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KBART Automation: Automated Retrieval of Customer Electronic Holdings

A Recommended Practice of the
National Information Standards Organization
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Prepared by the KBART Automation Working Group

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Foreword

About this Recommended Practice

Knowledge Bases and Related Tools (KBART) is an initiative that provides a recommended format for content providers to use to transfer metadata. Initially, these recommendations were implemented for journals and later expanded to include e-books and conference proceedings. More content providers adopting KBART recommendations has enabled knowledge bases to more accurately reflect what content is available from providers. However, individual library holdings are not always accurately reflected in discovery systems, knowledge bases, and electronic resource management (ERM) systems because library staff is often unable to manually keep up with changes and because individual library holdings do not always match standard publisher packages and offerings.

KBART Automation is a recommended practice that supports the timely exchange of accurate, library-specific KBART-formatted holdings reports between content providers' access control systems and knowledge bases, allowing knowledge base-powered systems to more accurately reflect content accessible at a particular institution and its unique holdings, with little interaction or ongoing maintenance from library staff. It facilitates the automatic transfer and retrieval of holdings data between content providers and institutional knowledge bases, with the goal of automatically and regularly updating institutional holdings via an API.

KBART Automation will benefit a variety of stakeholders, such as libraries, by reducing their workload to keep their data updated, reducing human errors and delays, and creating more clarity of what institutions have access to at a given time. It also provides benefits for content providers because it may increase usage of their material due to more timely activation in their customers' systems; therefore, it is likely to increase their customers' satisfaction and meet a market demand.

Similarly, KBART Automation offers benefits to knowledge base providers by eliminating the need to re-develop automation procedures for each content provider separately, thereby reducing costs. It also could increase customer satisfaction and better meet market demands. As an additional benefit, it serves authors because their material becomes accessible in a timely and accurate manner, therefore providing better exposure and possibly better usage. This work ultimately serves the consumers of academic materials by providing more reliable access to full text regardless of where they start their research.

In this document:

Section 1 provides an Introduction and an overview of the scope of the KBART Automation Recommended Practice.

Section 2 *Technical Specification for KBART Holdings Reports* describes the expectations for the KBART Holdings Report in terms of data elements and file format, and highlights specific expectations related to automated holdings output.

Section 3 *Delivery of KBART Holdings Reports* outlines the options a content provider must provide to enable customers to access their reports.

Section 4 *API for Automated Report Retrieval* offers a more in-depth description of the expected API support that enables automated retrieval of holdings reports.

Section 5 *Notes* offers license language to require KBART Holdings Reports and discusses confidentiality of data.

Section 6 *Extending the KBART Holdings Report* offers suggestions for content providers that may wish to include additional elements and attribute values in KBART reports.

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Trademarks, Services Marks

Section 1: Introduction

1.1 Purpose

The purpose of the KBART Automation initiative is to facilitate the retrieval of KBART Holdings Snapshot Reports (referred in this document as KBART Holdings Reports). The KBART Holdings Reports are KBART files customized to represent a "snapshot" of an institution's holdings at a given time, including content an institution is entitled to access contractually as well as content that may be accessible for other reasons (e.g. open access). Automatic transfer of holdings reports can significantly reduce the e-resource management workload for all stakeholders, provide more reliable access to content for end users, and thereby potentially contribute to increased usage to the benefit of all.

Timely and Accurate Access and Updates for E-Resource Management

Managing numerous models for e-resource access can be challenging, whether it is for content acquired through demand-driven acquisition (DDA), via an aggregator database, or directly from the content provider as individual titles or in packages. Changes in a library's DDA selection pool; aggregator packages that differ because of geographic location, library type, etc.; and journal changes (such as publisher transfers, new subscriptions, coverage date changes, etc.) make it difficult to keep the library's local knowledge base holdings up to date. Automated holdings reports will allow the knowledge base to accurately reflect changes as quickly as possible, saving time spent troubleshooting and reducing end user frustration over linking failures. They will also make new content discoverable more quickly to end users, increasing usage and revenue for content providers and demonstrating the value of the content selected for the library collection.

Reduce Cost and Increase Efficiency with Standardized Process

The current environment requires the knowledge base provider to spend time creating proprietary arrangements and technical workflows with each content provider. A standardized process for downloading library holdings directly from content provider platforms, following the recommended practice for automation, allows the knowledge base provider to use a similar setup for every content provider. These efficiencies and reduced costs from standardization will be passed down the supply chain, benefitting all parties. More widespread adoption of automated holdings feeds by content providers may be another outcome.

Increase Discoverability and Usage of E-Resources

Standardized holdings feeds can facilitate integration of holdings information into other product lines, making content more easily available in places where end users look for information, such as discovery systems, library catalogs, A-Z lists, abstracting & indexing (A&I) databases, Google Scholar, etc. This process can lead to more discovery and usage.

The KBART Holdings Report can also provide more usage visibility. Not all content providers are able to provide zero-usage titles as part of COUNTER reports. Also, if COUNTER and KBART reports from content providers utilize the same identifiers for titles, the process of matching usage to holdings is simplified and analysis improved.

