Building a Future Library with Ex Libris Platform Cloud Apps

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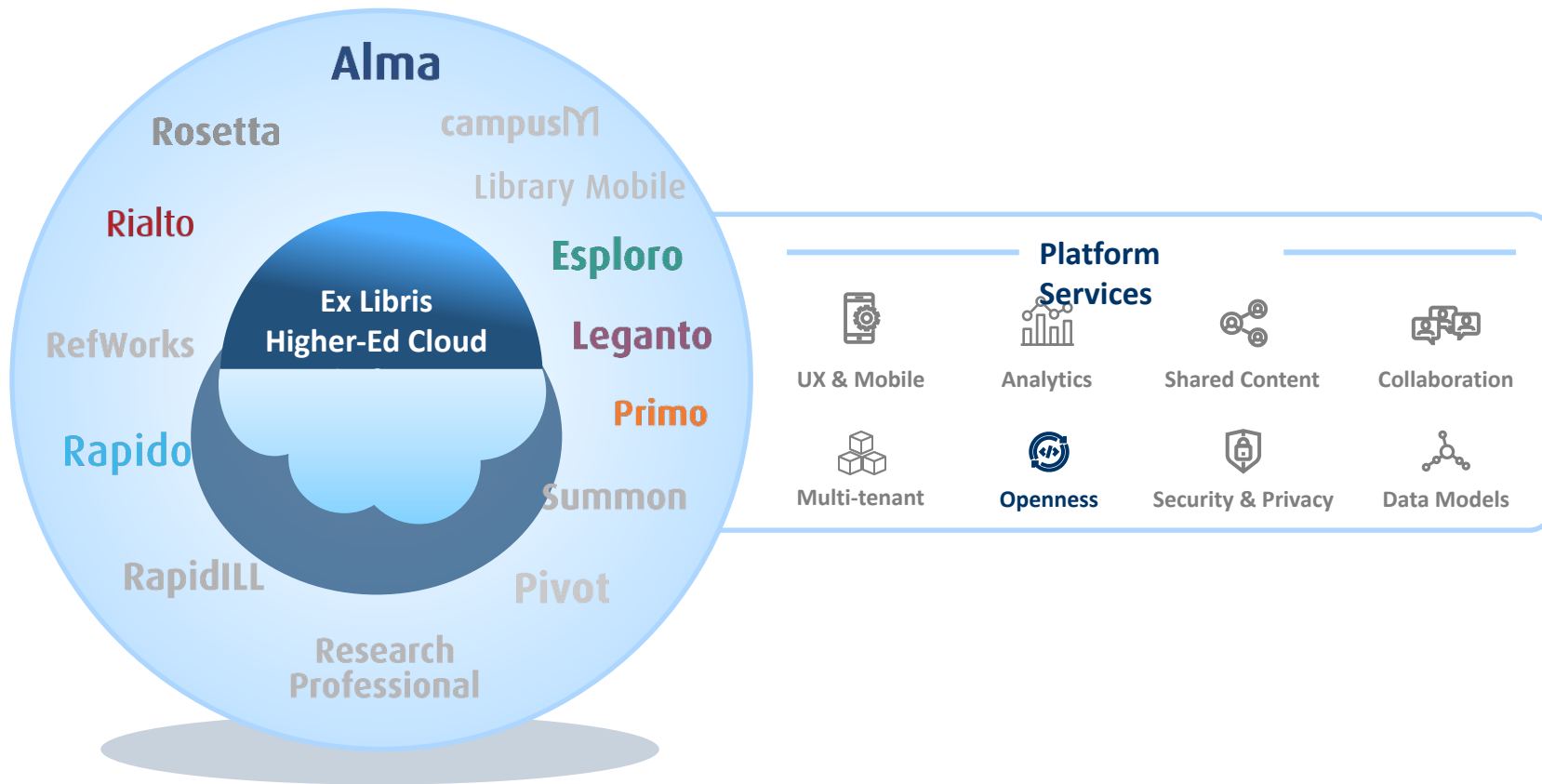# Agenda

- Overview
- Examples
- Behind the scenes
- What's new?
- Summary
- Q&A

Overview

Ex Libris Higher-Ed Cloud Platform

Alma

Rosetta

campusM

Library Mobile

Rialto

Esploro

Ex Libris
Higher-Ed Cloud

Leganto

RefWorks

Primo

Rapido

Summon

RapidILL

Pivot

Research
Professional

Platform Services

UX & Mobile

Analytics

Shared Content

Collaboration

Multi-tenant

Openness

Security & Privacy

Data Models

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Trends and Openness

Budget restrictions

$+$

"COVID 19"
Do it yourself

→ Need to support an open platform

Open platforms support APIs and industry standards to encourage extensibility and integration

The Ex Libris open platform has been adopted by the community and runs millions of API requests daily

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What would we like to achieve?

