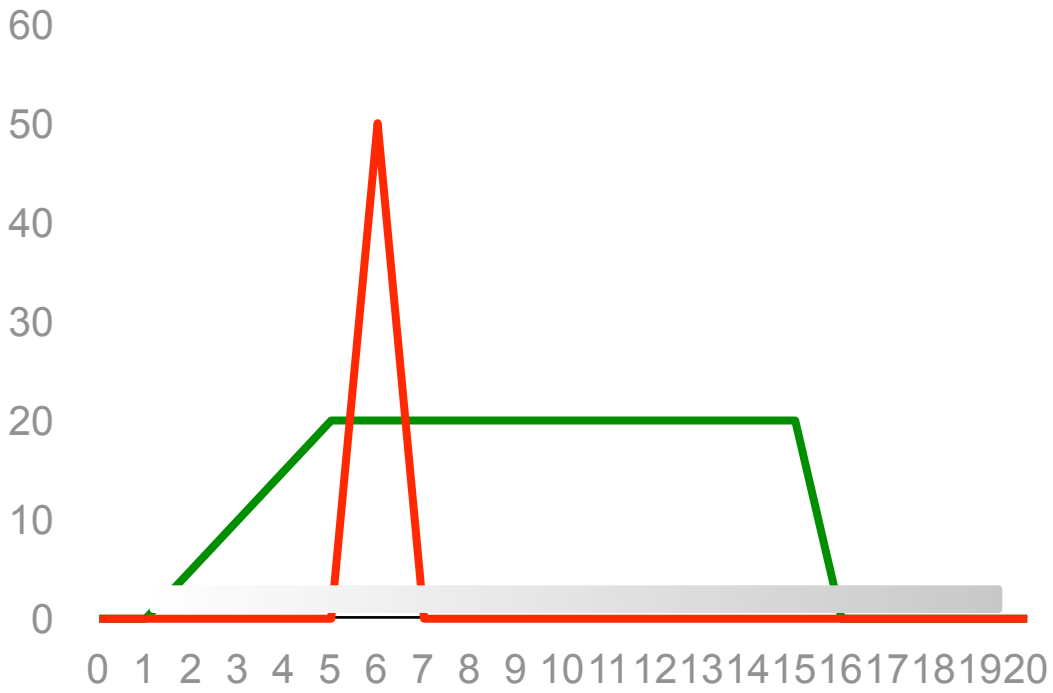
Good vs Bad



- Qualities of a good load test:
  - Use production system (not dev_appserver)