1.2 Scope

This document describes an automated transfer of holdings reports, specifically serials and monographs, from content providers to an institution's knowledge base. The holdings will be transferred in one single file, the "KBART Holdings Report", containing all titles from a content provider that an institution has access to at the time of creation, regardless of the reason (e.g. subscription, open access). The assumption is that providers will comply with the KBART II recommendations as outlined in the KBART Recommended Practice (http://www.niso.org/publications/rp/rp-9-2014/), utilizing a KBART II file format, with certain exceptions that are outlined later in this document. Other possible uses of automatic holdings transfers, such as updating global provider package title lists, consortia-level reports, and item-level access type (paid, open access, perpetual access, etc.), are currently outside the scope of this initiative but may be addressed in a later phase.

1.3 Definitions

The following terms, as used in this recommended practice, have the meanings indicated below.

Term	**Definition**
Access control system	The part of a content provider's platform that determines which content a user from a given institution is able to access. The access control system typically captures information about an institution's individual subscriptions, its packages, perpetually-owned content, and even content available as open access.
API	Application Programming Interface. Code that allows two software programs to communicate with each other in a distinct way.
Content Provider	A publisher, full text aggregator, or other organization that provides journals, books, or other content to libraries via a web site.
COUNTER	An organization that sets standards for usage statistics for scholarly information. See https://www.projectcounter.org.
Embargo	A limitation on when a resource becomes available online, generally as a result of contractual limitations established between the publisher and the content provider. (KBART 6.6.14)
Holdings	Those titles containing full text available to an institution, whether they have been purchased, licensed, or are available through free or open access.
ISBN	International Standard Book Number. ISO 2108:2017 *Information and documentation -- International Standard Book Number (ISBN)*
ISSN	International Standard Serial Number. ISO 3297:2017 *Information and documentation -- International standard serial number (ISSN)*
KBART	Knowledge Bases and Related Tools. A NISO initiative to improve the quality of data in knowledge bases through the standardization of format and contents of

	title lists. Published most recently as a Recommended Practice, NISO RP-9-2014, *KBART: Knowledge Bases and Related Tools*
Knowledge base	A component of an OpenURL link resolver, containing records representing library holdings (usually at the title level), used to verify access and to create links to library material for end users. A "global" knowledge base describes general availability of material, not specific to any individual institution or subscribing library.
Monograph	Material published as an individual volume, e.g., a book. A monograph is usually assigned an ISBN. In some cases monographs are published as a series (monographic series), in which case the overall series is treated as a serial and the individual publications are treated as monographs. In the context of KBART, a work published as part of a monographic series would have both an ISSN and an ISBN; however, the publication itself should be considered a monograph.
Open access	Content that can be accessed at a content provider's platform without restriction or cost to the end user: a subscription to the content is not required.
Serial	Material published on a continuing basis, for example a journal, newspaper, or magazine. A serial is usually assigned an ISSN.
TSV	Tab-Separated-Values. A format for a text file.

Section 2: Technical Specifications for KBART Holdings Reports

The technical specifications of the KBART Holdings Reports are governed by the KBART Recommended Practice (NISO RP-9-2014, *KBART: Knowledge Bases and Related Tools*). This section is intended to clarify and highlight any specific expectations for using KBART to deliver holdings data in an automated manner.

Appendix A of this document links to an example KBART Holdings Report, for reference together with the instructions listed below.

2.1 Changes to Data Elements for KBART Holdings Report

The data elements to be included in the Holdings Report are the same elements specified in the KBART Recommended Practice, NISO RP-9-2014. The following table lists a subset of fields and expectations specific to the Holdings Report, with references to sections in the KBART Recommended Practice; all other fields not specifically listed here should follow the general KBART guidelines.

Field Name	Description	Expectations for Holdings Report
`date_first_issue_online`	Date of first serial issue available online (KBART 6.6.5); applicable only to serials.	Date given should correspond to the date of the first accessible full issue for the institution whose holdings the report represents.
`num_first_vol_online`	Number of first volume available online (KBART 6.6.6); applicable only to serials.	Volume given should correspond to the volume number of the first accessible full issue for the institution whose holdings the report represents.
`num_first_issue_online`	Number of first issue available online (KBART 6.6.7); applicable only to serials.	Issue given should correspond to the number of the first accessible full issue for the institution whose holdings the report represents.
`date_last_issue_online`	Date of last issue available online (KBART 6.6.8); leave blank if coverage is to the present. Applicable only to serials.	Date given should correspond to the date of the latest issue accessible by the institution, or, if gaps in access exist (per KBART 6.4.6), the latest issue before the access gap.
`num_last_vol_online`	Number of last volume available online (KBART 6.6.9); leave blank if access is to the	Volume given should correspond to the number of the latest issue accessible by the

	present. Applicable only to serials.	institution, or, if gaps in access exist (per KBART 6.4.6), the latest issue before the access gap.
num_last_issue_online	Number of last issue available online (KBART 6.6.10); leave blank if access is to the present. Applicable only to serials.	Issue given should correspond to the number of the latest issue accessible by the institution, or, if gaps in access exist (per KBART 6.4.6), the latest issue before the access gap.
access_type	KBART 6.6.26	Optional for KBART Holdings Report, as all content is accessible regardless of whether it is free or paid.

2.1.1 Date of First Issue Available Online (KBART 6.6.5)

For journals, this field should contain a date corresponding to the date of the first accessible full issue *for the institution whose holdings the report represents*, not the date of the first issue available on the platform. The date should, in combination with Date of Last Issue Available Online, describe a period of time during which all articles are accessible by the institution. Note that depending on subscription and licensing models, individual institutions could have different date ranges from each other.