Agility *response quickly to change*

- Extends out of the box solutions and meet the exact needs of the library
- Deploy solutions by the institution for their staff quickly

Automation *streamline repetitive tasks*

- Libraries seek efficiencies in staff workflows
- Allow an IT staff to write scripts or programs for automation

Efficiency *doing "more with less"*

- Deep integration with the library system's user experience.
- Remove the need for the user to "swivel chair" between multiple solutions

Collaboration *create a "force multiplier"*

- Sharing solutions between institutions
- Informal methods
- Ease to share solutions with others

What are Cloud Apps?

Where it runs?
Cloud Apps run within the Ex Libris platform, as an integral part of the user experience

Who can create it?
Can be developed by institutions, partners, or Ex Libris

Who can use it?
Cloud Apps can be searched and activated by any user

What it provides?
Additional functionality, productivity shortcuts, or integrations with other systems

Examples

Over 50 Cloud Apps out there...

Print address
Zahra Mousavi
Alma | Cloud App

It gives the possibility to select one or more users or partners and print their addresses. The

InnReach locations setup
Ori Miller
Alma | Cloud App

Easy setup of Alma's libraries & locations into InnReach

Switch PO-Line type
Liron Menda
Alma | Cloud App

Change a PO Line from Physical to Electronic. It is done by creating a new PO Line, and

Libris Holdings
Royal Institute of Technology - Sweden
Alma | Cloud App

Cloud App which connects records in Alma to Libris Holdings. Libris is the Swedish

Orbis Cascade Label Printer
Orbis Cascade Alliance
Alma | Cloud App

This Cloud App developed by the Orbis Cascade Alliance generates individual spine labels to send to

Bulk Scan-In
Liron Menda
Alma | Cloud App

This app allows you to perform the scan in operation on file of barcodes. Supports configuring

CSV User Loader
Josh Weisman
Alma | Cloud App

Create, update, and delete Alma users from a list in a comma separated file. Supports flexible

Address manager
Marie Vaňková
Alma | Cloud App

An app to add/edit user addresses of type "alternative" in Alma. It displays the available

Download BIB
omid soleimani
Alma | Cloud App

The Download BIB app allows users to select a record in an Alma screen and download the

Display user statistical category type
Technion Israel Institute of Technology
Alma | Cloud App

Display users' statistical category types, for users in Alma screens such as Borrowing Requests and

Last Copy
GIL Support
Alma | Cloud App

This app can be used to identify whether a potential candidate for weeding is the last publicly-

Appointment Scheduler
Josh Weisman
Alma | Cloud App

Provides an interface to schedule appointments or events for Alma users. Features include: Define

Invoice Line Tax Calculator
Josh Weisman
Alma | Cloud App

This app allows you to configure tax rates per invoice line type. When you select invoices from a

Interlibrary Add-on
Jørgen Jegsen
Alma | Cloud App

This Cloud App is adding features to help handling Borrowing Request activities more

Trove Search
Nishen Naidoo
Alma | Cloud App

Search TroveSimilar to the Hathi Trust app, use metadata from bib records and resource sharing

POL Post Correction
Metadata Hangzhou
Alma | Cloud App

When viewing a Purchase Order Line with status SENT: modify the Currency, Vendor, and Fund

Print Bib Records
Ori Miller
Alma | Cloud App

Allows quickly printing records from the repository hit list. Provides an XSL-based printing

Touchnet Payment Helper
Josh Weisman
Alma | Cloud App

Integrates a "Pay with Touchnet" option when accessing a user with an open balance. For

Delete Your Sets
George Heydon
Alma | Cloud App

This app enhances the existing Manage Sets admin page in Alma, allowing users to bulk

Call Number Assistant
Metadata Hangzhou
Alma | Cloud App

Look up title sequence number via external API and enhance the call number field based on this

SpineOMatic Cloud App
Mark Gobat
Alma | Cloud App

Prints spine and other labels for items from Alma. Supports defining layouts, templates,

Alma Refine
Josh Weisman
Alma | Cloud App

Refine bibliographic records with services that adhere to the OpenRefine standard.

