

# Git-based Courses



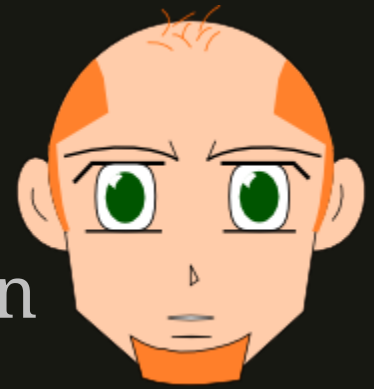
Carson Gee and Peter Pinch

@carsongee & @pdpinch

# Peter Pinch

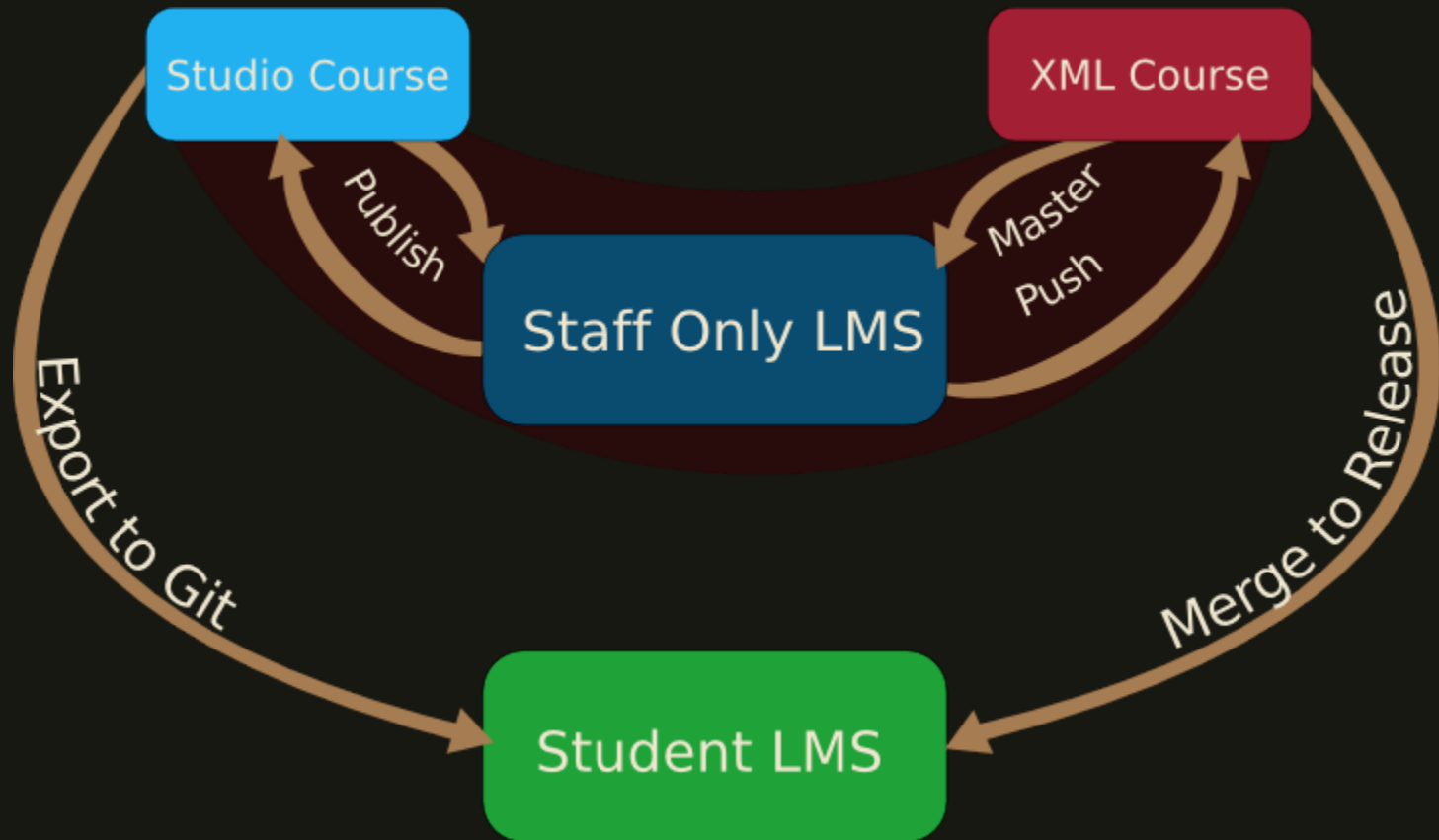
- education at scale
- pbs.org, pbslearningmedia.org
  - Ask me about animatronic aardvarks
- MIT OpenCourseWare
  - 2,240 courses and counting
- man of many hats at MITx