Examples:

A journal is available on the platform from March 1995 to the present.

- Institution A has access from January 2002-present. The value of `date_first_issue_online` in a report for Institution A would be: `2002-01`
- Institution B has access from March 1995-December 1999. The value of `date_first_issue_online` in a report for Institution B would be: `1995-03`
- Institution C has access from June 13, 2000-present. The value of `date_first_issue_online` in a report for Institution C would be: `2000-06-13`

2.1.2 Number of First Volume Available Online (KBART 6.6.6)

For journals, this field should contain the volume number of the first accessible full issue for the institution whose holdings the report represents, as in Date of First Issue Available Online above.

2.1.3 Number of First Issue Available Online (KBART 6.6.7)

For journals, this field should contain the number of the first accessible full issue for the institution whose holdings the report represents, as in Date of First Issue Available Online above.

2.1.4 Date of Last Issue Available Online (KBART 6.6.8)

For journals, this field should contain a date corresponding to the last accessible full issue *for the institution whose holdings the report represents*, not the date of the last issue available on the

platform. The date should, in combination with Date of First Issue Available Online, describe a period of time during which all articles are accessible by the institution. Note that depending on subscription and licensing models, individual institutions could have different date ranges from each other.

If the institution has ongoing access to the publication on the platform (access "to the present"), this field will be left blank.

If a gap in access to the publication exists on the platform, the entire record (row) should be repeated, with `date_first_issue_online` and `date_last_issue_online` representing the continuous coverage around the gap. The entire field may be represented multiple times to represent multiple gaps. See KBART 6.4.6 and Section 2.3 below for additional information.

Examples:

A journal is available on the platform from March 1995 to the present.

- Institution A has access from January 2002 to the present. The value of `date_last_issue_online` in a report for Institution A would be left blank.
- Institution B has access from March 1995-December 1999. The value of `date_last_issue_online` in a report for Institution B would be `1999-12.`
- Institution C has access from June 13, 2000 to the present. The value of `date_last_issue_online` in a report for Institution C would be left blank.

Note that the presence of a value in `embargo_info` may change the effective date included here, unless the embargo period is later than the date provided. For example, if the embargo is one year (`R1Y`) and `date_last_issue_online` is "to present", then the effective end date is 365 days prior to the present date, but if `date_last_issue_online` is two years before the present date, then the one year embargo is not valid.

2.1.5 Number of Last Volume Available Online (KBART 6.6.9)

Volume given should correspond to the number of the latest issue accessible by the institution, or, if gaps in access exist (per KBART 6.4.6), the latest issue before the gap, as in Date of Last Issue Available Online in Section 2.1.4 above.

If the institution has ongoing access to the publication on the platform (access "to the present"), this field will be left blank.

The presence of a value in `embargo_info` may change the effective volume of access. Because embargoes are dynamic, no expectation can be made that the volume would be updated dynamically. Unless access is otherwise restricted in addition to any embargo present for the title, access should be considered ongoing ("to present") for the purposes of this field and thus left blank.

2.1.6 Number of Last Issue Available Online (KBART 6.6.10)

Issue given should correspond to the number of the latest issue accessible by the institution, or, if gaps in access exist (per KBART 6.4.6), the latest issue before the gap, as in Date of Last Issue Available Online in Section 2.1.4 above.

If the institution has ongoing access to the publication on the platform (access "to the present"), this field will be left blank.

The presence of a value in `embargo_info` may change the effective issue of access. Because embargoes are dynamic, no expectation can be made that the volume would be updated dynamically. Unless access is otherwise restricted in addition to any embargo present for the title, access should be considered ongoing ("to present") for the purposes of this field, and thus left blank.

2.1.7 Title Identifier (KBART 6.6.13)

List the proprietary identifier for the content title, if you use a title identifier to create links to content. If more than one identifier exists, then supply the title identifier used for linking. If outside parties will not need to know or use these proprietary identifiers, or if no proprietary identifiers exist, this field may be left blank, but it would be preferable to include a `title_id` if one exists.

For conference proceedings or e-book series, a `title_id` is required to be used as a key that will be tied to the conference proceedings volume or e-book monograph as `parent_publication_title_id`.

Whenever possible, the same `title_id` should be used for linking, tracking usage information (i.e., for COUNTER and SUSHI reporting), etc., to support library and vendor systems to match data about the title from that provider.

2.1.8 Access Type (KBART 6.6.26)

Because the Holdings Report is intended to include only content that is accessible by the institution/library regardless of how it is licensed, populating the `access_type` field is optional, an exception to the KBART Recommended Practice. The field must be present in the file and the header regardless of whether or not it is populated (KBART 6.6.1; also see Section 2.2 below), but it may be left blank.

Regardless of whether or not the provider chooses to populate `access_type`, recommendations for handling freely accessible/open access content can be found below.

2.2 Data Format

Content providers creating KBART Holdings Report files must follow the KBART Recommended Practice, including, but not limited to:

1. The KBART Holdings Report must be in tab-delimited/tab-separated value text (.txt) files (KBART 6.4.1).
2. All text should be encoded in UTF-8 format (KBART 6.4.2).
3. The ISO 8601 date format should be used for all dates (KBART 6.4.7/6.6.5).
4. All fields must be present in the file, even if some fields will be unpopulated. However, all fields should be considered mandatory if they exist and are appropriate to the content (KBART 6.6.1).
5. Additional fields (columns) may be present in the file (to the right of the KBART standard fields) and should be ignored by the consumer of the report if not relevant (KBART 6.6.1).

