Slide 1

Fred King, MSLS, AHIP

Medical Librarian
MedStar Washington Hospital Center
Washington, DC
and
Member-at-Large (Unsupported) 2016-2019
koha-US.org
E-mail: koha@avengingchicken.online

This presentation was originally given at the koha-US conference in Pueblo, Colorado, September, 2019. Released under Creative Commons: you are welcome to use and modify this presentation as you wish. Please give credit to Fred King if possible. All non-credited photos are by Fred King, also released under Creative Commons.

Got a hundred dollars?

Get an ILS!

Slide 3

How to use Koha, MarcEdit, a Raspberry Pi, and a Chicken (optional) to create an ILS for under $100. Koha, MarcEdit, and Raspberry Pi photos from their respective web sites. If you're wondering about the Avenging Chicken, go to http://www.avengingchicken.online.

Every presentation by a librarian needs to have a picture of a cat.

Slide 5

Thank you to the people who helped me get past an especially troublesome problem. My wife declined to be mentioned by name here, but I'd like to thank her for listening to me talk about Koha day after day. When I thanked her at the 2013 conference in Reno, pretty much every developer in the room nodded understandingly.

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So why a Raspberry Pi?

- ▶ Incredibly complex computing platform, needs extensive training to utilize.
- ▶ Latest version is approaching a desktop in computing power.
- ▶ Readily available.
- ▶ Basic model costs $35.00.
- ▶ There are lots of Raspberry Pi projects around. Why not an ILS?
- ▶ I wanted to see if it was possible.
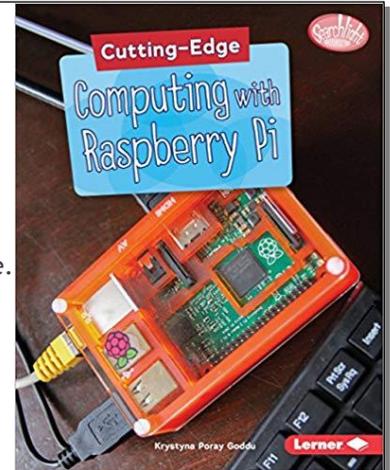
The most recent Raspberry Pi (as of September, 2019) can run up to 4GB RAM. Add a 250GB SD card and it rivals some desktop systems. One of the technical manuals is shown in the top right.

Starting out:
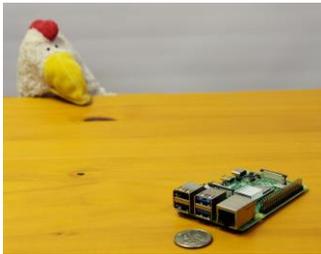
Raspberry Pi 4B
2GB RAM
Power Supply
$55.00

Case
$8.00

Micro SD Card
32GB, Class 10
$10.00

The Pi I'm running has 2GB RAM. You can run it without a case, but I feel more secure with one. You can actually use a 4GB card, but I couldn't find a 4GB Class 10 card. That's a US quarter in the picture.

Wherein I admit to cheating a bit

Monitor
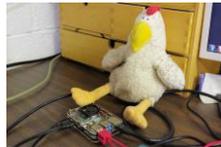
Drawer of Things

Network
Connection

Another Computer

Windows Ubuntu

I'm assuming that if you're going to take this on, you have a Drawer of Things with a keyboard, and you have an extra monitor hanging around. If you're going to use Z39.50 you'll need a network connection. The only thing you absolutely need another computer for is to flash the SD card, though I used it for other tasks as well.
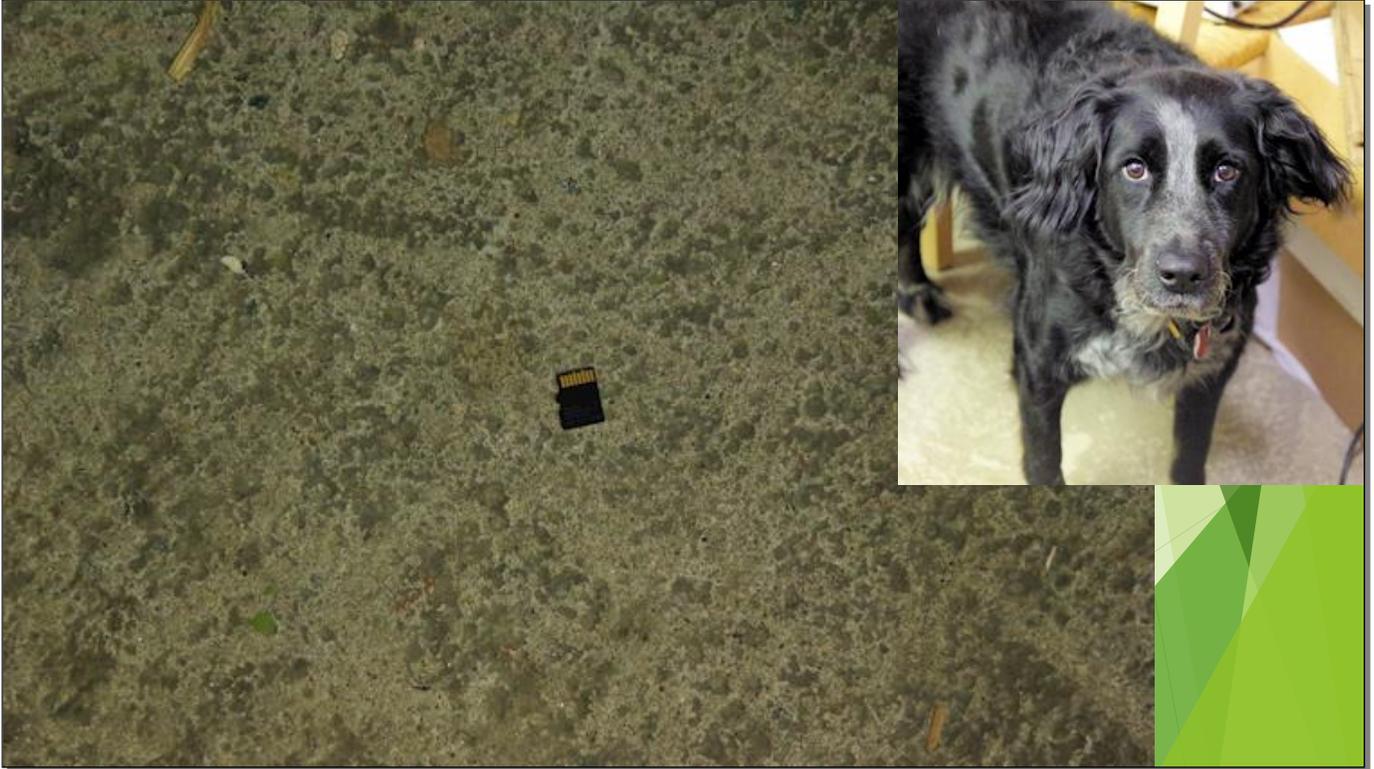
If you drop the card on the floor, it can be kind of hard to find. If you have a dog that thinks everything that falls on the floor is hers... Well, SD cards are inexpensive enough that you won't have to try to find it. A replacement card is not included in the $100 budget.

And we're off!

Now that the Pi is assembled and the card is installed, we're ready to go. Well, almost. It's pretty easy to miss the SD slot, and the card gets stuck between the Pi and the case. Shake it until it comes out again. Yes, that's a 64GB card whereas I'm using a 32GB card for the project. There's a lot of bad continuity in this presentation. Spot them all and win a prize! (Not really.)

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Steps

- Install Operating System
- Install and Configure Koha
- Obtain list of ISBNs
- Use MARCEdit and Z39.50 to harvest MARC records
- Edit the records, upload to Koha
- Add items (not shown)

Not much to add in the notes here.

Install Operating System

▶ Go to the main Raspberry Pi site: http://www.raspberrypi.org
▶ Lots of information on getting started
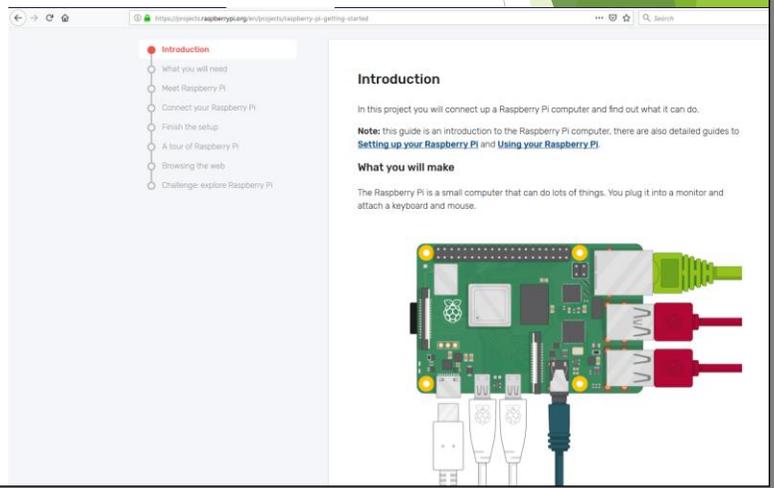
You can find a lot of information about the Raspberry Pi, including this image, at, not surprisingly, www.raspberrypi.org.

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There's a version of Ubuntu available for the Raspberry Pi 2 and 3, but not yet for the 4. There will be one available eventually. For now, I'm using Raspbian, yet another version of Debian.
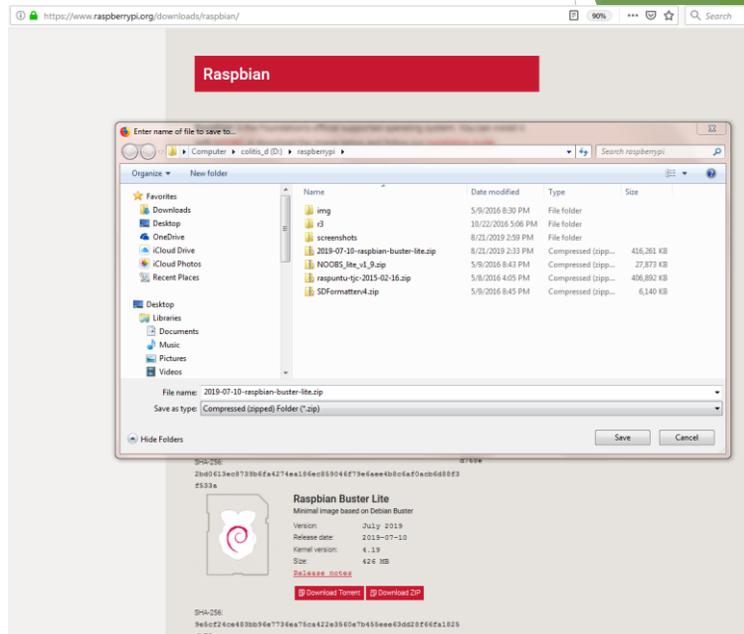
For this experiment, I'm using the bare-bones, command-line-only version. You can actually install a desktop, and it won't have a huge impact on performance.

