



**DESIGNING AND USING
NORMALIZATION RULES**

TECHNICAL SEMINAR 2017 – CHICAGO, IL

CONNIE BRAUN | IMPLEMENTATION SERVICES
MANAGER

ExLibris
a ProQuest Company

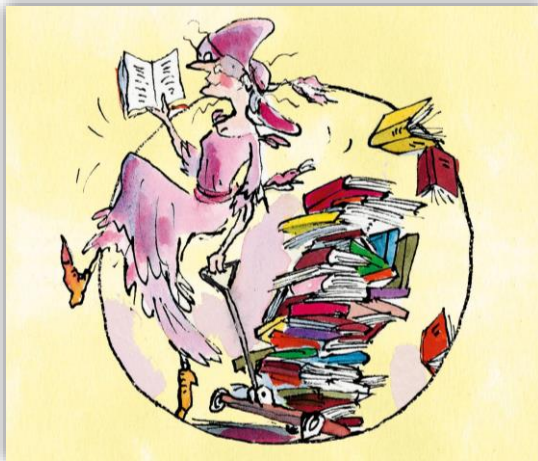
Agenda

- 1 Introduction
- 2 Creating and Testing Normalization Rules
- 3 Creating Normalization Processes
- 4 Creating Sets and Running Jobs
- 5 Next Steps, Support Resources and Survey

Introduction



Introductions

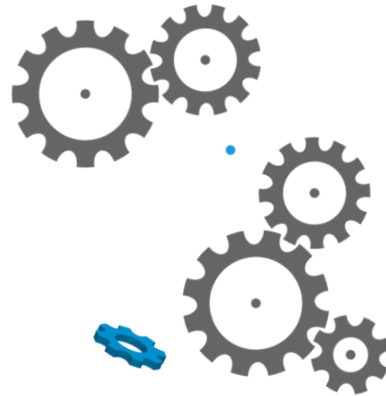


- Connie Braun, Implementation Services

Introduction

Normalization rules are created and used

- To change or update bibliographic or holdings metadata
- For various purposes and in different ways



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User Roles



Cataloger, Catalog Manager and Catalog Administrator roles may create and manage normalization rules

Catalog Administrator role is required to associate normalization rules with import profiles

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Objectives

By the end of this training session, you will be able to:

- Create various normalization rules
- Test a normalization rule to ensure that it is performing correctly
- Associate one or more normalization rules to an import process



Creating and Testing Normalization Rules

Normalization Rules

Are written in a specific syntax allowing cataloguing operators to create rules to

```
rule "Combine 650"  
when  
  (TRUE)  
then  
  combineFields "650" excluding "a,z"  
end
```

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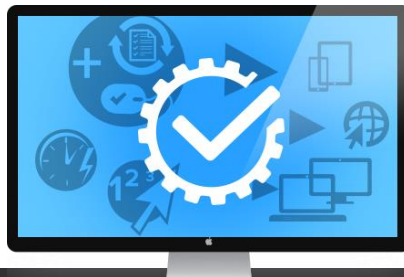
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Normalization Rules

May be applied to

- individual bibliographic records, or,
- sets of records via bulk processing

Have the option to preview the outcome of applying the rule to a bibliographic record



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Example 1

New fields and subfields may be added

```
rule "Add field 901 with sub field a with text Gift from  
Class of 2017 if it doesn't exist"  
when  
    not exists "901.a.Gift from Class of 2017"  
then  
    addField "901.a.Gift from Class of 2017"  
end
```

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Example 2

Fields and/or subfields may be removed entirely

```
rule "Remove subfields b and c from 260" when  
    (TRUE)  
then  
    removeSubField "260.b"  
    removeSubField "260.c"  
end
```

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Example 3

Replace text in fields or subfields

```
rule "Replace text colors with colours in 650 any subfield
(unconditional)"
when
  (TRUE)
then
  replaceContents "650.*.colors" with "colours"
end
```

Getting Help

Working with Normalization Rules

PERMISSIONS: To work with normalization rules, you must have the following role:

- Catalog Administrator

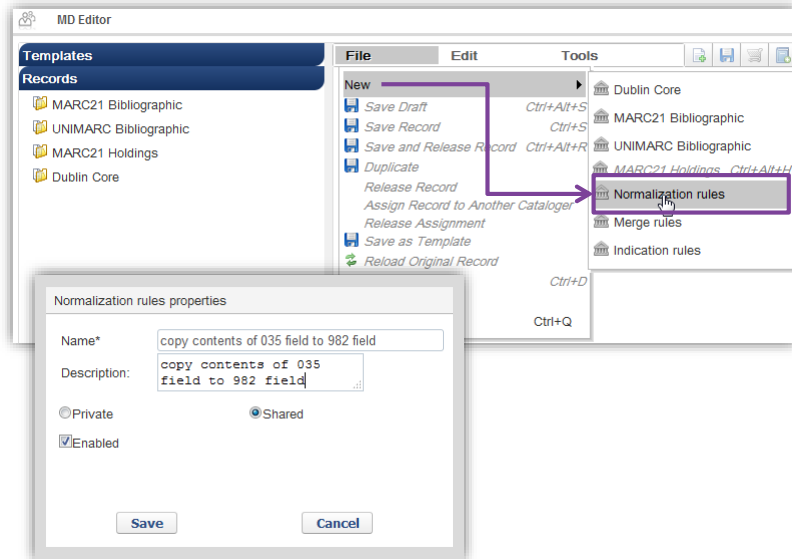
+ Table of contents

Normalization rules provide the building blocks for making enhancements to MARC 21 records. These enhancements can be made to individual records in the MD Editor (**Edit > Enhance the Record**) or to a group of records using sets.

In order to process record enhancements to an individual record, use the Enhance Record option (refer to the section [MD Editor Menu and Toolbar Options and Enhance the Record](#)) or **Apply Changes** to an individual record when you use the Preview normalization rule capability (see the procedure [To preview the outcome of a rule file](#)).

In order to process record enhancements to a set of records, you need to create a process using the MARC Drool Normalization process (see [Working with Normalization Processes](#)) and specify the normalization rule that you create with the MD Editor (refer to the procedure [To create a new normalization rule file](#)). Once you have created the process, you can, subsequently, run a job using that process (see [Running Manual Jobs on Defined Sets](#)).

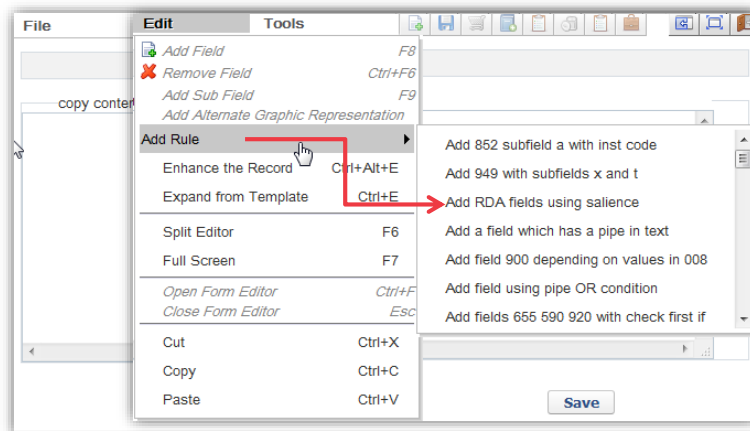
Sample Normalization Rule



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Sample Normalization Rules



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Sample Normalization Rule

```

copy contents of 035 field to 982 field
rule "copy contents of 035 field to 982 field"
  when
    (TRUE)
  then
    copyField "035" to "982.a"|
  end

```

Hands-On 1

Create a normalization rule to add a 901 field with subfield a and specific text when it does not exist

- 1 Within the Metadata editor and go to File > New > Normalization Rules.
- 2 For Name and Description, add descriptive details such as "Add field 901 with subfield a and text, Class Gift, if it doesn't exist."
- 3 Indicate whether or not the rule should be Shared, Enable the rule and Save it.
- 4 Edit the rule, deleting the second rule to add data.


```

rule "add field 901 with subfield a and text Class Gift, if it does not exist"
  when
    not exists "901.a.Class Gift"
  then
    Add "901.a.Class Gift"
  end

```
- 5 Save the edited normalization rule.