Differences and clarifications to the KBART Recommended Practice for the KBART Holdings Reports are as follows:

File Naming: The KBART Holdings Report file should be named using labels for Provider and Customer, separated by an underscore:

```
[ProviderName]_[CustomerAccount]_SerialsHoldingsReport_[YYYY-MM-DD].txt
[ProviderName]_[CustomerAccount]_MonographHoldingsReport_[YYYY-MM-DD].txt
[ProviderName]_[CustomerAccount]_HoldingsReport_[YYYY-MM-DD].txt
```

Where:

- `[ProviderName]` is the name of the platform at which the data is hosted.
- `[CustomerAccount]` is the provider's identifier for the institution whose holdings are represented in the report. It may be an account number, a name-tag, or whatever set of numbers and/or letters is meaningful and unique.
- *HoldingsReport* describes the type of report retrieved by the API. (In the examples above, three options are presented to demonstrate holdings delivered as separate files for serials and monographs and as a single file with all holdings.)
- `[YYYY-MM-DD]` is the date stamp of the time the report was generated/delivered via the API.

2.3 Representing Holdings

2.3.1 Representing Gaps in Access for Serial Titles

A title should be listed twice if there is a gap in the customer's access of greater than or equal to 12 months, with only the coverage fields (i.e., date, volume, issue of first and last issues) changing. Greater granularity in reporting data access gaps is desirable and should be agreed on with the knowledge base service provider, if it can be supported (KBART 6.4.6).

If a gap in access to the publication exists on the platform, the entire record (row) should be repeated, with `date_first_issue_online` and `date_last_issue_online` representing the continuous access around the gap. The entire field may be represented multiple times to represent multiple gaps.

Example:

> Journal A is available from the provider from January 1990 through December 1995, July 1997 through June 2005, and from January 2010 to the present. In this case, three records (rows) should be included for the title, with `date_first_issue_online` and `date_last_issue_online` (and corresponding Volume/Issue numbers in their respective fields) as follows:
>
> 1. `1990-01-01` to `1995-12-31`
> 2. `1997-07-01` to `2005-06-30`
> 3. `2010-01-01` to [leave blank]

A distinction should be noted between a gap in *publication* (e.g., a monthly publication skipped the publication of an issue for one or more months), and a gap in *availability* (e.g., the provider did not receive or digitize one or more issues that exist for the publication). Gaps in publication should not be represented in the Holdings Report; gaps in availability should be.

Examples of reasons for gaps in availability:

- Publication issue(s) do not exist on the provider's platform: possibly because of lack of digitization; the content provider did not receive those issues from the publisher; or the provider does not have rights for those particular issues.

- Access to the content has changed from freely accessible/open access to paid, where the institution whose access is being represented in the holdings report contains only access to the freely accessible content. If the institution has later paid access, the gap between its free and paid access must be noted.
    - If the provider does not include values in the `access_type` field for the Holdings Reports (as described above in Section 2.1.8), and the institution's access is continuous from the freely accessible to paid content, no such gap needs to be represented.
    - If the provider does include values in the `access_type` field, then separate records (rows) should reflect the free and paid content even if access is continuous.
- Other circumstances that may cause an institution to not have access to a range of publication issues that are otherwise available on the provider's platform.

2.3.2 Changes of Title and Depiction of Title Histories

Serial titles (including book series and conference proceedings) may change their name (title) one or more times during their lifespan. As noted in the KBART Recommended Practice and in a related NISO Recommended Practice, NISO RP-16-2013, *PIE-J: Presentation and Identification of E-Journals*, these changes in title should be noted whenever possible in the data about that title.

Instructions for describing title changes in KBART Holdings Reports are:

1. Create a new row for each major title change, such as one that would necessitate the issuing of a new ISSN (KBART 5.2; 6.6.2).
2. Each row should contain the title, print and online ISSN as they were known at the time.
3. The `date_first_issue_online`, `date_last_issue_online`, and related fields should reflect the institution's available access dates during the period when the title was active, not their dates of access during the title's entire run.
4. If the provider's platform has separate webpages/URLs for each preceding and successive title, then each historical title should have its own `title_id`. If it does not, then it should contain the `title_id` used for linking as outlined above.
5. Each title should have its preceding title's `title_id` populated in the `preceding_publication_title_id` field to enable tracing the title history (KBART 6.6.25).

2.3.3 Hybrid Open Access

Vendor knowledge bases--and thus KBART--are designed to represent title-level information, including rights to access, and were created before the popularization of hybrid Open Access and article-level licensing/document delivery models. It is quite difficult to represent hybrid Open Access and article-level access accurately at the title level of any publication. The KBART Recommended Practice considers the title "free" only if 100% of the articles in an issue (or chapters in a book) are freely accessible (KBART Section 4, particularly 4.4; Section 6.6.26).

