Lessons Learned
Custom Software in the Library Space

Andrew McDonald

Background

- Senior Software Developer
- Developing for around 18 years
- Started out in custom software development
  - Air monitoring software
  - Lost keys mail return system
  - Scientific land classification
  - Hospital stock tracking application
  - Zebra printer receipt programming

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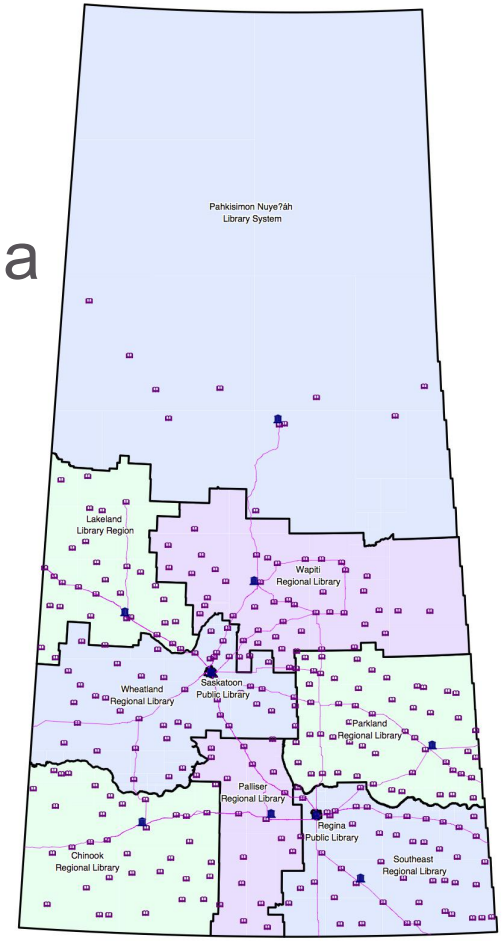
  - Hospital stock tracking application
  - Zebra printer receipt programming
  - **Library related software!**

SILS

- Saskatchewan Information and Library Services
- Establish in 2009
- NPO funded by the 12 public library members of the consortia
- Maintain the ILS and provide other technical services
- We cover the entire geographic region of Saskatchewan
- Serving approximately 1.25M people
- Supporting over 300 branches and their staff



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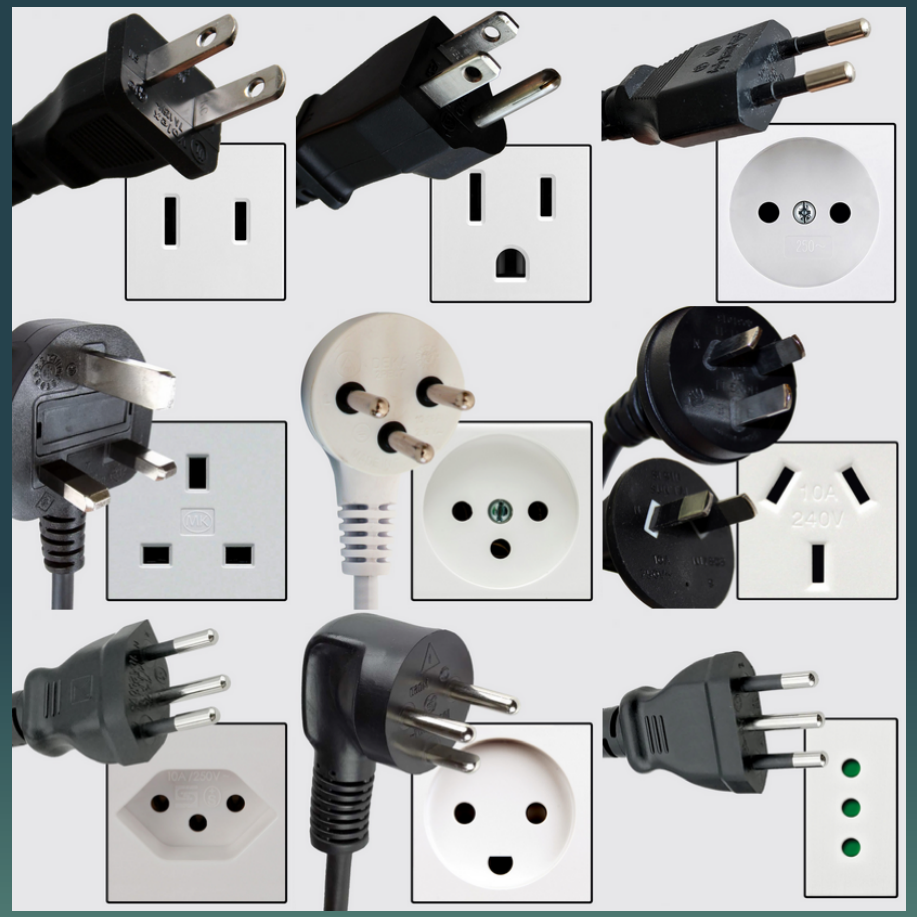
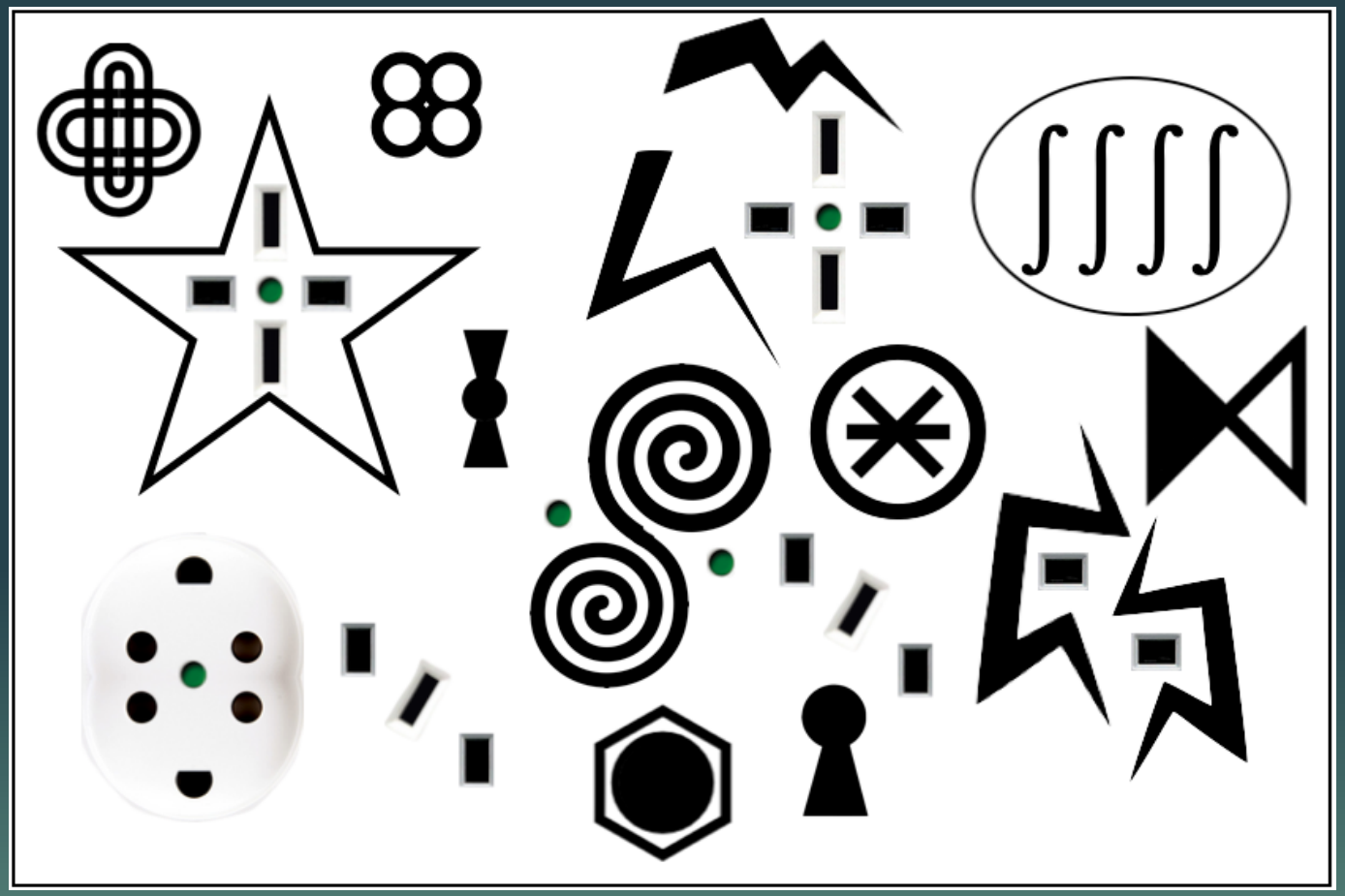
APIs