Hands-On 2

Create a normalization rule to copy contents of a field from one to another

- 1 Open the Metadata editor and go to File > New > Normalization Rules.
- 2 For Name and Description, add descriptive details such as "Copy the 001 to the 035 subfield a (001 does not have a subfield)."
- 3 Indicate whether or not the rule should be Shared, Enable the rule and Save it.
- 4 Enter the following text in the rule canvas:

```
rule "Copy 001 Field to 035 Field"
when
    (TRUE)
then
    copyField "001" to "035.a"
end
```
- 5 Save the edited normalization rule.

Hands-On 3

Create a normalization rule using existing rule syntax to replace text

- 1 Within the Metadata editor and go to File > New > Normalization Rules.
- 2 For Name and Description, add descriptive details such as "Replace pbk.) with paperback) in 020 \$\$a (unconditional)"
- 3 Indicate whether or not the rule should be Shared. Enable the rule. Save the rule.
- 4 Enter the following text in the rule canvas:

```
rule "Replace text pbk.) with paperback 020 $$a (unconditional)"
when
    (TRUE)
then
    replaceContents "020.a.pbk)" with "paperback)"
end
```
- 5 Save the edited normalization rule.

Hands-On 4

Create a normalization rule using existing rule syntax to delete 9XX fields

- 1 Within the Metadata editor and go to File > New > Normalization Rules.
- 2 For Name and Description, add descriptive details such as "Delete all 9XX fields."
- 3 Indicate whether or not the rule should be Shared. Enable the rule. Save the rule.
- 4 Enter the following text in the rule canvas:

```
rule "Remove all 9XX"
when
    (TRUE)
then
    removeField "9**"
end
```
- 5 Save the edited normalization rule.

Testing Normalization Rules

1. Using the Repository Search, locate and open a record on which to test the rule in the Metadata Editor.
2. Switch to split editor mode with the record in the left pane.
3. Click on the blank right pane of the split editor.
4. Go to the Rules tab, select the normalization rule you want to test and click edit to open the rule in right pane.
5. Test the rule by clicking on the **Preview** button.

Testing Normalization Rules

Edit the normalization rule

The Bib record against which the normalization rule will be tested is open in left pane

The normalization rule that will be previewed

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Testing Normalization Rules

Back to normalization rules = return to the rule for further editing

Apply Changes = update the record

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Hands-On 5

Test the normalization rules created in Hands-On 1 – 4

- 1 For each rule, confirm that the rule you are working with is functioning as expected.
- 2 Edit a rule further if there is more that you want to change.
- 3 When ready, apply the change to the record.



Creating Normalization Processes

Normalization Rule Processes

- Normalization rules, created in the Metadata Editor, may be used in processes that focuses on global data change
- Normalization rule processes, which are created by a Catalog Administrator, may include one or more normalization rules



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Normalization Rule Processes

Profile Details					Back
Profile: MARC21 Bibliographic		Family: MARC			
Type: Bibliographic		Usage: BIB, MMS			
Fields	Normalization Processes	Validation Processes	Validation Exception Profile List		
Add Process					Tools
Active	Name	Description	Actions		
1	✓ Add 245 sf h [Video]	This will add 245 sub field h video when pos. 6 of the LDR field is "g"...	Actions		
2	✓ Add 900 copied from worldcat	Add 900 copied from worldcat	Actions		
3	✓ Marc21 Bib Initial Normalization	Initial normalization for Marc21 Bib record	Actions		
4	✓ Marc21 Bib normalize on save	Normalize Marc 21 Bib while saving	Actions		
5	✓ Marc21 Bib Re-sequence	Marc21 Bib Re-sequence	Actions		
6	✓ Marc21 Bib Re-sequence And Clear empty fields	Marc 21 Bib Re-sequence and clear empty fields	Actions		
7	✓ remove 999 dsir	remove 999 dsir	Actions		
8	✓ Remove Bib Field 999	Remove Bib Field 999	Actions		
9	✓ Remove Vendor Data 949	Remove vendor 949 field from MARC	Actions		
10	✓ Remove Vendor Data 980 981 993	Remove vendor 980, 981 and 993 fields from MARC	Actions		
11	✓ Suppress Bib records from discovery	Marks MMS records as suppressed or non-suppressed from discovery	Actions		
12	✓ Synchronize Bib records with external catalog	Marks MMS records for synchronization or no-synchronization with external catalog...	Actions		