Slide 15
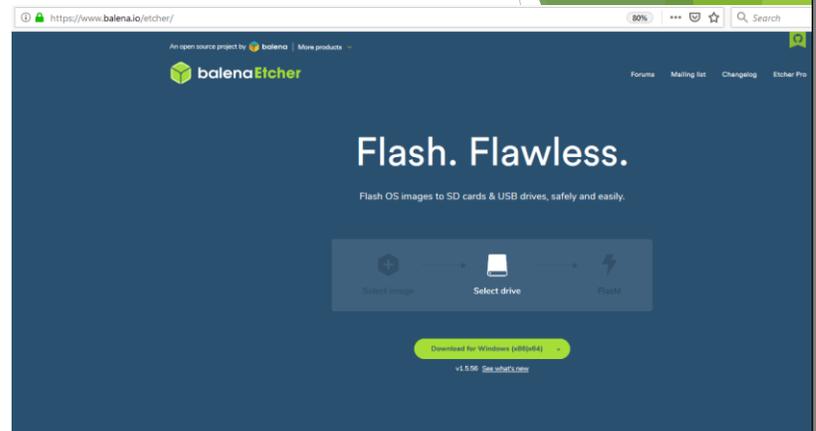
I used BalenaEtcher, but you can use other software to flash a card. BalenaEtcher can read a number of archive and image formats, which makes it especially convenient.

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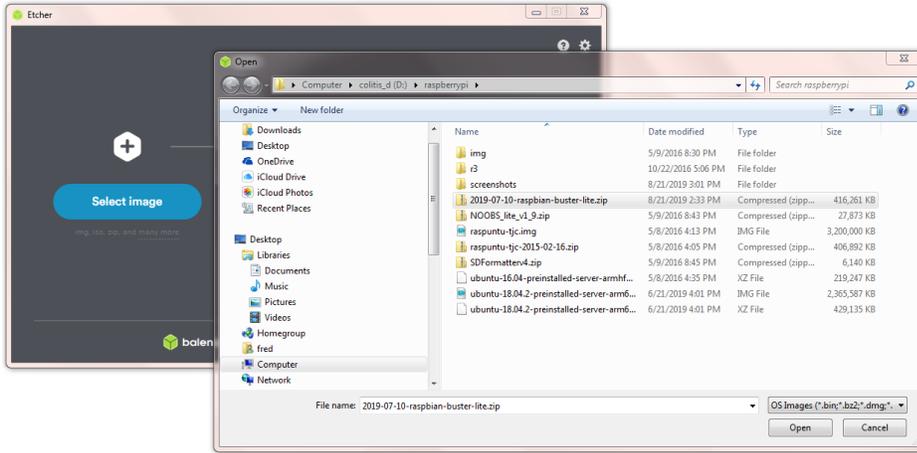
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balenaEtcher images the card for you

It flashes and then verifies the image. This can take a long time.

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Log in to your new computer
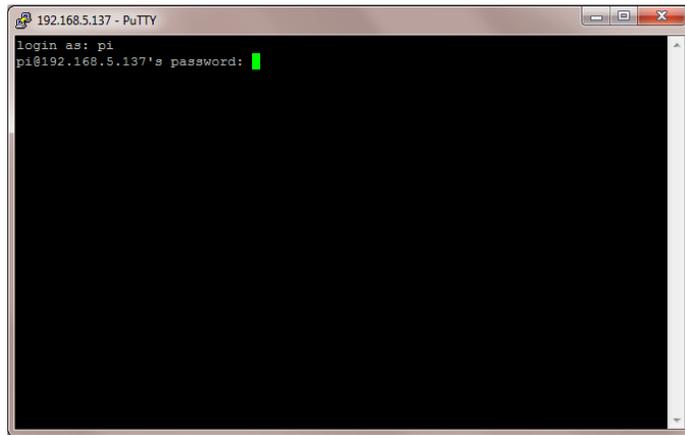

```
192.168.5.137 - PuTTY
login as: pi
pi@192.168.5.137's password:
```

Connect the cables, attach a monitor and keyboard, and turn it on. It works! The default username is pi, the default password is raspberry. I'm connecting via SSH for this screen shot, but you can log in from a keyboard attached to the Raspberry Pi.

You're ready!
(well, ready for the first part)

▶ Plug in the cables
▶ Turn it on
▶ Run raspi-config to set locale, keyboard, etc
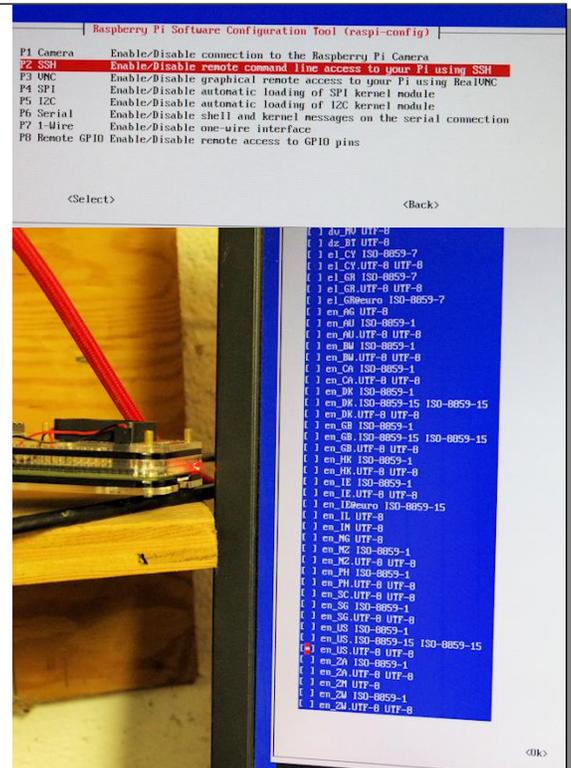
You need to run raspi-config to tell it which keyboard layout to use, etc. The default is Great Britain, which is slightly different from the US layout. In the top right I'm enabling SSH so I can connect from my other computer. This isn't absolutely necessary, but it does make screenshots a lot easier. These were taken of the actual monitor with a camera.

Now you're ready to install Koha

▶ These instructions are a combination of the Koha Wiki's Koha on a Raspberry Pi
  ▶ https://wiki.koha-community.org/wiki/Koha_on_a_Raspberry_Pi_3_B%2B
▶ And the Koha Wiki's Koha on Debian
  ▶ https://wiki.koha-community.org/wiki/Debian

▶ Tell your Pi where to find the software
  ▶ echo deb **[arch=i386]** http://debian.koha-community.org/koha stable main | sudo tee /etc/apt/sources.list.d/koha.list
▶ Tell your Pi that the software is OK
  ▶ wget **-O-** http://debian.koha-community.org/koha/gpg.asc | sudo apt-key add -

I used a combination of pages from the Koha Community Wiki to help me install Koha.

There are two important things to remember: when you're adding the Koha repository, include [arch=i386] in the command line. If you don't, you'll get an error message and nothing will work. Second, and this is true for all installations, the letter after wget is a capital letter O. Everybody else probably figured that out the first time.

Prepare to install the software

- ▶ Update the software packages
  - ▶ sudo apt-get update
- ▶ Then upgrade the software
  - ▶ sudo apt-get upgrade

Then update the software packages and upgrade the software. This is very important; if you don't, it won't work. Don't ask me why I know this.

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Getting a little ahead of myself here

This actually happens a little further down the road, but finding a solution (with the help of the people I thanked at the beginning), took a couple of days. I hit a brick wall and almost gave up.

If you're worried about the chicken sitting on dirty concrete, please note that it is sitting on a doily.

I'm not sure which command worked:

- ▶ curl -L https://cpanmin.us | sudo perl - -M https://cpan.metacpan.org -n Mojolicious
- ▶ perl -MCPAN -e 'install Mojolicious'
    - ▶ Let it automatically install and choose the default options
- ▶ install cpanminus
- ▶ cpanm Mojolicous::Plugin::OpenAPI

- ▶ Maybe all of them working together?

I ran all of these, and eventually worked. Someone with more knowledge can probably figure out which one. I'm more interested that it worked.

Keep slogging on

- Install koha-common
  - This is going to take a while
- Install mariadb

Now for the moment you've been waiting for!

- Create library (here called libcat)
  - sudo koha-create --create-db libcat

Next, install the main Koha software, koha-common. Then install mariadb (or mysql).

And next, create the library! I'm calling this one "libcat".

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Make a few changes to the web configuration files

Make sure the web server knows where the staff client page is.

And make sure it's listening there.

You have to tell Apache where the staff client page is (I'm using port 8080), and make sure that it's listening at that port. I also added port 81, which isn't necessary but I often use for other purposes.

The file on the left is /etc/apache2/sites-enabled/libcat.conf; the one on the right is /etc/apache2/ports.conf. You'll need to disable or rename /etc/apache2/sites-enabled/000-default.conf.

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Now you can start to set it up

- You'll need to know your pi's IP address
  - ifconfig
  - This one is 192.168.5.137
    - (though it changes later)

- You'll need a password to get in
  - sudo koha-passwd libcat
    - gJeqtYxEqO8BIq0@

You'll need to run ifconfig to find out the Pi's IP address is before you can log into the web-based staff client. (There are many other ways to find the IP as well.) The command "sudo koha-password [library name]" will give you the password to log in. The IP changes on the next page. Bad continuity again…

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Point your web browser to the Pi's IP address, then log in with "koha_[library's name" and that string of gibberish that's the password.