Appliance Power Interfaces



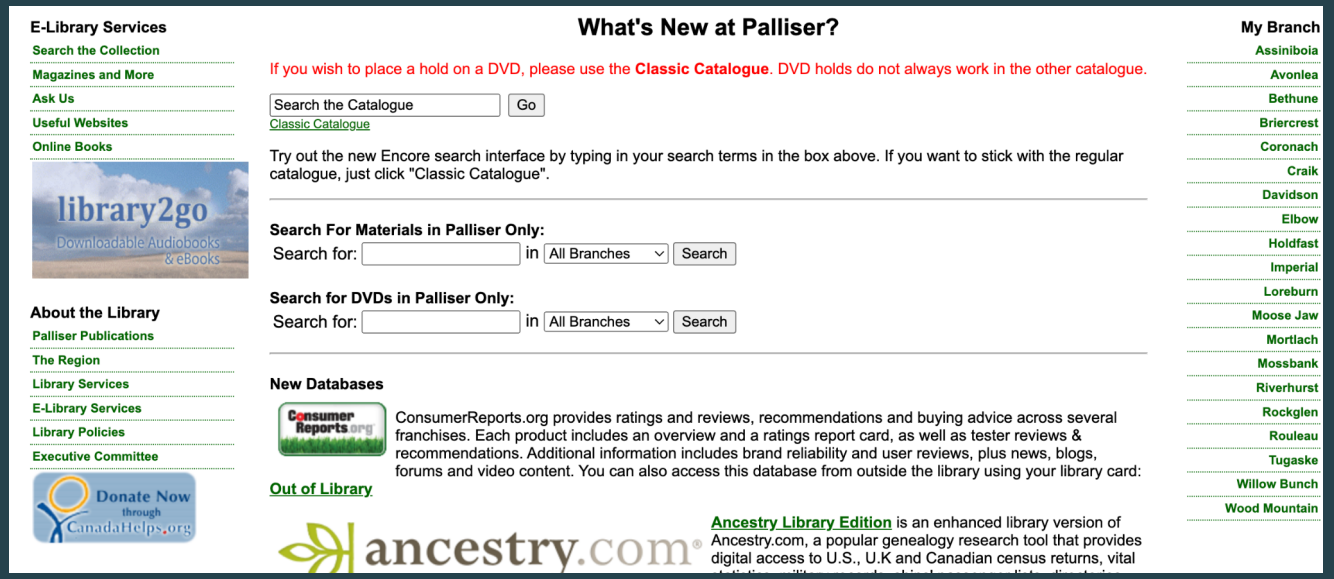
Application Programming Interfaces

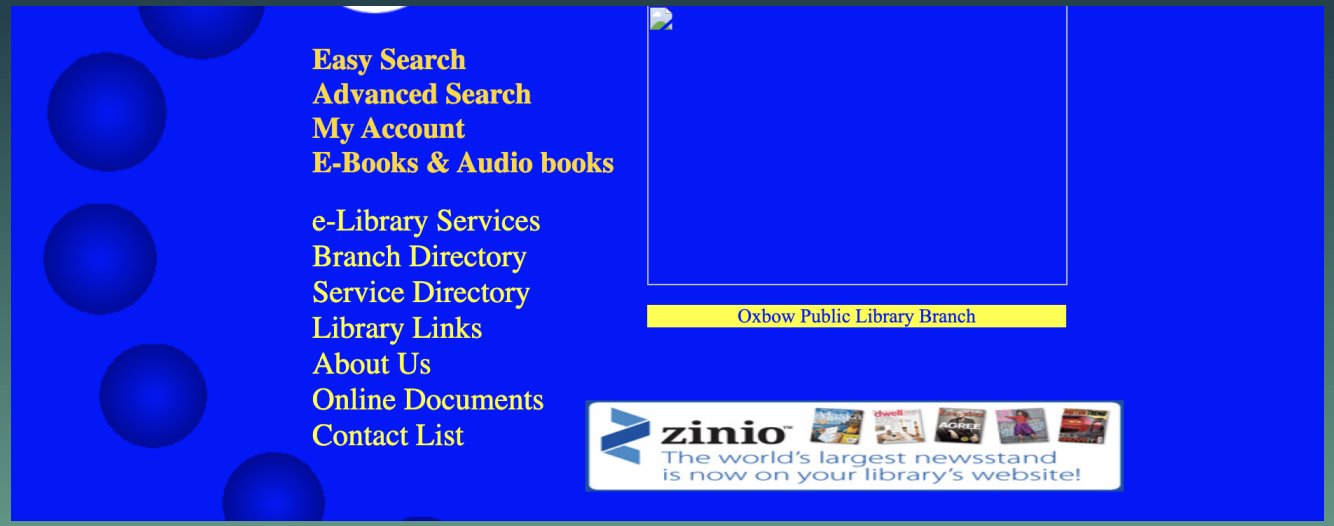


Application Programming Interface

- It’s a type of contract between provider and consumer
- It’s an abstraction that ideally hides complexity
- Designed for computer programs to access data or processes

Websites





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Websites - Problem

- Outdated and not mobile friendly
- They drove traffic away to the OPAC (Online Public Access Catalogue)
- The OPAC had limited branding and messaging capabilities
- This prevented clear online communication between the member libraries and their patrons
- The OPAC had limited options on how information is displayed

Websites - Solution

- Take a content management system (CMS)
- Use the APIs provided by the ILS develop modules for search and account
- Combine those together and create websites for each library member
- Information could be presented and tailored through these modules

Search

Search Results

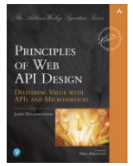
Location All

41 Results

Sort By Most Popular | Format All | Language English | Audience All

Literary Form All Results ◉ Non-Fiction Books ○ Fiction Books ○

Did you mean? pi apt ape



Principles of Web API design : delivering value with APIs and microservices

—Higginbotham, James, author.

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"Principles of Web API Design brings together principles and processes to help you succeed across the entire API design lifecycle. Drawing on extensive in-the-trenches experience, leading consultant James Higginbotham he...

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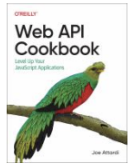

Web API cookbook : level up your JavaScript applications

—Attardi, Joe, author.

Book 2024 Availability: 3 of 3

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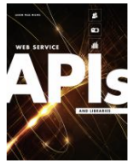

Web service APIs and libraries

—Michel, Jason Paul, author.

Book 2013 Availability: 0 of 1

Learn to put your library website front and center. APIs allow programmers and developers to both deliver content to and receive content from the web's larger, more highly used services. At the same time, APIs give devel...

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Kubernetes in action

—Lukša, Marko, author.

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Subjects

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Authors

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- Ball, Corey (Cybersecurity manager) (1)
- Faurot, Will (1)
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- Lukša, Marko (1)

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2022

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   by Higginbotham, James, author.

... product teams, map requirements to specific and well-organized *APIs* , and choose the right *API* style for writing them. He walks ...

Publisher, Date: Boston : Addison-Wesley/Pearson, [2022]

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2. Web service *APIs* and libraries
   by Michel, Jason Paul, author.

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3. Web *API* cookbook : level up your JavaScript applications
   by Attardi, Joe, author.

AVAILABILITY | FULL DISPLAY

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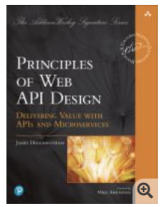

Principles of Web API design : delivering value with APIs and microservices

--Higginbotham, James, author.

Book | Published 2022

Availability: 0 of 1

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Item Details

"Principles of Web API Design brings together principles and processes to help you succeed across the entire API design lifecycle. Drawing on extensive in-the-trenches experience, leading consultant James Higginbotham helps you align every stakeholder on specific outcomes, design APIs that deliver value, and scale the design process from small teams to the entire organization. Higginbotham helps you bring an "outside-in" perspective to API design to reflect the voices of customers and product teams, map requirements to specific and well-organized APIs, and choose the right API style for writing them. He walks through a real-world example from the ground up, offering guidance for anyone designing new APIs or extending existing APIs"-- Provided by publisher.

