

Django Deployment with Nginx & uWSGI

Nginx?

- High Performance HTTP server and reverse proxy
- Open source
- Stable - first release was in 2004
- Resource friendly - very low memory
- Nearly 7.5% of all domains use it - including SourceForge, github, EngineYard, and Hulu

uWSGI?

- High Performance self-healing application server
- Open source
- Master process manager for re-spawning processes and monitoring the stack
- Concurrency (multiple workers)
- Per worker request limits
- Unix and TCP socket support
- Per worker memory limits
- Commercial support available

Nginx

Why Nginx?

- Easy configuration
- Event driven
- Simple reverse proxy / load balancer
- Built-in support for uWSGI

Nginx

Why Nginx?

- Easy configuration
- Event driven
- Simple reverse proxy / load balancer
- Built-in support for uWSGI
- Ultimately just a preference when compared to others like it -- i.e. Cherokee ;)

uWSGI

Why uWSGI?

- Ability to limit RAM per worker
- Set time limits for requests
- Built-in chroot support
- Supports virtualenv
- Custom PYTHONPATH options (up to 64 additional directories)
- UNIX sockets - avoid the full TCP stack overhead altogether
- Integrated profiler for debug/development

Recommends

- Build Nginx and uWSGI from source -- most distro packages are way out of date
- Start with few options in the configuration -- slowly grow -- will help with debugging

Django Project

```
demoapp /  
  blog /  
    admin.py  
    models.py  
  manage.py  
  settings.py  
  urls.py  
  __init__.py  
  data.db
```


Django Project

```
demoapp /  
  blog /  
    admin.py  
    models.py  
  manage.py  
  settings.py  
  urls.py  
  __init__.py  
  data.db
```

- Standard Django project
- Simple 'Blog' app
 - One model: Entry
- SQLite3 DB backed

Directory Structure

- `/srv/django` (holds Django projects)
- `/srv/ve` (holds Django project virtualenv's)

Technical Details (demo)

- VirtualBox virtual machine (virtio net/disk)
 - 1x vcpu (2.4GHz) 512 MB RAM
- Ubuntu 10.10 x64
- Nginx 0.8.54 (latest stable)
- uWSGI 0.9.8 (latest stable)
- Django 1.2.5 (latest stable)

uWSGI Configuration

Options available:

- Command line
- Environment variables
- XML
- INI
- YAML
- LDAP

uWSGI Configuration

```
bash # : uwsgi --chdir <project_dir>
```

uWSGI Configuration

```
bash # : uwsgi --chdir /srv/django/demoapp
```

uWSGI Configuration

```
bash # : uwsgi --chdir /srv/django/demoapp  
--pp /srv/django
```

uWSGI Configuration

```
bash # : uwsgi --chdir /srv/django/demoapp  
--pp /srv/django  
-s /tmp/uwsgi.sock --vacuum
```


uWSGI Configuration

```
bash # : uwsgi --chdir /srv/django/demoapp  
--pp /srv/django  
-s /tmp/uwsgi.sock --vacuum  
--env DJANGO_SETTINGS_MODULE=demoapp.settings
```

uWSGI Configuration

```
bash # : uwsgi --chdir /srv/django/demoapp  
--pp /srv/django  
-s /tmp/uwsgi.sock --vacuum  
--env DJANGO_SETTINGS_MODULE=demoapp.settings  
-w "django.core.handlers.wsgi:WSGIHandler()"
```

uWSGI Configuration

```
bash # : uwsgi --chdir /srv/django/demoapp  
--pp /srv/django  
-s /tmp/uwsgi.sock --vacuum  
--env DJANGO_SETTINGS_MODULE=demoapp.settings  
-w "django.core.handlers.wsgi:WSGIHandler()"   
-H <path_to_virtualenv>
```

uWSGI Configuration

```
bash # : uwsgi --chdir /srv/django/demoapp  
--pp /srv/django  
-s /tmp/uwsgi.sock --vacuum  
--env DJANGO_SETTINGS_MODULE=demoapp.settings  
-w "django.core.handlers.wsgi:WSGIHandler()"   
-H /srv/ve/demoapp
```

uWSGI Configuration

```
bash # : uwsgi --chdir /srv/django/demoapp  
--pp /srv/django  
-s /tmp/uwsgi.sock --vacuum  
--env DJANGO_SETTINGS_MODULE=demoapp.settings  
-w "django.core.handlers.wsgi:WSGIHandler()"  
-H /srv/ve/demoapp --http 0.0.0.0:8000
```

uWSGI Configuration

```
bash # : uwsgi --chdir /srv/django/demoapp  
--pp /srv/django  
-s /tmp/uwsgi.sock --vacuum  
--env DJANGO_SETTINGS_MODULE=demoapp.settings  
-w "django.core.handlers.wsgi:WSGIHandler()"  
-H /srv/ve/demoapp --http 0.0.0.0:8000 --chmod-sock
```