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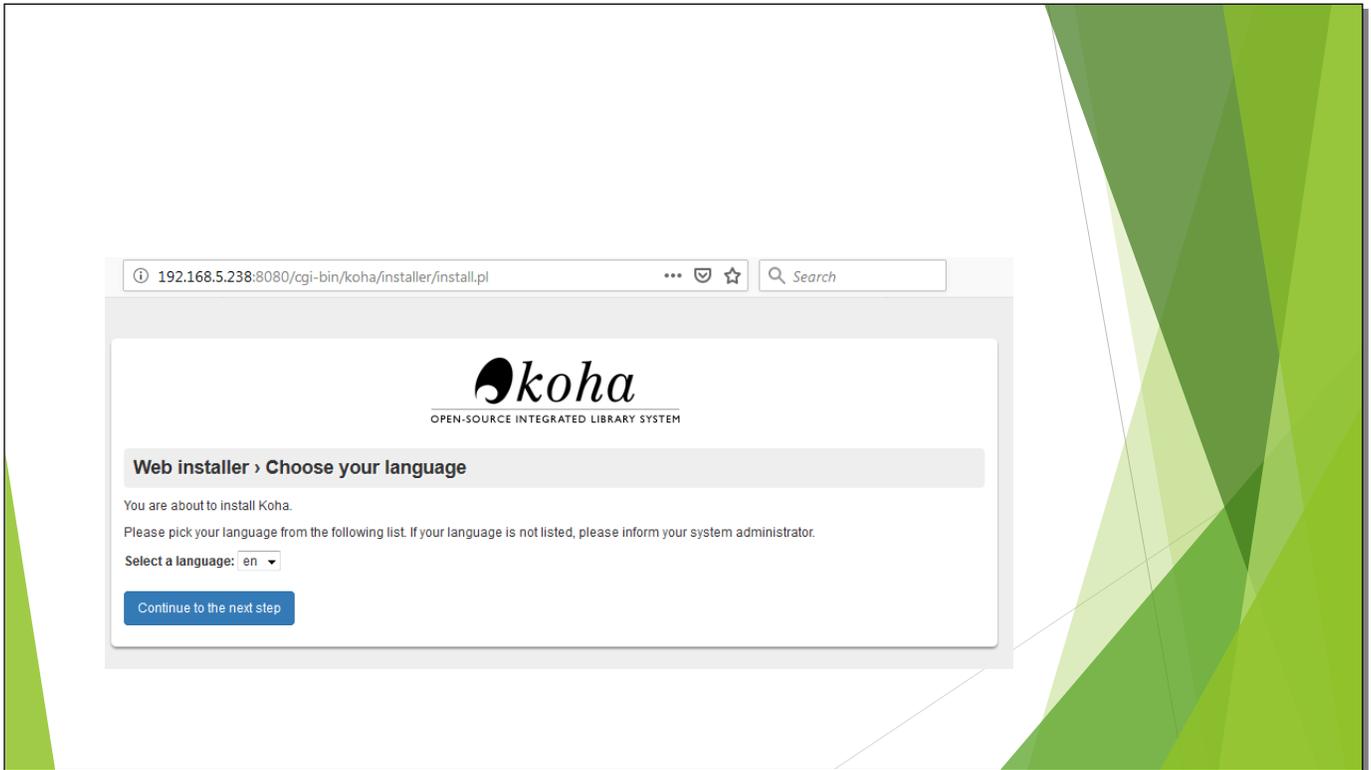
Now go through the Web installer. This will take several minutes and several screens. Don't worry, you'll get to the finish eventually.

Whew!
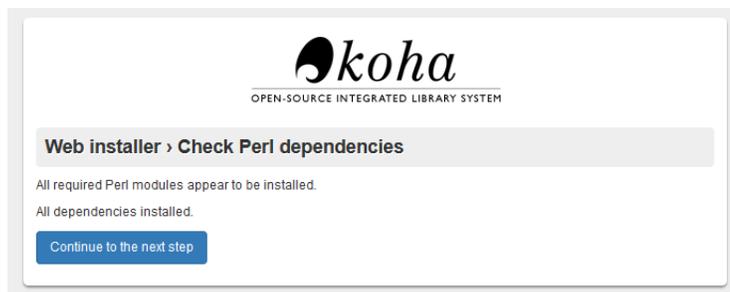
This is the screen that stopped me before. I was very happy when I no longer got the error message.

Slide 30
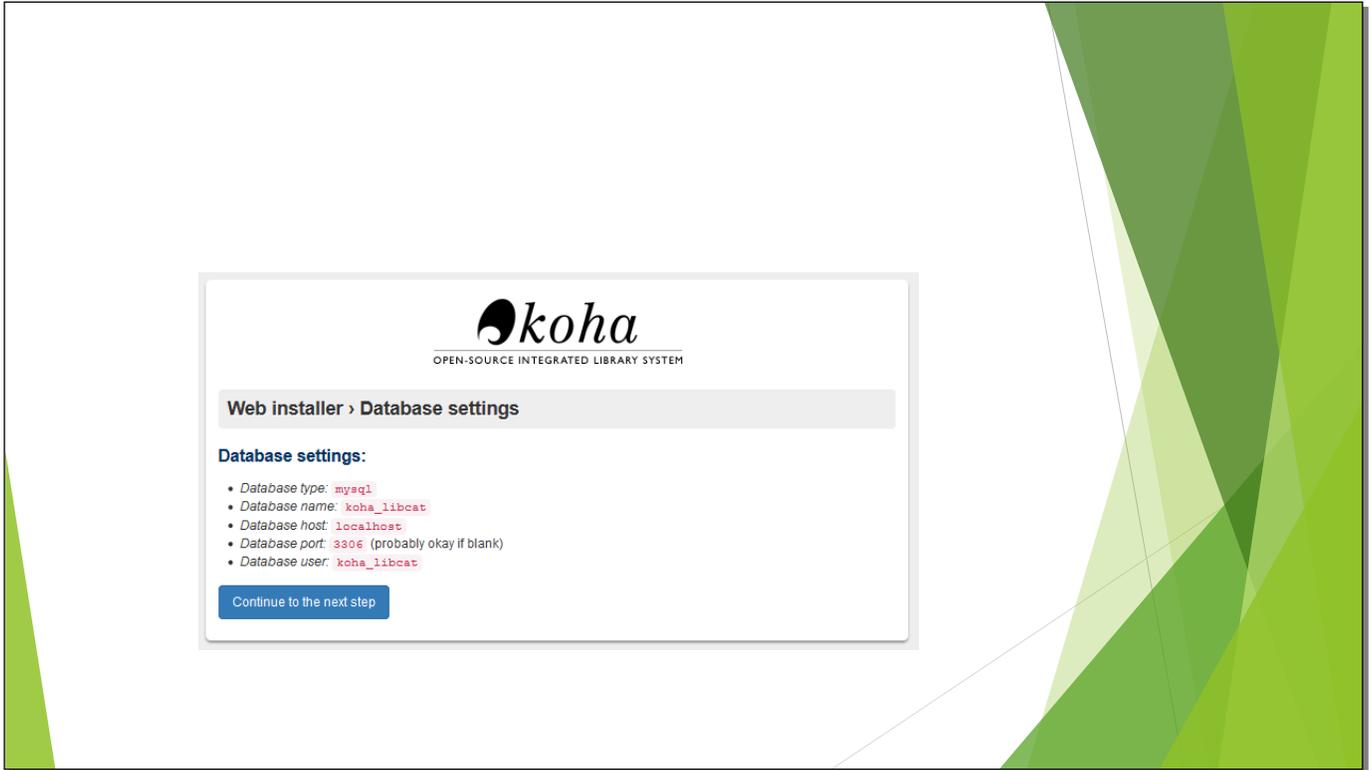
Koha will configure the database setting for you...

