Millennium APIs

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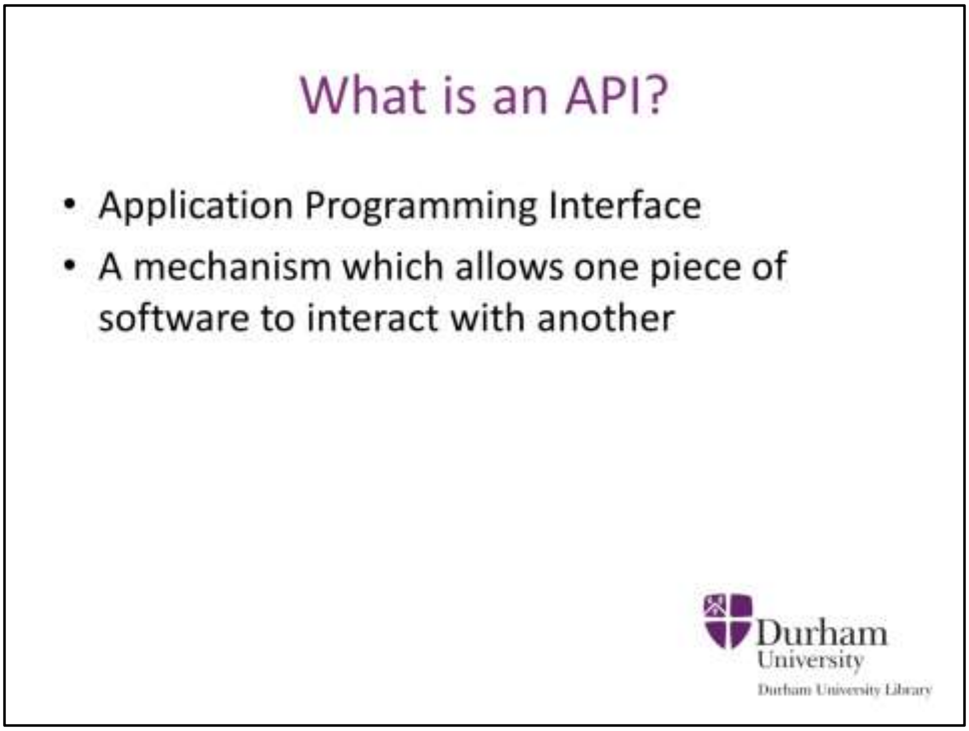

What is an API?

- Application Programming Interface
- A mechanism which allows one piece of software to interact with another

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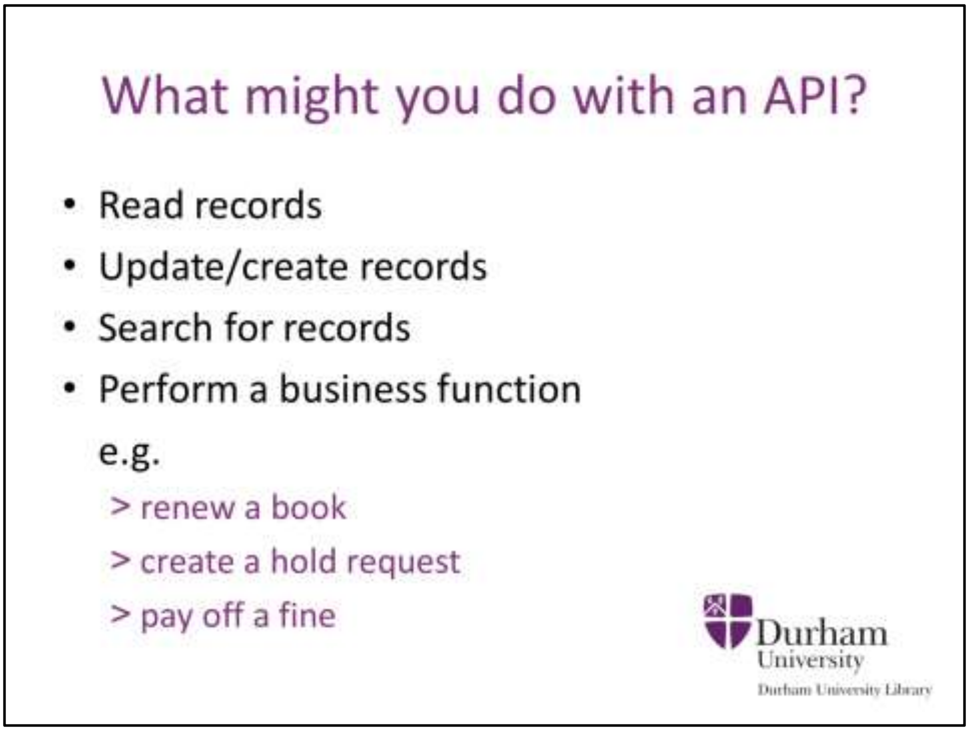
That software might be a user-interface, offering new functionality to the user, or the same functionality through a different medium.
Or it might be totally machine-driven. For example, regular feeds of data from one system to another.
Or just incorporating data from one system into the display of another system.