uWSGI Configuration

```
bash # : uwsgi --chdir /srv/django/demoapp  
--pp /srv/django  
-s /tmp/uwsgi.sock --vacuum  
--env DJANGO_SETTINGS_MODULE=demoapp.settings  
-w "django.core.handlers.wsgi:WSGIHandler()"   
-H /srv/ve/demoapp --http 0.0.0.0:8000 --chmod-sock  
--limit-as 128
```

uWSGI Configuration

```
bash # : uwsgi --chdir /srv/django/demoapp  
--pp /srv/django  
-s /tmp/uwsgi.sock --vacuum  
--env DJANGO_SETTINGS_MODULE=demoapp.settings  
-w "django.core.handlers.wsgi:WSGIHandler()"   
-H /srv/ve/demoapp --http 0.0.0.0:8000 --chmod-sock  
--limit-as 128
```

You can now test the application by accessing <ip/host>:8000 -- it uses the built-in uWSGI embedded (test) HTTP server.

For Production, remove --http 0.0.0.0:8000 and --chmod-sock (not secure)

Nginx Configuration

Edit /etc/nginx/nginx.conf

...

```
location / {  
    uwsgi_pass unix:///tmp/uwsgi.sock;  
    include uwsgi_params;  
}
```

...

bash # : service nginx reload

Nginx Configuration

Static media (*where Nginx shines*)

...

```
location /media/ {  
    alias /srv/ve/demoapp/lib/python2.6/site-  
packages/django/contrib/admin/media/  
}
```

```
location /static/ {  
    alias /srv/django/demoapp/static/  
}
```

...

bash # : service nginx reload

Results

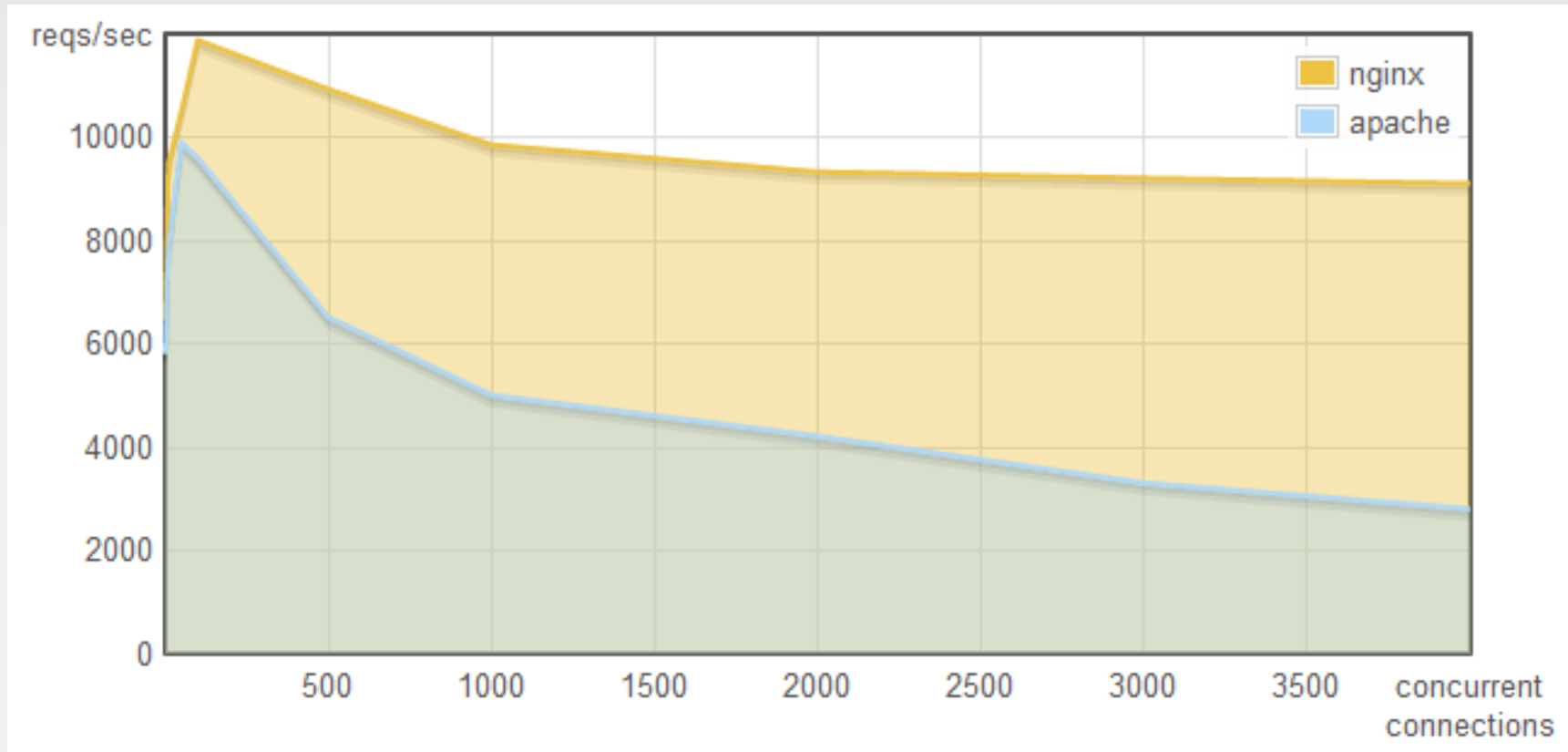
Basic results from our test VM

- Nginx
 - uses ~ 4 MB RAM
- uWSGI
 - uses ~ 20 MB RAM

Could handle roughly about 250 requests/sec when using application server (uWSGI)