ISBN:
9780137355631

Description:
xxxiii, 333 pages : illustrations ; 24 cm

Notes:
"A Vaughan Vernon Signature Book"--Cover
Includes bibliographical references and index

Contents:
The principles of API design
Collaborative API design
Identify digital capabilities
Capture activities and steps
Identifying API boundaries
API modeling
REST-based API design
RPC and query-based API design
Async APIs for eventing and streaming
From API to miscroservices
Improving the developer experience
API testing strategies
Document the API design
Designing for change
Protecting APIs
Continuing the API design journey

Series:
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Subjects:
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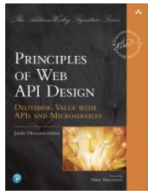
Application program interfaces (Computer software) -- Design
Web services
Web site development
Web sites -- Design



2022

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Web services.
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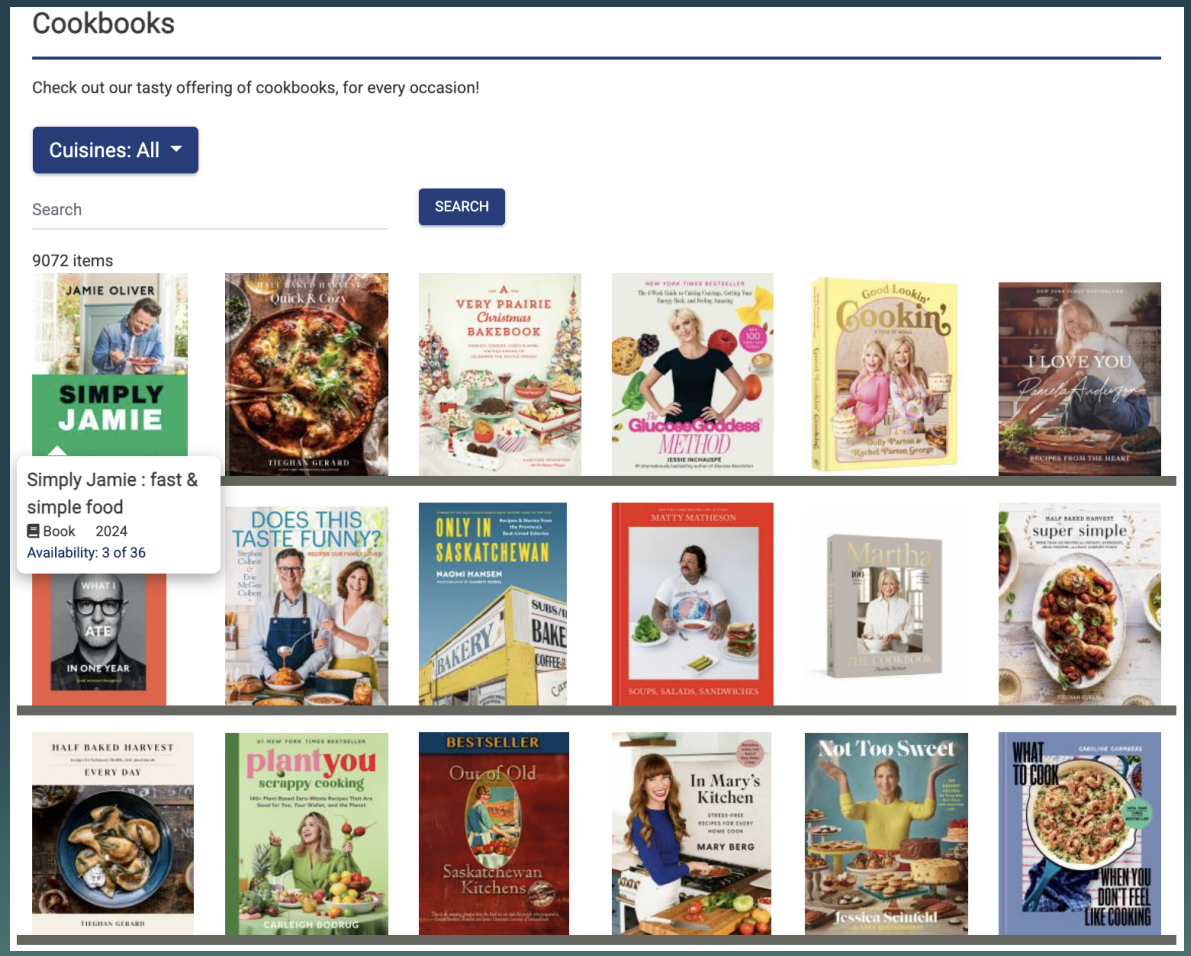
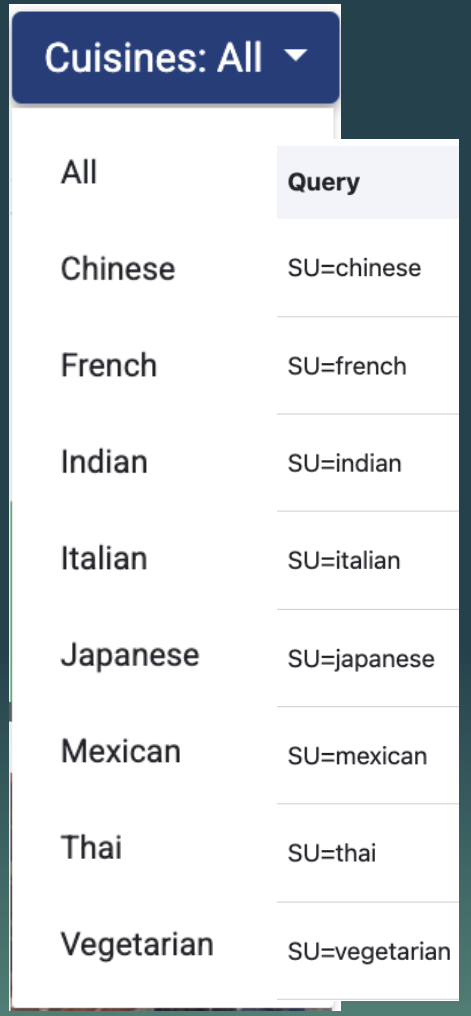
New Non-Fiction	MAT=1 AND COL=41 AND AB>=101 AND AB<=159 AND BRS=54051	All	MP	Yes	Edit | Delete
New Movies	AB>=101 AND AB<=159 AND BRS=41286	All	MP	Yes	Edit | Delete

Browse



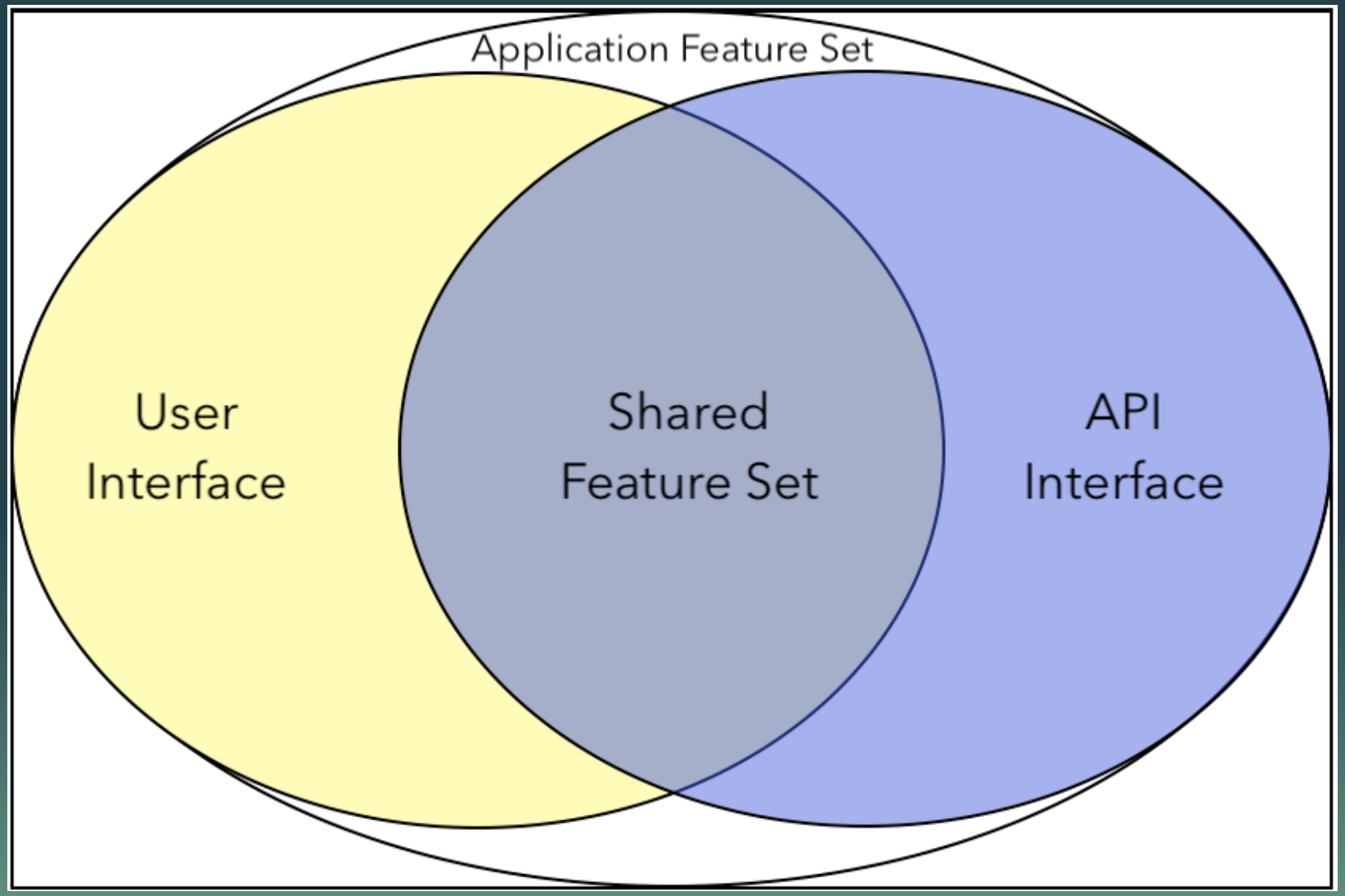


page	Route	Base Query
Cookbooks	/sm/browse/cookbooks	TOM=bks AND SU=cookbooks

Websites - The Downsides

- We now have 12 websites that need to be maintained
- We have hosting costs for those sites
- When the ILS API changes we may need to verify those changes and adjust our solution accordingly
- When the CMS changes may also need to verify and adjust.
- Some search and account features are lost or limited