Process Details	
Business Entity: Bibliographic title	Type: Marc 21 Bib normalization
General Information	
Name *	copy content of 035 field to 982 field
Description *	copy content of 035 field to 982 field
Status	Active
Status Date	-

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Normalization Rule Processes

Process Details (1/2/3) Back Cancel Next

Business Entity: Bibliographic title
Name: copy content of 035 field to 982 field
Type: Marc 21 Bib normalization

Processes Selected

	Name	Description	
1	MarcDroolNormalization	Marc Drool Normalization	Remove
2	MarcDroolNormalization	Marc Drool Normalization	Remove
3	MarcDroolNormalization	Marc Drool Normalization	Remove

Process List Pool

	Name	Description
1	marc21BibReSequenceTask	MARC21 BIB Re-Sequence task
2	MarcDroolNormalization	Marc Drool Normalization
3	marc21BibClearEmptyFieldsTask	MARC21 BIB Clear Empty Fields task
4	MmsTagSuppressed	Sets the Suppressed flag of MMS
5	MmsTagSyncExternal	Sets the SyncExternal flag of MMS
6	MmsIdentifyingBibRecords	Calculates if a record is brief or not
7	marc21createControlNumber	MARC21 BIB Create Control Number task
8	MmsTagSyncNationalCatalog	Sets the Sync National Catalog flag of MMS

Add to Selection

Click Add to Selection to include one or more processes in group of available processes

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Normalization Rule Processes

Process Details (1/2/3) Back Cancel Save

Business Entity: Bibliographic title
Name: copy content of 035 field to 982 field
Type: Marc 21 Bib normalization

Marc Drool Normalization

Drools File Key: Change 900

- Change 900
- Copied from WorldCat
- Delete 952 fields
- Delete 9XX and 029 fields
- Delete 9XX fields
- add 245 h [Video]
- add 245 h [vidéo]
- add 245 h [ⵓⴰⵔⵉ]
- change holdings
- change holdings location from Grad to Science

Back Cancel Save

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Hands-On 6

Create a normalization rule process using one of the rules created in Hands-On 1 – 4

- 1 Go to Resource Management > Configuration > Metadata Configuration and click on MARC21 Bibliographic. From the Profile Details page switch to the Normalization tab and click on the Add Process button.
- 2 Give a name and description to the new process. Click on the Next button to go to the next step.
- 3 Select “MarcDroolNormalization” and click the Add to Selection button. In a situation where you want to include multiple different normalization rules in one process, simply include the number of required “MarcDroolNormalization” entries.
- 4 Select the normalization rule that you want to include in the process. If including more than one normalization rule, one Drools File Keys exists for each “MarcDroolNormalization” added in Step 2. The last step in creating this process is to Save it.



Creating Sets and Running Jobs Using Normalization Processes

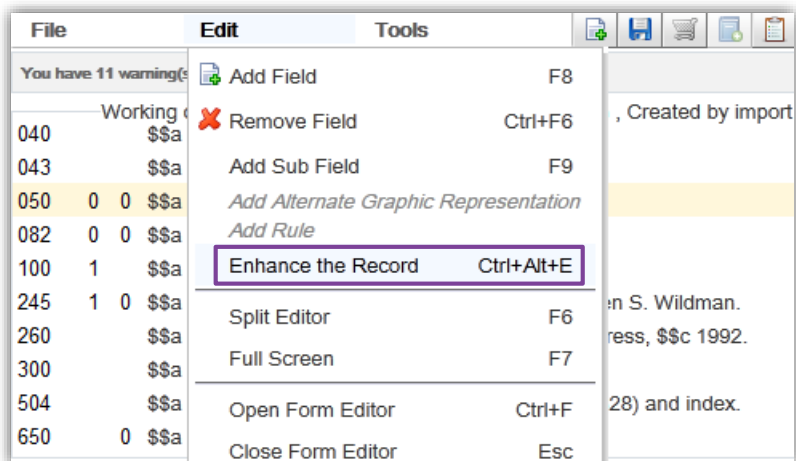
Running Normalization Processes

Normalization processes may be run...