Receive New Serial Items
Ori Miller
Alma | Cloud App

Currently in BETA. Search for (or navigate to) a continuous PO line. Supports specifying the

NACSIS Holdings for Alma
Shay Hadar
Alma | Cloud App

This app provides an integration with the Japanese NACSIS catalog. Currently supports the

Cloud Apps basics

- Cloud Apps are easily searched, installed, and launched within Alma by the end user

- Cloud Apps can respond to the context of the user's session, thereby offering additional functionality depending on the screen.

- Since Cloud Apps run in the Ex Libris platform, they don't require an API key or other local runtime environment.
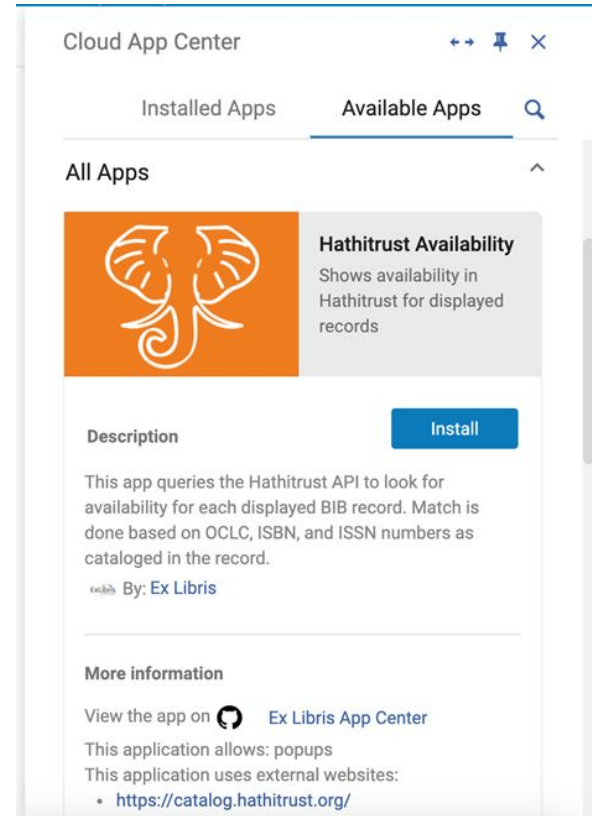
Demo

- Activate Cloud Apps for the Institution
- Search for Bib records, and open the list of Cloud Apps
  - Explain "Suggested for this page"
- Run the Cloud App
  - The iFrame
    - Open in a new tab and show headers
  - Info from Alma: AlmaPageMetadata.get()
  - F12 – show API requests

Behind the scenes

Using Alma's APIs

REST APIs

- Acquisitions
- Analytics
- Bibliographic Records and Inventory
- Configuration and Administration
- Courses
- Provider Zone
- Electronic Resources
- Resource Sharing Partners
- Task Lists
- Users and Fulfillment
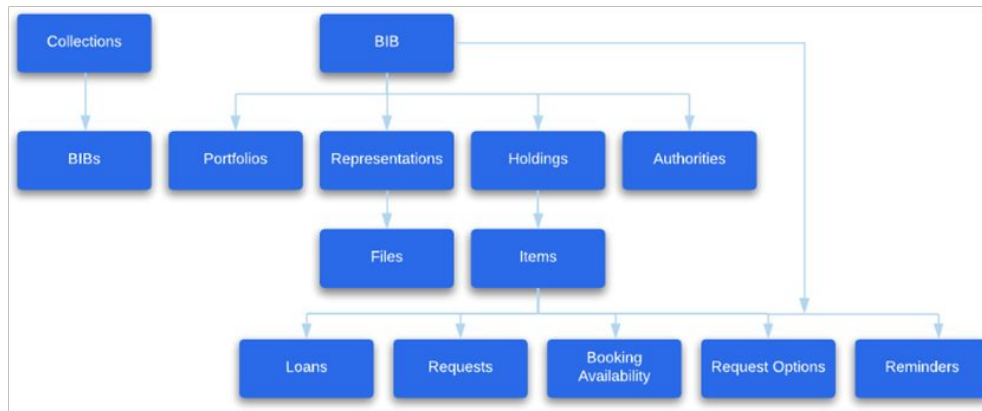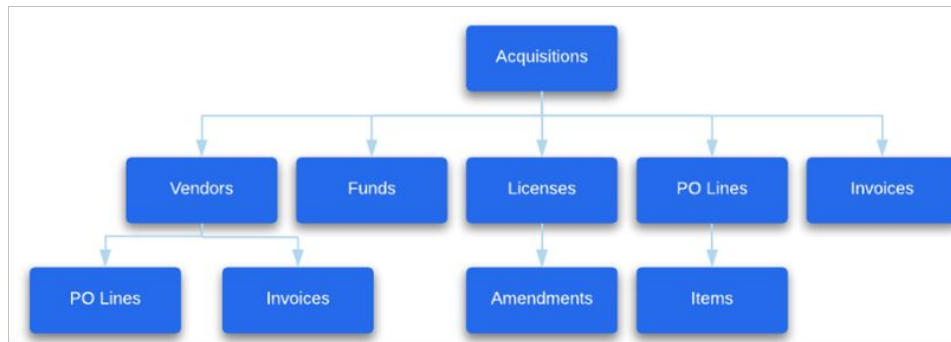
Calling Alma's REST APIs

```
this.restService.call('/conf/libraries').subscribe(result => {
  console.log(result);
});
```

```
let user = { first_name: "John", last_name: "Smith", account_type: { value: "INTERNAL" } };

this.restService.call({      url: '/users',      method: HttpMethod.POST,      requestBody: user    }).subscribe( user => {
  console.log('User created', user);
});
```