Application Feature Set Workspace

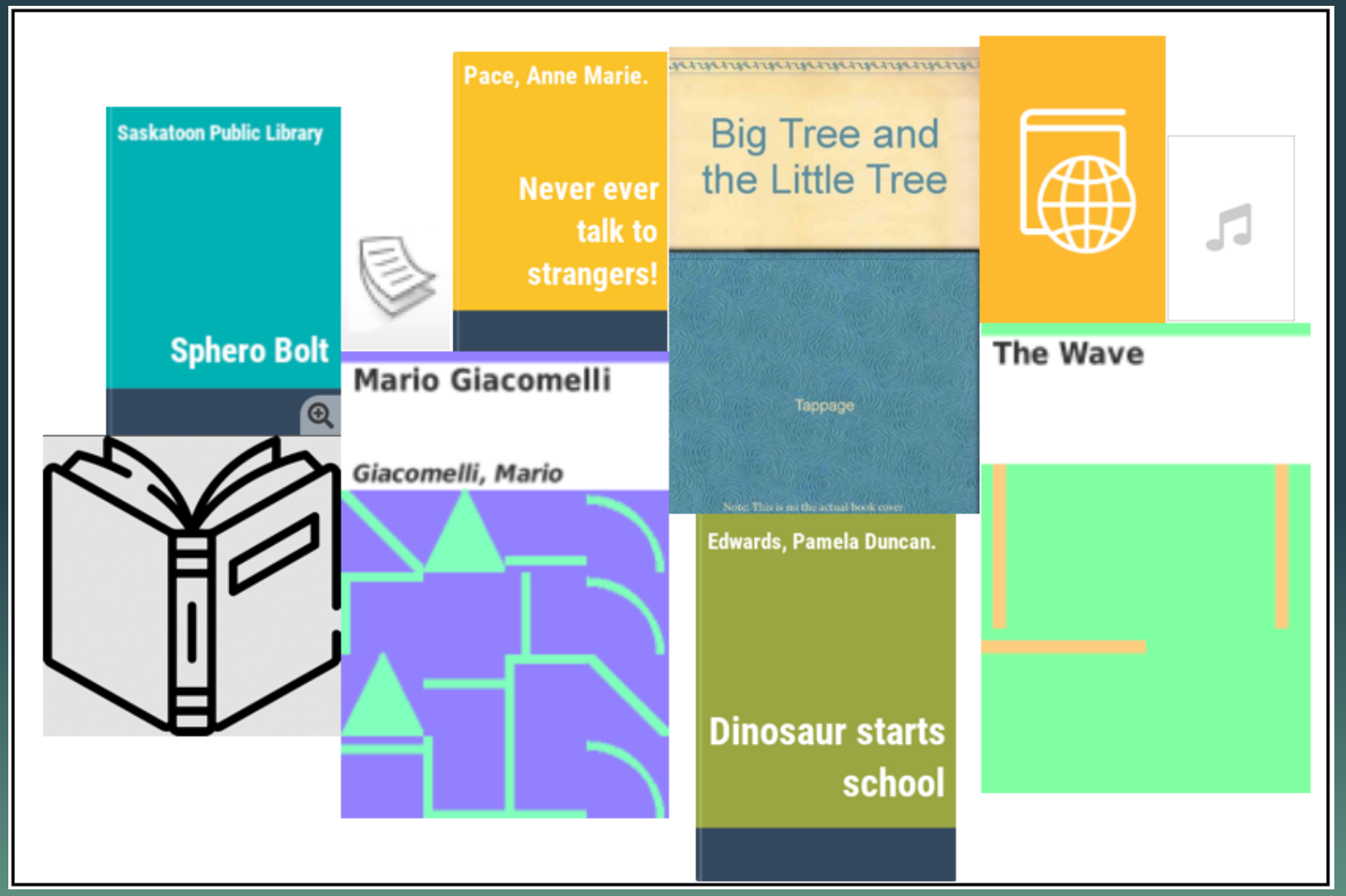


Websites - The Upsides

- We now have an all in one place for patrons to access services
- Tailored information
  - Reduce duplication of content
  - Cleaner titles less punctuation everywhere
  - Less is more
- Each site has its own analytics
- Creation of supporting modules
- Messages and notifications were now more visible to patrons
  - Funding cuts of 2017, protest, and reversal
  - Pandemic

Covers

Or lack thereof

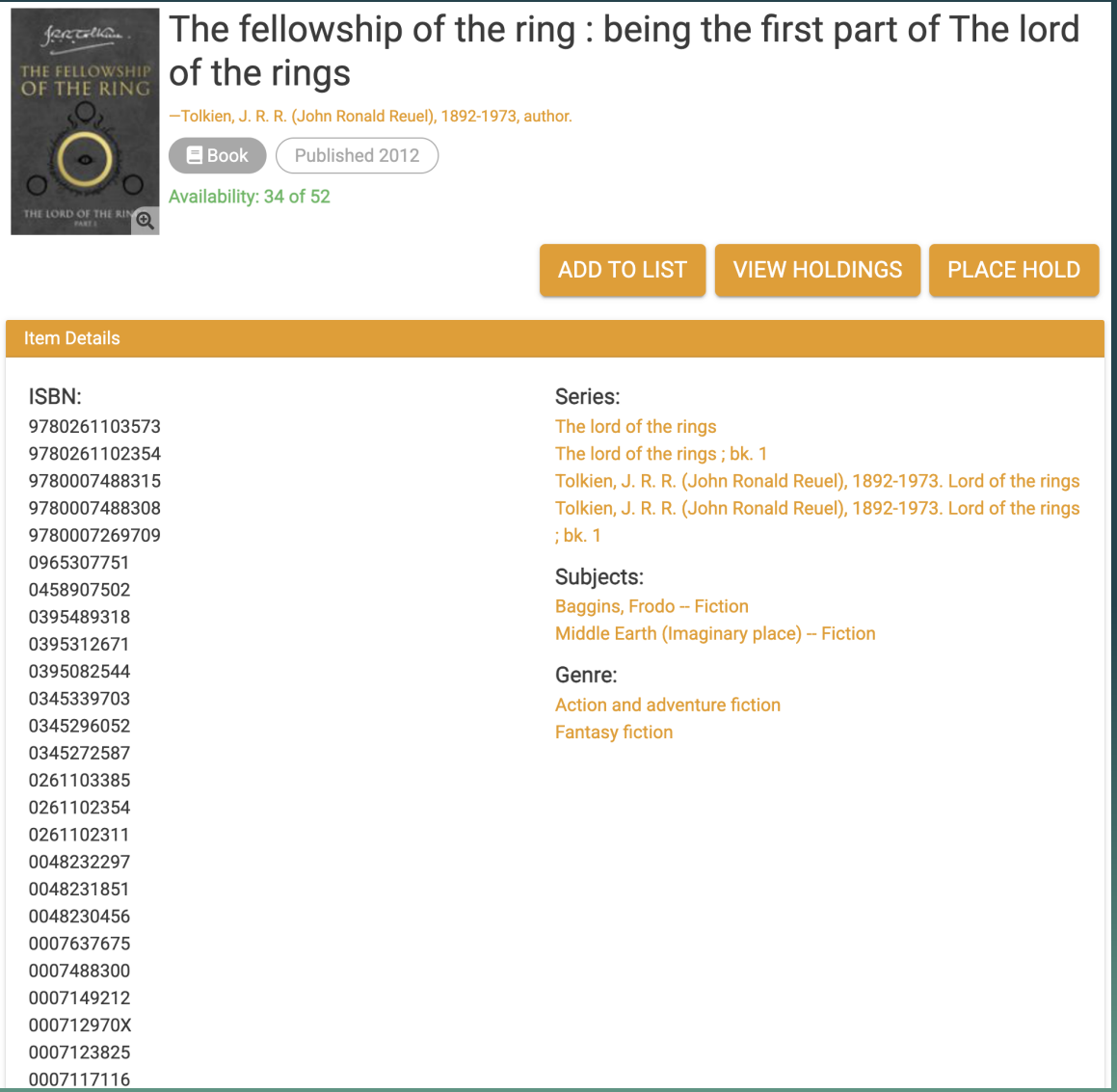


Covers - Problem

We have a lot of missing covers, why?

- The identifiers on the bibliographic record simply don’t match a cover in the provider’s system
- Kits, toys, musical instruments, art, etc. simply don’t have identifiers
- When we run out of options is there anything we can do?

Covers



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0048231851
0048230456
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Cover Service - Solution

1. Create a small application that will scan identifiers from a bibliographic record
2. Send them to the provider
3. If a cover is found
4. Return the URL for that cover

Wait a minute!

Doesn't that mean you are scanning every record and spamming the provider every time a cover is needed?