What might you do with an API?

- Read records
- Update/create records
- Search for records
- Perform a business function

e.g.

> renew a book
> create a hold request
> pay off a fine

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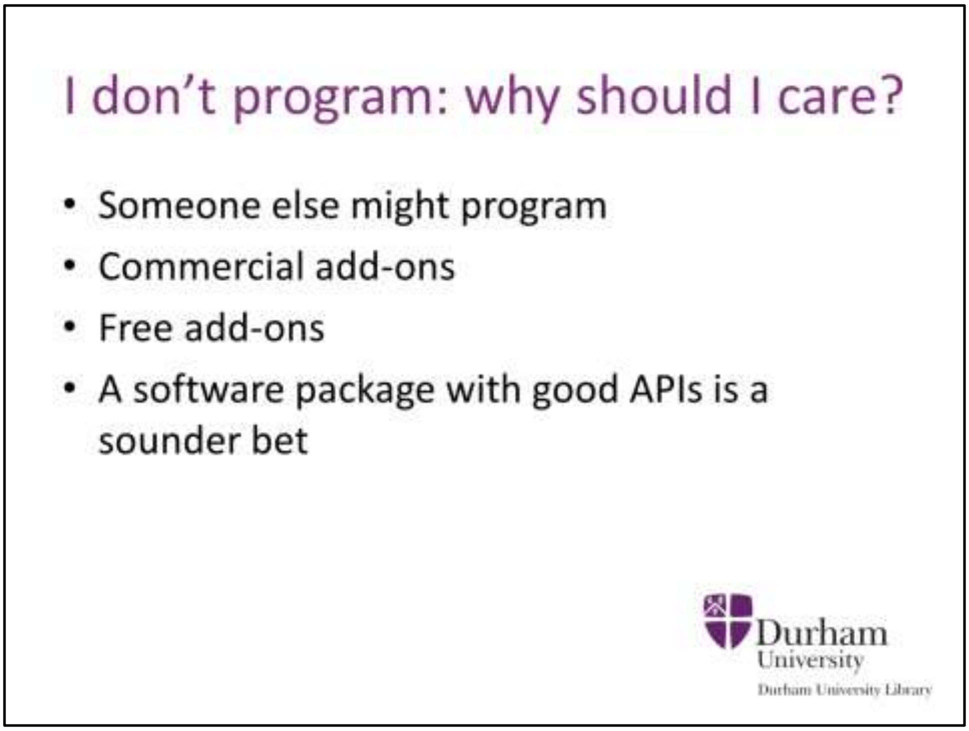
The most basic APIs allow you to read specific records if you already know some form of record ID (e.g. barcode, etc.).
It’s worth inspecting API documentation to see what record IDs are accept and which can be read: to link one system to another, or one API to another, the record keys must tie up.
Some APIs allow searching by non-unique terms, like names.
The most interesting APIs are those which directly implement a business function, with all the business logic of the application behind the scenes. So an API for renewing a book would know whether the patron had reached the limit, whether there was a hold request etc., rather than you having to check all these things in your own code.



I don’t program: why should I care?