1. Via **Enhance the record** option in Metadata editor
2. For a set of records assembled via **Manage Sets** function
3. When adding a file of records via **Import** function
4. While importing individual records via **External Search**

4

Enhance the Record



Enhance the Record

Working on -Video economics / Br (991521280000541) , Created by import (17/12/2011 23:31)

LDR	00836pgm#a2200265#a#4500
001	991521280000541
005	20121031113541.0
008	111217s1992####maua####b####001#0#enq
010	
020	
035	
035	
035	
040	

Enhance the Record

Choose Add 245 sf h [Video]

Normalization Add 245 sf h [Video]

Type:

- ☐ Marc21 Bib Initial Normalization
- ☐ Marc21 Bib normalize on save
- ☐ Marc21 Bib Re-sequence
- ☐ Marc21 Bib Re-sequence And Clear empty fields
- ☐ Remove Vendor Data 949
- ☐ Remove Vendor Data 980 981 993
- ☐ Suppress Bib records from discovery
- ☐ Synchronize Bib records with external catalog

Info Alerts

008 Missing data for position 38 in

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Enhance the Record

Enhance the Record

Choose Add 245 sf h [Video]

Normalization

Type:

Ok Cancel

035		\$ \$9 (DLC) 91032924
035		\$ \$a 1543675
035		\$ \$a (TrN)64982-train20072_c2db
040		\$ \$a DLC \$ \$c DLC \$ \$d DLC
043		\$ \$a n-us---
050	0 0	\$ \$a HE8700.8 \$ \$b .O93 1992
082	0 0	\$ \$a 384.55/1 \$ \$2 20
100	1	\$ \$a Owen, Bruce M.
245	1 0	\$ \$a Video economics / \$ \$c Bruce M. Owen, Steven S. Wildman. \$ \$h [Video]
260		\$ \$a Cambridge, Mass. : \$ \$b Harvard University Press, \$ \$c 1992.

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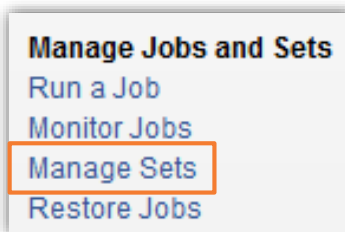
Hands-On 7

Apply a normalization rule by *enhancing the record*

- 1 Open any Bibliographic record in the Metadata editor.
- 2 Go to **Edit menu** and select **Enhance the Record** (Ctrl+Alt+E).
- 3 Select from among the available processes.
- 4 Click on **OK** button to run the process.

Normalization Job for a Set

- Each process may be run on a set of records
- Assumes processes have been created
- Choose “Run Process” from within Resource Configuration menu



Normalization Job for a Set

Create Job - Select Job to Run

Job List

Type: Marc 21 Bib normalization Find: in: All Go

1 - 7 of 7 Task Chains Tools

Name	Description	Content Type	Type
<input type="radio"/> Synchronize MMS with national catalog	Mark MMS as synchronized or non-synchronized with national catalog	Bibliographic title	Marc 21 Bib normalization
<input type="radio"/> Synchronize Bib records with external catalog	Marks MMS records for synchronization or no-synchronization with external catalog (OCLC)	Bibliographic title	Marc 21 Bib normalization
<input type="radio"/> Suppress Bib records from discovery	Marks MMS records as suppressed or non-suppressed from discovery	Bibliographic title	Marc 21 Bib normalization
<input checked="" type="radio"/> Remove Bib Field 999	Remove Bib Field 999	Bibliographic title	Marc 21 Bib normalization