Cover Service - Solution

1. Create a small application that will scan identifiers from a bibliographic record
2. **Check to see if that record has already been scanned if so, goto #6**
3. Send them to the provider
4. If a cover is found
5. **Write it down in the database**
6. Return the URL for that cover

Wait a minute!
What happens when no record is found?
Are you scanning those every time?

Cover Service - Solution

1. Create a small application that will scan identifiers from a bibliographic record
2. Check to see if that record has already been scanned if so, goto #**7**
3. Send them to the provider
4. If a cover is found, goto #**6**
5. **If no cover is found create a placeholder URL**
6. Write the URL down in the database
7. Return the URL for that cover

Wait a minute!
What happens if a cover gets added to the provider later?

Cover Service - Solution

1. Create a small application that will scan identifiers from a bibliographic record
2. Check to see if that record has already been scanned **and not expired** if so, goto **#7**
3. Send them to the provider
4. If a cover is found goto #6
5. If no cover is found create a placeholder URL
6. Write the URL down in the database **with an expiration date**
7. Return the URL for that cover

The No Identifier Problem

Cover Service - Solution - No Identifier Problem

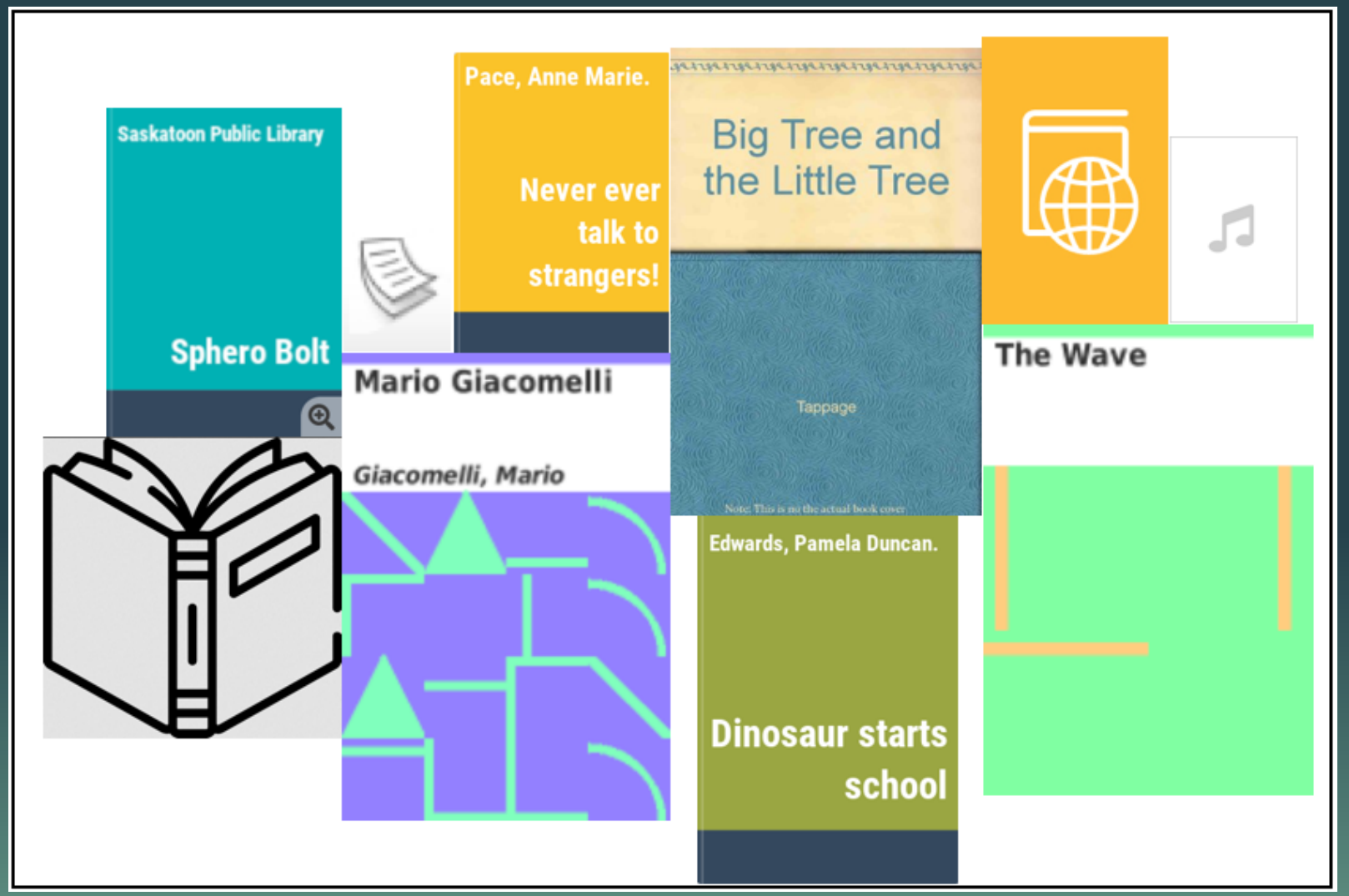
- We are already using bibliographic record ids
- Our application is a web application
- We can host these images ourselves
- Librarians can give us images for these record
- Overwrite the URL in the database
- But what about the expiration and scanning problem?
    - We can add an ‘is permanent’ value to the database

The EMagazine Problem

Cover Service - Solution - The Emagazine Problem

- Scan the bibliographic record for Overdrive links
- Ask the Overdrive API for the location of the cover
- Journal that URL down in the database
- Set an appropriate expiration date

The Last Resort



The Last Resort

All hope is not lost!

The Last Resort

All hope is not lost!

THE SHRUG

¯_(ツ)_/¯

Cover Service - Solution - The Last Resort

- When all else has failed create the best possible alternative
- Scan the bibliographic record for title, author, and format
- Construct the url according to the provider’s API
- Put it in the database with an appropriate expiration date

Cover Service - The Downsides

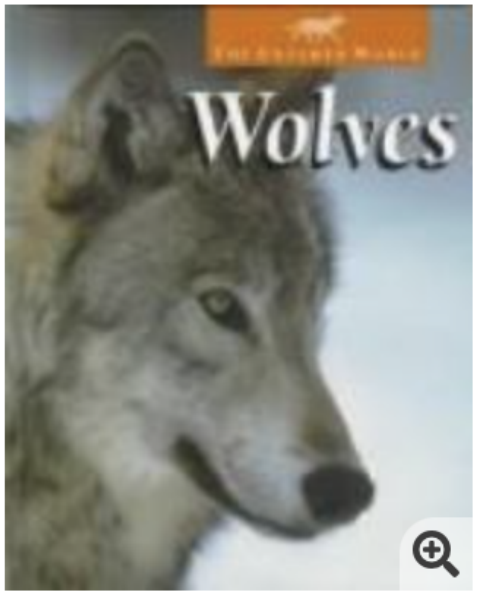
- Another service to maintain
- Hosting costs
- Single point of failure
- Custom covers can difficult to collect and load
- API Changes

Cover Service - The Upsides

- More covers
- Custom covers
- Multiple cover sources
- Flexibility

Cover Service - The Upsides

- More covers
- Custom covers
- Multiple cover sources
- Flexibility
- **We can quickly mitigate cover mismatches**



Whooping cranes

—Dudley, Karen, author.

Book | Published 1997

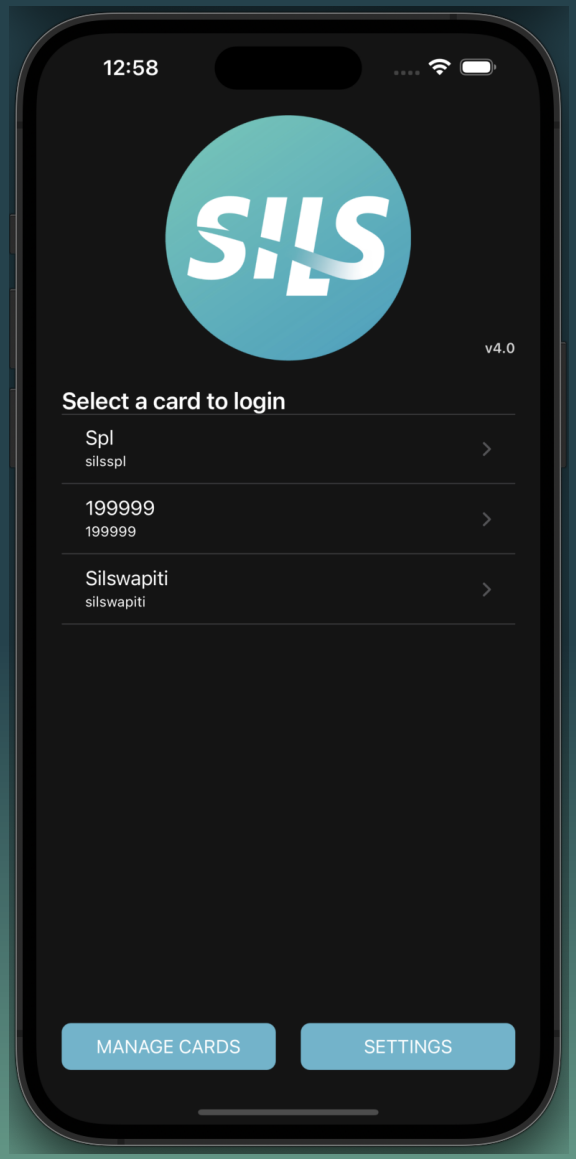
Availability: 17 of 17

Mobile Experience

Problem

How do we reach patrons in the era of mobile phones?

