Session 1:
Preparing the workspace

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0

Contents of this session

1. Introduction
2. Installing tools
3. Git and GitHub
4. Django setup
5. Docker setup

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1

1. Introduction

2

Goals

- Be able to **create and maintain** a **Django webapp in production**
  - With **integrated payments** by **Mollie**
  - With **error monitoring** by **Sentry**
- Be able to **use Git** and **GitHub**
- Be able to **deploy** the webapp **using DigitalOcean**

3

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3

Who am I?

- Xander Warszawski
- Master student Engineering Technology ICT
- IEEE SB KU Leuven Campus Bruges Chair
- GitHub Campus Expert

- Pythonista since +/- 2017
- Django for side projects
- Last year: worked on C# Web API
- For any questions: **xander@xdoubleu.com**

4

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4

Slides

- Can be fetched from https://xdoubleu.com/webdev-4-dummies-workshop/
- I can also provide printed slides on request
- Code is also available here

5

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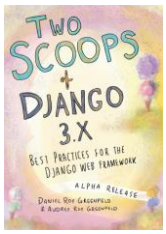
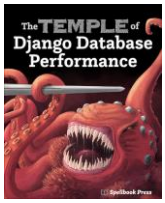
Slides

- Slides are based on:
  - '**Django for Professionals 4.0**' by William S. Vincent
  - '**Speed Up Your Django Tests**' by Adam Johnson
  - '**Two Scoops of Django**' by Audrey R. Greenfeld and Danny R. Greenfeld
  - '**The Temple of Django Database Performance**' by Andrew Brookins





6

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Scope of this workshop series

- Web applications / web apps:
  - App stored on remote server
  - Delivered over internet through browser interface
- Front-end / client-side:
  - HTML
  - CSS
  - JS
- Back-end / server-side:
  - In this case: Python
  - Other options:
    - JS/TS
    - Ruby
    - PHP
- I'll try to cover both, but back-end is my 'expertise'

7

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What is Django?

- From the Django docs:
  - ***Django** is a **high-level Python web framework** that encourages **rapid development** and **clean, pragmatic design**. Built by experienced developers, it **takes care of much of the hassle of web development**, so **you can focus on writing your app without needing to reinvent the wheel**. It's **free and open source**.*
- Used by:
  - Instagram
  - Spotify
  - Pinterest
  - Bitbucket

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Why use Django?

- Features (from Django docs):
  - **Ridiculously fast**: devs can take applications from concept to completion very fast
  - **Fully loaded**: handles lots of overhead out of the box (e.g. user authentication)
  - **Reassuringly secure**: lots of security features out of the box
  - **Exceedingly scalable**: can flexibly scale to meet the heaviest traffic demands
  - **Incredibly versatile**: lots of different use cases and uses

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Python cheat sheet

- Django uses specific code that doesn't contain a lot of logic
  - Basic Python knowledge is sufficient
  - https://www.pythoncheatsheet.org/
- If you want to practice programming (in Python):
  - https://www.hackerrank.com/
  - https://leetcode.com/

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Timing

- 05/10: Introduction + setup
- 12/10: Basics of Django
- 19/10: Varia
- 26/10: Preparing for Deployment
- 09/11: Deployment
- 16/11: Practice everything on your own

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2. Installing tools

12

Python install

- https://www.python.org/downloads/
- Install now:
  - For all users
  - Add to PATH

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13

VSCode install

- https://code.visualstudio.com/
- Recommended extensions:
  - Bookmarks
  - Docker
  - GitLens
  - IntelliCode
  - Python
  - Django
  - SQLTools
    - + driver for PostGreSQL

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Git install

- https://git-scm.com/download
- Default everything

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Sourcetree install

- https://www.sourcetreeapp.com/
- Skip registration
- Install git
- SSH Key: No

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Docker install

- https://www.docker.com/

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3. Git and GitHub

18

Introduction

- **Git** is a **VCS** (**V**ersion **C**ontrol **S**ystem)
  - Allows developers to store all versions of their code as one (= repository)
  - *Branching* and *merging*
- **GitHub** is a **Hub**
  - Hub? **A hub** airport is an airport used by one or more airlines **to concentrate** passenger **traffic and** flight **operations**.
  - So? GitHub is a **concentration of Git repositories**
    - Also publishing & collaboration tool

19

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19

Terminology

- **Repo**(sitory): project 'folder' (code, docs); has all versions
- **Branch**: parallel version in repo
- **Commit**: saving changes in branch
- **Fork**: 'copy' existing repo
- **Merge**: merge branches or repo
- **Pull Request** (GH) / Merge Request (GL): request to merge branch or fork
- **Clone**: copy of repo, mostly offline
- **Fetch**: getting last version of online repo
- **Pull**: 'download' latest commits from remote repo to clone
- **Push**: 'upload' committed changes to remote repo
- **Reverse**: undo changes made in commit(s), useful for when application breaks in production
- **Cherry pick**: pick a certain commit out of the change history