The `access_type` field is optional for the Holdings Report, as all titles/records included in the report are, by definition, accessible by the institution. However, some considerations in addition to the

KBART Recommended Practice must be made to ensure that freely accessible content is represented as accurately as possible:

- Although stated above and in the KBART Recommended Practice (KBART 6.6.26), it is worth repeating that unless the institution has subscribed to the paid articles for a particular title, that "free" or Open Access titles should not be included in the Holdings Report unless all articles in an issue or volume are free.
- If the provider does populate the `access_type` field, separate title records should be included for the free and paid content accessible to the institution (KBART Section 6.6.26).
- If the provider does not populate the `access_type` field and the institution's access is continuous from the free to paid content, no such gap needs to be represented as noted above in Section 2.3.1. However, if the institution's access to paid articles begins at some point after the end of free articles, then an access gap should be noted, with the record (row) repeated and the appropriate access dates, volume, and issue represented for each record.

2.3.4 Separate Versus Combined Serials and Monograph Files

Knowledge base vendors and librarians often prefer that serials and monograph files are delivered separately to facilitate processing and data cleanup, as well as ease of use. If possible, providers should deliver separate Holdings Report files based on the approved values for the `publication_type` field: "serial" or "monograph".

Section 3: Delivery of KBART Holdings Reports

Content providers must make KBART Holdings Reports available from an administrative/reporting site accessible by members of the institution requesting the report. KBART Holdings Reports provided by the content provider must also be available via an API to enable automated retrieval of holdings by knowledge base and other service providers who require up-to-date and accurate holdings to deliver their services to libraries.

Delivery requirements are:

- As required by the KBART Recommended Practice (KBART 6.4.1) and listed above in Section 2.2, Holdings Reports are to be provided in tab-delimited/tab-separated value text (.txt) files
- One institution's holdings may be delivered as separate files for serials and monographs or as a single file that combines both.
- If Holdings Report files are made available through a website:
    - The website may require authentication to access.
    - An optional email alert may be sent when data is updated.
- Holdings Report files should be updated at least weekly for e-books and at least monthly for journals. [Note: Global KBART title lists (reflecting all titles on a given platform) should be updated at the same frequency as institutional holdings data.]
- Holdings Report files must be available via an API (see Section 4).
- Where applicable, Holding Report file names should clearly identify the institution, the nature of the report, and the date the report was prepared. See Section 2.2 for recommendations on naming KBART Holdings Reports.
- Holdings Report files should contain all titles currently accessible for a particular library on the provider's platform. [Note: Packages are planned to be addressed in a later phase of KBART Automation.]
- Alerts to notify content providers and libraries if problems are observed (e.g., large mismatches, lack of updates, or "data could not be validated" errors) will be created and controlled by Knowledge base vendors.
- Knowledge base vendors should offer reports that include lists of titles added, removed, and/or updated during the automated update process.

Section 4: API for Automated Report Retrieval

4.1 API Paths (URLs)

Content providers must provide KBART Holdings Report files for an institution's journals and monographs but these may be delivered as combined or separate reports. A provider's URL syntax may contain customer-specific elements, but the path and parameters contained in the URL must be consistent across its customer base and be capable of being represented by knowledge base vendors as a provider-specific template.

4.1.1 Library-specific elements

The content provider may include any of the following elements as part of its KBART Automation report URL, for customer account identification and support of other security needs.

Customer ID	A unique code that identifies which customer account holdings are to be retrieved.
Requestor ID	A unique code that identifies the client (e.g., the knowledge base service) as one that has been registered and approved to use the KBART Automation API.
API-Key	A unique code that is assigned to a client or library and is typically used as part of the access control for the API.

4.1.2 URL Syntax

The content provider must provide a consistent and predictable URL for each KBART Automation report it supports. It must be possible for a knowledge base vendor supporting KBART Automation to determine the URL to use for a particular library and content provider by using a syntax and variable substitution method or similar. Library-specific elements in the URL must be limited to the list of elements described in Section 4.1.1 above.

Two examples of a predictable URL template are:

```
https://kbart.exampleProvider.com/holdings?customer={CustomerID}&api-
key={apikey}&clientID={requestorID}

https://kbart.example2Provider.com/holdings/customer/{CustomerID}?api-
key={apikey}
```

These examples demonstrate the flexibility available for URLs among different content providers: as long as a library-specific URL can be reliably generated by using the general URL syntax and performing substitutions of the library-specific elements, the URL is acceptable.

4.1.3 URLs and Reports

As described in Section 4.1 above, the content provider may offer separate reports for serials and monographs or it may offer a single combined report. The content provider must offer a unique URL syntax for each report it provides. The institution-specific elements used within these URLs must be the same.

Examples for URLs when multiple reports are provided, using a simple approach where the API-Key also identifies the library.

Serial Holdings
```
https://kbart.example2Provider.com/holdings/serials?
api-key={apikey}&custID={CustomerID}

https://kbart.example2Provider.com/holdings?
api-key={apikey}&rpt=serial&custID={CustomerID}
```

Monograph Holdings
```
https://kbart.example2Provider.com/holdings/monograph?
api-key={apikey}&custID={CustomerID}

https://kbart.example2Provider.com/holdings?
api-key={apikey}&rpt=monograph&custID={CustomerID}
```

Combined Holdings
```
https://kbart.example2Provider.com/holdings?
api-key={apikey}&custID={CustomerID}
```

The knowledge base service provider must be able to register unique URL templates for each report the content provider offers. The content provider may determine the syntax of the URL as long as it meets the requirements specified in Section 4.1.2.

4.2 Authentication and Security

The API must be implemented using TLS (HTTPS).

The API may be secured using one or a combination of the following methods:

- Customer ID
- Requestor ID
- IP Address of the client
- API-Key assigned to the organization retrieving the holdings

Authentication approaches not specified in this Recommended Practice are not allowed.