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...
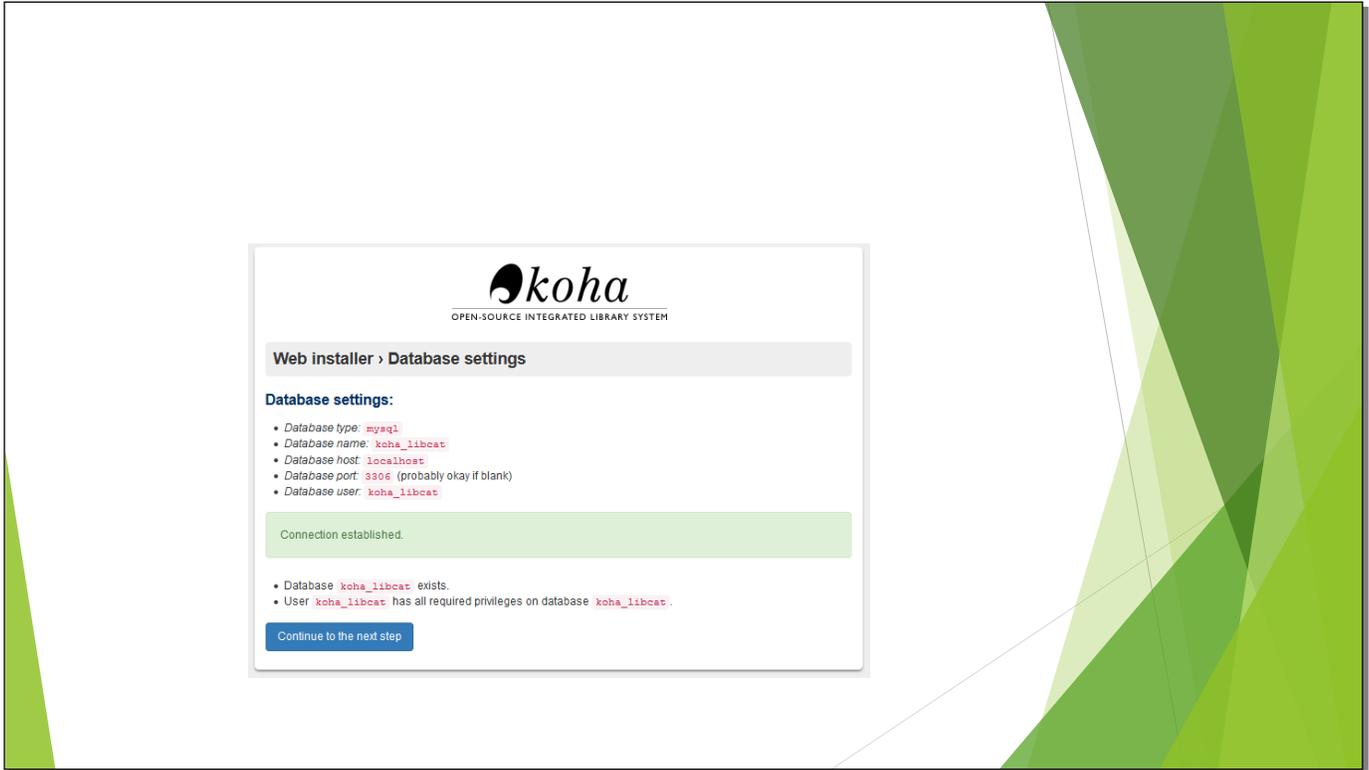
Slide 32
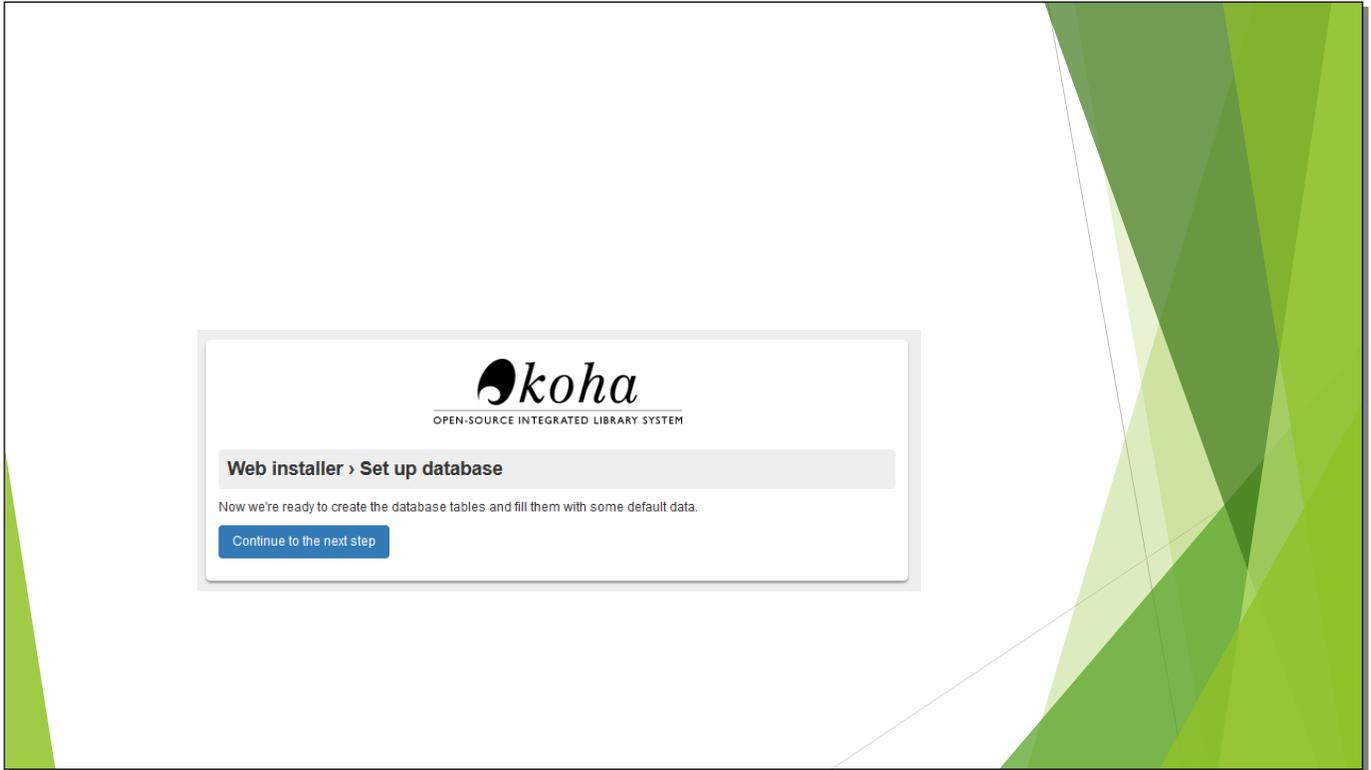
...then set up the database...

Slide 33
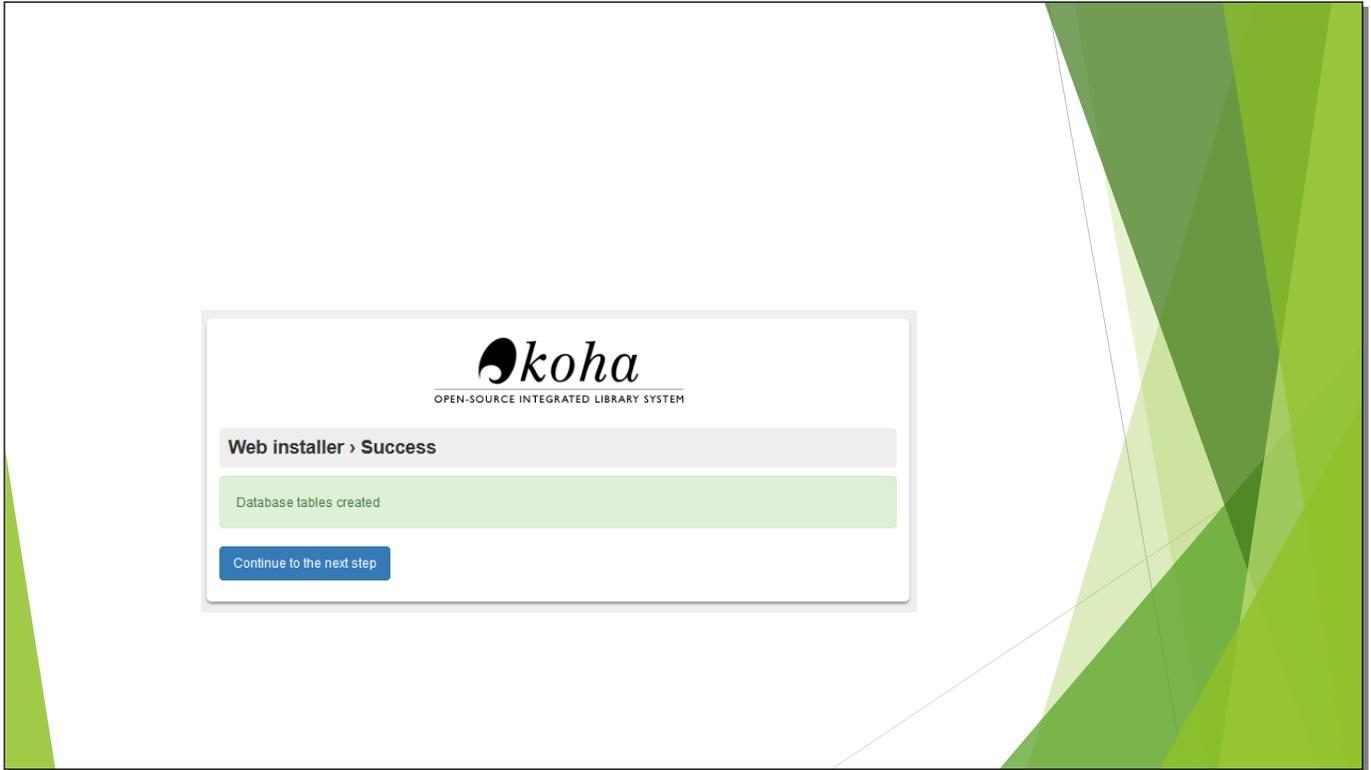
...and when it says Success, you've succeeded!

Slide 34
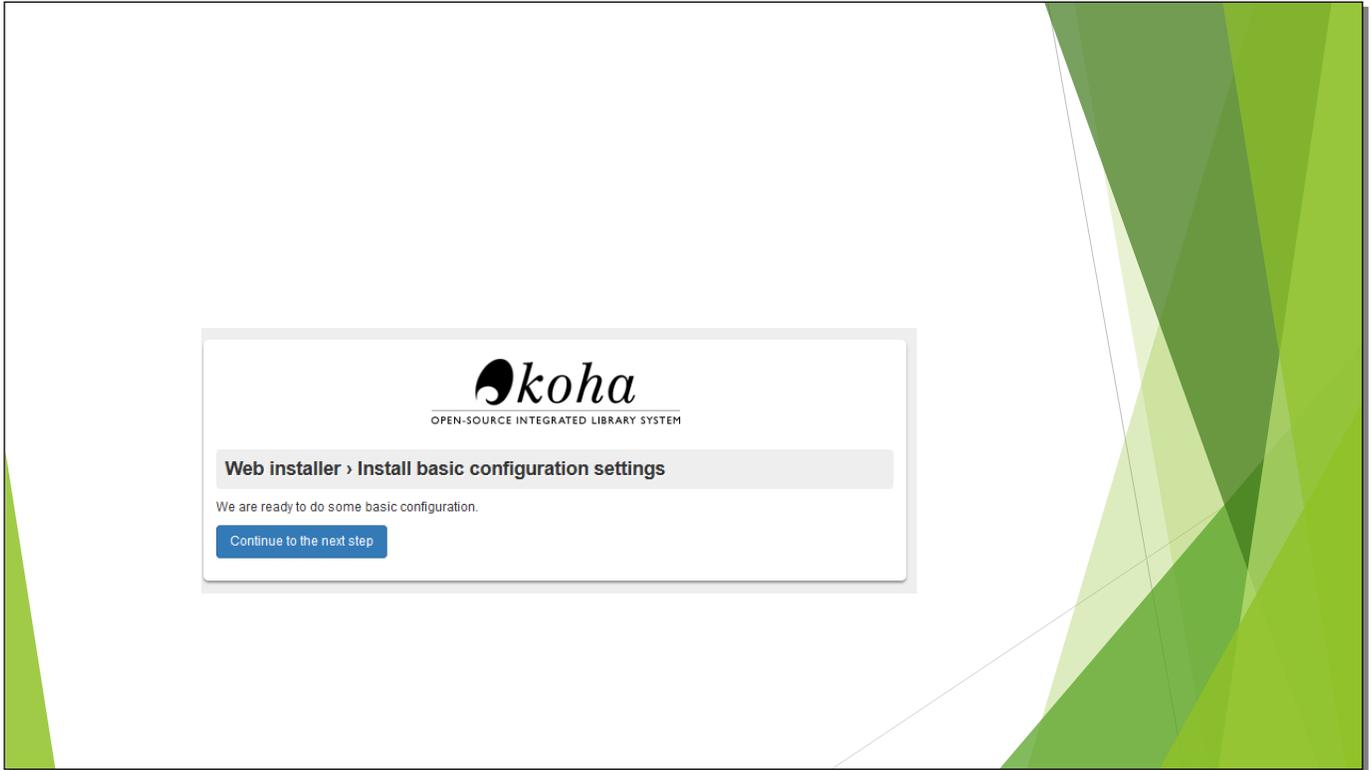
Now install the basic configuration settings.

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I'm using MARC 21 here.

You'll have to make some choices here. I generally install only the mandatory settings.

Can the Pi 4 handle the load?

