

# The challenges of Multi-tenant Open edX

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About me

From **Montevideo, Uruguay**

Software engineer at **Appsembler**



## About Appsembler

**20 people** in the organisation

**13 engineers**

We Operate as a distributed-first t



About Tahoe

**Appsembler SaaS Cloud based  
platform**

[appsembler.com/tahoe](https://appsembler.com/tahoe)



## Goals

- **To understand what multi-tenancy is.**
- **Learn what we have available for multi-tenancy approaches in edX**
- **To learn what we haven't available for multi-tenancy in edX.**
- **See some Appsembler Tahoe examples on how to push multi-tenancy forward.**
- **To see what are the challenges ahead and start the conversation in the community.**

# What is Multi-tenancy?

**Multi-tenancy != Multi-instance**

**Multi-tenancy != Virtualisation**



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## Benefits of Multi-tenancy

**Lowers down infrastructure costs**

**Same application code is shared by all tenants**

**Simultaneous upgrades**

**Simultaneous feature releases**



## Use cases

**Universities with different departments**

**Companies who wants to serve partners**

**Companies who wants to resell Open edX Courses**

**Cloud SaaS Architecture for Open edX**

**On which parts / components of Open edX  
can we rely today for multi-tenancy?**

**Open edX Sites**  
**Site configurations**  
**Site theming**  
**Configuration helpers**  
**edX Organizations**



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# Open edX Sites

# Open edX Sites

**Django administration** Welcome, staff. [View site](#) / [Change password](#) / [Log out](#)

[Home](#) > [Sites](#) > [Sites](#) > [Add site](#)

### Add site



Domain name:	<input type="text" value="maxi-academy.example.com"/>
Display name:	<input type="text" value="maxi-academy"/>

# Open edX Sites

**Django administration** Welcome, staff. [View site](#) / [Change password](#) / [Log out](#)

[Home](#) > [Site Configuration](#) > [Site configurations](#) > [Add site configuration](#)

## Add site configuration

Site:   

Enabled

Values:

```
{
  "PLATFORM_NAME": "Maxi's Academy",
  "SITE_NAME": "maxi-academy.example.com",
  "course_org_filter": "maxi-academy",
  "ENABLE_COMBINED_LOGIN_REGISTRATION": true,
}
```



Enter valid JSON

# Open edX Sites

Django administration Welcome, staff. [View site](#) / [Change password](#) / [Log out](#)

[Home](#) > [Site\\_Configuration](#) > [Site configurations](#) > [Add site configuration](#)

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```

Enter valid JSON



[Save and add another](#) [Save and continue editing](#) [Save](#)

# Open edX Sites

**Django administration** Welcome, **staff**. [View site](#) / [Change password](#) / [Log out](#)

[Home](#) > [Theming](#) > [Site themes](#) > [Add site theme](#)

### Add site theme

Site:	<input type="text" value="maxi-academy.example.com"/>  
Theme dir name:	<input type="text" value=":/dx/var/edxapp/themes/maxi-academy/"/>



# edx-organizations

<https://github.com/edx/edx-organizations>

# Configuration helpers

[edx-platform/openedx/core/djangoapps/site\\_configuration/helpers.py](https://github.com/edx-platform/openedx-core-djangoapps-site_configuration_helpers.py)



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## Config - standard way:

```
from django.conf import settings
```

```
settings.ENABLE_COURSE_SORTING_BY_START_DATE
```

## Config - site-aware way:

```
from django.conf import settings
```

```
from openedx.core.djangoapps.site_configuration import helpers as configuration_helpers  
configuration_helpers.get_value("ENABLE_COURSE_SORTING_BY_START_DATE",  
    settings.FEATURES["ENABLE_COURSE_SORTING_BY_START_DATE"])
```

## Config - site-aware way:

```
from django.conf import settings
```

```
from openedx.core.djangoapps.site_configuration import helpers as configuration_helpers  
configuration_helpers.get_value("ENABLE_COURSE_SORTING_BY_START_DATE",  
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    settings.FEATURES["ENABLE_COURSE_SORTING_BY_START_DATE"])
```



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# How have we extended the platform?