If IP address authentication is implemented, it must allow the same client software to retrieve holdings for multiple institutions, as the same server IP address (e.g., vendor-hosted electronic resource management services) may need to retrieve holdings for multiple customer accounts.

4.3 Errors and Exceptions

Standard HTTPS error codes must be used to respond to the status of a request. The most common are:

`200 - Request OK` (meaning: success)
`500 - Unauthorized` (meaning: some combination of IP, API-Key, Customer ID or Requestor ID not valid)

Section 5: Notes

5.1 Including Requirements for KBART Automation in License Agreements

To encourage widespread implementation of KBART Automation, libraries are urged to include relevant clauses in their license agreements with vendors. A sample clause is:

'The licensor confirms to the licensee that an institution-specific holdings reports will be provided in KBART-2 format. The licensor further confirms that such holdings will be available for automated retrieving via an API that adheres to the requirements in the NISO KBART Automation Recommended Practice."

5.2 Confidentiality of Holdings Data

5.2.1 Privacy and User Confidentiality

KBART Holdings Reports do not reveal personal information of users or their use of library resources; therefore, personal privacy and confidentiality requirements do not apply to the KBART Automation process.

5.2.2 Institutional Confidentiality

Protection of an institution's holdings is generally covered by a separate agreement between the institution and the knowledge base or other vendor.

Section 6: Extending the KBART Holdings Report

The KBART Recommended Practice allows additional columns to be added to a KBART report as long as they appear to the right of all of the standard columns; the same option applies to the KBART Holdings Report files (KBART 6.6.1).

Following are some recommendations for naming of the additional columns to encourage consistency (these columns are optional and would be supplied only by content providers that are able to include such data):

Suggested Field Name	Description
`package_name`	The name of the package or database of which the title is a part. This can be used in cases where the content provider is able to identify the package for a given holding.
`package_id`	The content provider's unique identifier for the package. Knowledge base services can use this element, when available, to match against holdings already loaded from the content provider.

The KBART Recommended Practice does not allow content providers to supply non-standard values for fields that have a controlled set of values, such as `embargo` or `access_type`. If additional information about a title needs to be included, the recommendation is to use the `notes` column (KBART 6.6.16).

Appendix A:
Example KBART Holdings Report

KBART Holdings Report Example

Appendix B:
Proof of Concept Implementation

Microsoft Excel based proofs of concept were developed to demonstrate automated retrieval of holdings data and are available at the links below.

- KBART Automation Demonstrator
- KBART Automation Demonstrator with COUNTER R5 Usage Integration
- Google Slides Presentation of KBART Automation Demonstrator with COUNTER Integration

Appendix C:
Detailed Use Cases

The NISO KBART Automation Working Group conducted a detailed review of the current landscape related to link resolvers and knowledge bases, the need for exchanging holdings data in a consistent manner, and the automation of the retrieval of those holdings.

Summary and Purpose

In order to develop recommendations for automated KBART file delivery it was necessary to identify use cases describing practices in the current landscape that the KBART automation should seek to improve. The use cases below will serve as the basis for delivering the automation recommendations, and they represent view-points from librarians, content providers, and KBs (knowledge bases).

1. Automated update and transfer of institutional holdings lists ("KBART Holdings Report")
2. Increased accuracy for updating aggregator databases in KBs
3. Timely and accurate access for e-books managed in demand-driven (DDA) models
4. Timely updates on holdings changes
5. Improved holdings maintenance and end user experience
6. Reduced cost and increased efficiency with standardized processes
7. Increased usage and accessibility of e-resource data in different product lines
8. Simplify the identification of unused resources when such data not included in COUNTER reports

These use cases focus on the first stage of automated delivery, referred to as the "KBART Holdings Report." They represent the update of knowledge base content with one single file containing all titles from a content provider that an institution has access to at the time of creation, regardless of the reason (e.g. subscription, open access). Additional use cases that do not fall within the scope of this initial stage have been documented for future review.

Along with a detailed description of the practice or problem at hand these cases also identify the main benefits to stakeholders. The summary at the end of the document outlines the main benefits extracted from the use cases for each stakeholder group.

Definitions and terminology

Entitlement = All material an institution should be entitled to access contractually
Holdings = All material (such as serials and e-books) that an institution has access to, either because it is purchased or it is open access. For the purposes of this document, the term "Access" also refers to Holdings
KBART Holdings Report = list of titles and their coverage (in case of serials) the library has access to at the time the list was created

Structure of Use cases

Sample questions to answer in a use case

- Who is the beneficiary (whose viewpoint is represented)?
- What problem does he/she try to solve (also state if the use case is about holdings transfer or package transfer)?
- What part of the KBART Automation proposal would help (or the entire proposal) and why?
- What specifically are the benefits on a higher and on a lower level (also to serve as a justification for the investment for each party)?

- What are the steps in the ideal world for a process to solve the problem (use case scenario)?

Example:

As a knowledge base vendor I want to automate the harvesting of title lists from my content providers.
So that I may keep my knowledge base up-to-date with less effort and fewer errors.
Unlike the current method of downloading files that may be manually generated and often have format and content errors.
This solution allows the harvesting of the lists to be automated (less labor) and helps ensure consistency in format (less errors).