Linux has a command called "top" that shows what is going on, similar to the Windows Task Manager. The third line down shows the percentage of the CPU's capacity being used. For most of the installation, it was well below 50%. Right now, 69.5% of the CPU is idle. The fourth line shows how much RAM is being used, in this case, about one quarter. This was a lot less than I expected.

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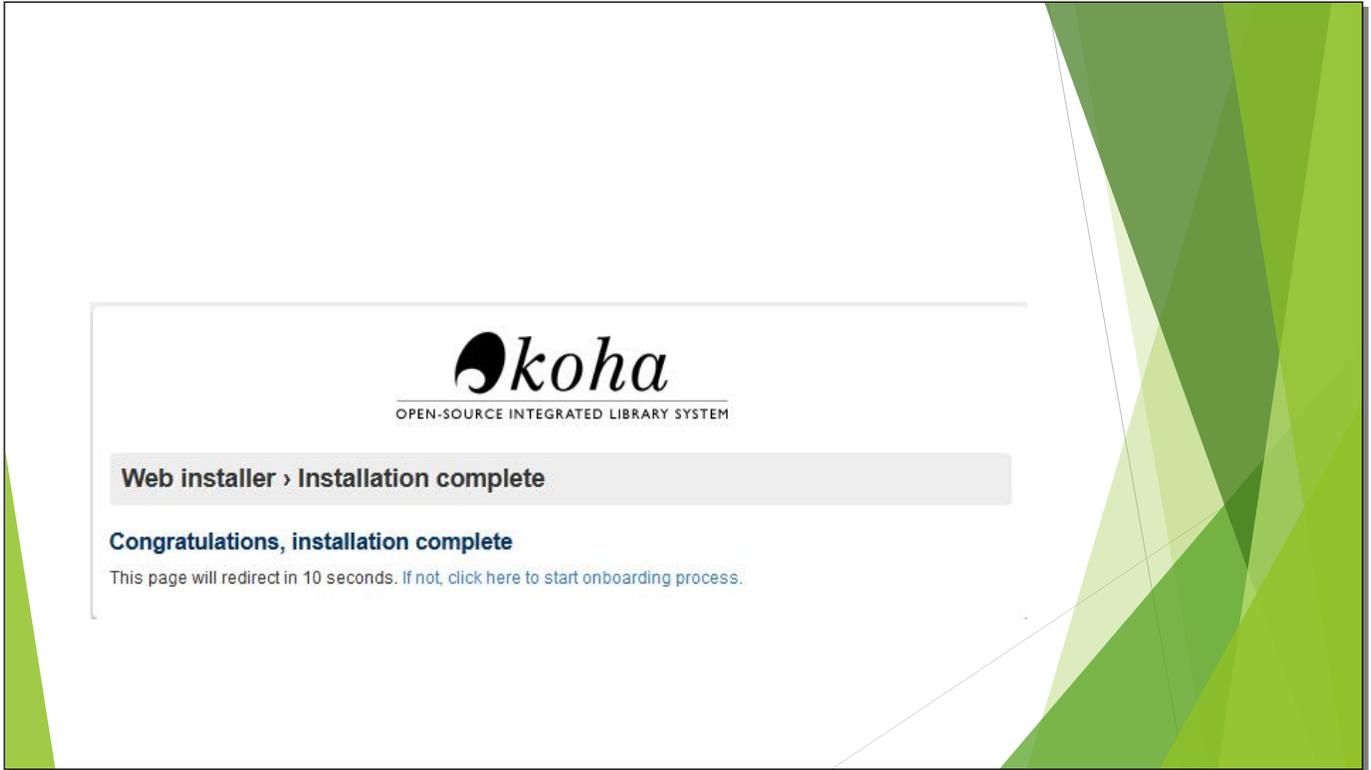
You're ready to start adding information!

Slide 40
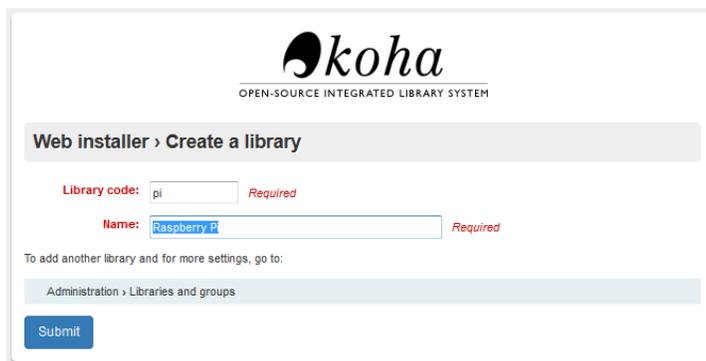
Create a library code and name. This library is called Raspberry Pi and the code is pi.

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Create a Patron Category

You need to add a patron category.

Create an Administrator Patron

And an administrator so you can log in and run the system. For this library, the Avenging Chicken is the administrator, the username is ac, and the password is Koha1.

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And an item type. You can delete this one and add others later.

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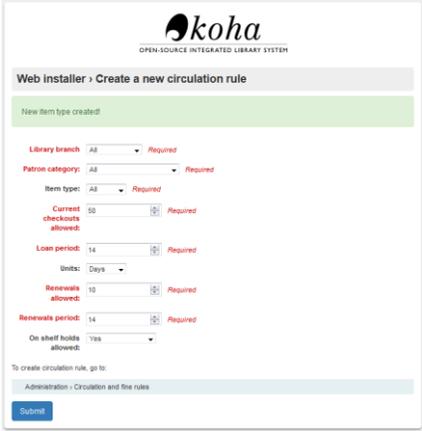
You can add more circulation rules, too.

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Finished and ready to log in.

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Yes we are

In this instance, log in with username ac and password Koha1.

Finally!
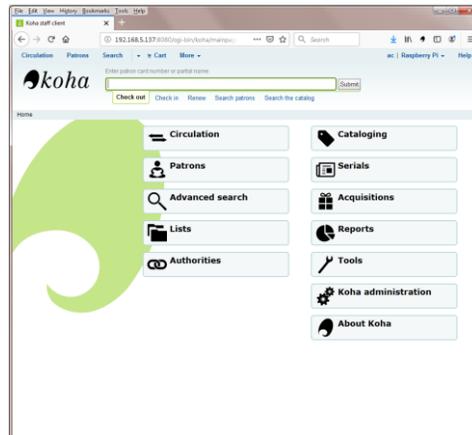
And this screen should look familiar.

Yes, but now what?

You have the ILS, but what about the bib records?

I'm cheating again

- ▶ But I'll get to that momentarily
- ▶ It's not just because I'm using bits of a presentation I gave at MLA in 2019

Meet MARCEdit!

▶ Who uses it?
  ▶ Anybody who does anything with MARC records

```
=LDR  04440nas a2200529M  4500
=001  \\422
=005  20130605151550.0
=008  750901d19541990njuuu\\\\\\\\\\0\\\\0eng\d
=010  \\$a   53002151
=035  \\$aocm01588948
=035  \\$a0523546$bMULS
=040  \\$aMUL$cMUL$dm.c.$dRCS$dNSD$dOCL$dwHC
=049  \\$aWHCA$bwHC
=060  0\$aQZ 17 N474C
=069  1\$aC21530000
=097  \\$aQZ 17 N474C
=100  1\$aNetter, Frank H.$g(Frank Henry),$d1906-$w1n$915278
=245  00$aCiba collection of medical illustrations.
=260  \\$aSummit, N.J.,$bCiba Pharmaceutical Products.
=500  \\$aIncludes bibliographical references.
=500  \\$avarious editions.
=500  \\$aCiba collection of medical illustrations.
=510  2\$aBiological abstracts$x0006-3169$b-1979
=650  \2$aMedical Illustration.
=650  \2$aAnatomy$xatlases.$9944
=650  \2$aCIBA-GEIGY Corporation.$94069
=999  \\$c81$d81
=952  \\$00$10$40$6QZ_00017_N474C_V_1_PT_1$70$8CIRC$9108$awHC$bwHC$cGEN$d2013-05-29$l1$oQZ 17 N474C v. 1 pt. 1$p3297
=952  \\$00$10$40$6QZ_00017_N474C_V_1_PT_2$70$8CIRC$9109$awHC$bwHC$cGEN$d2013-05-29$l1$oQZ 17 N474C v. 1 pt. 2$p3297
=952  \\$00$10$40$6QZ_00017_N474C_V_2$70$8CIRC$9110$awHC$bwHC$cGEN$d2013-05-29$l1$oQZ 17 N474C v. 2$p32975000088075
=952  \\$00$10$40$6QZ_00017_N474C_V_3_PT_1$70$8CIRC$9111$awHC$bwHC$cGEN$d2013-05-29$l1$oQZ 17 N474C v. 3 pt. 1$p3297
=952  \\$00$10$40$6QZ_00017_N474C_V_3_PT_2$70$8CIRC$9112$awHC$bwHC$cGEN$d2013-05-29$l1$oQZ 17 N474C v. 3 pt. 2$p3297
```

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Free! (not open source)

ALA member news

Terry Reese Jr. selected for Margaret Mann Citation

For Immediate Release
Fri, 02/22/2019

Contact:
Julie Reese
Deputy Executive Director
Association for Library Collections & Technical Services
jreese@ala.org

CHICAGO—The Association for Library Collections & Technical Services (ALCTS) ann
Margaret Mann Citation presented by the ALCTS Cataloging and Metadata Managem
June 22 at the ALCTS Awards Ceremony during the 2019 American Library Associatio

The Mann Citation, recognizing outstanding professional achievement in cataloging or
to the library school of the winner's choice. Reese has chosen the University of Maryla
award.

Reese's outstanding professional achievements in cataloging have had a lasting and p
and well-known achievement leading the creation, development and on-going work of
and librarians, ranging from small public libraries to large academic research libraries.
future cataloging practices such as MARC, XML, crosswalks and linked data.

Terry Reese!

He never sleeps!*

*Not confirmed. Photo from MarcEdit web site, press release from ALA's web site.

Available for Windows, MacOS, and Linux. Yes, you can run it on a Raspberry Pi, though I didn't for this presentation. See https://marcedit.reeset.net.

What does it do?

It's kind of like a Swiss Army Knife. When I first used it, I only used the knife and corkscrew. (Yes, there's no corkscrew here. Deal with it.)