Create Job - Select Set

Content Type: All Find: in: All Go

1 - 9 of 9 Sets Tools

Name	Type	Content Type	Create Date
<input type="radio"/> BibHeadingWithMultipleMatches	Itemized	All Titles	11/16/2011 09:50:53 EST
<input type="radio"/> Books about Israel in Main library	Logical	Physical titles	02/06/2012 15:03:02 EST
<input type="radio"/> Electronic	Logical	Physical titles	08/14/2013 14:53:36 EDT
<input type="radio"/> Gale Electronic Titles	Itemized	Electronic titles	01/13/2014 20:40:14 EST
<input type="radio"/> have a guess C-4 LCR	Logical	All Titles	11/04/2013 04:30:31 EDT
<input checked="" type="radio"/> logical set of keyword=yorkshire	Logical	All Titles	01/16/2014 17:12:03 EST
<input type="radio"/> Main ELECTRONIC	Logical	Physical titles	09/11/2013 08:41:31 EDT
<input type="radio"/> TGG Historic Preservation logical set	Logical	All Titles	01/21/2014 14:36:33 EST
<input type="radio"/> time	Logical	All Titles	06/06/2013 17:20:54 EDT

1 - 9 of 9 Sets Tools

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Normalization Job for a Set

General Information Task List Task Parameters

Business Entity Bibliographic title Type Marc 21 Bib normalization

Name Add 245 sf h [Video]

Marc Drool Normalization
Drools File Key * add 245 h [Video]

Marc Drool Normalization
Drools File Key * add 245 h [vidéo]

Marc Drool Normalization
Drools File Key * add 245 h [יידא]

Create Job - Job Details and Schedule

General Information

Job Name * Add video

Schedule Job

As soon as possible

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Normalization Job for a Set

LDR		00885ngm#a22002411##4500
001		992174140000521
005		20121101103351.0
008		121101s1967####cau#####d####000#0#eng##
010		\$\$a 67020728
035		\$\$9 (DLC) 67020728
040		\$\$a DLC \$\$c DLC \$\$d DLC
050	0 0	\$\$a Z719 \$\$b .L4 1967
082	0 0	\$\$a 016.021/0025
100	1	\$\$a Lewanski, Richard Casimir, \$\$d 1918-
245	1 0	\$\$a Library directories. \$\$b Library science dictionaries. \$\$c [By] Richard C. Lewanski. \$\$h [Video]
260		\$\$a Santa Barbara, Calif., \$\$b [American Bibliographical Center] \$\$c 1967.
300		\$\$a 49 p. \$\$c 28 cm.
490	0	\$\$a Bibliography and reference series, no. 4
650	0	\$\$a Libraries \$\$x Directories \$\$x Bibliography.

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Hands-On 8

Create a set and run the process

- 1 Go to Manage Sets.
- 2 Create an Itemized set of three or four physical items against which to run a process.
- 3 Run the process.
- 4 View and confirm the changes to the records.

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Normalization During File Import

Import Profile Details

Profile Type Repository Profile Name Import with items for YILIS

Profile Details **Normalization & Validation** Match Profile Set Management Tags Inventory Information

Normalization

Correct the data using Add 245 sf h [Video]

Validation Exception Profile

Check the data using

- Marc21 Bib normalize on save
- Marc21 Bib Re-sequence
- Marc21 Bib Re-sequence And Clear empty fields
- Remove Vendor Data 949
- Remove Vendor Data 980 981 993
- Suppress Bib records from discovery
- Synchronize Bib records with external catalog

When an input file is imported using this profile, this normalization process will occur as part of the import activities