Use cases

1. **Automated update and transfer of institutional holdings lists ("KBART Holdings Report")**

Updating and reporting on straightforward holdings lists automatically can **significantly reduce the workload for a library to manage their holdings in their knowledge base**. Instead of manually downloading holdings lists from provider platforms and uploading them into their respective knowledge base this new process will run the job automatically. It will enable librarians to focus only on checking reports to identify errors or complicated situations instead of doing all the basic work themselves. It will also provide more accurate holdings indication for users and make sure that holdings lists are always up to date.

The holdings lists will contain fully accessible content regardless of how it was purchased (e.g. subscriptions from an individual library as well as subscriptions inherited from a consortium) or whether it is open access. The use case scenario would be as follows:

1. Library adds institutional ID to the provider listing in their knowledge base.
2. Knowledge base process is running automatically in the background.
3. Librarians automatically (via email or via the knowledge base back-office) receive reports where they can check what was added, updated, and removed.

As a prerequisite a full package of all titles available from the provider the automation is for already exists in the knowledge base and is kept in sync with the holdings files to avoid any discrepancies.

As a content provider I want to automate how the knowledge base and library maintain the most up-to-date and complete information about content to which users have full-text access. Implementing customer-level KBART reports ("KBART Holdings Report") will allow for easy consumption of this information. The KBART Holdings Report can use the existing KBART recommendations with the following exceptions:

1. The report will ONLY list content to which the library/user has full-text access.
2. The Holdings Report will only contain content that is captured by KBART AllTitles report. This means the snapshot list will always be up to date with the holdings that are actually available.
3. When possible, the report will expose content within a title to which full-text access is granted (for example, full open-access issues in mixed access title can be exposed on multiple lines of the report)
4. `Date_first_issue_online`, `num_first_issue_online`, and other date/vol/issue fields will indicate the first/last issue to which full-text access is granted.

5. `Access_type` value is not relevant and should be blank because all the content listed in the Snapshot report will have access to full-text.
6. `Embargo_info` value is not relevant and should be resolved using date, issue, volume fields to indicate full-text access content that is available now.

The benefit for content provider is more traffic to content and **benefit for author** is better exposure of published articles. However, the **primary beneficiary is the library** -- solving a problem for librarians having have to manually maintain their KB

2. Increased Accuracy for updating Aggregator databases in KBs

Aggregator provided access to content can differ slightly at the title level for different library customers purchasing the same products, due to rights limitations, geographic location, library type, and other factors. The current method of providing "one size fits all" package title lists in KBs does not take into account these nuanced access differences. The automated KBART Holdings Report would allow libraries to easily access all holdings, regardless of whether they differ from the standard package list currently provided by aggregators.

3. Timely and accurate access for e-books managed in demand-driven (DDA) models

As a librarian, I want to automate the population of our Demand-Driven selection pool and triggered purchases in our discovery KB. Not every book provided by our DDA aggregator is included in our selection pool, and some content providers' access permissions change from time to time. Keeping up with the changes can be very difficult, and manually reflecting those changes in the discovery knowledge base is labor intensive. Automating the process of activating e-book holdings we have access to in the knowledge base will free up time to focus more on managing the DDA budget and selection criteria.

As a content provider I want my e-books to be discoverable in libraries' catalogs and discovery systems as soon as possible. As new e-books become available it can take a long time for librarians to become aware and then manually add it to their discovery knowledge base. Automating the transmission of the available DDA titles into the libraries' knowledge base means that my products will become discoverable sooner, and thus increase usage. This will increase my revenue as well as awareness of my products. Streamlining the pathway from availability to discoverability will make managing any Demand-Driven Acquisition program easier for my customers.

4. Timely updates on holdings changes

As a librarian, I want our knowledge base holdings to accurately reflect changes to our content (such as journal transfers from one publisher to another, package additions or removals, new purchases, cancellations, URLs, etc.) as quickly as possible. With automated snapshot reports librarians would not have to manually make these updates in the knowledge base, which would reduce the possibility of human error and delays and save staff time which could be spent on more complex tasks.

As a content provider, I want to ensure my customers are updated on any changes in their holdings in a timely manner so that I may:

- Reduce confusion by allowing librarians to access their holdings with confidence in their accuracy;

- Save resource and effort spent manually troubleshooting which package(s) are appropriate in the knowledge base and reduce potential error;
- Improve customer service and retention and market this improved service to potential customers.

The current method involves guesswork on the part of the librarian setting up their packages in the KB, confusion on whether to communicate with the content provider or the knowledge base vendor, and difficulty determining where content can be accessed when titles migrate between content providers.

5. Improved holdings maintenance and end user experiences

Automated holdings feeds (KBART Holdings Reports) coming directly from providers' access control systems would greatly improve the likelihood that a library's holdings accurately reflect content to which they have access on a given platform. As a library we want to ensure that our users are able to easily and successfully access valuable full text content.

With the automated KBART Holdings Reports libraries would no longer have to obtain title lists from content providers to populate their KBs manually. This cuts down on manual work for libraries and allows for content provider data to be available in end user systems more quickly. The content is more accurate, so when patrons are accessing data it resolves to the correct item that the library has purchased within the correct coverage range. This may also reduce unnecessary interlibrary loan requests as patrons will be able to access holdings in their own library more reliably. It will also increase usage for content providers and increase renewals of resources.