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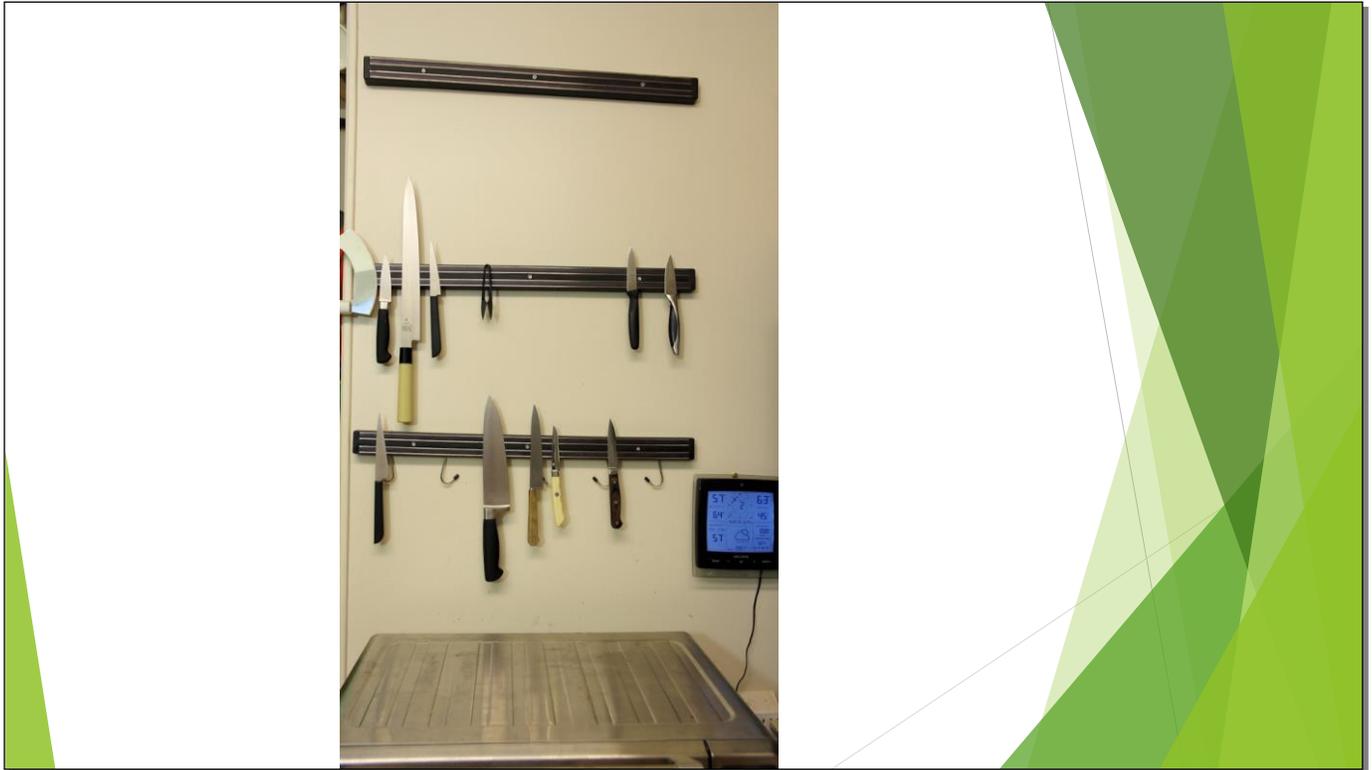
Then I found out that it did a few more things.
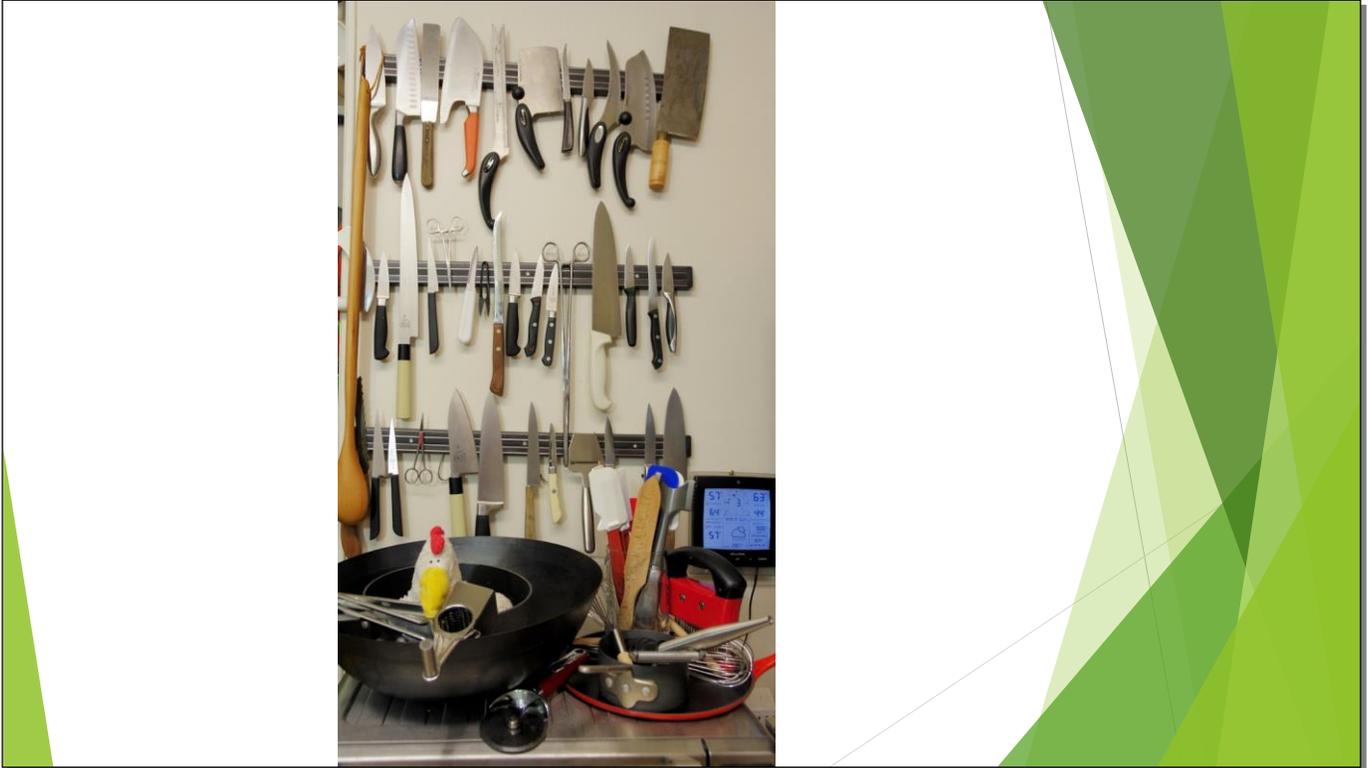
Make that a whole lot of other things. I still don't know how to use all its functions.

Slide 56
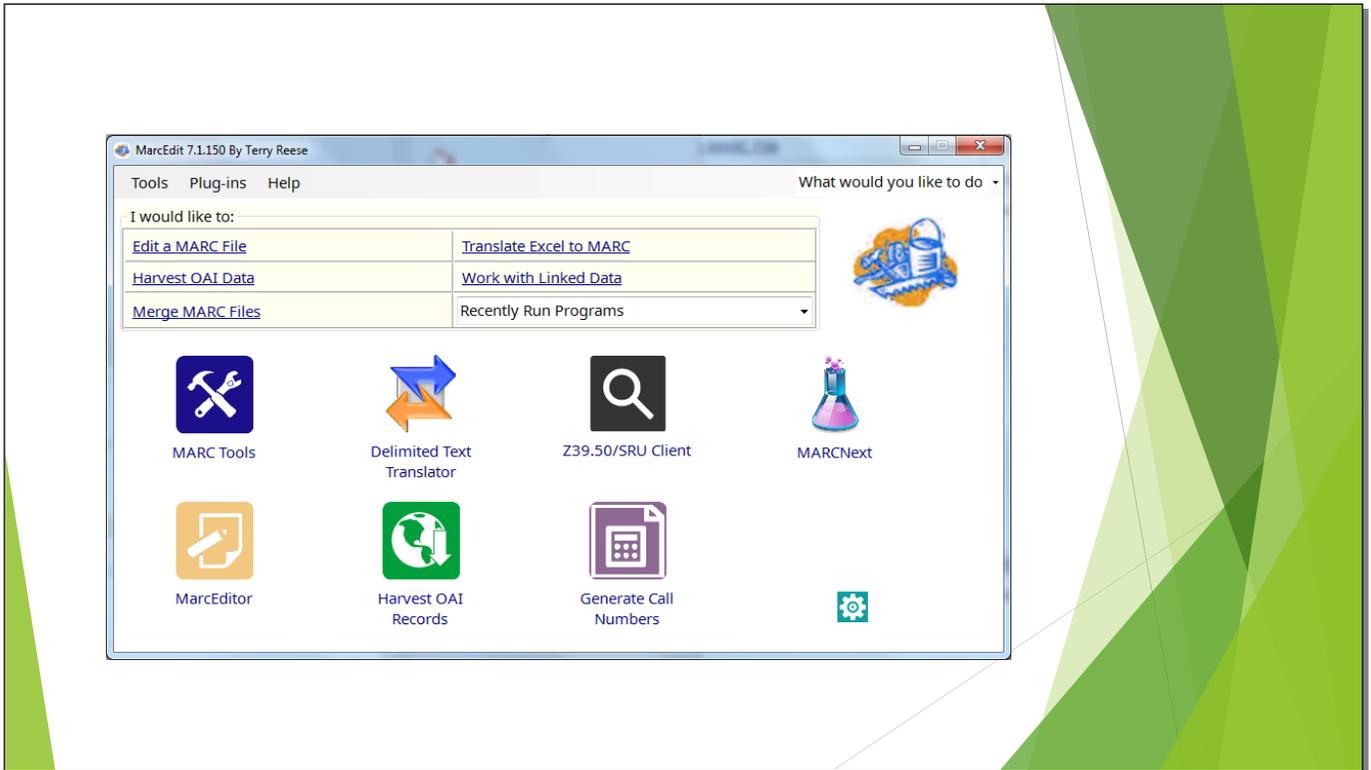
This is the main screen. Even from here you can see that it does interesting things. MarcEdit will work directly with Koha, but I haven't figured that bit out yet.

Z39.50

- Allows uses to harvest MARC records by
  - ISBN (020)
  - ISSN (022)
  - LC Card/Control Number (010)
- I'm going to be using ISBNs

This is where you need the network connection.