- Someone else might program
- Commercial add-ons
- Free add-ons
- A software package with good APIs is a sounder bet

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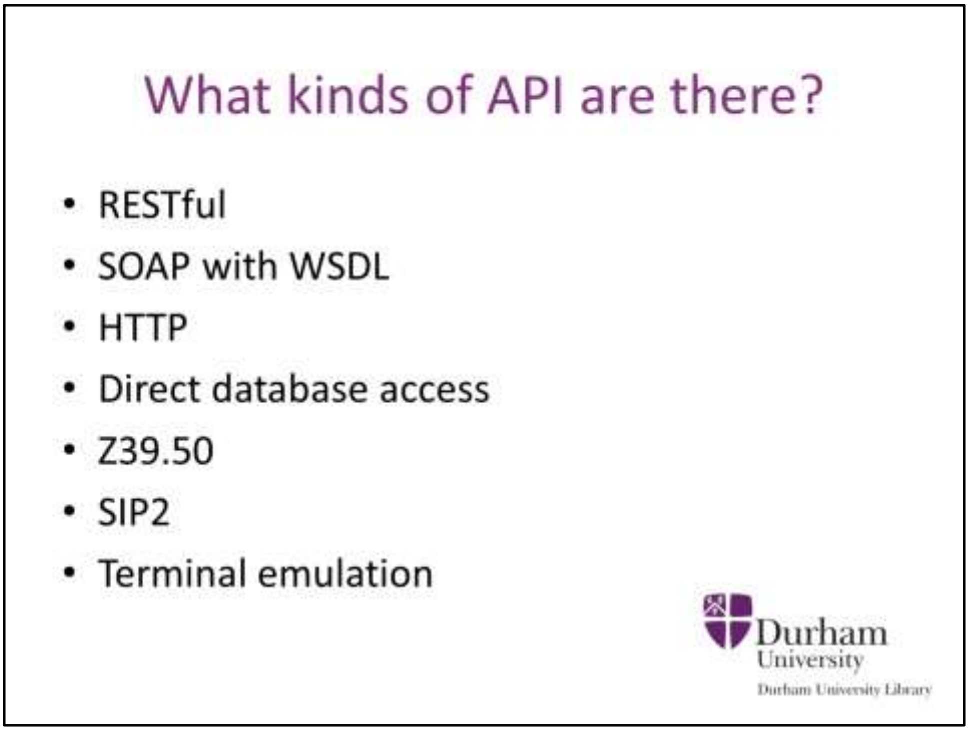
The richness of the APIs affects what you can achieve with your system.
The API quality of a product should be really high up in your evaluation: you are always going to have to make up for gaps in functionality or integrate with another system. APIs are essential for these purposes.

Someone else in the organisation might have programming ability: for on-line fines payment at Durham the development work was done by the web team in IT Services, not by the Library.

You might buy in, or find free software that interfaces with your system.

Watch out for software with expensive add-on APIs. It’s more of a risk: relatively few customers will be using the APIs so the company will not be getting enough feedback on them to develop the APIs.



What kinds of API are there?

- RESTful
- SOAP with WSDL
- HTTP
- Direct database access
- Z39.50
- SIP2
- Terminal emulation

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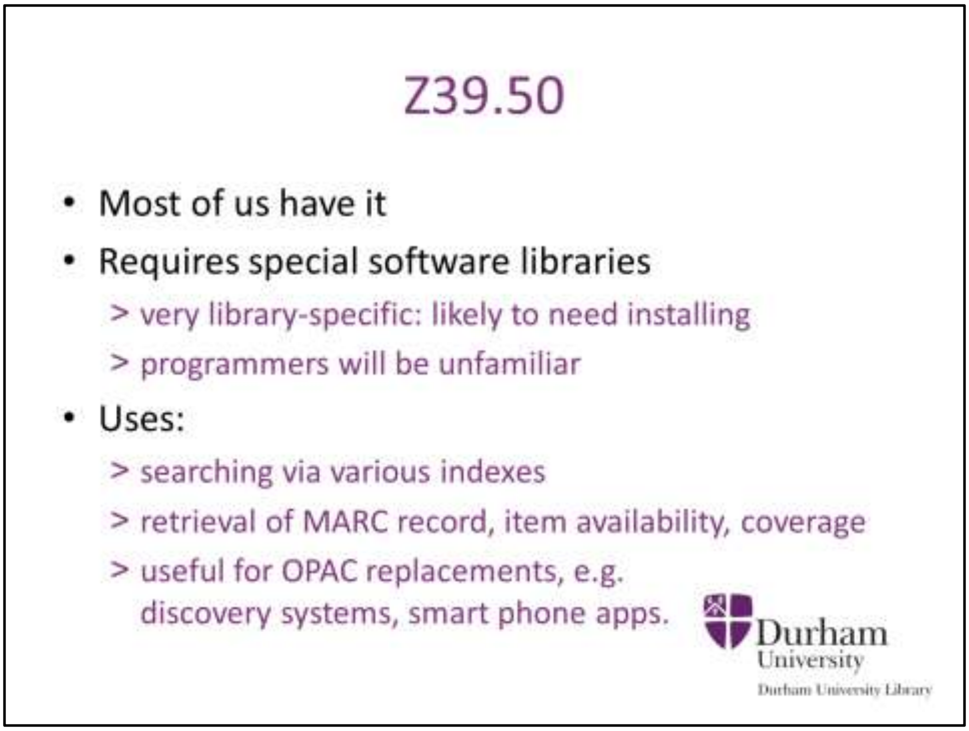
RESTful: none of Innovative's APIs at present, but they plan to move that way.
Simple Object Access Protocol (but now acknowledged as not being simple or object-oriented, so doesn't stand for anything). WSDL is Web Services Description Language: allows bindings to be built automatically.
HTTP: e.g. Patron API: very basic. Also screen scraping: sometimes the only way!

