
REAL WORLD COLDBOX APP ARCHITECTURE

Nolan Erck

INTO THE BOX 2023

About Me

- Owner @ South of Shasta
- Organizer @ Sac Interactive Tech Meetup (formerly Sacramento CFUG)
- Recovering Video Game Developer (Grim Fandango, SimPark, Star Wars Phantom Menace, etc)
- Music Junkie

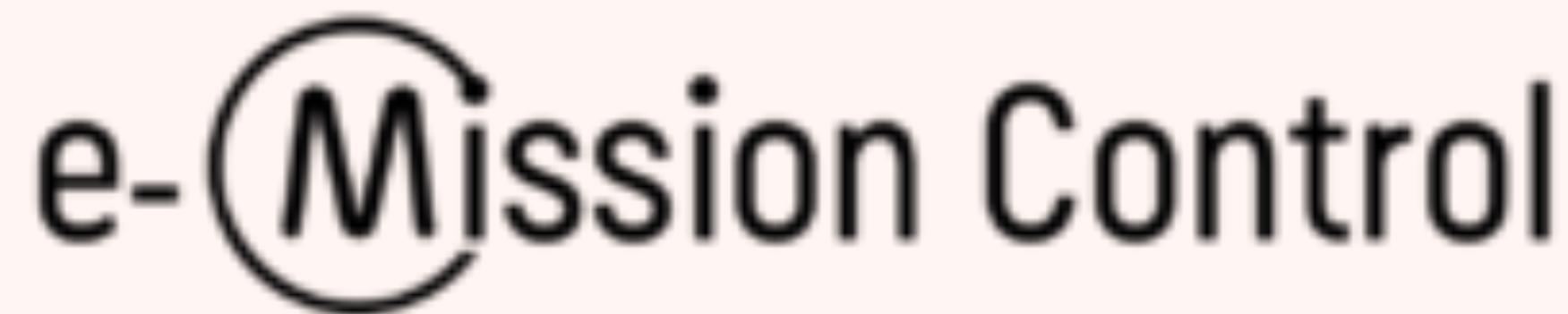




I'M REAL PROUD OF MY
RECORD COLLECTION



About Me



- **Also VP of Engineering for e-Mission Control**
 - **SaaS startup in Sacramento**
 - **Building the FuSE web app**
-

What Does The FuSE App Do?

- Streamlines using your local Clean Fuel Program / LCFS
- Free to use
- SaaS Platform
- Tech stack at a glance:
- Lucee, MySQL, Alpine.js, AWS



The same needs as other apps

- **Login, Authentication, Authorization, Permissions, AWS, Validation, etc.**
 - **Want it to be flexible, organized.**
 - **Started with a blank slate. Zero existing code.**
 - **Where to begin?**
 - **CFML, ColdBox, Alpine.js, MySQL**
-

WHY CFML?

- Try to be objective when picking a tech stack
 - Lucee = free and open source
 - Startups = costs are a real concern
 - Strong ties to the CFML community
 - Might use ACF for some features later
-

WHY MVC?

- **Industry standard, not just for CFML!**
 - Any good developer can pick it up quickly.
 - **Learn your design patterns!** Opens up new job opportunities to you!
 - OO Primer video series on CFCasts.com that I made with Ortus to get you started.
-

WHY MVC?

- **Almost* never a good reason to roll your own framework!**
 - **Doing so usually means:**
 - a) They are not really using the MVC pattern, or**
 - b) They don't understand MVC enough to make decisions on that front**
 - * One very unique app we did for the semiconductor industry needed a custom framework. One. In 20+ years of web development. One. Uno.
-

**So...FW/1, CF Wheels, or
ColdBox?**

Enter ColdBox

(...and the Box ecosystem)

What ColdBox Gives Me

- **At a minimum**
 - **MVC structure**
 - **DI / AOP**
 - **Command Line tools/scaffolding**
-

What ColdBox Gives Me

- **ALSO...**
 - **Server side testing**
 - **Professional support**
 - **There is no FW/1 or CFWheels Conference, nor paid support option**
 - **An ecosystem...**
-