https://api-...?apikey=123

API Gateway

Cloud Apps

Same Inst & user
as used for the UI

Inst & user (exl_api)

Alma

Allow all for exl_api. For other users according
to their roles (as allowed from the UI)

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Security

- Cloud App is hosted in sandboxed iframe from another domain
- Developer needs to indicate (in manifest.json) what his app could do.

HathiTrust Availability
Shows availability in HathiTrust for displayed records

Description

Activate

This app queries the HathiTrust API to look for availability for each displayed BIB record. Match is done based on OCLC, ISBN, and ISSN numbers as cataloged in the record.

By: Ex Libris

More information

View the app on: | Ex Libris App Center

Version: v1.0.0

This application allows: popups
This application uses external websites:
- https://catalog.hathitrust.org/

Part of **Clarivate**

iFrame (inline Frame)

```
<!DOCTYPE html>
<html>
<body>

<h1>The iframe element</h1>

<iframe src="https://www.w3schools.com" height="300px" width="500px" id="myIframe">
</iframe>

</body>
</html>
```

The iframe element
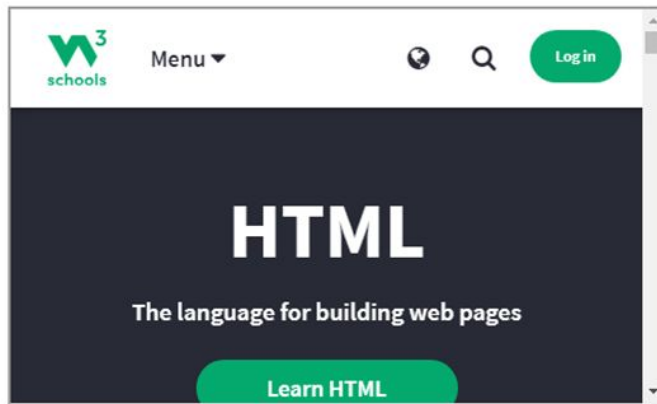
Send the message from the parent element:

```javascript
const myiframe = document.getElementById('myIframe')

myIframe.contentWindow.postMessage('message', '*');
```

And listen to it in the iframe:

```javascript
window.onmessage = function(event){
    if (event.data == 'message') {
        console('Message received!');
    }
};
```

Send the message from the iframe:

```javascript
window.top.postMessage('reply', '*')
```

And listen to it in the parent:

```javascript
window.onmessage = function(event){
    if (event.data == 'reply') {
        console('Reply received!');
    }
};
```

```
<iframe sandbox="allow-forms allow-modals" src="https://www.something.com/"></ifr
```

Flag	Details
allow-forms	Allows form submission.
allow-modals	Allows the resource to open new modal windows.
allow-orientation-lock	Allows the resource to lock the screen orientation.
allow-pointer-lock	Allows the resource to use the Pointer Lock API.
allow-popups	Allows the resource to open new popups or tabs.
allow-popups-to-escape-sandbox	Allows the resource to open new windows that will not inherit the sandboxing.
allow-presentation	Allows the resource to start a presentation session.
allow-same-origin	Allows the resource to maintain its origin.
allow-scripts	Allows the resource to run scripts.
allow-top-navigation	Allows the resource to navigate the top-level browsing context.
allow-top-navigation-by-user-activation	Allows the resource to navigate the top-level browsing context, but only if initiated by a user gesture.

```
▼<cloudapp-container _ngcontent-xht-c502 _nghost-xht-c495 class="ng-star-inserted" style>
  ▼<div _ngcontent-xht-c495>
    ▶<div _ngcontent-xht-c495 class="cloudapp-container-header">…</div> flex
    ▼<div _ngcontent-xht-c495 class="cloudapp-container-content">
      ▼<iframe _ngcontent-xht-c495 src="https://apps01.ext.exlibrisgroup.com/exlibrisgroup/print-bib-record/?v=0.1.8" sandbox="allow-scripts allow-forms allow-modals allow-popups">
        ▼#document
            <!DOCTYPE html>
          ▼<html lang="en">
            ▶<head>…</head>
            ▼<body class="mat-typography cloudapp-theme--blue" data-new-gr-c-s-check-loaded="14.1019.0" data-gr-ext-installed>
              ▼<app-root ng-version="9.1.6">
                  <router-outlet></router-outlet>
                ▼<app-main _nghost-ejy-c0>
```

```
"contentSecurity": {
    "sandbox": {
        "popups": true,
        "modals": true
    }
},
```