# Carson Gee



- Seriously into process automation
- Over a year with Open edX
- Over 100 PRs between platform and configuration
- Not serious about much else

# Git Course Flow Overview



# What We'll Cover

- Course Production Workflow
- How to make it go (tech details)

# Why do we do it this way?

## Course teams want to:

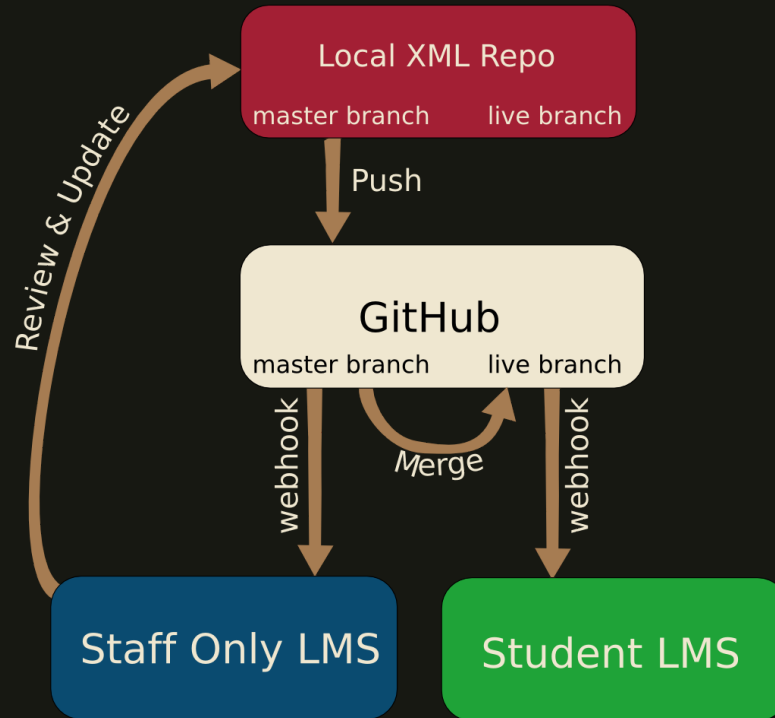
- use familiar tools
- migrate content
- manage versions
- manage multiple contributors
- preview and release

# Why do we do it this way?

## Admins need to:

- help course teams, safely
- bulk updates
- move courses from staging to production
- archive (and restore) courses