All of the above are pretty OK for programmers to work with.

DB access: MySQL or Oracle. In future PostgreSQL.

Z39.50 / SIP2 : very library-specific protocols.

Terminal emulation: Expect. Very Innovative-specific. Desperate measures!



Z39.50

- Most of us have it
- Requires special software libraries
  > very library-specific: likely to need installing
  > programmers will be unfamiliar
- Uses:
  > searching via various indexes
  > retrieval of MARC record, item availability, coverage
  > useful for OPAC replacements, e.g. discovery systems, smart phone apps.

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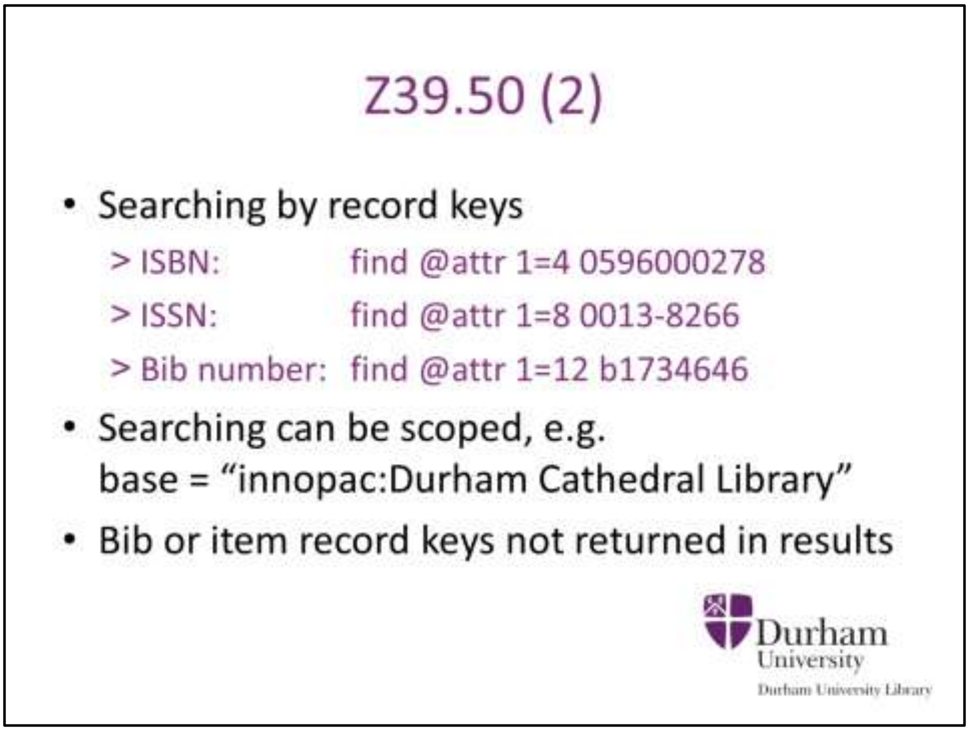

Z39.50 (2)

- Searching by record keys
  - > ISBN: find @attr 1=4 0596000278
  - > ISSN: find @attr 1=8 0013-8266
  - > Bib number: find @attr 1=12 b1734646
- Searching can be scoped, e.g.
  base = "innopac:Durham Cathedral Library"
- Bib or item record keys not returned in results