The ColdBox Ecosystem

- **Compatible modules**
 - [**forgebox.io**](#)
 - **More than just ColdBox modules!**
 - **CommandBox Tooling**
 - **Docker images**
-

**So anyway, back to the
FuSE app...**

**Same concerns as any
other web app**

Users need to log in

- **How many of you have rolled your own “check if this password is valid / login / logout” code? Repetitive, boring to build. But necessary.**
 - **Users also need permission levels.**
 - **Forgebox has cbAuth & cbSecurity**
-

cbAuth

➤ In ColdBox.cfc:

```
cbAuth: {  
    userServiceClass: "services.UserService",  
    sessionStorage: "SessionStorage@cbstorages",  
    requestStorage: "RequestStorage@cbstorages"  
}
```

cbAuth

- **UserService.cfc**
- **3 methods**
 - **isValidCredentials**
 - **retrieveUserByUsername**
 - **retrieveUserId**
- **Let's look at the code!**

cbSecurity

- **Give users permissions**
 - **Admin User, Customer logins, etc**
 - **Easily mark blocks of code for just specific User Roles**
 - **Easily configure the levels of permission**
-

cbSecurity

```
cbSecurity : {  
    "invalidAuthenticationEvent" : "auth.onInvalidAuthentication",  
    "invalidAuthorizationEvent" : "auth.onInvalidAuthorization",  
    "rules" : "db",  
    "validator" : "CBAuthValidator@cbsecurity",  
    "authenticationService" : "authenticationService@cbauth",  
    "userService" : "services.UserService",  
    "prcUserVariable" : "oCurrentUser",  
    "rulesDSN" : application.datasource,  
    "rulesTable" : "tSecuritySettings",  
    "rulesOrderBy" : "",  
    "rulesSql" : "SELECT * from tSettings where isActive = 1 order by priority asc",  
    "useRegex" : true,
```

cbSecurity

```
<cfif cbsecure().has( "Admin" )>
    <ui:linkButton href="#event.buildLink( 'user.add' )#" id="addUserBtn" btnClass="button-primary">Add User</ui:linkButton>
<cfelseif cbsecure().has( "Customer" )>
    <ui:linkButton href="#event.buildLink( 'user.request' )#" id="requestUserBtn" btnClass="button-primary">Request User</ui:linkButton>
</cfif>
```

cbSecurity

```
<cfif cbsecure().has( "Admin", "Customer" )>
    <cfset showCompanyColumn = false>

    <cfif cbsecure().has( "Admin" )>
        <cfset showCompanyColumn = true>
    </cfif>

    <panel:PendingRequestsPanel
        pendingUsersQuery="#prc.qPendingUsers#
        showCompanyColumn="#showCompanyColumn#"
        showActions="#cbsecure().has( "Admin" )#"
        actionURL="#event.buildLink("user.list")#">
    </cfif>
```

cbSecurity

🔒 Security Settings

ADD SETTING

PRIORITY	MATCH	PERMISSIONS	SECURELIST	WHITELIST	REDIRECT	OVERRIDE EVENT	USE SSL
0	EVENT	eMC Super Admin eMC Sales Rep eMC General User Client - Admin	facility.*		auth.onInvalidAuthorization		
0	EVENT	eMC Super Admin	fuseadmin:*		auth.onInvalidAuthorization		
0	EVENT	Client - Admin eMC Super Admin	user.*		auth.onInvalidAuthorization		
0	EVENT	Referral Partner		api.v1.*			
0	EVENT	eMC Super Admin eMC Sales Rep eMC General User Client - Admin	equipment.*		auth.onInvalidAuthorization		

API

- **Want it to be RESTful (industry standard)**
 - **Versioned**
 - **Use the core app codebase, without copy/pasting business logic**
 - **Testable**
 - **Enter ColdBox Modules & REST Template**
-

ColdBox Modules & REST Template

- **modules_app/api/v1**
 - **API code calls Services and Models however it needs to**
 - **Bug fix in Service fixes both the core app and API at the same time**
-