# XML Course Development

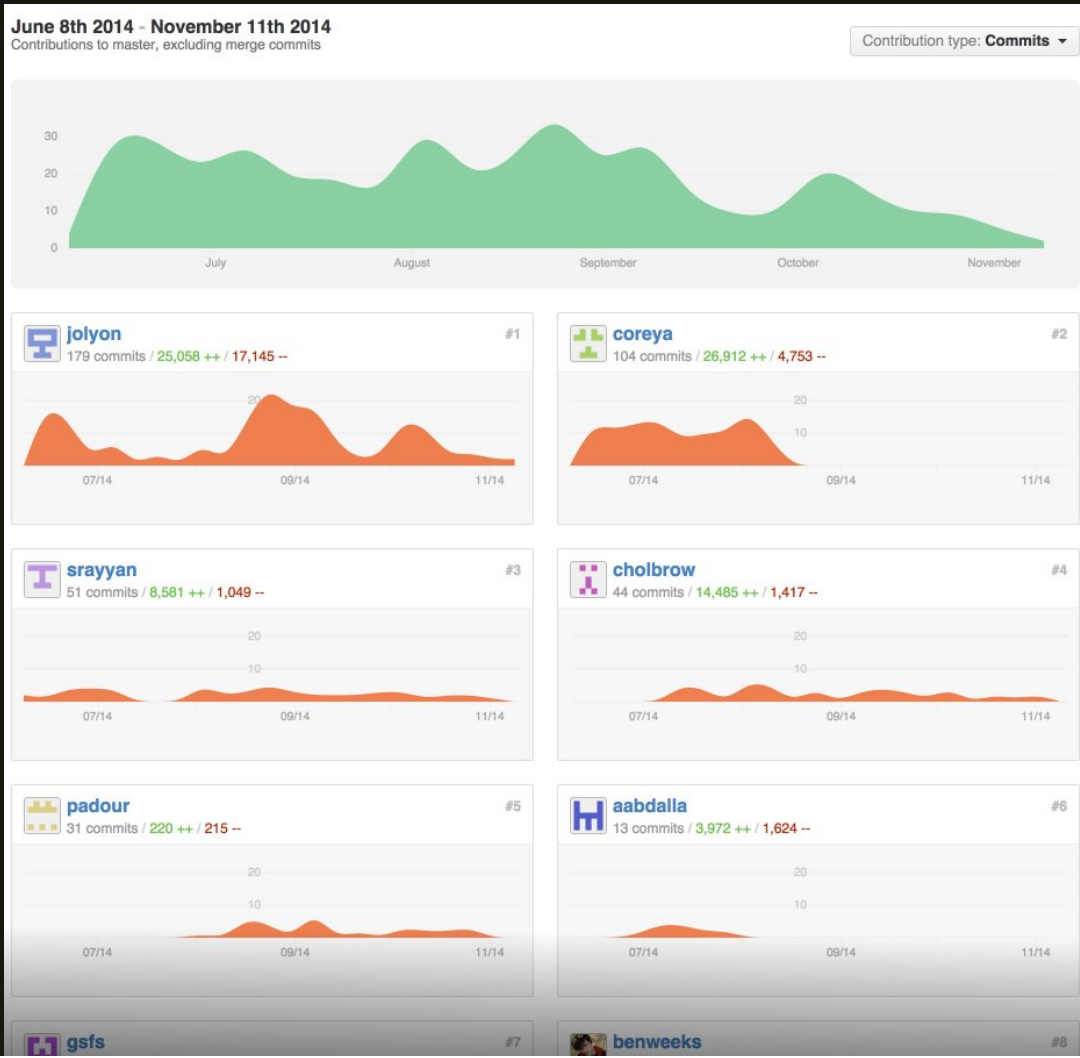




# XML Course Development

1. edit XML
2. commit and push to master branch
3. trigger → updates course on staging server
4. review on staging, repeat as necessary
5. merge to live branch
6. trigger → updates course on production server

# example commit graph



# example PR with comments

made two typo fixes (LS23-15b and LS25-15a), also updated code formatting for old LS26 problems #80

Merged jtriley merged 3 commits into 3091sandbox from master 5 days ago

Conversation 6 Commits 3 Files changed 16

dicksonw commented 6 days ago

updated code formatting was just tabs so the LS26 updates shouldn't affect anything

dicksonw added some commits 7 days ago

- updated formatting of code in old LS26 problems to match current form... f95fcaa
- fixed typos in LS23-15a and LS25-15 by creating \*b and \*a version, re... 05eea6c
- accidentally typed incorrect suspension problem, changed it 6ee90e9

jtriley commented 5 days ago

@pdpinch This will require `reapply_extensions` xslifter. There are extensions for LS23 but no extensions for LS25.

jtriley commented 5 days ago

@pdpinch LS26 starts tomorrow (11/7) so should be OK to modify those problems until then.

jtriley commented 5 days ago

LGTM

pdpinch commented on the diff 5 days ago

policies/2014\_Fall\_residential\_exam/policy.json View full changes

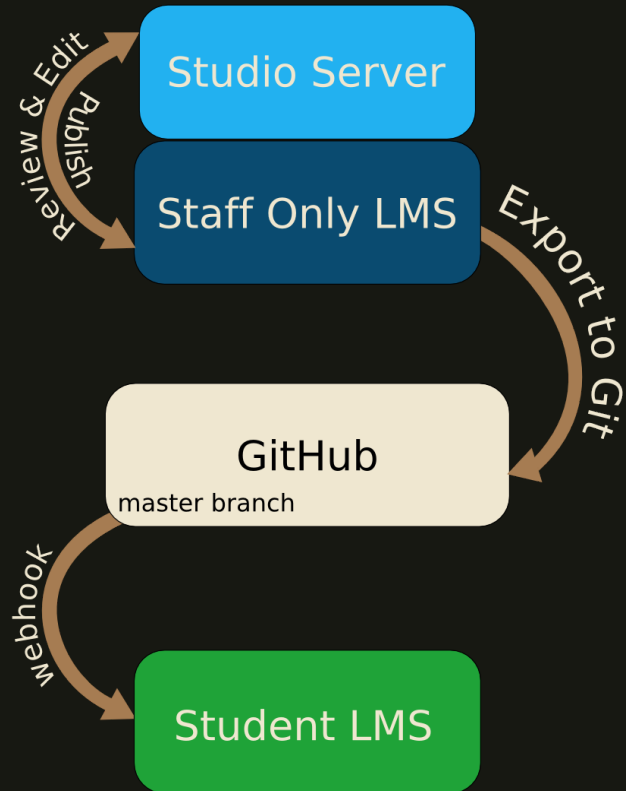
Line	Change	Code
70		"Bank:LS15:LS15-18",
71		"Bank:LS22:LS22-12",
72		"Bank:LS23:LS23-18",
73	-	"Bank:LS23:LS23-15"
73	+	"Bank:LS23:LS23-15",
74	+	"Bank:LS23:LS23-15a",