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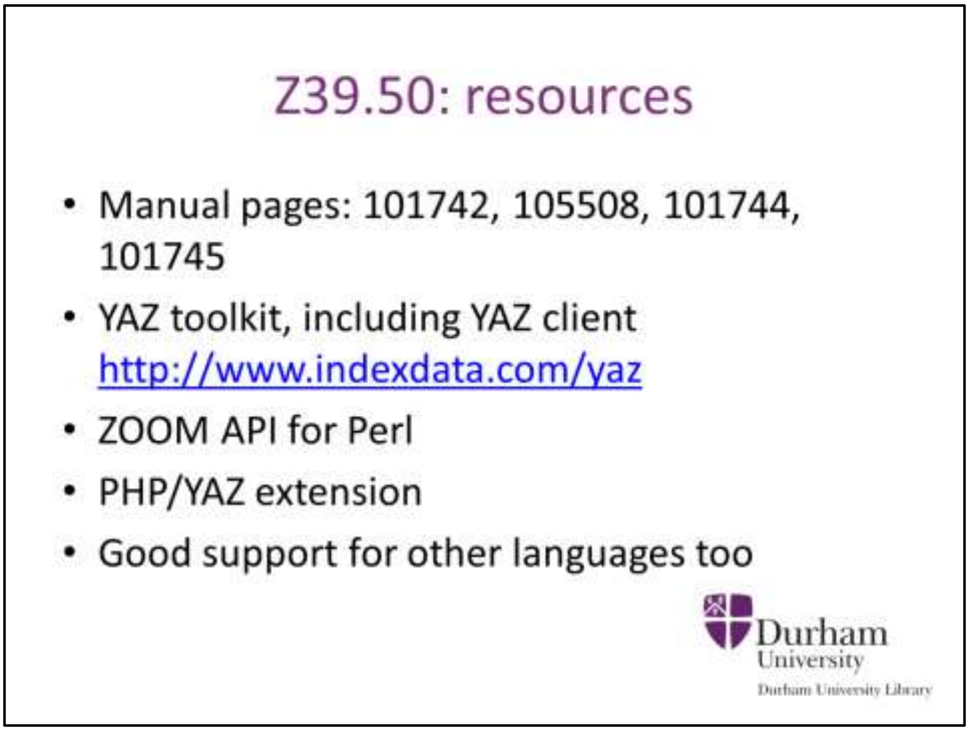
Bib number search may not work on all servers: I found out attribute number by asking COPAC what they were using for live availability.
Lack of record keys severely limits usefulness: could not implement a search and link plugin for Blackboard, for example.
Does the output perhaps depend on profile tables? Hard to say.



Z39.50: resources

- Manual pages: 101742, 105508, 101744, 101745
- YAZ toolkit, including YAZ client http://www.indexdata.com/yaz
- ZOOM API for Perl
- PHP/YAZ extension
- Good support for other languages too

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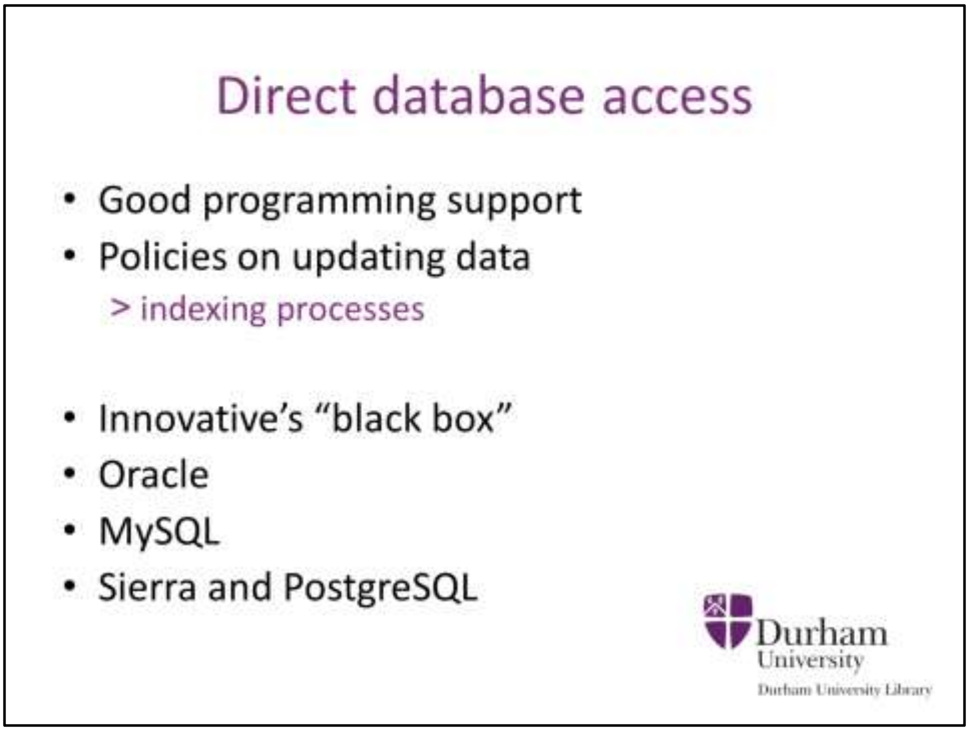