Assemble your collection of ISBNs

I was given my first book during the Eisenhower administration, when I was a few weeks old. My collection grew from there. Then when I was in my 50s I got married to another librarian. She, too, has a large book collection. We have more books than a lot of small library branches.

Assemble your collection of ISBNs

And fortunately, a lot of books have their ISBNs in barcodes on their covers. Scan the codes and you have a list of ISBNs. I didn't include a barcode scanner in my budget because you can also type them into a text file, but if you have an extra $35 for a low-end scanner, it's well worth it. I think this wireless scanner was around $50.

Ran out of time, and LC Z39.50 server wasn't working very well

▶ So this is where I'm cheating

So instead of using my own collection…

Five collections from MWHC Medical Library

▶ Circulating Books
▶ Reference
▶ Reserve
▶ Popular Health Reading (medical history, biographies, etc.)
▶ Lynch Collection (ethics, end-of-life care)

I used the library where I worked. I exported the five different itypes shown above. Popular Health Reading is our "what did you read as a child that made you want to become a nurse/doctor?" collection.

Extracted ISBNs from those collections

000047715X	007182684X	0323083404	0721604242	080892334X	1118674952	1451194587
000047715X	0071831428	0323083897	072160479X	0808923382	1259252892	1451195303
000047715X	0071834583	0323087868	0721605095	0808923749	125958707X	1455703109
000047715X	0071840060	0323172202	0721697577	0808923757	1259587142	1455710652
000047715X	0071843132	032326199X	0723432589	0815340761	1259642887	1455723746
000047715X	0071843620	032329054X	0727914464	0815340788	1259835030	1455753734
0000769029	0071844570	0323311962	0738610062	0826119638	125986359X	1455775657
0017631041	0071849130	0323321828	075067492X	0826122825	1260031373	1466565373
0017688345	0124339018	0323329047	0763738255	0826129544	1260116735	146658534X
0030260299	0124339026	0323339662	0763740802	0826131948	1260116751	1467534560
0071378294	0128499052	032335324X	0763756016	0826134181	1284053008	1469887762
0071413650	0130407763	0323353762	0781714877	082613436X	1284066347	1469890682
007143979X	0131089900	0323353770	0781718325	0826135587	1284093956	1496310241
0071439803	0131708147	0323354238	0781719283	0826158269	1284111180	1496331478
0071439811	0132243555	0323356176	0781731984	0826172016	1284121240	1496349792
007143982X	0132377292	0323356427	0781732654	0826194060	1284141853	1496377230
0071439838	013314772X	032339129X	0781735114	0835960641	1284144925	1496379942
0071439862	013314772X	0323399401	0781736390	0838503446	1284169715	1496387333
0071439870	0134380991	0323399843	0781740630	0838562744	1285174151	1506208517

I probably could have written a report to do this, but I just dumped the text into a word processor, sorted it, and deleted everything but the 020 fields. Not fancy, but it worked.
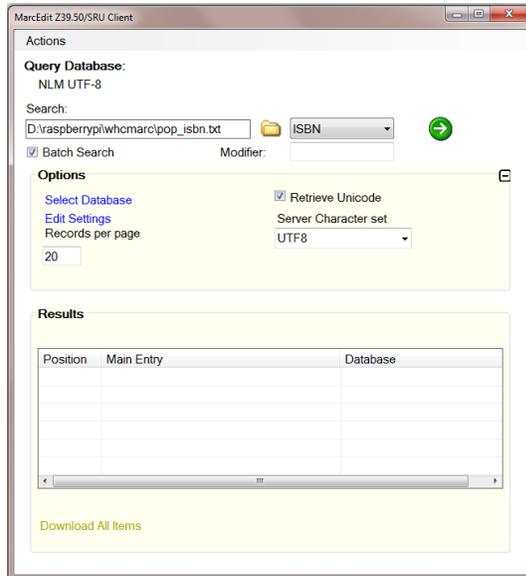
Slide 63
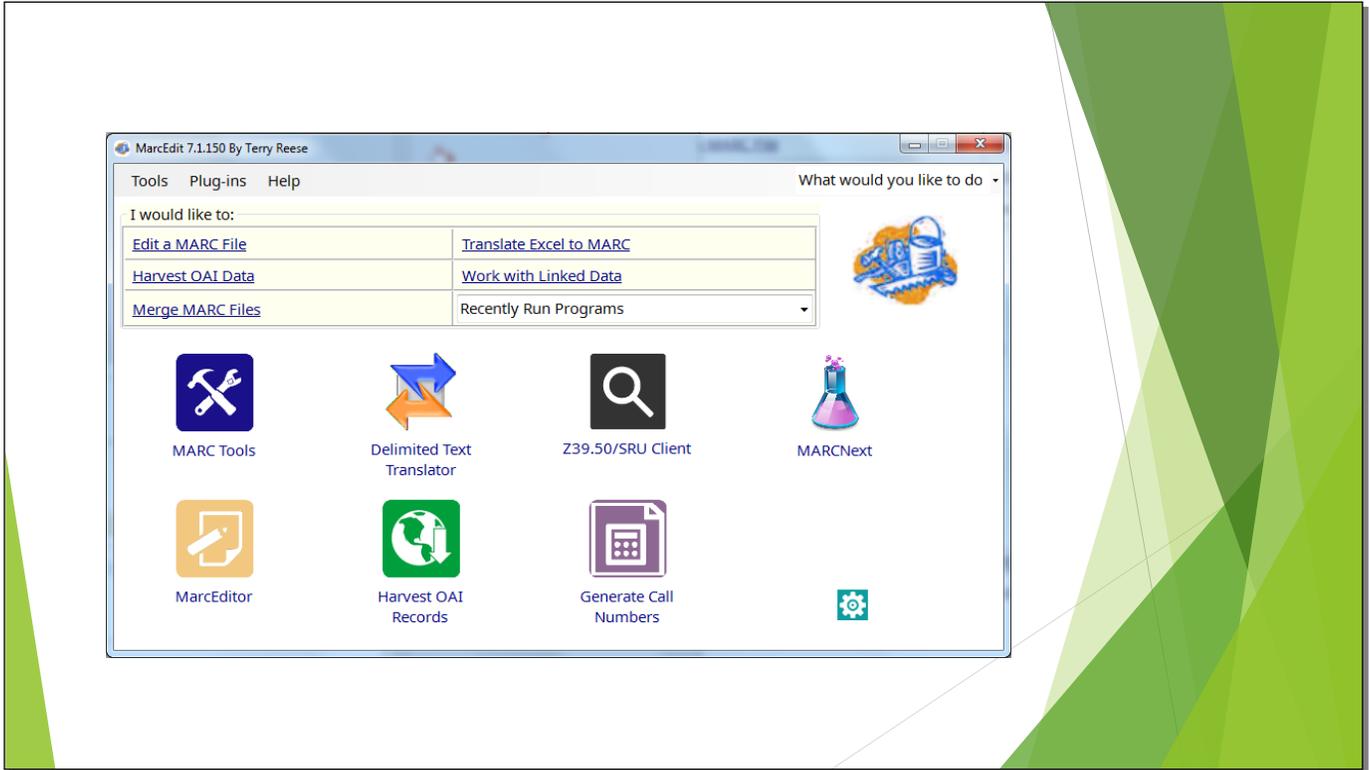
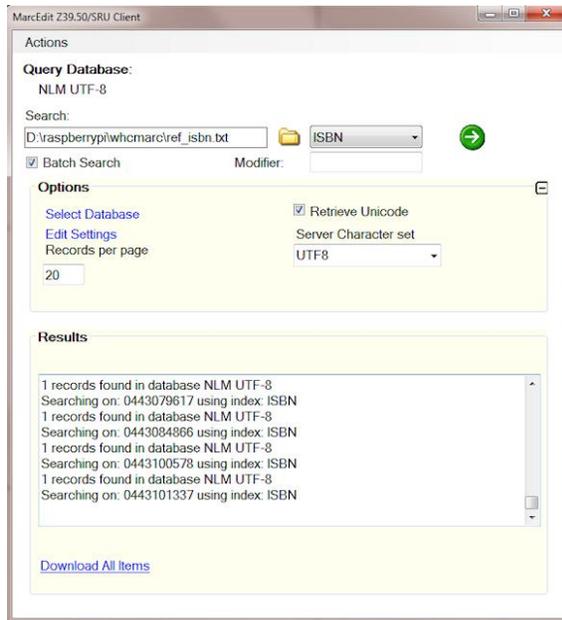Now we're ready to use the Z39.50 client.

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I'm using our Popular Health Reading collection for this example.

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Searching NLM

Wait a minute—now I'm using the reference collection. I told you the continuity wasn't great.

And you have MARC records!

- Circulating books
  - 3721 books
    - Found: 2037
    - Not Found: 516

- Reference
  - 840 Books
    - Found 458
    - Not found: 175

- Reserve
  - 446 Books
    - Found 424
    - Not found: 356
- Lynch
  - 165 Books
    - Found 165
    - Not found 92
- Popular Health Reading
  - 165 Books
    - Found 99
    - Not found 194

This was just from the ISBNs. MarcEdit gives you a list of numbers not found, so you can run those in another Z39.50 server, use their LCCNs, etc.

These numbers don't add up. Partly it's because some books have ISBN-10s and ISBN-13s, and partly for reasons I don't know.

MARC Breaker

▶ Changes machine-readable .mrc file to text .mrk file
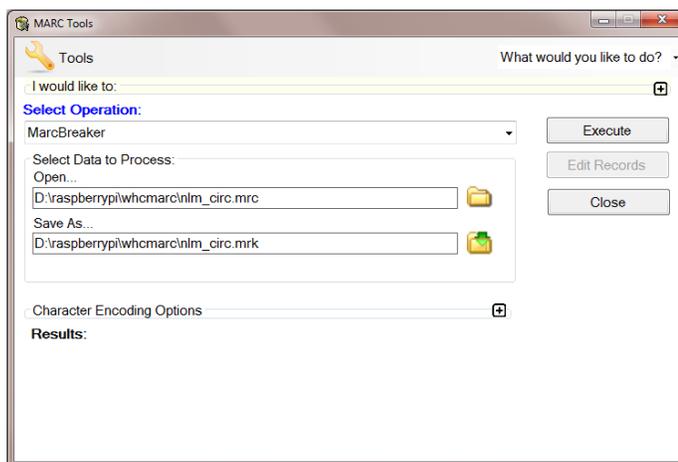
Another great feature of MarcEdit is Marc Breaker.