pdpinch added a note 5 days ago

Why is he adding and suspending LS23-15a ?

jtriley added a note 5 days ago

# Studio Course Development



# Studio Course Development

1. author course on studio server
2. review on staging server, repeat
3. export to Git
4. trigger → updates course on production server

# Technical Implementation

- Course Import and Export via Git
- Workflow Automation

# Git Course Import via Command

```
sudo su - edxapp -s /bin/bash
. edxapp_env
mkdir /edx/var/edxapp/course_repos
python edx-platform/manage.py lms --settings=aws \
git_add_course http://github.com/edx/edx-demo-course
```

## Options

- Directory to check out into
- Branch to use

# Sysadmin Dashboard Import

Enable with:

```
ENABLE_SYSADMIN_DASHBOARD=True
```

flag in `FEATURES` dict

- Head to:  
`https://<your_instance>/sysadmin` with  
global staff privs



# Sysadmin Dashboard Import

The screenshot shows the MITx Sysadmin Dashboard. At the top left is the MITx logo. To its right are two navigation tabs: 'FIND COURSES' and 'SYSADMIN'. Below the navigation is a horizontal line, followed by the main heading 'Sysadmin Dashboard'. Underneath this heading is another horizontal line, and then a row of four navigation links: 'USERS', 'COURSES', 'STAFFING AND ENROLLMENT', and 'GIT LOGS'. Below these links is the section title 'Administer Courses'. This section contains a list of two items: 'Repo Location:' followed by a text input field containing the URL 'https://github.com/edx/edx-demo-course.git', and 'Repo Branch (optional):' followed by an empty text input field. At the bottom of this section is a button labeled 'Load new course from github'.

**MITx** FIND COURSES SYSADMIN

## Sysadmin Dashboard

USERS COURSES STAFFING AND ENROLLMENT GIT LOGS

### Administer Courses

- Repo Location:
- Repo Branch (optional):

Load new course from github

# Sysadmin Dashboard Import

## Sysadmin Dashboard

USERS COURSES STAFFING AND ENROLLMENT GIT LOGS

### Git Logs

RECENT GIT LOAD ACTIVITY FOR MITX/0.01/2015-T2

Date	Course ID	Git Action
Nov 07, 2014 at 13:53	MITx/0.01/2015-T2	Already up-to-date. Commit ID: 7e3efd40cc83041e82cd18dcd6fad48707ae64ee Branch: master
Sep 22, 2014 at 12:18	MITx/0.01/2015-T2	Already up-to-date. Commit ID: 7e3efd40cc83041e82cd18dcd6fad48707ae64ee Branch: master

```
=====> Starting course import from edx-demo-course
=====> Done with course import from edx-demo-course
Scanning MITx/0.01/2015-T2 for course module...
=====> IMPORTING course MITx/0.01/2015-T2
course static_asset_path=edx-demo-course
course data_dir=edx-demo-course
Skipping import of static content, since do_import_static=False
importing module location i4x://MITx/0.01/html/148ae8fa73ea460eb6f05505da0ba6e6
importing module location i4x://MITx/0.01/problem/d2e35c1d294b4ba0b3b1048615605d2a
```

# Git Course Export via Command

```
sudo su - edxapp -s /bin/bash
. edxapp_env
mkdir /edx/var/edxapp/export_course_repos
cd edx-platform
python manage.py cms --settings=aws \
  git_export edX/DemoX/Demo_Course \
  git@github.com:carsongee/edx-demo-course.git
```

## Options

- username (for commit authorship)
- repo\_dir (specify location of local repo location)

# Export to Git in Studio

Enable with:

```
ENABLE_EXPORT_GIT=True
```

flag in `FEATURES` dict

- Set `giturl` in course's advanced settings

GIT URL

```
"git@github.com:edx/edx-demo-course.git"
```

Enter the URL for the course data GIT repository.