Loadtests

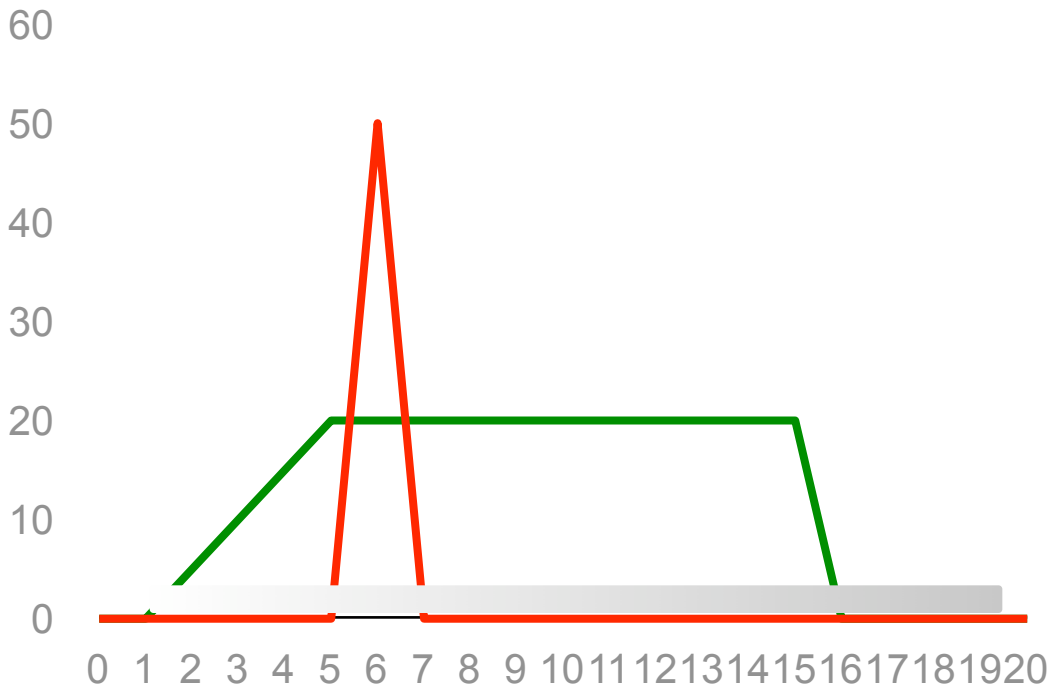
Good vs Bad



- Qualities of a good load test:
  - Use production system (not dev_appserver)
  - Gradual ramp up

Loadtests

Good vs Bad



- Qualities of a good load test:
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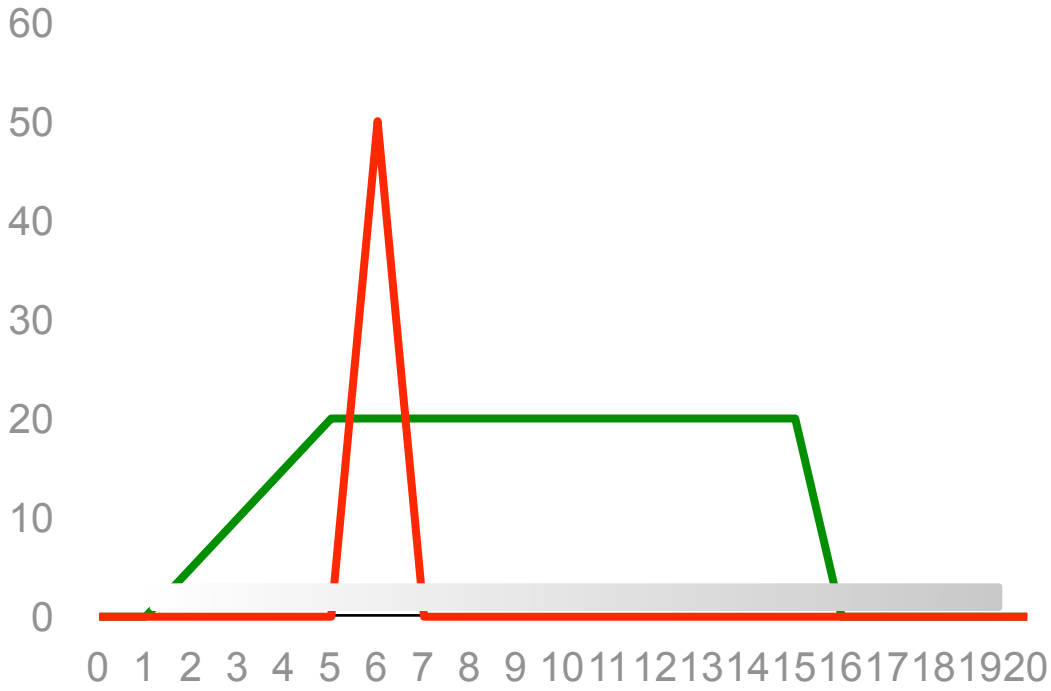
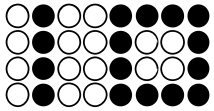
  - Sustained load