False positive/negative and broken full text links would also be minimized, which would improve the user experience. This in turn would lead to more successful full text linking and possibly higher usage. End users' content needs would be better fulfilled, and libraries could achieve a greater return on their sizable electronic resources investments. In addition, the accuracy of the feeds could be an important factor in convincing librarians to abandon manual holdings management and rely on automated feeds instead.

As a content provider, I want librarians and end-users to use as much of my content as possible (including pre-set collections/packages as well as accessible titles that fall outside packages) so that I may benefit from the library's usage, demonstrate the value of the content, encourage libraries to invest in my products, and use the resultant resource (including revenue and usage data) to continue developing content offerings. The automated KBART Holdings Report would allow libraries to easily access all content, regardless of access type. The current method does not make it clear to library customers what content they may access outside of their current purchased holdings.

6. Reduced cost and increased efficiency with standardized processes

Currently every automated feed to download files containing holdings information for a specific library from a content provider's platform and using it to update pre-existing full title lists for this provider in the knowledge base is subject to an agreement between the knowledge base and the content provider. Every such implementation is proprietary. This is a costly process. As a knowledge base provider, I would like to have standardized processes that allow me to write the basic programs and the setup on the knowledge base back-office once and use them for every provider who implements the recommended API without further intervention from development. The knowledge

base would provide the library with one full title list for the given provider and use this for automatically updating holdings. New providers could be added on the spot by simply:

- Adding the provider URL (for the information provider API) to a pre-existing field in the link resolver backend;
- Providing libraries with a field to add their unique customer identifier to the full title list in question;
- Scheduling the process to run automatically for every library that adds the identifier;
- Providing reports for the library to check what was added, changed and removed.

This efficiency increases customer satisfaction and meets a market demand. It may also provide the knowledge base and the products using it with a competitive edge. In addition, provided that the holdings feeds are accurate, this solution could help to reduce support cases and therefore further reduce operational costs on the knowledge base vendor's side. The prerequisite for this process to be successful is that the knowledge base vendor already receives accurate and up to date full title lists from the content provider and that the library holdings do not contain information that is missing from the full title lists at the time of the automated holdings update**.**

7. Increase usage and accessibility of e-resource data in different product lines

KBs usually serve not only one specific solution such as a link resolver but are part of a larger information landscape. They are for example used to accurately reflect the availability of a journal article in a library discovery system. They often also serve the library as a basis to provide full text links in other external systems such as Google Scholar. They furthermore impact the use of ILL (Interlibrary Loan) systems, ERM (Electronic Resource Management) systems and analytics. Standardized automated holdings feeds allow for the integration into other product lines and systems to become more streamlined. This improves efficiencies for library staff as well as the return on the investment of their purchases by maximizing the visibility and use of their content across different systems. It would allow for resources to be made easily available and accessible in different places where patrons look for information such as discovery systems, library catalogs, A to Z lists, A&I (Abstracting & Indexing) databases, Google Scholar and so on.

This new streamlined process can increase the resources' visibility and lead to more usage. It benefits the content provider as well as the library and library patrons who can find and access the material they need regardless of where they start their search. It also benefits the knowledge base vendor who must provide accurate processes to reflect the library's holdings across their systems.

8. Simplify the identification of unused resources when such information is not supplied in COUNTER reports

Currently not all content providers are able to provide zero-usage titles as part of COUNTER Journal Report 1 which introduces challenges for librarians to identify unused resources that they subscribe to. Obtaining a list of holdings from a publisher is sometimes a challenge, normalizing those lists (when obtained) to compare to COUNTER data is another challenge, and attempting to match holdings to titles in COUNTER reports is a further challenge due to the requirement to match on ISSN, eISSN and/or title.

KBART Automation's work will serve to simplify this process and improve results. The expectation that publishers and other content providers offer holdings in KBART format will not only improve the availability of holdings data but also serve to standardize the format across publishers. The ability

to access this data via an API/web service, allows processes to be created that automate the identification of zero-usage titles. The fact that both COUNTER and KBART require the publisher to include their title ID in the respective report (and both expect the same identifier to be used in both reports) will simplify and improve the matching of usage to holdings; and, the fact that both COUNTER and KBART have similar expectations for representing historical titles (title changes) will also improve the alignment of usage and holdings when titles have changed names and/or ISSNs.

Benefits (summary)

KBART Automation can significantly increase accuracy and timeliness of library holdings across different systems, regardless of the purchasing model. Therefore, it helps to minimize false and broken links and false positive/negative. Automated snapshot reports provide more cross system accuracy, support users wherever they search for information, and in consequence can increase usage.

The key benefits by stakeholder group are:

For libraries:

- Reduced workload
- Reduced possibility of human error and delays
- Increased confidence in accuracy
- Reduced confusion about holdings
- Fewer unnecessary interlibrary loan requests
- Improved communication between stakeholders

For content providers:

- Increased usage
- Increased customer satisfaction
- Meeting market demand
- Customer retention
- More sales and renewals

For authors:

- Better exposure of published articles across different systems
- More usage, possibly leading to higher citation counts

End users:

- More reliable access to full text regardless where they start their research
- Quicker and more seamless user experience allowing them to focus more on the content itself instead of the process of obtaining it
- Help to contribute to an overall better experience of library and content provider services
- Access to a broader range of content

For knowledge base vendors:

- Reduced costs and more efficiency in implementing automated processes based on standardized rather than individually
- Increased customer satisfaction
- Meeting market demand
- Customer retention