# edx-organizations customizations



# edx-organizations customizations

user -> organization mapping

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user -> organization mapping

Django Authentication backends



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# edx-organizations customizations

user -> organization mapping

Django Authentication backends

Django middleware



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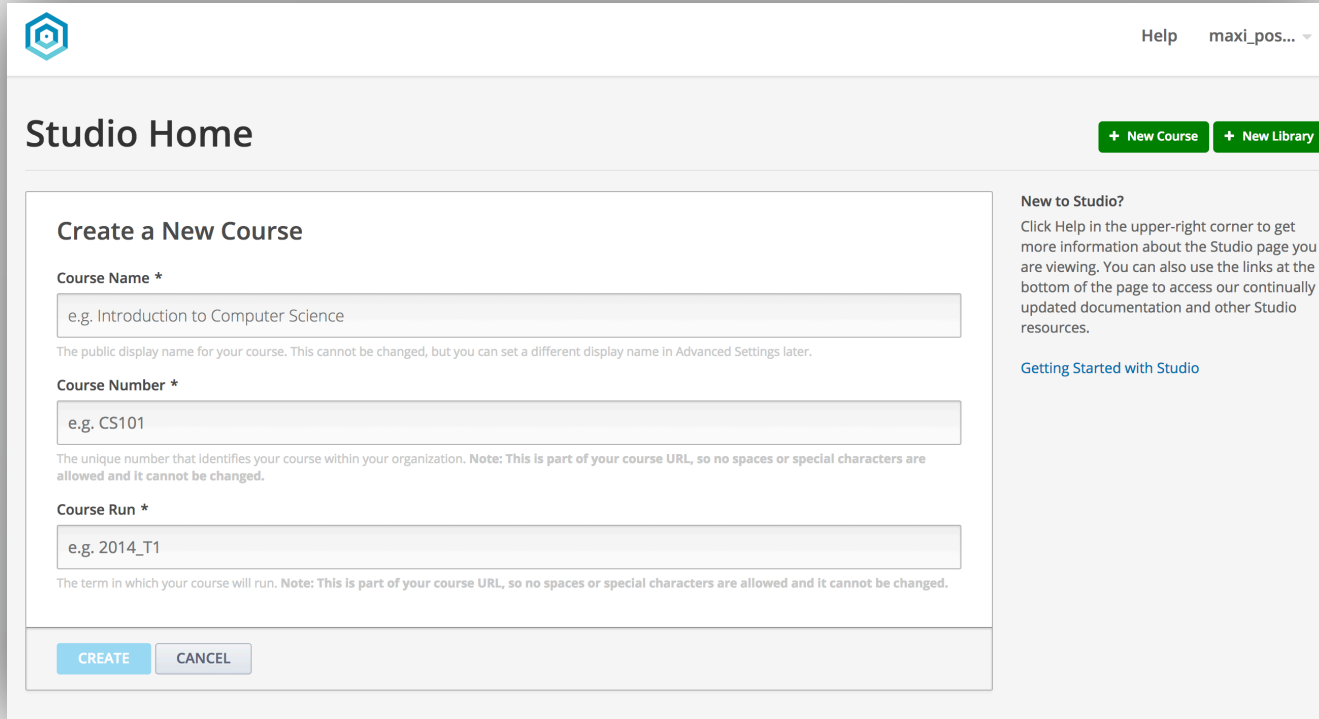
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# Studio customizations

**By default, no Open edX Sites available in Studio.  
Also, if a user has global staff permissions,  
will be able to access all courses in studio**

# Studio customizations



The screenshot shows the 'Studio Home' interface. At the top left is the Appsembler logo. At the top right are 'Help' and a user profile 'maxi\_pos...'. Below the header, the main area is titled 'Studio Home'. On the right side of this area are two green buttons: '+ New Course' and '+ New Library'. The central part of the page features a 'Create a New Course' form with three input fields: 'Course Name \*' (with example 'e.g. Introduction to Computer Science'), 'Course Number \*' (with example 'e.g. CS101'), and 'Course Run \*' (with example 'e.g. 2014\_T1'). Each field has a descriptive note below it. At the bottom of the form are 'CREATE' and 'CANCEL' buttons. To the right of the form is a 'New to Studio?' section with a paragraph of text and a link 'Getting Started with Studio'.

Help maxi\_pos...

## Studio Home

+ New Course + New Library

### Create a New Course

**Course Name \***  
e.g. Introduction to Computer Science  
The public display name for your course. This cannot be changed, but you can set a different display name in Advanced Settings later.