This application allows: modals, popups

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CSP headers

- Content Security Policy limits the outbound requests and frames that the Cloud App is allowed to make

- Developers can specify in a special manifest file that the app makes outbound requests to other sites

HathiTrust Availability
Shows availability in HathiTrust for displayed records

Activate

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This app queries the HathiTrust API to look for availability for each displayed BIB record. Match is done based on OCLC, ISBN, and ISSN numbers as cataloged in the record.

By: Ex Libris

More information

View the app on: | Ex Libris App Center

Version: v1.0.0

This application allows: popups
This application uses external websites:
- https://catalog.hathitrust.org/

▼ Response Headers

age: 11

content-encoding: gzip

content-security-policy: default-src 'none'; style-src 'self' https://apps01.ext.exlibrisgroup.com 'unsafe-inline' fonts.googleapis.com; script-src 'self' https://apps01.ext.exlibrisgroup.com; font-src 'self' fonts.gstatic.com *.ext.exlibrisgroup.com; img-src 'self' data: https:; connect-src 'self' https://catalog.hathitrust.org/; frame-src 'self'

content-type: text/html

Using AWS CloudFront

- For 3 reasons:
  - CDN
  - Change in req. (add index.html)
  - Change in Resp. (CSP header)
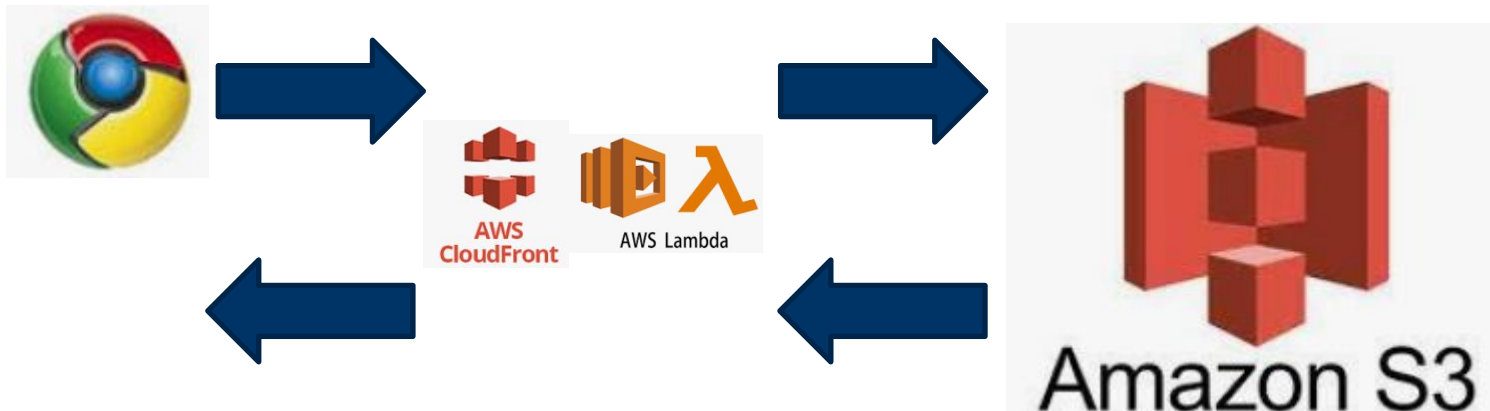
Function associations – *optional* Info

Choose an edge function to associate with this cache behavior, and the CloudFront event that invokes the function.