REST Template

```
function list( event, rc, prc ) allowedMethods="GET"
{
    event.getResponse()
        .setData(
            {
                'rs': equipmentTypeService.list( rc.cleanFuelProgramUUID ),
                'pagination': {}
            });
}
```

REST Template

```
function update( event, rc, prc ) allowedMethods="PUT"
{
    validateOrFail(
        target      = rc,
        constraints = {
            equipmentTypeUUID    = { type: "string", required: true },
            equipmentCategoryUUID = { type: "string", required: true },
            equipmentType         = { type: "string", required: true },
            eer                  = { type: "numeric", required: true },
            isMetered            = { type: "boolean", required: true }
        }
    );

    event.getResponse()
        .setData(
            {
                'recordcount': equipmentTypeService.update( argumentCollection=rc )
            }
        );
}
```

Required Fields / Validation

- **Every web app has this**
 - **Optional vs required fields**
 - **Constraints and business rules**
 - **Need a way to report the errors back to the caller**
 - **Enter cbValidation**
-

cbValidation

```
this.constraints = {
  ClientName: { required: true, requiredMessage: "Client Name is required", type: "string" },
  FirstReportingQuarter: { required: false, type: "date" },
  eMCStartDate: { required: false, type: "date" },
  eMCEndDate: { required: false, type: "date" },
  WebsiteURL: { required: false, type: "string" },
  ContractPDF: { required: false, type: "string" },
  ClientLogo: { required: false, type: "string" },
```

AWS

- **S3, Elastic Search, various other AWS things**
 - **No official CFML library for AWS**
 - **Enter ForgeBox: aws-cfml**
 - **Library for interacting with AWS APIs**
-

AWS-CFML

```
awscfml: {  
    awsKey: 'OMGL0LBBQ',  
    awsSecretKey: 'this is where your aws secret key goes',  
    defaultRegion: 'us-south-east-99'  
},
```

AWS-CFML

```
var uploadURL = aws.s3.generatePresignedURL(  
    Bucket      = application.s3BucketName,  
    ObjectKey   = arguments.fileNameAndPath,  
    Expires     = 60  
) ;
```

```
var rslt = aws.s3.putObject(  
    Bucket      = application.s3BucketName,  
    ObjectKey   = arguments.destinationPath,  
    FileContent = _fileContents  
) ;
```

Automated Testing

- **Automated testing saves huge chunks of time and money!**
 - **Way cheaper to find and fix bugs early, before in Production**
 - **Enter TestBox**
 - **You can test any CFML app with TestBox! Not just ColdBox apps!**
 - **Runs from web browser and command line**
 - **Command line = it can be scripted**
 - **GitHub Actions**
-

TestBox

The screenshot shows the TestBox interface with the following details:

- Top Bar:** TESTBOX logo, v4.5.0+5, Filter Bundles..., Expand All Bundles, Collapse All Bundles, Run All Tests.
- Test Results Stats:** (20,696 ms)
 - Bundles: 39, Suites: 158, Specs: 211
 - Lucee 5.3.8.189
 - Status: ✓ Pass: 211, ▲ Failures: 0, ✗ Errors: 0, ⏷ Skipped: 0, ⚡ Reset
- Suite Details:** tests.specs.Services.AuthServiceTest (341 ms)
 - Suites: 11, Specs: 15
 - Status: ✓ Pass: 15, ▲ Failures: 0, ✗ Errors: 0, ⏷ Skipped: 0, ⚡ Reset
 - Test Cases:
 - ✓ AuthService Suite (340 ms)
 - ✓ should initialize the object (60 ms)
 - ✓ authenticate() (87 ms)
 - ✓ should return true on successful login (57 ms)
 - ✓ should return false on unsuccessful login (30 ms)
 - ✓ authenticateCookie() (88 ms)
 - ✓ should return true on successful authentication with cookie (79 ms)
 - ✓ should return false if no cookie is set (2 ms)
 - ✓ should return false on unsuccessful authentication with invalid cookie (6 ms)
 - ✓ isLoggedIn() (14 ms)
 - ✓ should return true if the user is logged in (12 ms)
 - ✓ should return false if the user is not logged in (2 ms)
 - ✓ getUser() (12 ms)

<http://localhost/tests/runner.cfm>

box testbox run reporter=html/text/whatever other things

/tests folder

Can test any CFML app with TestBox! Not just ColdBox apps!