Loadtests

Good vs Bad



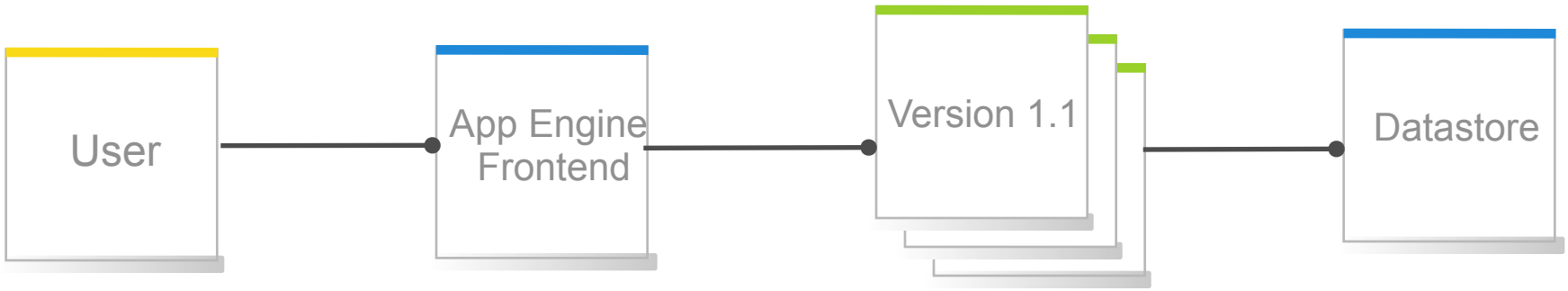
- Qualities of a good load test:
  - Use production system (not dev_appserver)
  - Gradual ramp up
  - Sustained load
  - Realistic load



Safe Deployment

How App Versioning Works

http://wiki-io.appspot.com



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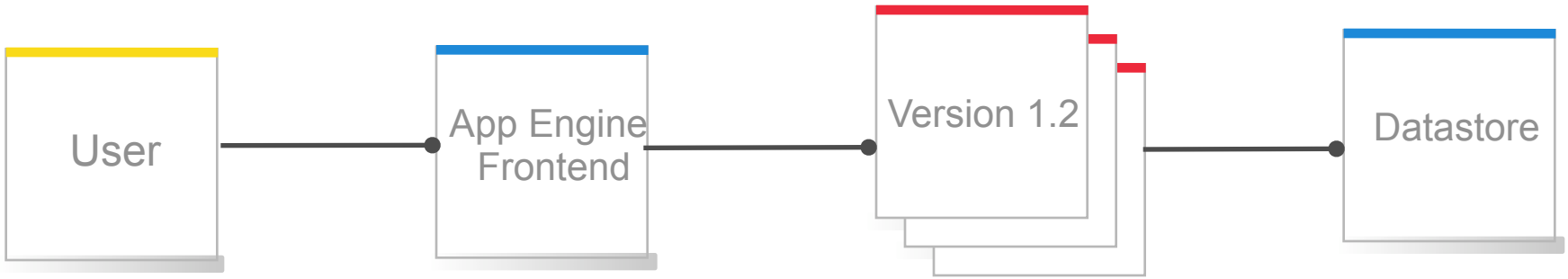
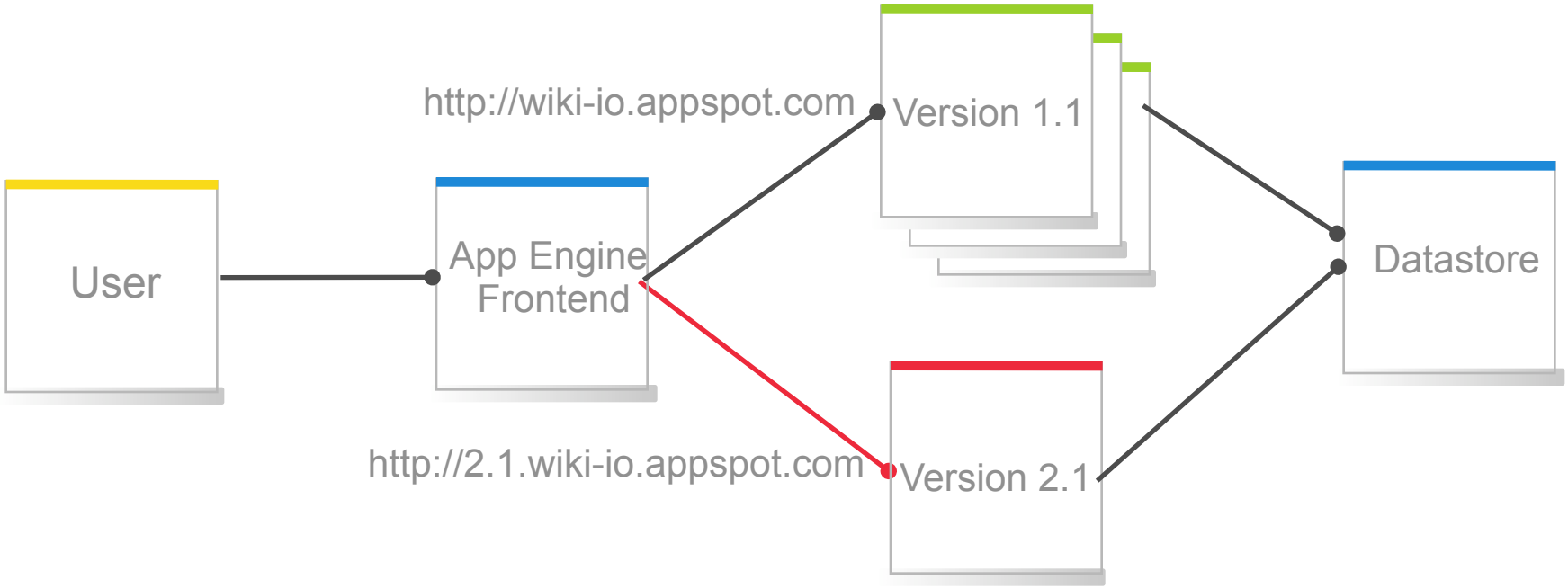