# Export to Git in Studio

The screenshot shows the edX Studio interface for an "edX DemoX edX Demonstration Course". The top navigation bar includes "Content", "Settings", and "Tools" menus. The "Tools" menu is open, showing options: "Checklists", "Import", "Export", and "Export to Git". The main content area is titled "Tools" and "Export to Git". It contains the following text: "Use this to export your course to its git repository. This will then trigger an automatic update of the main LMS site and update the contents of your course visible there to students if automatic git imports are configured." Below this text is a large blue button with a download icon and the text "Export to Git". On the right side, there is a sidebar with the text: "Your course: edX/DemoX/Demo\_Course" and "Course git url: git@github.com:edx/edx-demo-course.git".

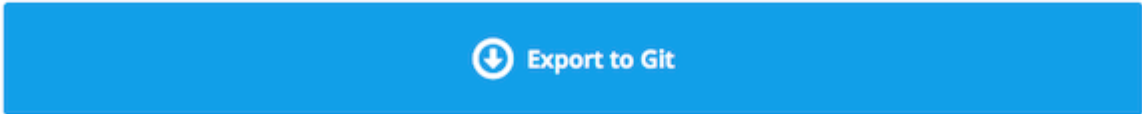
edX STUDIO edX DemoX edX Demonstration Course Content Settings Tools Help

Tools

## Export to Git

Use this to export your course to its git repository.  
This will then trigger an automatic update of the main LMS site and update the contents of your course visible there to students if automatic git imports are configured.

**Export Course to Git:**



**Your course:**  
[edX/DemoX/Demo\\_Course](#)

**Course git url:**  
[git@github.com:edx/edx-demo-course.git](https://git@github.com:edx/edx-demo-course.git)

# Workflow Automation

Enter gitreload:

<https://github.com/mitodl/gitreload>

- Responds to hooks from github/gitlab
- Runs `git_add_course` from hookshot
- Only operates on courses already checked out

# Installing gitreload


Try before you buy:

```
sudo su - edxapp -s /bin/bash
. edxapp_env
pip install gitreload
gitreload
```

Install for realies with Ansible:

```
- hosts: all
  sudo: True
  vars:
    COMMON_ENABLE_BASIC_AUTH: True
  roles:
    - gitreload
    - role: nginx
      nginx_sites:
        - gitreload
```

# Add the Hook

 mitx / content-devops-0001 Unwatch 10

- Options
- Collaborators
- Webhooks & Services**
- Deploy keys
- Custom tabs

### Webhooks / Add webhook

We'll send a POST request to the URL below with details of any subscribed events. You can also specify which data format you'd like to receive (JSON, x-www-form-urlencoded, etc). More information can be found in [our developer documentation](#).

**Payload URL**

**Content type**

**Secret**

**Which events would you like to trigger this webhook?**

- Just the push event.
- Send me **everything**.
- Let me select individual events.



# Who needs ContentStore?

- Setup shared filesystem for course storage
- Symlink to:

```
{{ edxapp_data_dir }}/course_static
```

- Set `GIT_IMPORT_STATIC=False`

# Who needs ContentStore?

Add to static nginx server rule:

```
location ~ ^/static/(?P<file>.*) {  
    root {{ edxapp_data_dir }};  
    try_files /staticfiles/$file  
             /course_static/$file =404;
```

Changes to:

```
location ~ /static/((?P<dir>[^/]+)/(?P<file>.*)|(?P<rfile>[\w\d\-.]+)) {  
    root {{ edxapp_app_dir }};  
    try_files /staticfiles/$dir/$file  
             /course_static/$dir/static/$file  
             /staticfiles/$rfile =404;
```

# Conclusions

## The Good

- Simple and safe to publish to students
- Social course development w/ github
- Versioned per course backups gratis
- Support of multiple student LMS targets
- Better courseware debugging

# Conclusions

## The Bad

- More complex setup
  - git hooks
  - repository creation
  - manual first checkout
- Extra step for Studio courses
- Did the hook work?
- Easier to break courses when editing raw XML

# Future Work

- Create RESTful token auth Course Import/Export API
  - Studio and LMS
- "Create a Course" Application
  - Automatic course/repo creation
  - Initial LMS import
  - Hook setup
  - "giturl" setting

# Questions?



[mitodl/git-based-courses-slides](https://github.com/mitodl/git-based-courses-slides)