	Function type	Function ARN / Name	Include body
Viewer request	No association ▼		
Viewer response	No association ▼		
Origin request	Lambda@Edge ▼	:function:CloudFrontDefaultIndex:1	☐
Origin response	Lambda@Edge ▼	arn:aws:lambda:us-east-1:1499120	

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AWS Lambda   ✕

Dashboard

Applications

Functions

▼ Additional resources

Code signing configurations

Layers

Replicas

▼ Related AWS resources

Step Functions state machines

Lambda > Functions

Functions (24)

🔍 Filter by tags and attributes or search by keyword   Matches: 3

cloud ✕   Clear filters

☐	Function name ▽	Description
☐	CloudFrontDefaultIndex	Support default index for CloudFront requests (i.e. /mydir -> /mydir/index.html)
☐	CloudAppsAddHeaders	Add security headers (CSP, etc.) to Cloud Apps requests
☐	serverless-iiif-exl-IiifFunction-1EIDHXCP3WIW1	-

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CloudFrontDefaultIndex

Throttle   🗗 Copy ARN   Actions ▼

▼ **Function overview** Info

🔶 CloudFrontDefaultIndex

📚 Layers   (0)

+ Add trigger

+ Add destination

Description
Support default index for CloudFront requests (i.e. /mydir -> /mydir/index.html)

Last modified
last year

Function ARN
🗗 arn:aws:lambda:us-east-1:149912001890:function:CloudFrontDefaultIndex

Function URL Info
-

Code   Test   Monitor   Configuration   Aliases   Versions

Code source Info

Upload from ▼

▲   File   Edit   Find   View   Go   Tools   Window   **Test** ▼   Deploy

🔍 Go to Anything (Ctrl-P)

⊟   index.js   ✕   ⊕

▼ 📁 CloudFrontDefaultIr   ⚙▾
   ⟨⟩ index.js

```
1  exports.handler = async (event) => {
2      // Extract the request from the CloudFront event that is sent to Lambda@Edge
3      var request = event.Records[0].cf.request;
4
5      // Extract the URI from the request
6      var olduri = request.uri;
7
8      // Match any '/' that occurs at the end of a URI. Replace it with a default index
9      var newuri = olduri.replace(/\/$/, '\/index.html');
10
11     // Replace the received URI with the URI that includes the index page
12     request.uri = newuri;
13
14     // Return to CloudFront
15     return request;
16 };
17
```

Path: exlibrisgroup/alma-adlib/

File	Size	Type
📁		
📁 assets/		
📄 5.ae5a17ecb506d2d78021.js	1.87 KB	JavaScript File
📄 favicon.ico	5.30 KB	Icon
📄 index.html	2.32 KB	Chrome HTML ...
📄 main.325faf4e1ee4e7f65570.js	883.60 KB	JavaScript File
📄 polyfills-es5.a8fbd8ec6dd62b6edcaa.js	129.65 KB	JavaScript File
📄 polyfills.a3f823dd8032b9cfaf23.js	43.93 KB	JavaScript File
📄 runtime.c2c48efc9377477ba24f.js	2.22 KB	JavaScript File
📄 styles.d528c72f933131041969.css	1.42 MB	Cascading Style...

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CloudAppsAddHeaders

Throttle   Copy ARN   Actions ▼

▼ Function overview Info

CloudAppsAddHeaders

Layers (0)