Mobile Apps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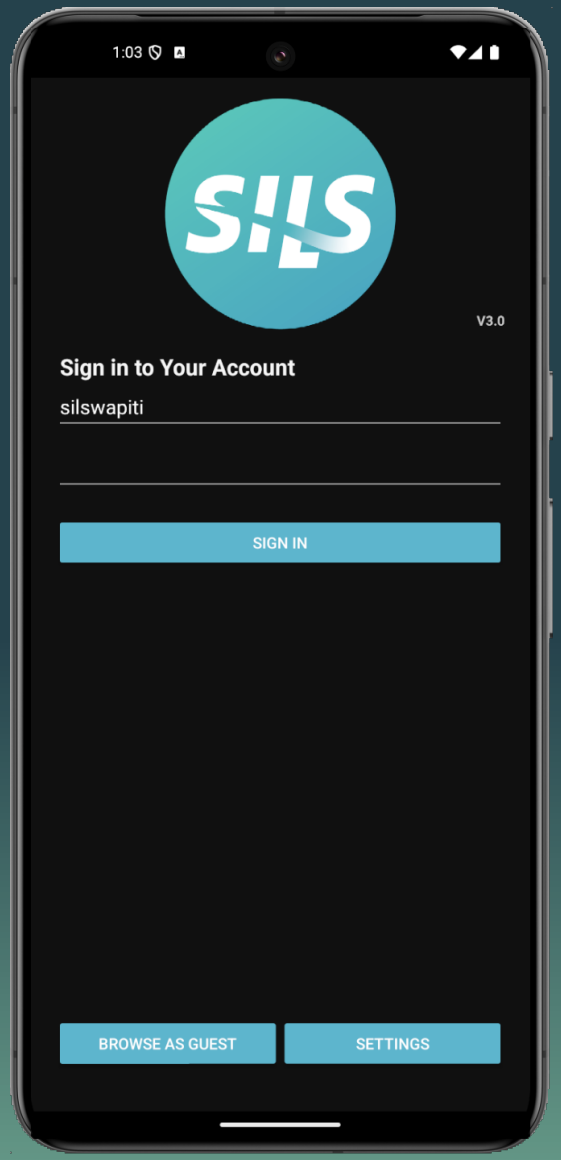
MANAGE CARDS
SETTINGS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V3.0
Sign in to Your Account
silswapiti
SIGN IN
BROWSE AS GUEST
SETTINGS

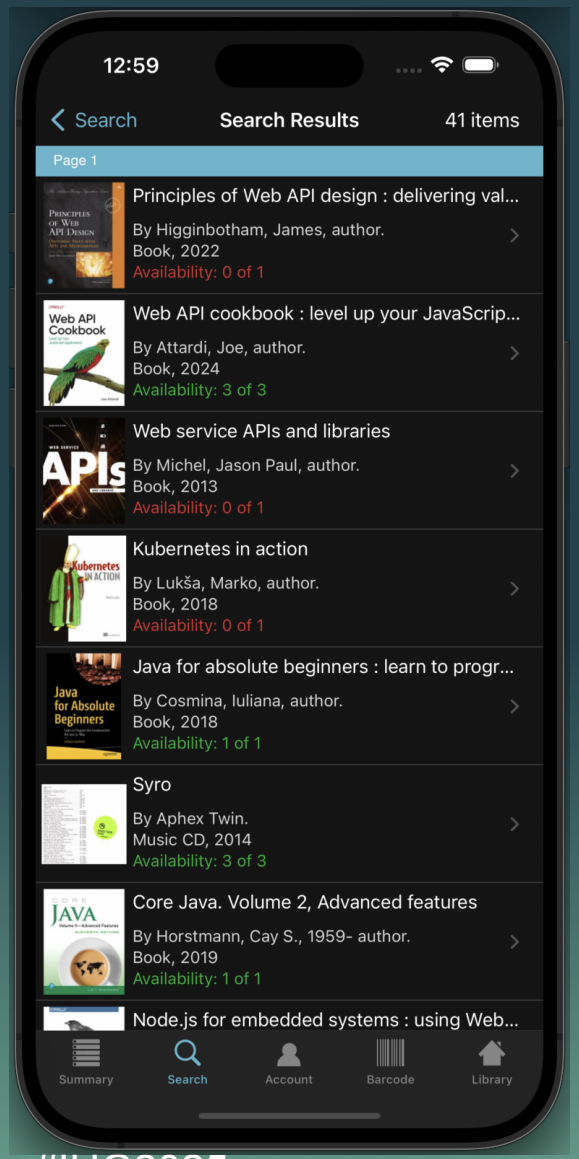
Mobile Apps - Problem

- How do we keep this project manageable?
- How do get the needed data safely over to the apps?
- Patrons were looking for alternatives to physical library cards

Mobile Apps - Solution

- Develop native apps (iOS, Android)
- Keep the feature set as small as possible
- Create a new API that can combine information needed for the apps in a secure way
- Create a digital library card in the app

iOS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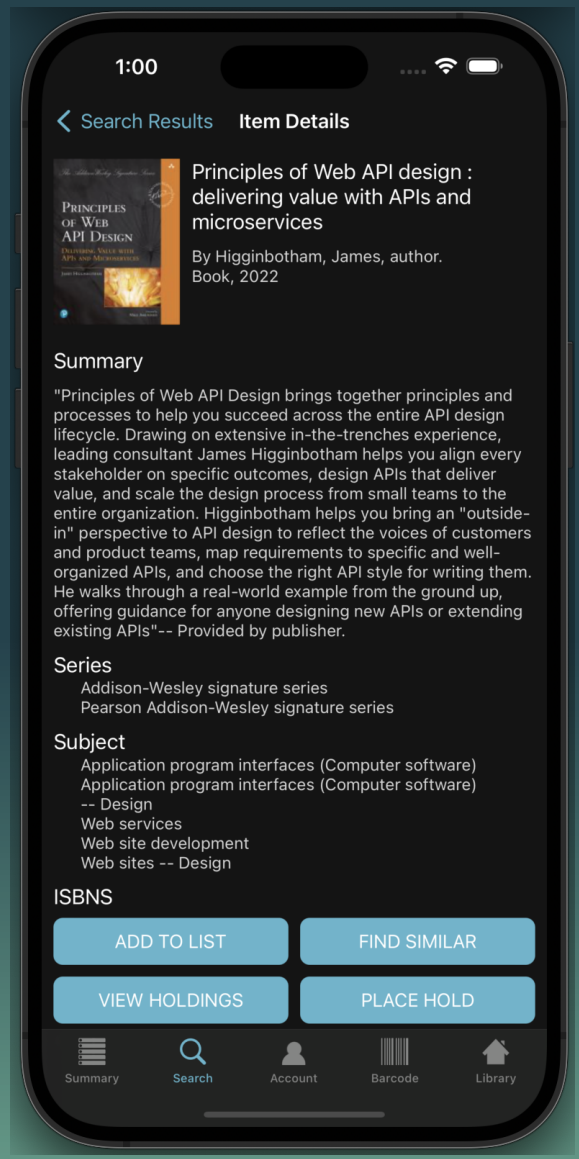
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By Higginbotham, James, author.
Book, 2022
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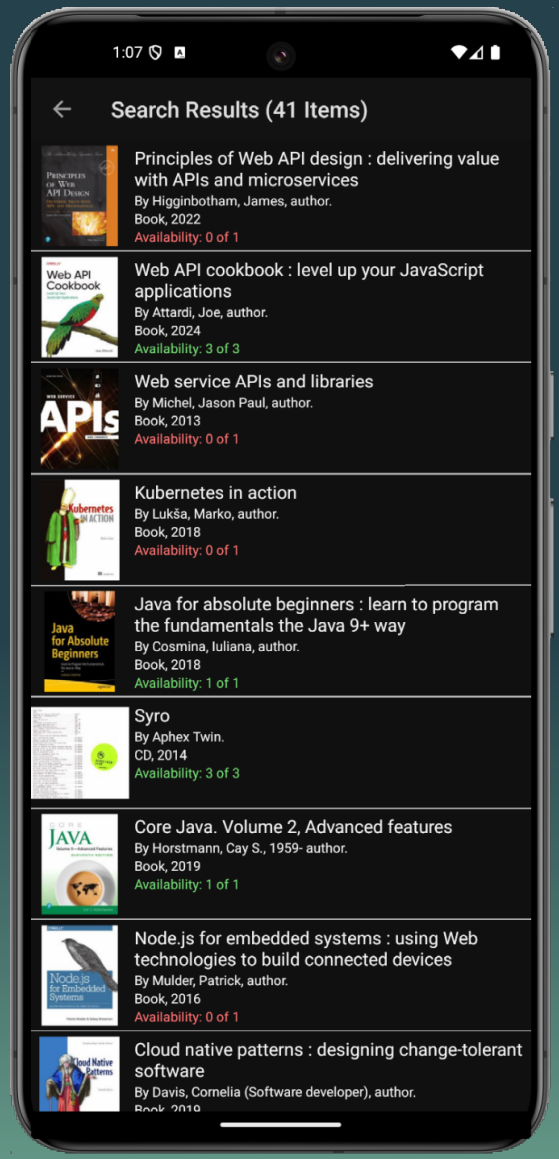
Library