Yep, that's a MARC record. Since this is a medical library, we're using 060 call numbers from the NLM system.
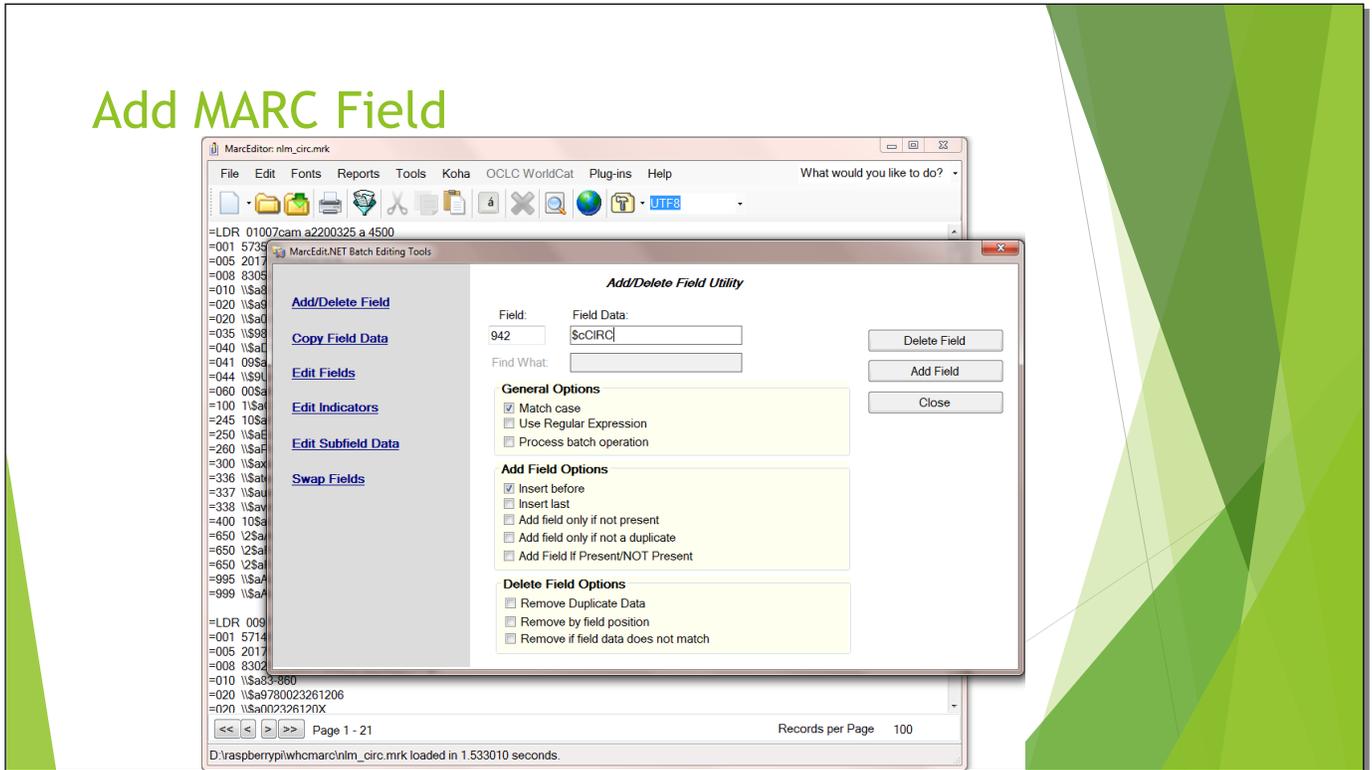
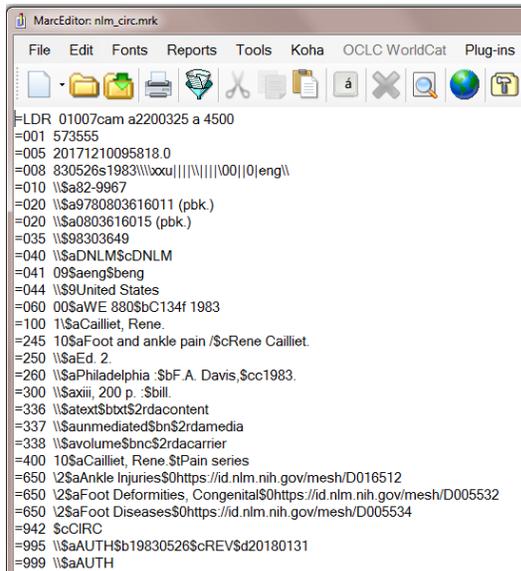Koha really wants a 942$c field, the default item type. If you go to Add/Delete Field, you can add it. I could also have added the 942$2, default classification system, at the same time. Oh well.
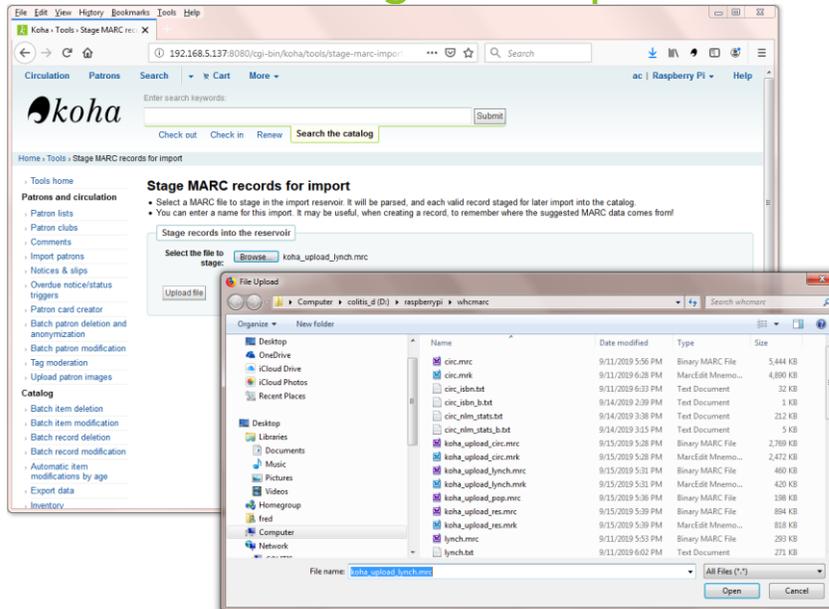
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Once you have the field added, recompile to MRC format

MarcEditor: nlm_circ.mrk

File   Edit   Fonts   Reports   Tools   Koha   OCLC WorldCat   Plug-ins

```
=LDR  01007cam a2200325 a 4500
=001  573555
=005  20171210095818.0
=008  830526s1983\\\\xxu||||\\||||\00||0|eng\\
=010  \\$a82-9967
=020  \\$a9780803616011 (pbk.)
=020  \\$a0803616015 (pbk.)
=035  \\$98303649
=040  \\$aDNLM$cDNLM
=041  09$aeng$beng
=044  \\$9United States
=060  00$aWE 880$bC134f 1983
=100  1\$aCailliet, Rene.
=245  10$aFoot and ankle pain /$cRene Cailliet.
=250  \\$aEd. 2.
=260  \\$aPhiladelphia :$bF.A. Davis,$cc1983.
=300  \\$axiii, 200 p. :$bill.
=336  \\$atext$btxt$2rdacontent
=337  \\$aunmediated$bn$2rdamedia
=338  \\$avolume$bnc$2rdacarrier
=400  10$aCailliet, Rene.$tPain series
=650  \2$aAnkle Injuries$0https://id.nlm.nih.gov/mesh/D016512
=650  \2$aFoot Deformities, Congenital$0https://id.nlm.nih.gov/mesh/D005532
=650  \2$aFoot Diseases$0https://id.nlm.nih.gov/mesh/D005534
=942  $cCIRC
=995  \\$aAUTH$b19830526$cREV$d20180131
=999  \\$aAUTH
```

There it is!

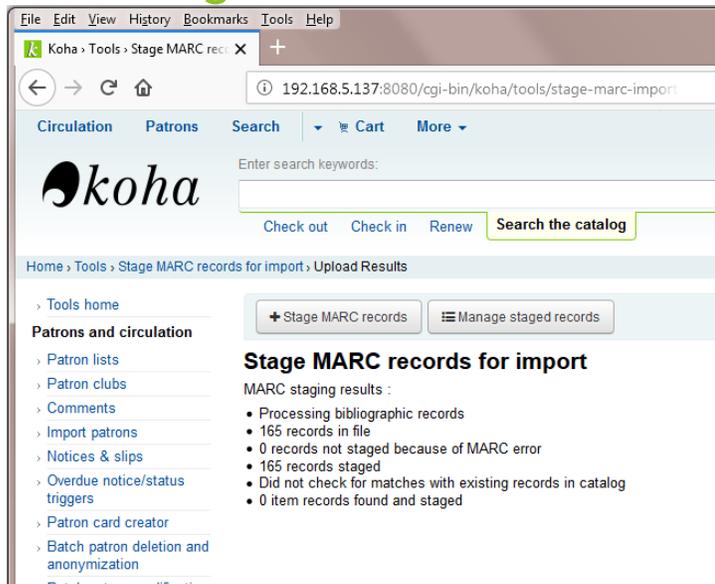Back to Koha: Stage for Import

Now I'm uploading the Lynch collection.

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Everything uploaded correctly.

Slide 74
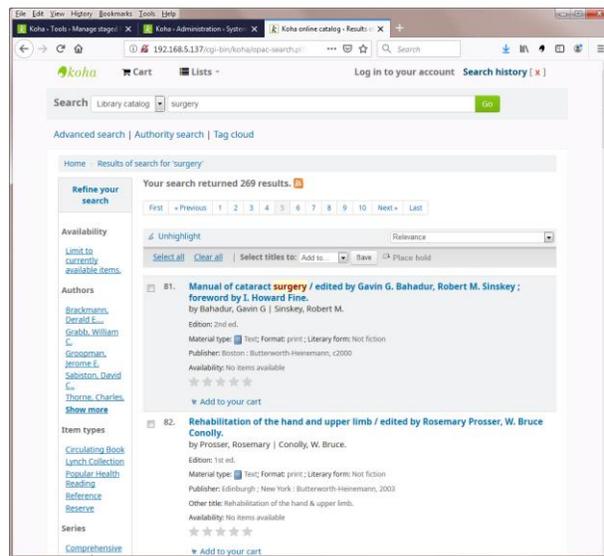
That's a fairly bare home OPAC screen, but you can change it. At this point, I had loaded all the MARC records into the system.

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Not surprisingly for a medical library, the keyword "surgery" brings up a lot of titles.

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That's all for now...