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Normalization During File Import

```

<?xml version="1.0" encoding="UTF-8" ?><marc:collection xmlns:marc="http://www.loc.gov/MARC
"http://www.w3.org/2001/XMLSchema-instance" xsi:schemaLocation="http://www.loc.gov/MARC21/s
http://www.loc.gov/standards/marcxml/schema/MARC21slim.xsd">
<marc:record><marc:leader>01577cgs a2200325 a 4500</marc:leader>
<marc:controlfield tag="001">13772036</marc:controlfield>
<marc:controlfield tag="005">20090501050254.0</marc:controlfield><marc:controlfield tag="00
041103c20039999nyuar 0 Deng </marc:controlfield><marc:datafield tag="010" ind1=
><marc:subfield code="a"> 2005202828</marc:subfield><marc:subfield code="z"> 2004272034
</marc:subfield></marc:datafield><marc:datafield tag="012" ind1=" " ind2=" "><marc:subfield
-3-7-0904300071-p----- </marc:subfield></marc:datafield><marc:datafield tag="035" ind1="
"><marc:subfield code="a">(OCoLC)ocm59710958 </marc:subfield></marc:datafield><marc:datafiel
=" "><marc:subfield code="a">DLC</marc:subfield><marc:subfield code="c">DLC</marc:subfield>
DLC</marc:subfield></marc:datafield><marc:datafield tag="042" ind1=" " ind2=" "><marc:subfi
</marc:subfield></marc:datafield><marc:datafield tag="050" ind1="0" ind2="0"><marc:subfield
</marc:subfield><marc:subfield code="b">.T67</marc:subfield></marc:datafield><marc:datafiel
="0"><marc:subfield code="a">Top ... technologies </marc:subfield><marc:subfield code="b">

```

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Normalization During File Import

```
<marc:record><marc:leader>01229cam a22003015a 4500</marc:leader>
<marc:controlfield tag="001">13993756</marc:controlfield>
<marc:controlfield tag="005">20050727113835.0</marc:controlfield><marc:
nyua b 000 0 eng d</marc:controlfield><marc:datafield tag="906"
</marc:subfield><marc:subfield code="b">ibc</marc:subfield><marc:subfie
</marc:subfield><marc:subfield code="d">2</marc:subfield><marc:subfield
code="f">20</marc:subfield><marc:subfield code="g">y-gencatlg</marc:sub
"925" ind1="0" ind2=" " <marc:subfield code="a">acquire</marc:subfield>
</marc:subfield><marc:subfield code="x">policy default</marc:subfield><
ind1=" " ind2=" " <marc:subfield code="a">pv12 2005-06-07 z-processor t
>se00 2005-06-23 ; se38 2005-07-27 to SRD</marc:subfield></marc:datafi
" "><marc:subfield code="a"> 2005278111</marc:subfield></marc:datafi
><marc:subfield code="a">(OCoLC)ocm60378779</marc:subfield></marc:dataf
" "><marc:subfield code="a">MUM</marc:subfield><marc:subfield code="c">
DLC</marc:subfield></marc:subfield><marc:datafield tag="042" ind1=" "
</marc:subfield></marc:subfield><marc:datafield tag="097" ind1="0" ind
</marc:subfield><marc:subfield code="b">.C98 2004</marc:subfield></marc
ind2=" " <marc:subfield code="a">Cytron, Scott H.</marc:subfield></mar
"1" ind2="0" <marc:subfield code="a">AICPA's top technologies 2004 /</marc:subfield>
```

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Normalization During File Import

Files List

1 - 1 of 1 Records

File Name	Label	Notes	Source	Size	Date	Actions
20121101.xml_1.xml	-	-	-	8 KB	01/11/2012	Actions

Cancel Submit

Title: Top ... technologies : and their impact on the accounting profession /

MMS ID: 992174090000521 Originating system: LIBRARY_OF_CONGRESS Originating system ID: 13772036

Suppress from publishing: No Synchronize with external system: Yes Brief record: No

LDR 0157 cgs 00000000 4500

001 992174090000521

005 20090501050254.0

008 041103c2003999nyuar 0 0eng

010 _ la 2005202828 lz 2004272034

012 _ la 3-7-0904300071-p---

035 _ la (OCoLC)ocm59710958

040 _ la DLC lc DLC jd DLC

042 _ la lc

050 00 la HF5625.7 lb .T67

245 00 la Top ... technologies : lb and their impact on the accounting profession / lc Information Technology Section la [Video]

