

RESTFUL APIs IN PRIMO

PAUL MCBRIDE | PRIMO TIER2 SENIOR SUPPORT ANALYST
TROY GNAT | PRIMO TIER1 SUPPORT ANALYST

ExLibris
a ProQuest Company

Introductions

- Paul McBride

Paul joined the North American Primo Support Team in 2010. Prior to joining Ex Libris, he spent ten years doing distributed application development and support. Paul is an SME on Primo's APIs.

- Troy Gnat

Troy joined the North American Tier 1 Support Team in 2013. Prior to joining Ex Libris, he spent four years working as a Linux Administrator and Support Specialist. Troy is experienced in Primo web, CSS, UI, Open Interfaces.

Objectives and Target Audience

- **Brief Session Description:** Integrate Primo into other software! Primo RESTful APIs can be used to bring the power of Primo to your applications, web portals, library site and more. Different Primo APIs and their syntax will be explained and discussed. Usage of the API Explorer to develop Primo REST APIs will be demonstrated as part of this presentation.
- **Session Objective(s)**
 - By the end of this sessions you will know, understand and/or be able to:
 - Understand the differences in Primo APIs
 - Get started with Primo REST APIs using the API Explorer
 - Perform a brief search using Primo REST APIs
- **Session Target Audience:**
 - New and Experienced Customers
 - Local and Direct SAAS Customers will have advantage over TotalCare

Agenda

- 1 Introduction
- 2 Developer Network
- 3 Primo API Overview
- 4 REST APIs
- 5 API Gateway

Why use APIs?

“People don't want to buy a quarter-inch drill. They want a quarter-inch hole.”

Theodore Levitt
Economist & Professor at Harvard Business School



Why use APIs?