Android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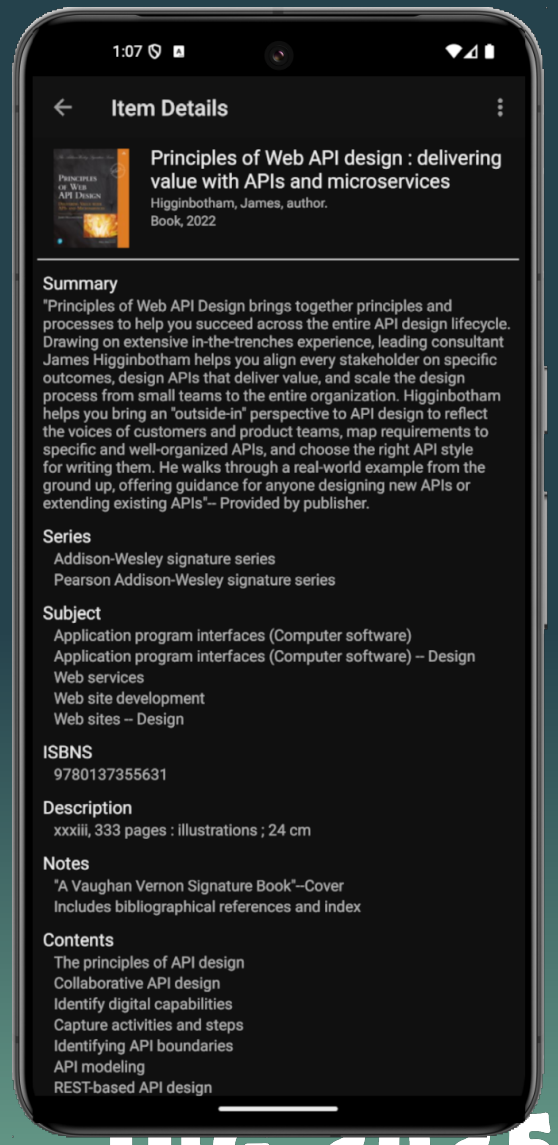
Search Results (41 Items)
Principles of Web API design : delivering value with APIs and microservices
By Higginbotham, James, author.
Book, 2022
Availability: 0 of 1
Web API cookbook : level up your JavaScript applications
By Attardi, Joe, author.
Book, 2024
Availability: 3 of 3
Web service APIs and libraries
By Michel, Jason Paul, author.
Book, 2013
Availability: 0 of 1
Kubernetes in action
By Lukša, Marko, author.
Book, 2018
Availability: 0 of 1
Java for absolute beginners : learn to program the fundamentals the Java 9+ way
By Cosmina, Iuliana, author.
Book, 2018
Availability: 1 of 1
Syro
By Aphex Twin.
CD, 2014
Availability: 3 of 3
Core Java. Volume 2, Advanced features
By Horstmann, Cay S., 1959- author.
Book, 2019
Availability: 1 of 1
Node.js for embedded systems : using Web technologies to build connected devices
By Mulder, Patrick, author.
Book, 2016
Availability: 0 of 1
Cloud native patterns : designing change-tolerant software
By Davis, Cornelia (Software developer), author.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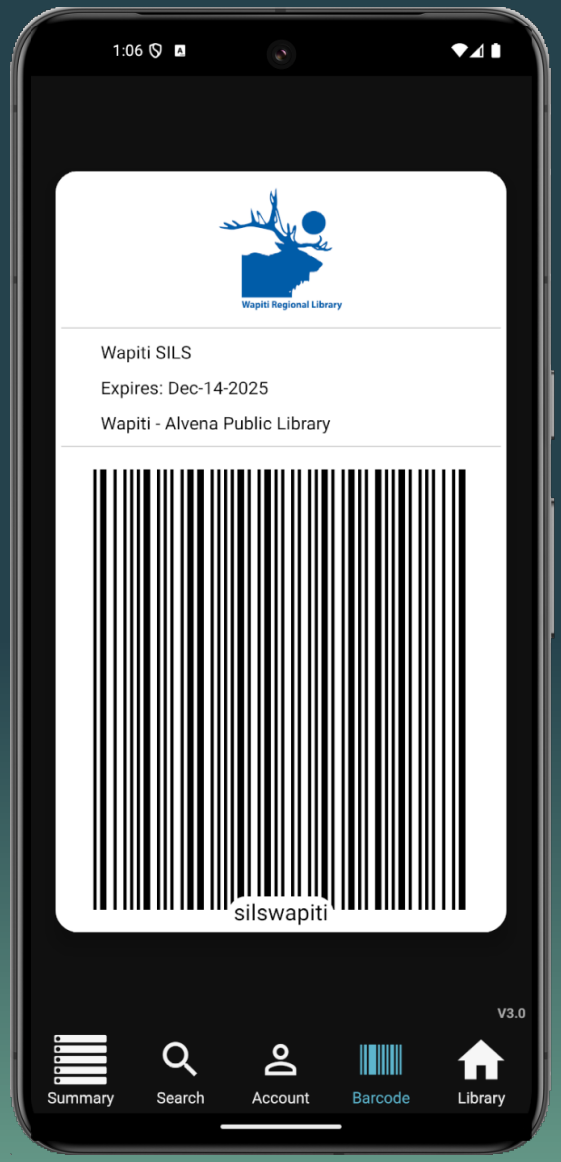
Item Details
Principles of Web API design : delivering value with APIs and microservices
Higginbotham, James, author.
Book, 2022
Summary
"Principles of Web API Design brings together principles and processes to help you succeed across the entire API design lifecycle. Drawing on extensive in-the-trenches experience, leading consultant James Higginbotham helps you align every stakeholder on specific outcomes, design APIs that deliver value, and scale the design process from small teams to the entire organization. Higginbotham helps you bring an "outside-in" perspective to API design to reflect the voices of customers and product teams, map requirements to specific and well-organized APIs, and choose the right API style for writing them. He walks through a real-world example from the ground up, offering guidance for anyone designing new APIs or extending existing APIs"-- Provided by publisher.
Series
Addison-Wesley signature series
Pearson Addison-Wesley signature series
Subject
Application program interfaces (Computer software)
Application program interfaces (Computer software) -- Design
Web services
Web site development
Web sites -- Design
ISBNS
9780137355631
Description
xxxiii, 333 pages : illustrations ; 24 cm
Notes
"A Vaughan Vernon Signature Book"--Cover
Includes bibliographical references and index
Contents
The principles of API design
Collaborative API design
Identify digital capabilities
Capture activities and steps
Identifying API boundaries
API modeling
REST-based API design

Mobile Apps - Solution - SILS API

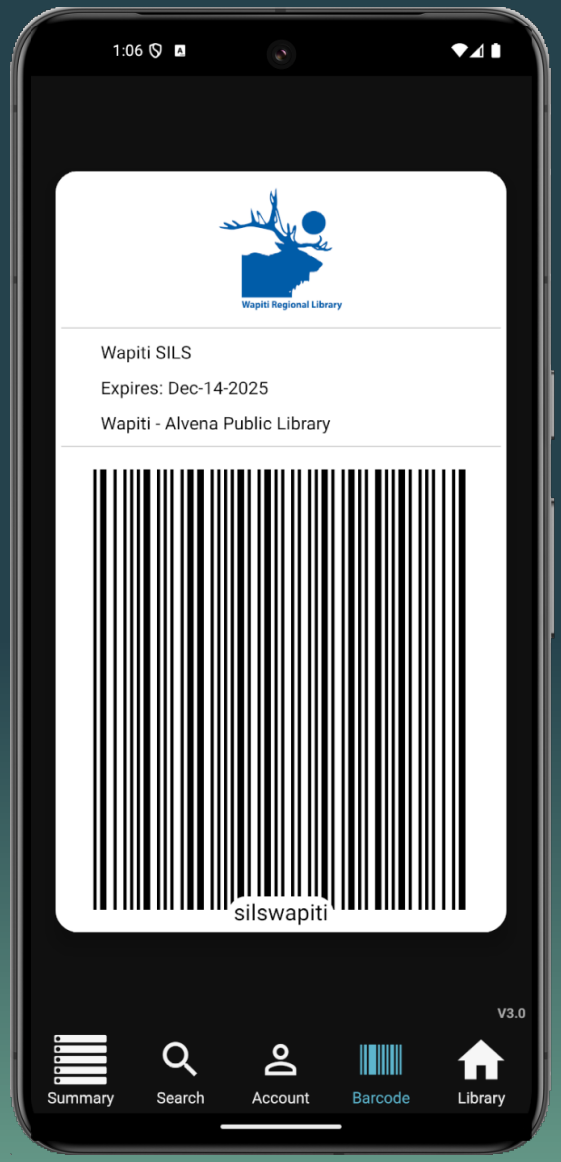
- Hides the provider APIs
- Safely stores any API access keys
- API hides endpoints that we don’t want accessed
- Combined information for less data requests