TestBox GitHub Actions

```
# .github/workflows/tests.yml
name: TestBox Ortus

on:
  push:
    branches: [ 'main' ]
  pull_request:
    branches: [ 'main' ]
jobs:
  tests:
    name: Tests
    runs-on: ubuntu-latest
    steps:
      - name: Checkout
        uses: actions/checkout@v3

      - name : Start the servers and wait until up
        run: ./ci.sh

      - name: Checkout Repository
        uses: actions/checkout@v3
        with:
          fetch-depth: 0
```

Cypress

✓ equipment/equipment_detail.cy.js	00:06	2	2	-	-	-
✓ facility/facility_detail.cy.js	00:08	2	2	-	-	-
✓ facility/facility_list.cy.js	00:03	1	1	-	-	-
✓ selfenroll/index.cy.js	00:01	1	1	-	-	-
✓ fuseAdmin/brokerComission.cy.js	20ms	1	-	-	1	-
✓ fuseAdmin/ci_lookup.cy.js	36ms	2	-	-	2	-
✓ fuseAdmin/credit_pricing.cy.js	00:06	2	2	-	-	-
✓ fuseAdmin/equipmentType.cy.js	20ms	1	-	-	1	-
✓ fuseAdmin/kilowatt_hour_totals.cy.js	00:04	2	1	-	1	-
✓ fuseAdmin/recCost.cy.js	20ms	1	-	-	1	-
✓ user/menu-actions.cy.js	00:11	5	5	-	-	-

Can test ANY web app with Cypress! Not just ColdBox! Not just CFML!