20

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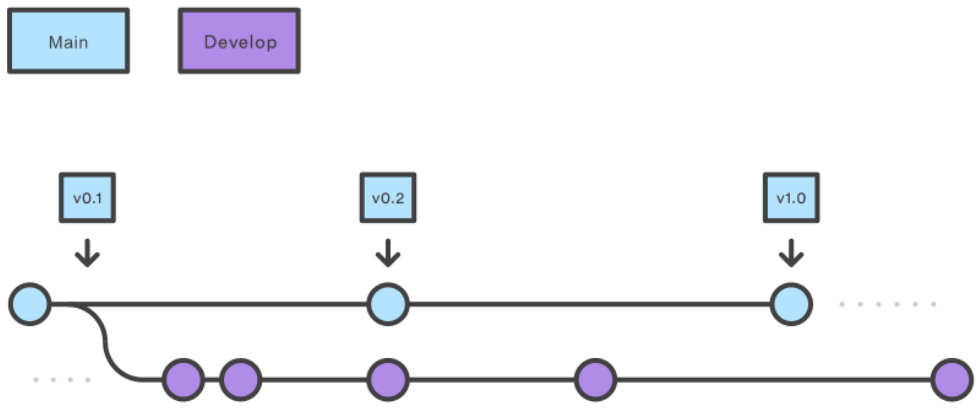
20

GitFlow Workflow 1: main & dev



21

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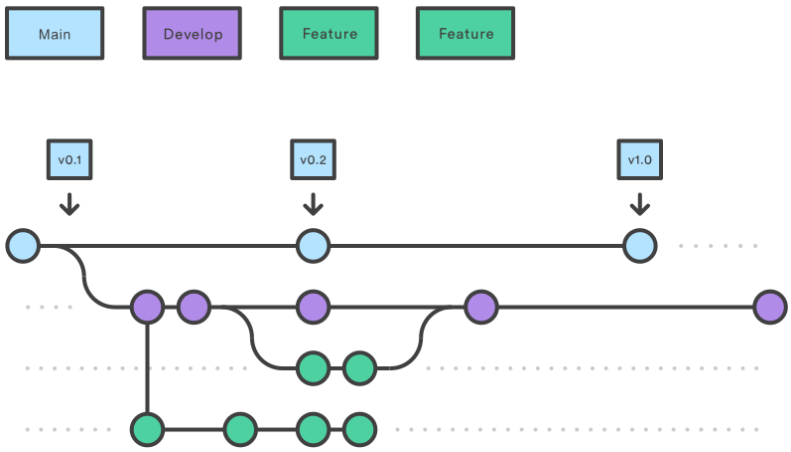
21

GitFlow Workflow 2: feature



22

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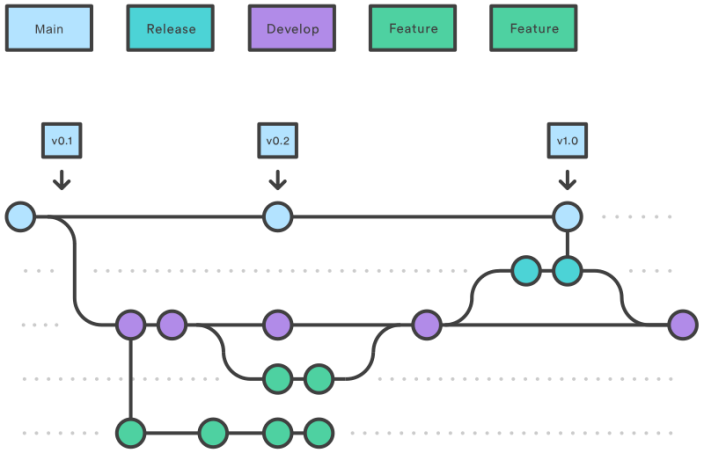
22

GitFlow Workflow 3: release



23

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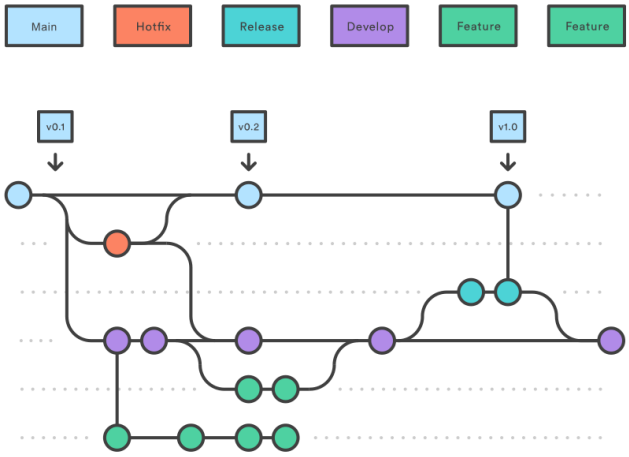
23

GitFlow Workflow 4: hotfix



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GitFlow Workflow: overall flow

1. **Dev** branch from **main**
2. **Release** branch from **dev**
3. **Feature** branches from **dev**
4. **Feature** done? Merge in **dev**
5. **Release** done? Merge in **main** & **dev**
6. Issue in main? Create **hotfix** branch from **main**
7. **Hotfix** done? Merge in **main** & **dev**
8. Source: https://www.atlassian.com/git/tutorials/comparing-workflows/gitflow-workflow

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Questions?