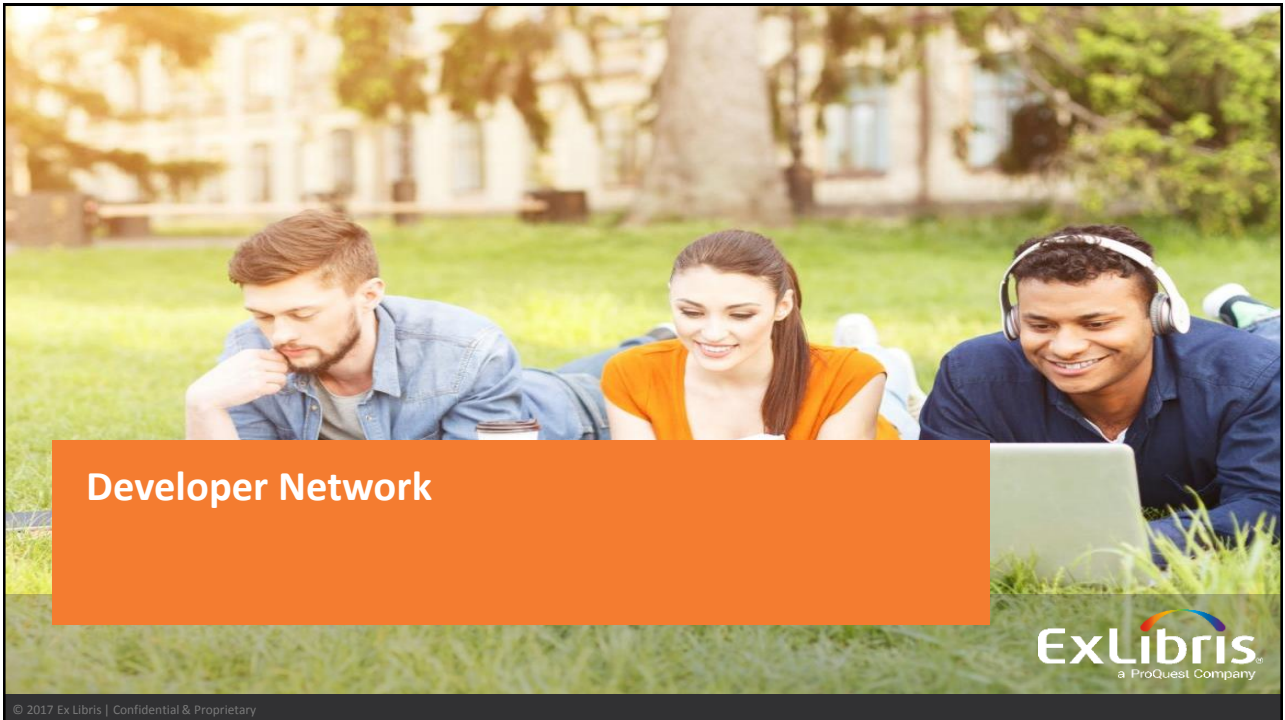


Build your own UI

Integrate new workflows into Primo

- Plug-ins
- Send To
- RTA

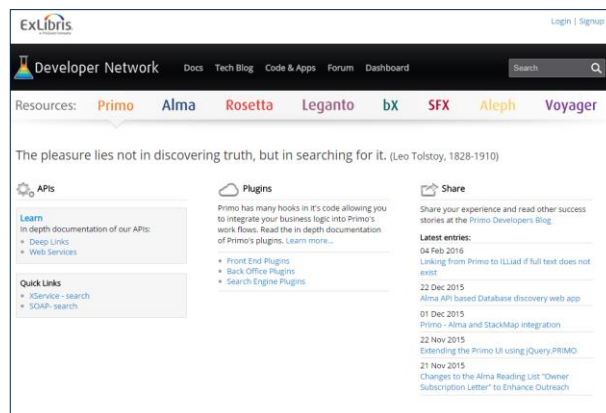
Integrate Primo functionality into your site



© 2017 Ex Libris | Confidential & Proprietary

New Portal -- Developer Network

- All content from EI-Commons moved to “Developer Network”
- <http://developers.exlibrisgroup.com/primo>

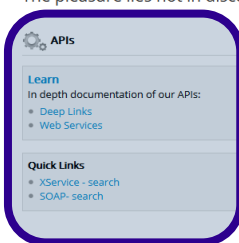
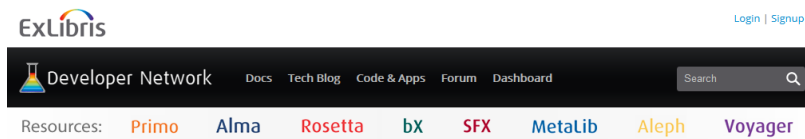


© 2017 Ex Libris | Confidential & Proprietary

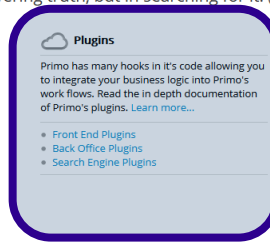
8

ExLibris

Developer Network - Sections



API



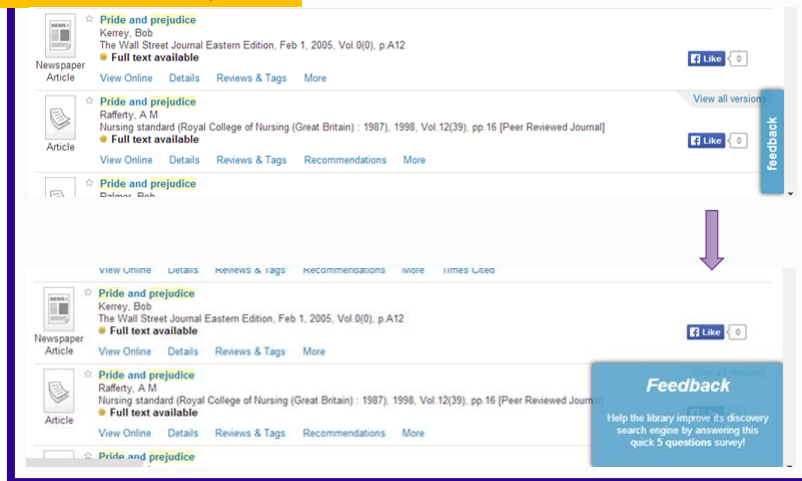
Plugins

Code contributions /
Developer's Blog

Developer Network – Code contributions / Developer's Blog

- Last Time I Counted... Over 70 contributions

Feedback Button example



Developer Network - Plugins



Front End

- RTA – Real Time Availability
- Push To - social bookmark services (Delicious, RefWorks...)



Back Office

- File Splitters
- Enrichment



Search Engine

- Deep Search

Primo API Overview

Developer Network – API Section

ExLibris

Login | Signup

Developer Network Docs Tech Blog Code & Apps Forum Dashboard

Search

Resources: **Primo** Alma Rosetta Leganto bX SFX Aleph Voyager

The pleasure lies not in discovering truth, but in searching for it. (Leo Tolstoy, 1828-1910)

APIs

Learn
In depth documentation of our APIs:

- Deep Links
- Web Services

Quick Links

- XService - search
- SOAP- search

Plugins

Primo has many hooks in it's code allowing you to integrate your business logic into Primo's work flows. Read the in depth documentation of Primo's plugins. [Learn more...](#)