Description
Add security headers (CSP, etc.) to Cloud Apps requests

Last modified
11 days ago

Function ARN
arn:aws:lambda:us-east-1:149912001890:function:CloudAppsAddHeaders

Function URL Info

index.js

```javascript
1  'use strict';
2
3  const aws = require('aws-sdk');
4  const s3 = new aws.S3({ region: 'eu-central-1' });
5  const bucket = 'apps01.ext.exlibrisgroup.com';
6
7  async function fetchManifest(dir) {
8    const params = { Bucket: bucket, Key: dir + '/assets/manifest.json' };
9    try {
10     const response = await s3.getObject(params).promise();
11     return JSON.parse(response.Body);
12   } catch(e) {
13     return {};
14   }
15 }
16
17 // Mock html-entities
18 const entities = {
19   encodeNonUTF: string => string
20 }
21
22 const getCsp = (contentSecurity) => {
23   const csp = {
24     "default-src": "'none'",
25     "style-src": "'self' https://apps01.ext.exlibrisgroup.com 'unsafe-inline' fonts.googleapis.com",
26     "script-src": "'self' https://apps01.ext.exlibrisgroup.com",
27     "font-src": "'self' fonts.gstatic.com *.ext.exlibrisgroup.com",
28     "img-src": "'self' data: https:",
29     "connect-src": "'self'",
30     "frame-src": "'self'"
31   }
32   if (process.env.NODE_ENV !== "production" && !process.env.LAMBDA_TASK_ROOT) {
33     csp["script-src"] = `'unsafe-eval' 'unsafe-inline' ${csp["script-src"]}`;
34   }
35   if (contentSecurity) {
36     Object.entries(contentSecurity).forEach(([key, val]) => {
37       key = camelToKebab(key);
```

```javascript
35   if (contentSecurity) {
36     Object.entries(contentSecurity).forEach(([key, val]) => {
37       key = camelToKebab(key);
38       if (key in csp && Array.isArray(val)) {
39         const whitelist = entities.encodeNonUTF(val.join(" "));
40         csp[key] = `${csp[key]} ${whitelist}`;
41       }
42     })
43   }
44   let arr = [];
45   for (const directive in csp) {
46     arr.push(`${directive} ${csp[directive]}`);
47   }
48   return arr.join("; ");
49 }
50
51 const camelToKebab = string => string.replace(/([a-z0-9])([A-Z])/g, '$1-$2').toLowerCase();
52
53 exports.handler = async (event) => {
54
55   //Get contents of response
56   const response = event.Records[0].cf.response;
57   const headers = response.headers;
58   const uri = event.Records[0].cf.request.uri;
59
60   if (uri.endsWith('index.html')) {
61     const manifest = await fetchManifest(uri.substring(1, uri.lastIndexOf('/')));
62     const cspPolicy = getCsp(manifest.contentSecurity);
63     headers['strict-transport-security'] = [{key: 'Strict-Transport-Security', value: 'max-age=63072000'}];
64     headers['content-security-policy'] = [{key: 'Content-Security-Policy', value: cspPolicy}];
65   }
66
67   //Return modified response
```

"Installing" a Cloud App

Activated Apps   **Available Apps**   🔍

Orbis Cascade Label Printer

Print spine labels directly to your label printer

Description   **Activate**

Print labels from any item record. Supports settings for appearance and configurable prefixes.

By: Orbis Cascade Alliance

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```
select institutionid,user_id,cloud_app_id,cloud_app_config from user_cloud_apps
order by institutionid, cloud_app_id,user_id;
```

Query Result ×

SQL | Fetched 200 rows in 1.09 seconds

	INSTITUTIONID	USER_ID	CLOUD_APP_ID	CLOUD_APP_CONFIG
135	3976	1919846040003976	exlibrisgroup/alma-refine	(null)
136	3976	1935580120003976	exlibrisgroup/alma-refine	(null)
137	3976	-1	exlibrisgroup/alma-scheduler	{"locations":[{"id":"13ba8bd1-cc81-45e0-9eae-5eacea603e30","color":"purp...
138	3976	814288470003976	exlibrisgroup/alma-scheduler	(null)
139	3976	814337050003976	exlibrisgroup/alma-scheduler	(null)
140	3976	814338080003976	exlibrisgroup/alma-scheduler	(null)
141	3976	1917835420003976	exlibrisgroup/alma-scheduler	(null)
142	3976	1917837780003976	exlibrisgroup/alma-scheduler	(null)
143	3976	1917841640003976	exlibrisgroup/alma-scheduler	(null)
144	3976	1919822080003976	exlibrisgroup/alma-scheduler	(null)
145	3976	1919823760003976	exlibrisgroup/alma-scheduler	(null)
146	3976	1919824770003976	exlibrisgroup/alma-scheduler	(null)
147	3976	1919838730003976	exlibrisgroup/alma-scheduler	(null)
148	3976	1935580120003976	exlibrisgroup/alma-scheduler	(null)
149	3976	1935581960003976	exlibrisgroup/alma-scheduler	(null)
150	3976	3526653540003976	exlibrisgroup/alma-scheduler	(null)
151	3976	4601143830003976	exlibrisgroup/alma-scheduler	(null)
152	3976	8019393020003976	exlibrisgroup/alma-scheduler	(null)
153	3976	-1	exlibrisgroup/print-bib-record	{"customXsls":[{"name":"Helveticat Standard","xsl":"<?xml version=\"1.0\...
154	3976	814288470003976	exlibrisgroup/print-bib-record	{"xslFile":"MARC21ColumnarFormat.xsl"}
155	3976	814326890003976	exlibrisgroup/print-bib-record	{"xslFile":"instConfig:Helveticat Standard"}
156	3976	814329080003976	exlibrisgroup/print-bib-record	{"xslFile":"instConfig:Helveticat Standard"}
157	3976	814329370003976	exlibrisgroup/print-bib-record	{"xslFile":"instConfig:Helveticat Standard"}
158	3976	814329640003976	exlibrisgroup/print-bib-record	(null)

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Publishing a Cloud App

Develop App

Release to GitHub

Add to AppCenter

Available in Alma

Manual review and approval