245 10 la AICPA's top technologies 2004 / lc Scott H. Cytron, Ann K. Stanton

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External Search Import

The screenshot shows the ExLibris Alma MD Editor interface. On the left, under 'Rules', a rule named 'Copied from WorldCat' is highlighted. The rule text in the main editor is:

```
rule "Add data field 900 with subfield a = Copied from WorldCat if it doesnt exist"
when
  ( not exists "900.a.Copied from WorldCat" )
then
  addField "900.a.Copied from WorldCat"
end
```

Below the editor, the 'Process Details' window is open, showing 'General Information'. The 'Business Entity' is 'Bibliographic title' and the 'Type' is 'Marc 21 Bib normalization'. The 'Name' is 'Add 900 copied from worldcat'. The 'Marc Drol Normalization' section shows the 'Drools File Key' as 'Copied from WorldCat'.

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External Search Import

The screenshot shows the ExLibris Alma MD Editor interface. On the left, under 'Records', the 'MARC21 bibliographic' record type is selected. The 'Search Cataloging Profile' is set to 'WorldCat'. The 'Find' section shows a list of fields with their corresponding search operators:

Find:	Any Field	Contains Phrase
AND	Title	Contains Phrase
AND	Creator	Contains Phrase
AND	Subjects	Contains Phrase
AND	ISBN	Contains Phrase
AND	ISSN	Contains Phrase
AND	System Number	Contains Phrase
AND	Year of Publication	Equals

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External Search Import

Name	Description	
British Library	British Library Public Catalog	Actions
Jewish National and University Library	Jewish National and University Library	Actions
Library of Congress	Library of Congress (LOC)	Actions
WorldCat	WorldCat	Actions Edit Duplicate Delete Back

External Search Profile Details [Cancel](#) [Save](#)

General Information **Resource List** [Support, Ex Libr...](#)

Name WorldCat Description WorldCat

External Resources Selected

1 - 1 of 1 Records [Tools](#)

Resource Name	Actions
WorldCat	Actions Edit Duplicate Delete Back

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External Search Import

External Resource List [Support, Ex Libr...](#)

Find : in : Resource Name [Go](#)

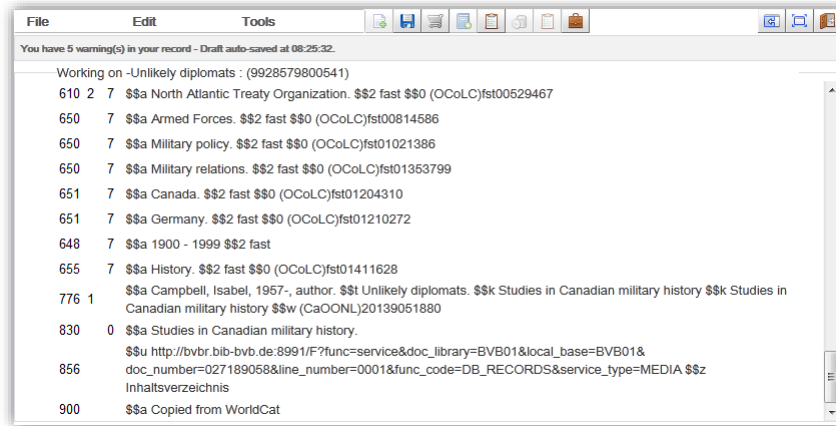
[Add External Resource](#) 1 - 5 of 5 Records [Tools](#)

Resource Name	Actions
British Library Public Catalog	Actions
Library of Congress (United States Library of Congress (LOC))	Actions
National Library of Australia	Actions
National library of Israel	Actions
WorldCat	Actions Edit Delete Copy Back

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External Search Import



Next Steps and Support Resources



Next Steps and Support Resources

From the Knowledge Center,

[https://knowledge.exlibrisgroup.com/Alma/Product_Documentation/Alma_Online_Help_\(English\)/Resource_Management/040Metadata_Management/070Working_with_Normalization_Rules](https://knowledge.exlibrisgroup.com/Alma/Product_Documentation/Alma_Online_Help_(English)/Resource_Management/040Metadata_Management/070Working_with_Normalization_Rules)

At the bottom of this page, see the Word document containing nearly 70 examples.

Q & A

Any Questions?



Session Survey Evaluation

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