- Front End Plugins
- Back Office Plugins
- Search Engine Plugins

Share

Share your experience and read other success stories at the [Primo Developers Blog](#)

Latest entries:

- 04 Feb 2016
[Linking from Primo to ILLiad if full text does not exist](#)
- 22 Dec 2015
[Alma API based Database discovery web app](#)
- 01 Dec 2015
[Primo - Alma and StackMap integration](#)
- 22 Nov 2015
[Extending the Primo UI using JQuery.PRIMO](#)
- 21 Nov 2015
[Changes to the Alma Reading List "Owner Subscription Letter" to Enhance Outreach](#)

© 2017 Ex Libris | Confidential & Proprietary

ExLibris

Developer Network – API Section

1. Deep Links (Classic UI)
 2. Web Services
 - ✓ X-Services (non-standard REST)
 - ✓ SOAP
- REST (stay tuned!)

ExLibris

Developer Network Docs Tech Blog Code & Apps Forum Dashboard

Resources: **Primo** Alma Rosetta bX SFX Meta

APIs

- Deep Links
- Web Services
- X-Services
- SOAP (Web Services)
- REST
- XSD

Plugins

More

Ex Libris Developer Network / Primo / APIs / **Web Services**

This section includes the 3 different protocols we support for our .

- a) **X-Services** - Basically like REST APIs. The responses of these req
- b) **SOAP** - Standard XML based protocol for accessing Web Service
- c) **REST** - Will hold all previous APIs in the standard REST protocol

© 2017 Ex Libris | Confidential & Proprietary

ExLibris

Deep Links



Input:

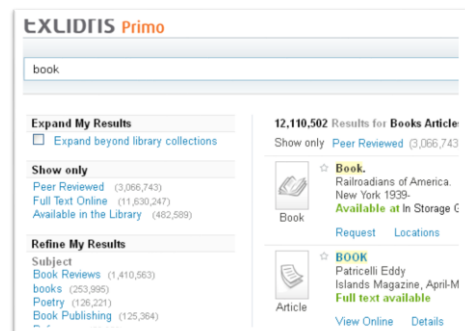
A URL with parameters:

http://myprimo.hosted.exlibrisgroup.com/primo_library/libweb/action/dlSearch.do?tab=default_tab&vid=01UNIV_main&institution=01UNIV&query=any,contains,economics&search_scope=UNIV_ALMA

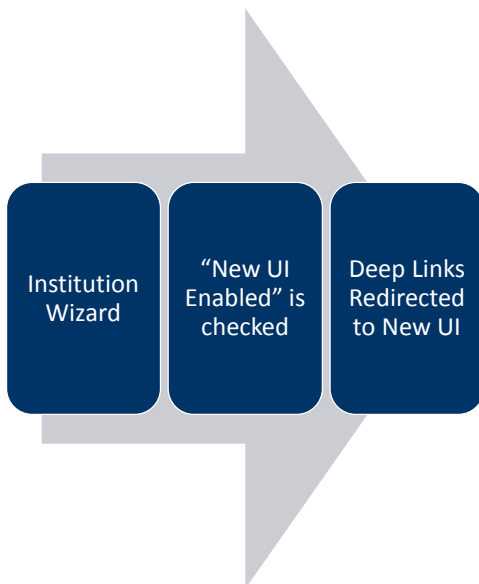
Output:

Your Primo site Classic UI

(Works best with Classic UI)



Deep Links in New UI



Replaced by
Primo Search
URL

WYSIWYG

Web Services - SOAP

**Supported but deprecated*

Input:

A Primo search **request XML**

Wrapped in SOAP envelope

Uses POST

```
<searchRequest xmlns="http://www.exlibris.com/prim
<PrimoSearchRequest xmlns="http://www.exlibris.c
  <QueryTerms>
    <BoolOperator>AND</BoolOperator>
    <QueryTerm>
      <IndexField>any</IndexField>
      <PrecisionOperator>contains</PrecisionOpe
      <Value>book</Value>
    </QueryTerm>
  </QueryTerms>
  <StartIndex>1</StartIndex>
  <BulkSize>10</BulkSize>
  <DidUMeanEnabled>true</DidUMeanEnabled>
```



Output:

A Primo search **result XML**

```
- <sear:SEGMENTS>
- <sear:JAGROOT>
- <sear:RESULT>
  <sear:QUERYTRANSFORMS/>
  + <sear:EACETLIST ACCURATE_COUNTERS="true"></sear:EAC
  - <sear:DOCKET IS_LOCAL="true" TOTAL_TIME="1432" LASTI
  + <sear:DOC SEARCH_ENGINE_TYPE="Local Search Engine" S
  - <sear:DOC SEARCH_ENGINE_TYPE="Local Search Engine" S
    - <PrimoNMBib>
      - <record>
        - <control>
          - <sourcecercidid>001938596</sourcecercidid>
          - <sourceid>DEMO-ALEPH</sourceid>
          - <recordid>DEMO-ALEPH001938596</recordid>
          - <originalsourceid>PRM01</originalsourceid>
          - <ilsapid>PRM01001938596</ilsapid>
```

Types of SOAP Web Services

- Search
 - searchRequest
 - fullViewRequest
 - getItRequest
- eShelf
 - addFoldertoE-Shelf
 - addToEshelfRequest
 - eshelfStructureRequest
 - getEshelfRequest
 - removeFromEshelfRequest
- Tags
 - addTagRequest
 - getAllMyTagsRequest
 - getTagsForRecordRequest
 - getTagsRequest
 - removeTagRequest
 - removeUserTagsRequest
- Reviews
 - addReviewRequest
 - getAllMyReviewsRequest
 - getReviewsByRatingRequest
 - getReviewsForRecordRequest
 - getReviewsRequest
 - removeReviewRequest

Web Services – X-Service



**Supported but deprecated*

Input:

A URL with parameters:

http://primosb-pmtna.hosted.exlibrisgroup.com/PrimoWebServices/xservice/search/brief?institution=TRIAL_1_INST&indx=1&bulkSize=10&query=any,contains,science

Output:

A Primo search result **XML**

JSON is supported, add: **&json=true**

```
- <sear:SEGMENTS>
- <sear:JAGROOT>
- <sear:RESULT>
  <sear:QUERYTRANSFORMS/>
  + <sear:FACETLIST ACCURATE_COUNTERS="true"></sear:FACETLIST>
  - <sear:DOCSET IN_LOCAL="true" TOTAL_TIME="1432" LASTI
  + <sear:DOC SEARCH_ENGINE_TYPE="Local Search Engine" S
  - <sear:DOC SEARCH_ENGINE_TYPE="Local Search Engine" S
  - <PrimoNMBib>
    - <record>
      - <control>
        <sourceid>001938596</sourceid>
        <sourceid>DEMO-ALEPH</sourceid>
        <recordid>DEMO-ALEPH001938596</recordid>
        <originalsourceid>PRM01</originalsourceid>
        <ilsapid>PRM01001938596</ilsapid>
```

Types of X-Services

- Search
 - Brief Search
 - Full View
 - Browse Primo Records –SP4.1
 - Get Scopes Of View
 - GetIt
- eShelf
 - Add Folder to E-Shelf
 - Add to E-Shelf
 - Get E-Shelf
 - Get E-ShelfStructure
 - Remove Folder From E-Shelf
 - Remove from E-Shelf
- Tags
 - Add Tag
 - Get Tags
 - Get Tags for Record
 - getAllMyTags
 - Remove Tag
 - removeUserTags
- Reviews
 - Add Review
 - Get Reviews
 - getAllMyReviews
 - getReviewsByRating
 - getReviewsForRecord
 - Remove Review

X-Service – Understand the response

Brief search response structure:

Constructed from 3 parts:

```
<sear:SEGMENTS>
- <sear:JAGROOT>
- <sear:RESULT>
  <sear:QUERYTRANSFORMS/>
  + <sear:FACETLIST ACCURATE_COUNT
  + <sear:DOCSET IS_LOCAL="true" TOTAL
</sear:RESULT>
<sear:searchToken>0</sear:searchToken>
</sear:JAGROOT>
</sear:SEGMENTS>
```

1. QUERYTRANSFORMS – Did You Mean
2. FACETLIST – Facets and counters
3. DOCSET – PNX records

WS and XS IP mapping table

- IP address restrictions for **X-Services** or **SOAP** Web Services
- Configuration is required for usage
- Open a Case to Ex Libris Support

Primo Back Office

Primo Home > Advanced Configuration > All Mapping Tables

Mapping Tables

Sub System: FrontEnd Table Name: WS and XS IP

Mapping Table Rows

Enabled	Start IP	End IP	Description	Last Updated
<input checked="" type="checkbox"/>	1.1.1.1	1.1.1.4	range of authorized IPs	11/20/08 By: ExLibrisSupport