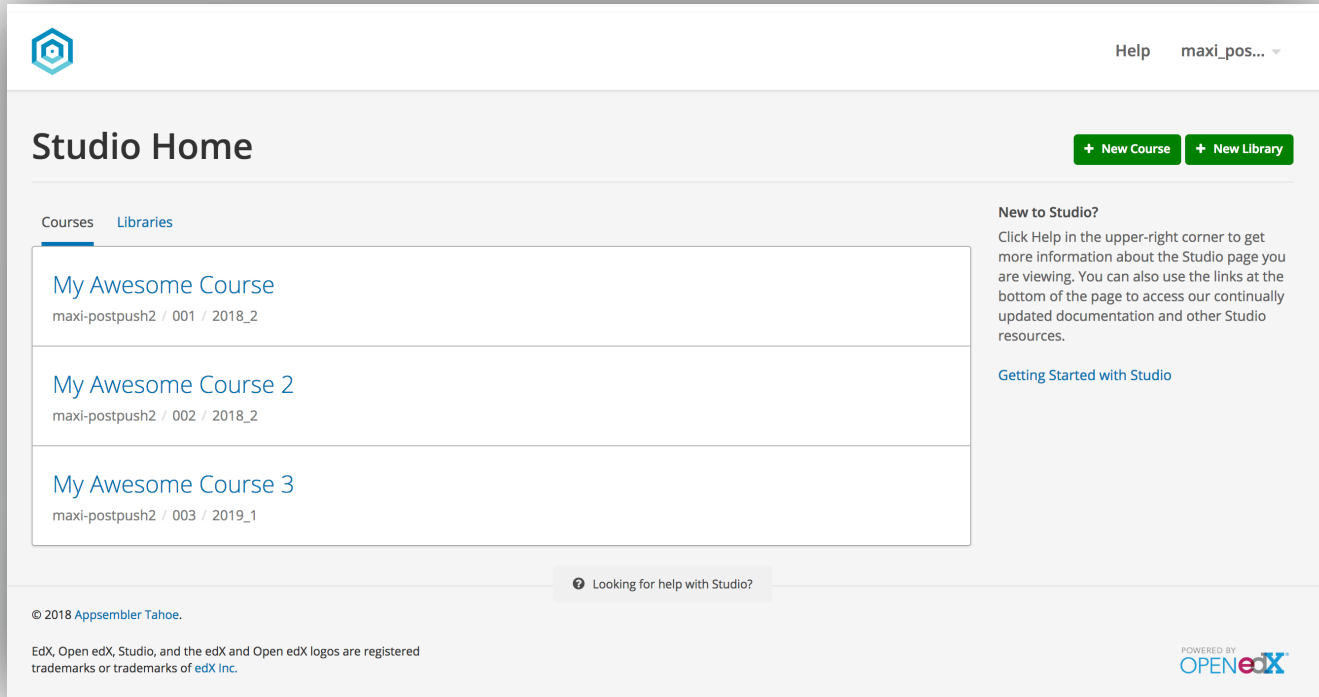
**Course Number \***  
e.g. CS101  
The unique number that identifies your course within your organization. Note: This is part of your course URL, so no spaces or special characters are allowed and it cannot be changed.

**Course Run \***  
e.g. 2014\_T1  
The term in which your course will run. Note: This is part of your course URL, so no spaces or special characters are allowed and it cannot be changed.

CREATE CANCEL

**New to Studio?**  
Click Help in the upper-right corner to get more information about the Studio page you are viewing. You can also use the links at the bottom of the page to access our continually updated documentation and other Studio resources.  
[Getting Started with Studio](#)

# Studio customizations



The screenshot displays the Studio Home interface. At the top left is the Appsembler logo, and at the top right are links for 'Help' and a user profile 'maxi\_pos...'. The main heading is 'Studio Home'. Below this, there are two buttons: '+ New Course' and '+ New Library'. A navigation bar shows 'Courses' (selected) and 'Libraries'. The main content area lists three courses: 'My Awesome Course' (maxi-postpush2 / 001 / 2018\_2), 'My Awesome Course 2' (maxi-postpush2 / 002 / 2018\_2), and 'My Awesome Course 3' (maxi-postpush2 / 003 / 2019\_1). On the right side, there is a 'New to Studio?' section with a paragraph of text and a link 'Getting Started with Studio'. At the bottom, there is a footer with copyright information, a help link, and the 'POWERED BY OPEN edX' logo.

Help maxi\_pos...

## Studio Home

+ New Course + New Library

Courses Libraries

**My Awesome Course**  
maxi-postpush2 / 001 / 2018\_2

**My Awesome Course 2**  
maxi-postpush2 / 002 / 2018\_2

**My Awesome Course 3**  
maxi-postpush2 / 003 / 2019\_1

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[Getting Started with Studio](#)

Looking for help with Studio?

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**So, back to the current state of platform.**

Challenges ahead:

# User registration over multiple sites



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Challenges ahead:

# Permissions Structure



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**Challenges ahead:**

**APIs**

## Takeaways

What do we have available today:

- **Sites**
- **edx-organizations**

What we cannot achieve yet:

- **Separate user accounts per site/organizations**
- **Partitioning courses per organizations in studio**

# Join the conversation

If you're interested, please join us to the discussion in the Open edX  
Slack channel **#multi-tenancy**

# Thanks!



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**Questions?**