How App Versioning Works



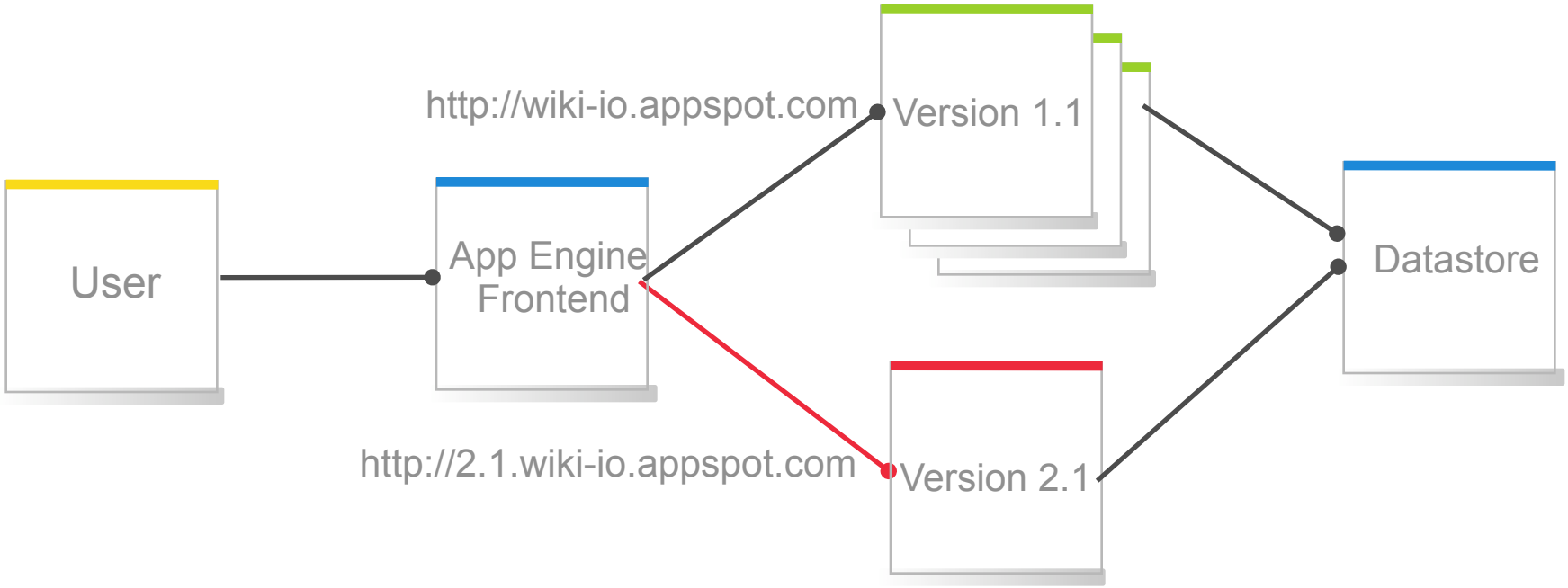
App Versioning

Control the version with app.yaml

```
application: wiki-io
version: 5482  # Revision number
runtime: python
api_version: 1
…
```