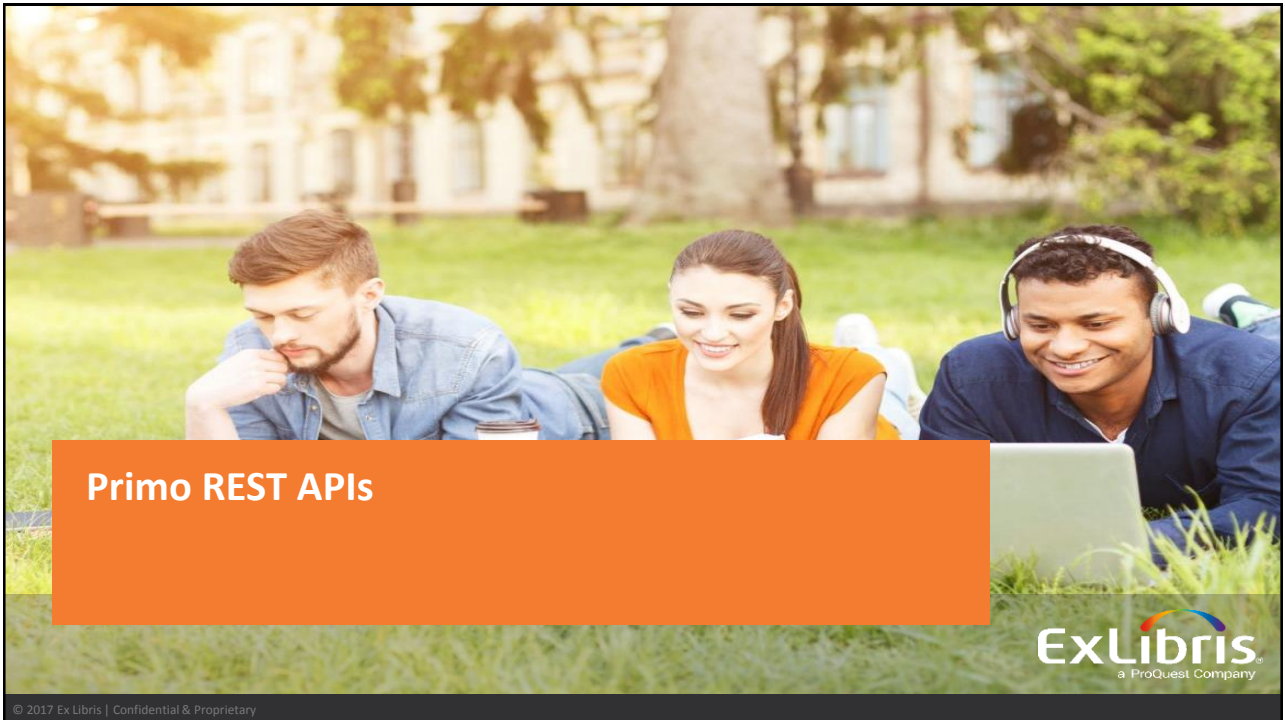
Table Description: IP Restriction for Web Services and XServices

Create a New Mapping Row

Start IP	End IP	Description
<input type="text"/>	<input type="text"/>	<input type="text"/>

Cancel & Go back To Mapping Table List

Export To Excel Save



What is REST?



REST = Representational State Transfer

- architectural style and paradigm by Roy Fielding, developer of HTTP
- Using links to navigate and utilize an application to represent transferring from one state (page) to another state (page)
- Roy Fielding said of the process to standardize HTTP:
- *"That process honed my model down to a core set of principles, properties, and constraints that are now called REST"*

<https://developers.exlibrisgroup.com/blog/How-we-re-building-APIs-at-Ex-Libris>
https://developers.exlibrisgroup.com/primo/apis/webservices/rest/linked_data

REST APIs – SaaS vs Local

Web Services:

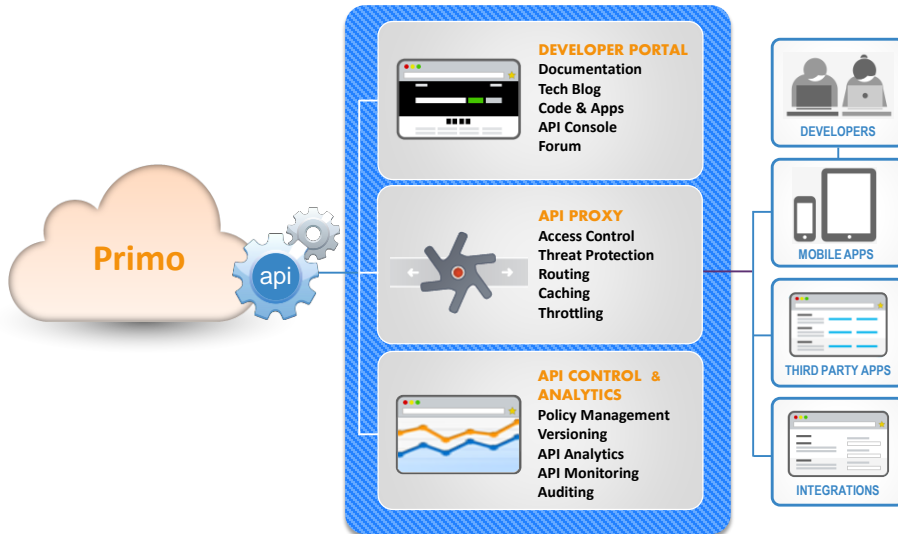
- X-Services
- SOAP
- REST

- Hosted / SaaS Customers – use REST calls via API Gateway
- Local Customers – use REST calls directly to Primo server
 - Different from Xservices
 - API respond in JSON (not XML)
- *Pro-tip:* To view JSON LD files in your Chrome browser, use "[JSON Formatter](#)" Chrome Extension.



REST API's & API Gateway

• Gateway Flow



© 2017 Ex Libris | Confidential & Proprietary

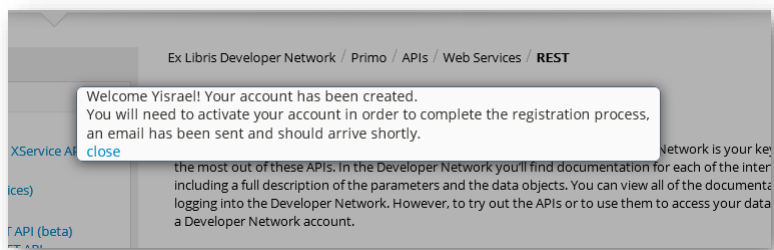
ExLibris

Configuring the Gateway

• Getting Started with Primo REST APIs

➔ **REST**
 Primo PNX REST API (beta)
 Primo Eshelf REST API
 XCD

1. Signup in Developers Network
2. Activate account - confirmation email



© 2017 Ex Libris | Confidential & Proprietary

ExLibris

Configuring the Gateway

- 3. Add application
 - Select Platform = "Web Application"

Application Information API Management

Current APIs *

Title		
primo PNX (beta)	i	x

Add APIs

Choose an API x v

Cancel Next Step Save

© 2017 Ex Libris | Confidential & Proprietary

ExLibris

Configuring the Gateway

- 4. Get API Key – **MOST IMPORTANT STEP!**
 - Edit Application (using ) to link to Production or Sandbox
 - Set read/write permission

Application Information API Management

Current APIs *

API	Current Plan	Plan Change
Primo Analytics (Preview) Unlimited Hits i	Prod read-only	Change to -- Please select -- x
Primo eShelf (beta) 0.00% i	Guest Sandbox	Change to Sandbox read/write x
primo PNX (beta) Unlimited Hits i	Prod read-only	Change to -- Please select -- x

© 2017 Ex Libris | Confidential & Proprietary

ExLibris

Configuring the Gateway

- 5. Open Case to **Ex Libris Support** to connect your new Gateway applications to your relevant Primo environment
 - Title – “Primo REST API registration”
 - In the description please include the following information:
 1. Alma Institution code
 2. Primo Institution code
 3. Your Production Primo URL
 4. Your Sandbox Primo URL

Once Ex Libris support completes the registration process, you will be able to start developing using the API gateway.

PNX API Syntax

REST

Primo PNX REST API (beta)
Primo Eshelf REST API

➤ SaaS customers:

https://api-na.hosted.exlibrisgroup.com/primo/v1/pnxs?q=any,contains,book&apikey=l7xxcdd0d5ae3ac84b3f886ac6f443cfbdad

Note: “inst “ parameter is required in local API calling - but “apikey” is used in SaaS syntax

➤ Local customers

http://<primoserver>:<port>/primo_library/libweb/webservices/rest/v1/pnxs?q=any,contains,book&inst=MY_INST

API Explorer

- Build and test API syntax structure - <https://developers.exlibrisgroup.com/alma/api-explorer>

API Explorer interface showing configuration for the primo PNX (beta) API. The API is set to 'primo PNX (beta)', Resource to '/primo/v1/pnxs', and Method to 'briefSearch'. An API Key 'TRIAL_1' is entered. The 'Execute Request' button is visible. Below, the 'Request' tab shows a GET request to 'https://api-na.hosted.exlibrisgroup.com/primo/v1/pnxs' with query parameters: q='any,contains,book', lang='eng', offset='1', and limit='50'.