Direct database access

- Good programming support
- Policies on updating data

  > indexing processes

- Innovative's "black box"
- Oracle
- MySQL
- Sierra and PostgreSQL

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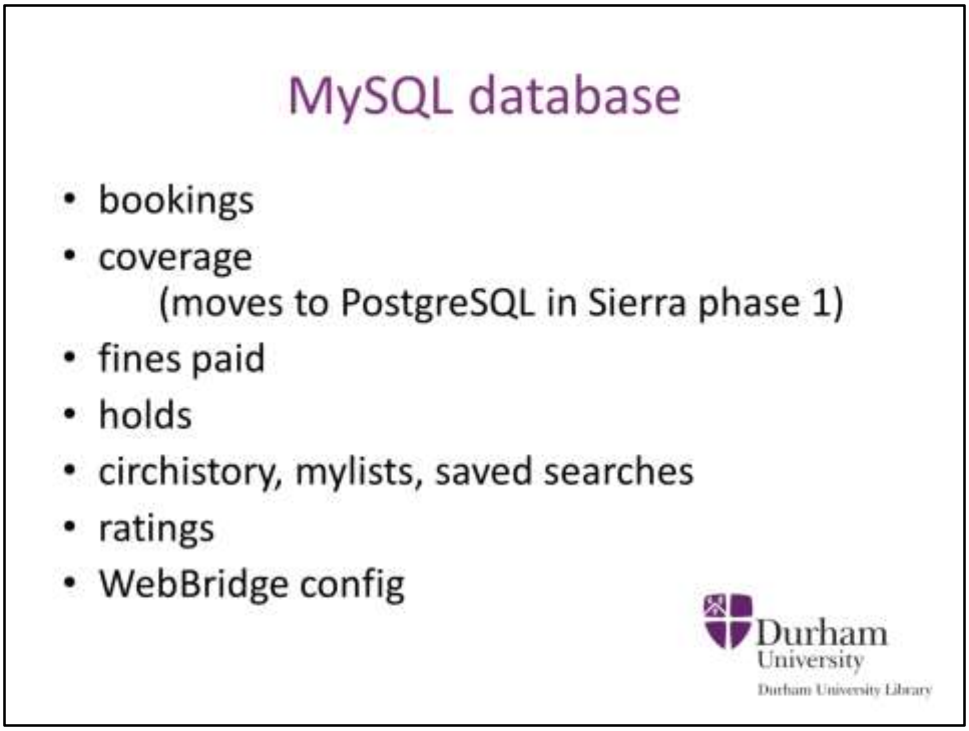
Don't know much about Oracle in Millennium: from the documentation you can get access to record data , build queries, import as create lists, update/add patron records, but no other record changes allowed.

With Sierra promise to move completely to PostgreSQL. Immediate benefits include Create Lists speeding up and possibility of reporting in ways which Create Lists does not allow. ODBC possibilities. How will MARC records be stored? Some designs are very intractable.

But, is data structured well? Won't improve areas where data is lacking, e.g. transaction logs.

MySQL available now for many of the newer areas of the system.

Database access policies vary by software supplier. MARC data often manipulated for indexing, so might be done by application rather than database engine, restricting possibility of using database for record updating.



MySQL database

- bookings
- coverage
  (moves to PostgreSQL in Sierra phase 1)
- fines paid
- holds
- circhistory, mylists, saved searches
- ratings
- WebBridge config

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Bookings go back to September 2009 for us. Patron IDs, Item IDs, item barcode, title, call number, date from/to, patron name, etc. Watch out: data protection implications.

Coverage database and some related bits: not totally sure of purpose of all of it.