- Suggestion: Create a build script to populate *version*

How App Versioning Works



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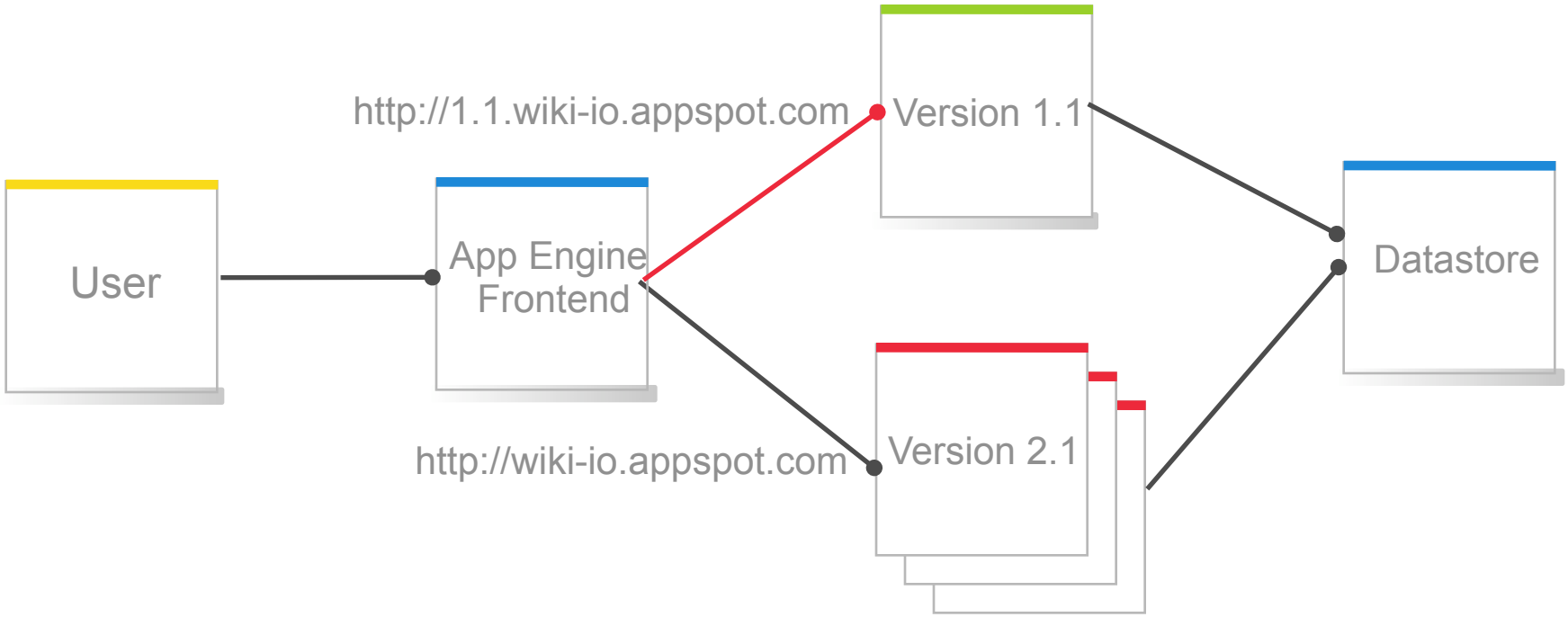

Testing the Release

- http://<major>.<minor>.<app>.appspot.com
- Selenium: a test tool for web applications
  - http://selenium.openqa.org
- Use the log viewer to look for errors

Feature Requests

Feature Requests

- A/B testing

Feature Requests

- A/B testing
- Integration with SVN

Feature Requests

- A/B testing
- Integration with SVN
- Edit running code

Summary

Summary

- Write code to handle errors
  - Use logging and catch exceptions

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- Write code to handle errors
  - Use logging and catch exceptions
- Do realistic loadtests

Summary

- Write code to handle errors
  - Use logging and catch exceptions
- Do realistic loadtests
- Use versions for safe deployment


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