© 2017 Ex Libris | Confidential & Proprietary

ExLibris

Eshelf API Methods

Eshelf services/methods:

GET - Retrieve
 DELETE - Delete – Remove folder or item
 POST - Create –Add folder or item
 PUT - Update – Change note or folder name

POST Method Example:

<https://api-na.hosted.exlibrisgroup.com/primo/v1/eshelf/johnt123/Basket/fishing?apikey=7xx44f7c09f06ed47709aabe31fbf3bac57>
 {"folders":[{"name":"MyNonfiction"}]}
 {"basket-items":[{"pnxId":"ALMA00123245","context":"L or PC"}]}

REST

Primo PNX REST API (beta)
 Primo Eshelf REST API

© 2017 Ex Libris | Confidential & Proprietary

ExLibris

Eshelf API Syntax

➤ SaaS customers:

https://api-na.hosted.exlibrisgroup.com/primo/v1/eshelf/johnt123?apikey=l7xx44f7c09f06ed47709aabe31bf3bac57

https://api-na.hosted.exlibrisgroup.com/primo/v1/eshelf/johnt123/Basket/fishing?apikey=l7xx44f7c09f06ed47709aabe31bf3bac57

Note: “inst” parameter is required in local API calling - but “apikey” is used in SaaS syntax

➤ Local customers

http://<primoserver>:<port>/primo_library/libweb/webservices/rest/v1/eshelf/johnt123?inst=MY_INST

REST

Primo PNX REST API (beta)

Primo Eshelf REST API

YCP

Analytics API

- <https://developers.exlibrisgroup.com/blog/Working-with-Analytics-REST-APIs>
- https://developers.exlibrisgroup.com/primo/apis/Analytics/Retrieve_Analytics_report
- Returns a Primo Analytics (OBI) report in **XML** format only (not JSON)
- Maximum 65,000 lines response
- **GET** /primo/v1/analytics/reports
- Uses the OBI Analytics URL-encoded path to your report
- Sample: <https://api-na.hosted.exlibrisgroup.com/primo/v1/analytics/reports?path=%2Fshared%2FPrimo+Lincoln+University+%28New+Zealand%29%2FReports%2FSearches+vs+clickthroughs&limit=50>

Analytics API - Results

```
<report>
  <QueryResult>
    <ResumptionToken>dy4gvmE8rqFwNtzVf9fe19yILmEXvuaQvPKiHdPNWn7urPhoqaggw0gzwIVnjtKzF0f2Fi0Z81qDev021zYdIZ4zWk30f3D</ResumptionToken>
    <IsFinished>true</IsFinished>
  </QueryResult>
  <ResultXml>
    <rowset xmlns="urn:schemas-microsoft-com:xml-analysis:rowset">
      <xsd:schema targetNamespace="urn:schemas-microsoft-com:xml-analysis:rowset" xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns:saw-sql="urn:saw-sql">
        <xsd:complexType name="Row">
          <xsd:sequence>
            <xsd:element name="Column0" type="xsd:int" minOccurs="0" maxOccurs="1" saw-sql:type="integer" saw-sql:displayFormula="s_0"/>
            <xsd:element name="Column1" type="xsd:string" minOccurs="0" maxOccurs="1" saw-sql:type="varchar" saw-sql:displayFormula="s_1"/>
            <xsd:element name="Column2" type="xsd:string" minOccurs="0" maxOccurs="1" saw-sql:type="varchar" saw-sql:displayFormula="s_2"/>
            <xsd:element name="Column3" type="xsd:date" minOccurs="0" maxOccurs="1" saw-sql:type="date" saw-sql:displayFormula="s_3"/>
            <xsd:element name="Column4" type="xsd:int" minOccurs="0" maxOccurs="1" saw-sql:type="integer" saw-sql:displayFormula="s_4"/>
          </xsd:sequence>
        </xsd:complexType>
      </xsd:schema>
      <Row>
        <Column0>0</Column0>
        <Column1>April 2017</Column1>
        <Column2>Clickthroughs</Column2>
        <Column3>2017-04-01</Column3>
        <Column4>6065</Column4>
      </Row>
      <Row>
        <Column0>0</Column0>
        <Column1>April 2017</Column1>
        <Column2>Searches</Column2>
        <Column3>2017-04-01</Column3>
        <Column4>13931</Column4>
      </Row>
      <Row>
        <Column0>0</Column0>
        <Column1>March 2017</Column1>
        <Column2>Clickthroughs</Column2>
        <Column3>2017-03-01</Column3>
        <Column4>18422</Column4>
      </Row>
      <Row>
        <Column0>0</Column0>