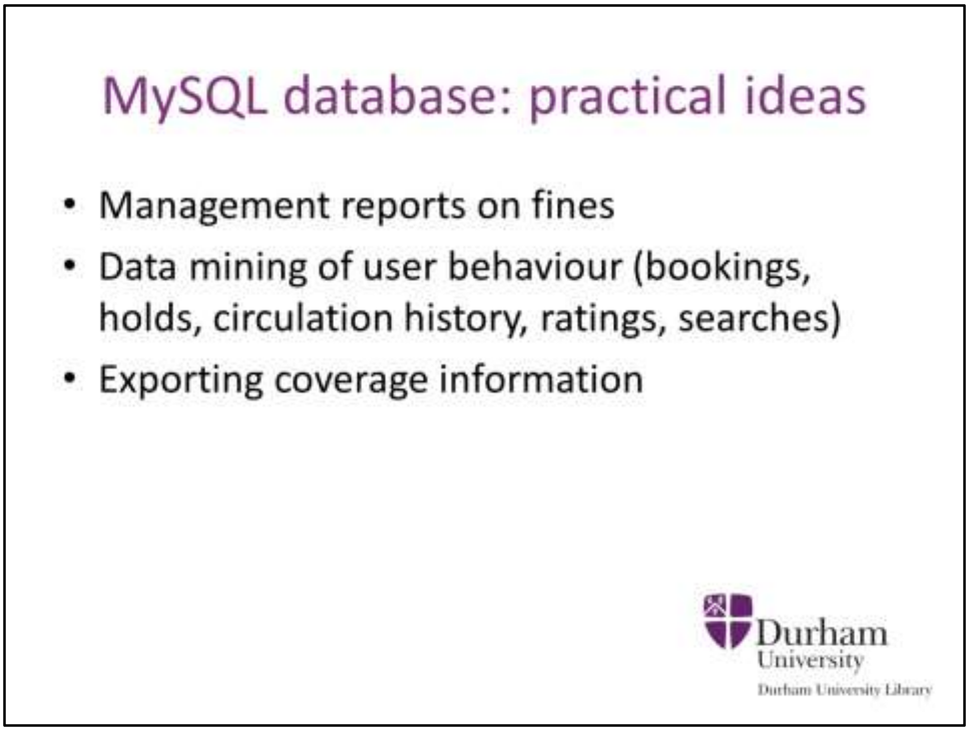
Finespaid records all fines paid since May 2006 on our system. Detailed info. Sadly useful for FOI requests. No patron names, just IDs.

Holds has a year’s worth of cancelled holds record (not sure whether it includes filled holds) and a table of outstanding holds.

Pfile is circulation history, MyLists, searches.

Recordinfo.ratings is the book ratings stuff from the WebPAC.

Webbridge database contains all the webbridge settings. Can be easier to see what’s what via SQL than via the WebBridge web admin interface!



MySQL database: practical ideas

- Management reports on fines
- Data mining of user behaviour (bookings, holds, circulation history, ratings, searches)
- Exporting coverage information

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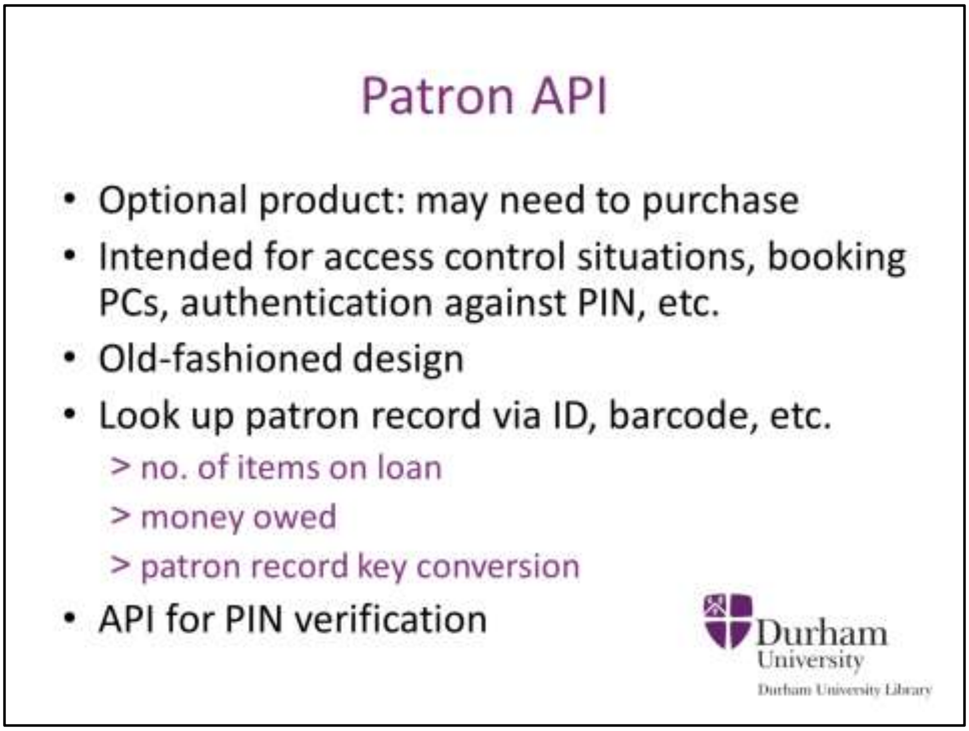
We’ve also used MySQL access as a way of circumventing the WebBridge “unknown origin” problem. If WebBridge receives an OpenURL from an unknown origin (source) it displays a default and fairly useless page. But there are loads of obscure lesser-used origins out there: you can’t configure all of them. We now point openurl.ac.uk at a wrapper script which checks the WebBridge database for the origin, and rewrites the OpenURL to a known default origin if the origin is unrecognised.