`npx cypress run`

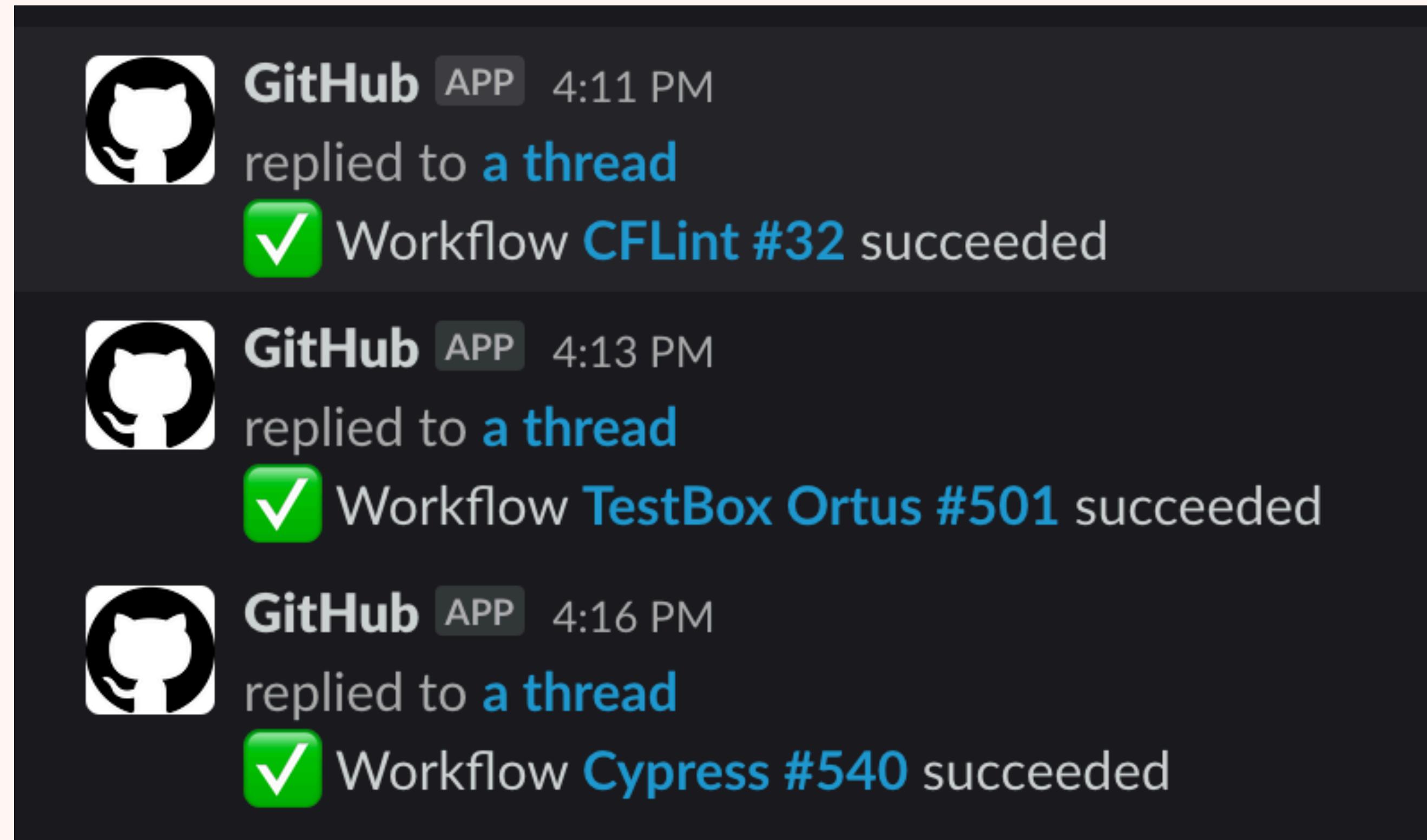
Command line = it can be scripted

/cypress/e2e folder

Cypress GitHub Actions

```
name: Cypress
on:
  push:
    branches: [ 'main' ]
  pull_request:
    branches: [ 'main' ]
jobs:
  run-tests:
    runs-on: ubuntu-22.04
    steps:
      - name: Checkout
        uses: actions/checkout@v3
      - name : Start the servers and wait until up
        run: ./ci.sh
      - name: Checkout
        uses: actions/checkout@v3
      - name: Cypress run
        uses: cypress-io/github-action@v5
```

GitHub Actions, Slack



Deployment Process

- **Want an easy way to push code to servers**
 - **No manual steps, FTP, RDP, things prone to error**
 - **No physical web servers to maintain, just Docker containers**
 - **(except the database)**
-

Deployment Process

SCRIPT ALL THE THINGS!



Ortus Docker Images

```
# syntax=docker/dockerfile:1
FROM ortussolutions/commandbox:lucee5-3.6.0

ARG IMG_VERSION
ENV IMG_VERSION=${IMG_VERSION}

ARG IMG_BUILD_UTC
ENV IMG_BUILD_UTC=${IMG_BUILD_UTC}
```

Deployment Process

- **GitHub Actions + AWS App Runner**
 - **Deploy CommandBox Docker image to a branch**
 - **Separate cfconfig.json / env files for each environment**
 - **Dev, Staging, Production**
 - **GitHub Action + AWS App Runner does the rest**
 - **10 minutes later, we have a new version deployed**
-

Deployment Process

- Everything is scripted
- go.sh for spinning up the container

```
What would you like to do?

1) 🚧 Build image & run container locally
2) 🛡 Build image & run container locally, with bind mount
3) ⚡ Connect to local container's shell, if it's running
4) 💣 Clean up local image & container

0) 🚪 Exit

Choose an option: █
```

- Ci script for deployment. Ci calls the Go script

And that's our stack!

FAQs

**Why aren't you using the
latest versions of these
*box things?**

Why Alpine.js?

Did you do all this at once?

Just Start

Learning in 30 Minutes A Day

More Resources

- **This Conference!**
 - **CFCast.com**
 - **CFML Slack channels (ugh!)**
 - **Ortus Solutions**
 - **South of Shasta**
-

Any Questions?

- › You can find me here:
 - › southofshasta.com
 - › Twitter [@southofshasta](https://twitter.com/southofshasta), [@nolanerck](https://twitter.com/nolanerck)
 - › nolan@southofshasta.com
 - › e-missioncontrol.com
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