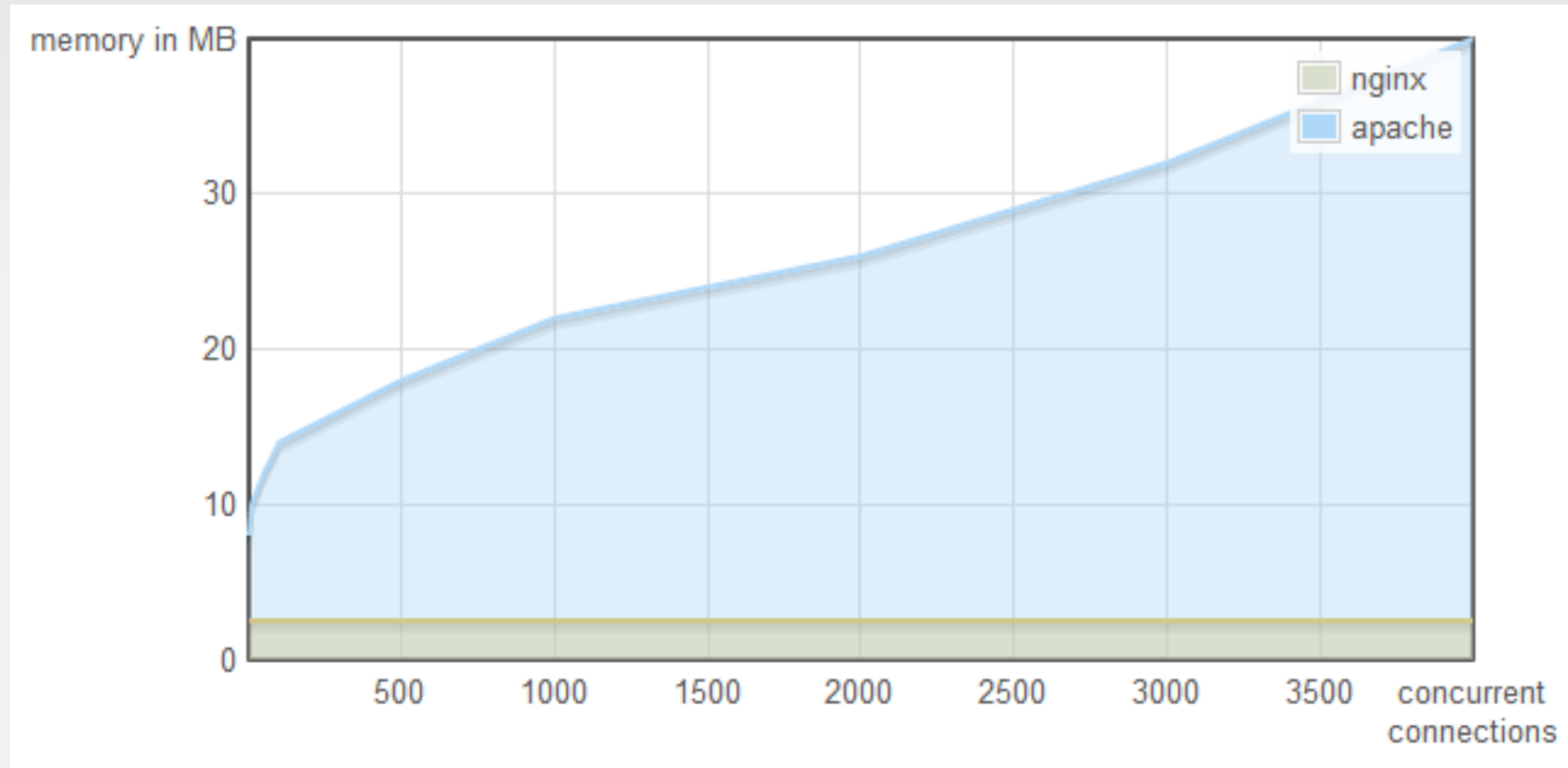
Static content could get ~ 1500 requests/sec

Comparison



courtesy of webfaction.com

Comparison



courtesy of webfaction.com

Questions?

Source: <https://bitbucket.org/ehazlett/indydjango/src>

Nginx: <http://wiki.nginx.org>

uWSGI: <http://projects.unbit.it/uwsgi/>