Library Card



Barcodes

12:59
Library Card
Wapiti Regional Library
Wapiti SILS
Expires: Dec-14-2025
Wapiti - Alvena Public Library
silswapiti
Summary
Search
Account
Barcode
Library


1:06
Wapiti Regional Library
Wapiti SILS
Expires: Dec-14-2025
Wapiti - Alvena Public Library
silswapiti
V3.0
Summary
Search
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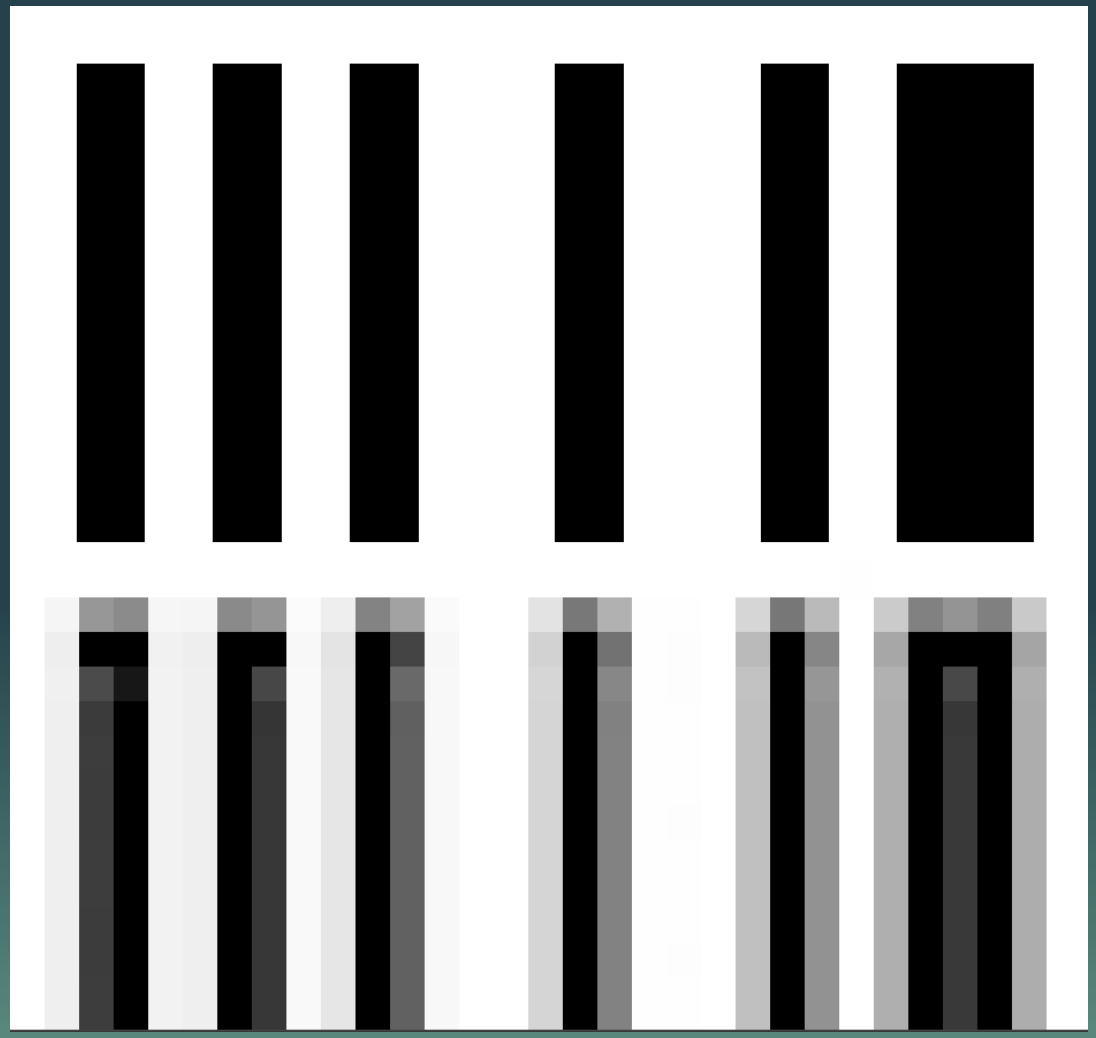
Barcode
Library



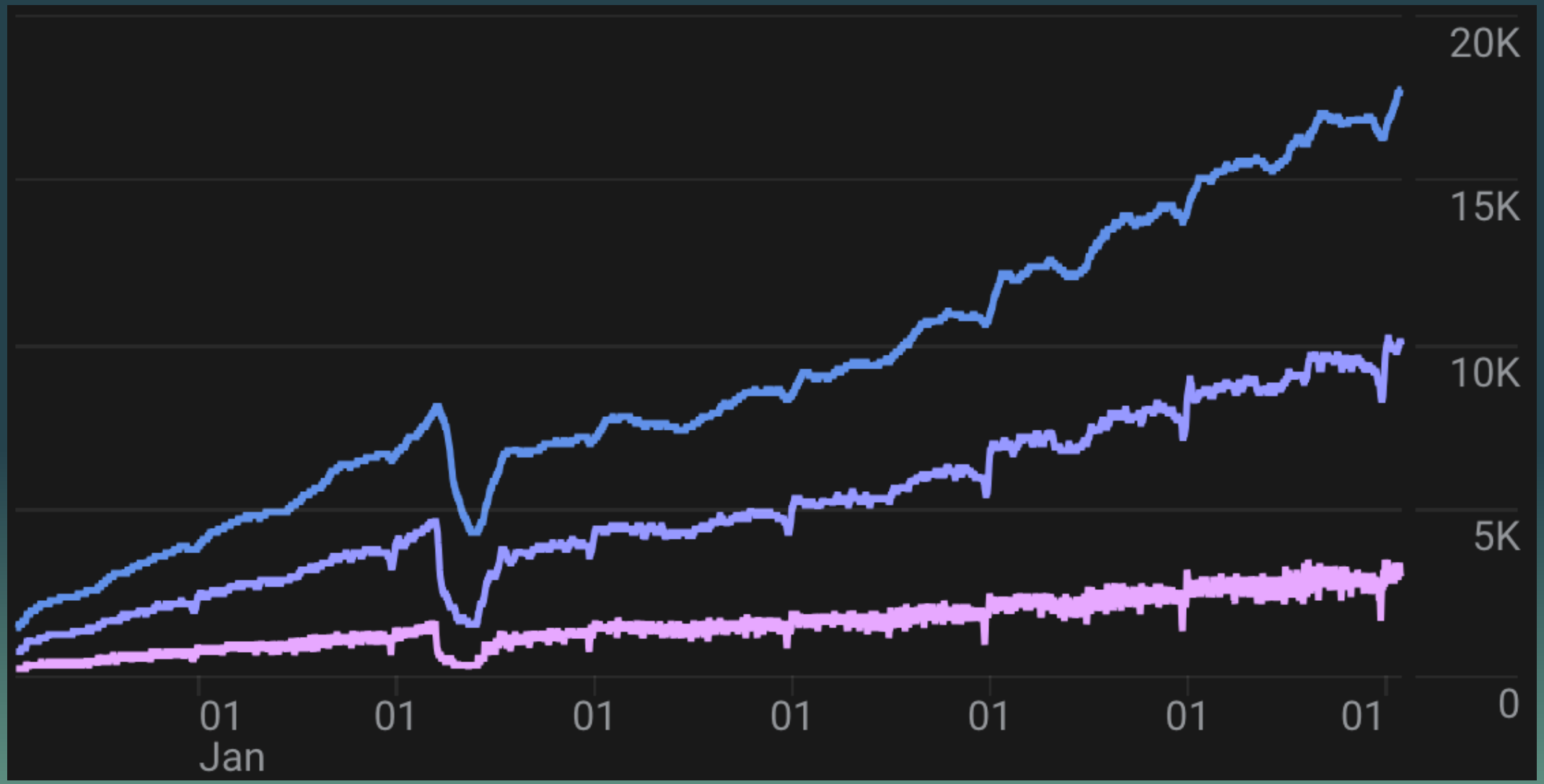
Mobile Apps - The Downsides

- Two apps, twice the maintenance
- Keeping the apps inline can be a challenge
- This is a changing space making maintenance more demanding
- Lots of documentation and bureaucratic hurdles
- App update adoption occurs gradually, changes need to be mindful
- Apps can only be changed with a release and cannot be changed quickly

Cover Service - The Upsides

- One app for everyone
- Digital library card
- Fast access
- SILS API

Joy!



Lessons Learned

Lessons Learned

- Maintenance
- Succession
- Internal vs external development
- Exploration leads to inspiration which leads to innovation
- Understand your users
- Simplicity over complexity

Dare to dream!

THANK YOU

Questions?