```

© 2017 Ex Libris | Confidential & Proprietary

ExLibris

API Governance Thresholds

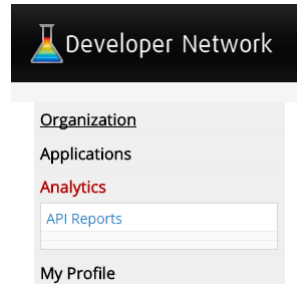
- Maintain optimum performance
- Efficient and proper use of infrastructure resources
- Reduce the risks of malicious attacks
- Two types (for Primo):
 1. Daily API Request Threshold
 - (FTE x 5) REST APIs per day
 - Violation = error message for the day
 2. Concurrent API Request Threshold
 - 10 REST APIs per institution per second
 - Violation requests are queued and may be slower
- Since each request made to the API incurs a computational cost, it's important to make economical use of API requests. If a common function of your application can be performed using fewer requests than it currently does, it should.

© 2017 Ex Libris | Confidential & Proprietary

ExLibris

Analytics for REST APIs

- Sign in
- Dashboard > Analytics
- You can view statistics about your REST API usage



Summary

Useful Guides and Articles

- **Deep Links**
 - <https://developers.exlibrisgroup.com/primo/apis/deeplinks>
- **Xservices**
 - [Brief Search](https://developers.exlibrisgroup.com/primo/apis/webservices/xservices/search/briefsearch) <https://developers.exlibrisgroup.com/primo/apis/webservices/xservices/search/briefsearch>
 - [Deprecated](https://developers.exlibrisgroup.com/blog/Ex-Libris-API-Road-Map) <https://developers.exlibrisgroup.com/blog/Ex-Libris-API-Road-Map>
- **SOAP**
 - [Brief Search](https://developers.exlibrisgroup.com/primo/apis/webservices/soap/search/briefsearch_soap) https://developers.exlibrisgroup.com/primo/apis/webservices/soap/search/briefsearch_soap
 - [Deprecated](https://developers.exlibrisgroup.com/blog/Ex-Libris-API-Road-Map) <https://developers.exlibrisgroup.com/blog/Ex-Libris-API-Road-Map>
- **REST APIs**
 - Concepts - [Part 1](#), [Part 2](#), [Part 3](#)
 - <https://developers.exlibrisgroup.com/blog/How-we-re-building-APIs-at-Ex-Libris>
 - https://developers.exlibrisgroup.com/primo/apis/webservices/rest/linked_data
 - <https://developers.exlibrisgroup.com/blog/Ex-Libris-API-Road-Map>
 - [Getting Started/Registration](https://developers.exlibrisgroup.com/primo/apis/webservices/rest) <https://developers.exlibrisgroup.com/primo/apis/webservices/rest>
 - [Thresholds](https://developers.exlibrisgroup.com/blog/reducing-the-number-of-API-calls) <https://developers.exlibrisgroup.com/blog/reducing-the-number-of-API-calls>
 - [Brief Search](https://developers.exlibrisgroup.com/primo/apis/webservices/rest/pnxs) <https://developers.exlibrisgroup.com/primo/apis/webservices/rest/pnxs>
 - Analytics – [Part 1](#), [Part 2](#)
 - <https://developers.exlibrisgroup.com/blog/Working-with-Analytics-REST-APIs>
 - https://developers.exlibrisgroup.com/primo/apis/Analytics/Retrieve_Analytics_report
- **Analytics of REST APIs**
 - <https://developers.exlibrisgroup.com/dashboard/reports/api-reports>



Useful Knowledge Articles

- **Eshelf APIs return “Invalid URI Syntax” errors when using API Explorer**
https://knowledge.exlibrisgroup.com/Primo/Knowledge_Articles/Eshelf_REST_APIs_return_Invalid_URI_Syntax_errors_when_using_API_Explorer
- **Other helpful tools (Chrome Web Store)**
 - JSON Formatter
 - Advanced REST Client
 - XML Tree



Summary

- 1 Developer Network
- 2 Primo API overview
- 3 REST APIs
- 4 API Gateway
- 5 API Explorer

Q & A

Any Questions?





Session Survey Evaluation

Please use the following link,
<https://www.surveymonkey.com/r/techsem2017>, to
provide feedback on your sessions.

THANK YOU
Paul.McBride@exlibrisgroup.com
Troy.Gnat@exlibrisgroup.com

ExLibris
a ProQuest Company