```bash
  echo "Builds Cloud-App"
  echo "Usage: ./build.sh GIT_URL RELEASE"
  echo "Example: ./build.sh https://github.com/exlcodeshare/temp-first-angular-app/ v0.1"
  exit 1;
fi

REGEX="https?:\/\/[^\/]*(\/.*\/).*$"
URL=$1
VERSION=$2
WORKING_DIR="repo/"

if [ -d "$WORKING_DIR" ]; then rm -Rf $WORKING_DIR; fi

if [[ $URL =~ $REGEX ]]
then
  APP_PATH=${BASH_REMATCH[1]}
else
  echo "Invalid URL: " $URL
  exit 1;
fi

echo ">> Checking out $URL to $WORKING_DIR"
git clone --quiet -b "$VERSION" --depth 1 "$URL" "$WORKING_DIR"
cd "$WORKING_DIR"
echo ">> Installing dependencies"
npm install --silent
echo ">> Building project"
ng build --no-progress --prod --base-href "$APP_PATH" --outputPath=../output/
echo ">> Uploading to $APP_PATH on S3"
aws s3 sync --quiet ../output "s3://apps01.ext.exlibrisgroup.com$APP_PATH" --region=eu-central-1 --delete
echo ">> Updating manifest.json into apps.json"
cd ..
curl -s 'https://apps01.ext.exlibrisgroup.com/apps.json' > apps.json
python ./tmp/parseJson.py "$APP_PATH" "$VERSION" > apps.json.UPDATED
echo ">> Uploading the updated apps.json"
aws s3 cp apps.json.UPDATED "s3://apps01.ext.exlibrisgroup.com/apps.json" --region=eu-central-1 --content-type application/json
```

What's new?

Integration with the new MD-Editor

- App shows all records opened

- First record is the in focus

- Support for Holdings records

- Refresh from the Cloud App reloads the doc

What else?

- New APIs that were requested for Cloud App Development

- Visibility of additional Alma pages to the Cloud App

- More info for the getInitData() service

Save Query

Sandbox Backup for Refresh ⋯

| | Staff | Public | Contact | All |

Upload

1 - 8 of 8

⊕ Add User ▾

▽ Account : All ▾   Role : All ▾   Status : All ▾

☐ Check/Uncheck All

☑ Bunch, Dan

☑ Tesi Daniel-Geli, Dan

☑ Zahavi, Dan

☐ Wang, Dan

☐ Wu, Dan

☐ Dunham, Dan

☐ Dan, Toni

☐ Dan, Yoo Jung

	▲ Record Type	⇕ Name	⇕ Job Category	⇕ Account Type	User Group	⇕ Expiration date	Blocks	Notes	Researcher	
1	Public	Bunch, Dan 📇	-	External	BC Staff	2016-04-05		✓		⋯
2	Public	Tesi Daniel-Geli, Dan 📇	-	External	Graduating	2015-01-01				⋯
3	Public	Zahavi, Dan 📇	-	External	BC Faculty	2016-04-05				⋯
4	Public	Wang, Dan 📇	-	External	BC Undergraduate	2015-03-04				⋯
5	Public	Wu, Dan 📇	-	External	BC Master's	2015-02-09				⋯
6	Public	Dunham, Dan 📇	-	External	BC Law Student	2014-13-11				⋯
7	Public	Dan, Toni 📇	-	External	BC Faculty	2016-04-05		✓		⋯
8	Public	Dan, Yoo Jung 📇	-	External	BC Undergraduate	2015-02-06		✓		⋯

Users to Save:

Name	Remove
Keaty, Anthony (KEATYA)	✕
Sirois, Celia (SIROISCE)	✕
O ' Connell, Daniel (OCONNEDQ)	✕
Franks, David (FRANKSDA)	✕
Bunch, Dan (BUNCH)	✕
Tesi Daniel-Geli, Dan (TESID)	✕
Zahavi, Dan (ZAHAVI)	✕

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Summary

- Budgetary pressure and pandemic conditions contribute to a trend towards agility and efficiency.

- A library management system which is open and supports industry standards and REST APIs facilitates writing scripts and software which can automate repetitive tasks, enable efficient workflows, and power integrations with other systems in the library ecosystem.

- An open platform which supports an app model can accelerate innovation, making it easier to develop, deploy, and use apps. This model accelerates innovation, allowing institutions to provide custom workflows and integrations in their library system without relying solely on the system vendor.

Q&A

Thank you!

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