- If you want to practice git:
  - https://learngitbranching.js.org/

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Practice

1. Create GitHub account: https://github.com/signup
2. Create repo:
   1. '+'-icon right upper corner > new repo;
   2. public or private up to you
   3. no readme
   4. no gitignore
3. Automatically delete head branches (Settings > General > Pull Requests)
4. Go to actions:
   1. Search for 'Django', click configure
   2. Remove run on push, add 'dev' to on PR branches
   3. Make sure python versions are: 3.8, 3.9, 3.10
   4. Start commit

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Practice

1. Setup dev branch:
    1. Click main > Type dev in “find or create a branch” > create dev branch from main
    2. Settings > branches
    3. Add branch protection rule for main and dev
        1. Require PR
        2. Disable require approvals
2. Clone using SourceTree
3. Add file:
    1. Checkout dev branch from remotes
    2. Create feature branch from dev
    3. Add file, commit file
    4. Create PR to dev
4. Django action will fail, merge anyways

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4. Django setup

Git checkpoint

1. Create new feature branch

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Django installation

1. Make sure you have a GitHub repo on your pc and you're on a feature branch
2. Open the folder in VSCode, open a new terminal
3. **python –m venv .venv**
4. **.venv\Scripts\activate**
5. **pip install django**
6. Optional: **pip install --upgrade pip**
7. **pip freeze > requirements.txt**
8. **django-admin startproject config . (!! Don't forget dot at the end)**
9. **python manage.py migrate**
10. **python manage.py runserver**

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Git checkpoint

1. Add gitignore (https://www.toptal.com/developers/gitignore)
2. Commit changes + do a PR
3. Add require checks to branch protection
    1. ''build 3.10'' by example

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Questions?

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5. Docker setup

34

Introduction

- Docker:
  - Type of virtualization that only uses Linux containers
    - Containers are created from images
  - Everything above the OS is virtualized
- Virtual environments:
  - Can only isolate Python packages
- We will use Docker to facilitate local runs only, not in deployment

35

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35

Git checkpoint

1. Create new feature branch

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Add Docker

1. Create a **Dockerfile** next to **manage.py**

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Dockerfile (1)

```
# Pull base image
FROM python:3.10.4-slim-bullseye

# Set environment variables
ENV PIP_DISABLE_PIP_VERSION_CHECK 1
ENV PYTHONDONTWRITEBYTECODE 1
ENV PYTHONUNBUFFERED 1
```

38

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38

Dockerfile (2)

```
# Set work directory
WORKDIR /code

# Install dependencies
COPY ./requirements.txt .
RUN pip install -r requirements.txt

# Copy project
COPY . .
```

39

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39

Add Docker

1. Create a **Dockerfile** next to **manage.py**
2. Add **.dockerignore** (similar to .gitignore)

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.dockerignore

```
.venv
.git
.gitignore
```


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Add Docker

1. Create a **Dockerfile** next to **manage.py**
2. Add **.dockerignore** (similar to .gitignore)
3. Add **docker-compose.yml**

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docker-compose.yml

```
version: "3.9"

services:
  web:
    build: .
    command: python manage.py runserver 0.0.0.0:8000
    volumes:
      - .:/code
    ports:
      - "8000:8000"
```


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Add Docker

1. Create a **Dockerfile** next to **manage.py**
2. Add **.dockerignore** (similar to .gitignore)
3. Add **docker-compose.yml**
4. Execute: **docker-compose up -d --build**
5. To stop**:**
    1. **docker-compose down**

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Database

- Django has built-in support for five databases:
    - PostgreSQL
    - MariaDB / MySQL
    - Oracle
    - SQLite
- Code is the same for each one, Django ORM & drivers handle the differences

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Add database

1. Pip install **psycopg2-binary** & freeze
2. Update **docker-compose.yml**

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docker-compose.yml (1)

```
version: "3.9"

services:
  web:
    build: .
    command: python manage.py runserver 0.0.0.0:8000
    volumes:
      - .:/code
    ports:
      - "8000:8000"
    depends_on:
      - db
```


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docker-compose.yml (2)

```
  db:
    image: postgres:13
    volumes:
      - postgres_data:/var/lib/postgresql/data
    ports:
      - "5432:5432"
    environment:
      - "POSTGRES_HOST_AUTH_METHOD=trust"

volumes: #level of services
  postgres_data:
```


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Add database

1. Pip install **psycopg2-binary** & freeze
2. Update **docker-compose.yml**
3. Update **config/settings.py**

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config/settings.py

```
DATABASES = {
    'default': {
        'ENGINE': 'django.db.backends.postgresql',
        'NAME': 'postgres',
        'USER': 'postgres',
        'PASSWORD': 'postgres',
        'HOST': 'db', # set in docker-compose.yml
        'PORT': 5432 # default port
    }
}
```


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Spin up containers

docker-compose up -d --build:

docker-compose exec web python manage.py migrate

docker-compose exec web python manage.py createsuperuser

docker-compose down

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Git checkpoint

1. Commit changes
2. Create PR

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Questions?

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