Patron API

- Optional product: may need to purchase
- Intended for access control situations, booking PCs, authentication against PIN, etc.
- Old-fashioned design
- Look up patron record via ID, barcode, etc.
  > no. of items on loan
  > money owed
  > patron record key conversion
- API for PIN verification

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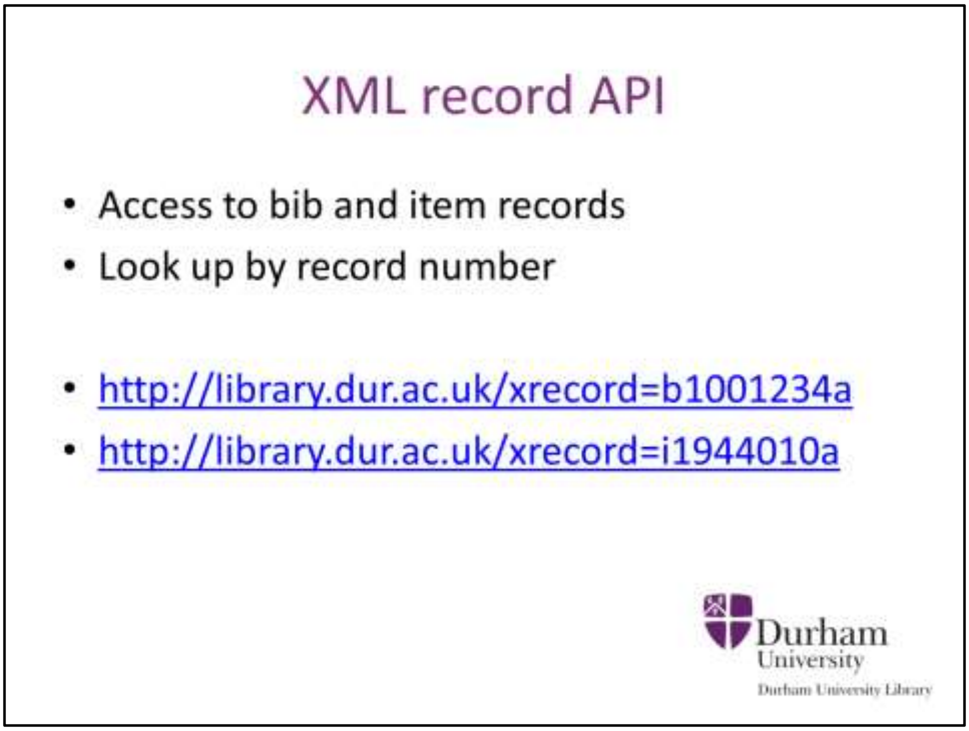
Doesn’t give details of titles of items or anything more interesting.
If you have it, you could do basic things with it, but not worth buying for its own sake.
Used by Telepen Sentry, and for authentication against the patron database for EZProxy, PC and room bookings, access to e-resources etc. But most of us would use other campus systems for this, and many of us probably don’t use PINs.



XML record API

- Access to bib and item records
- Look up by record number

- http://library.dur.ac.uk/xrecord=b1001234a
- http://library.dur.ac.uk/xrecord=i1944010a

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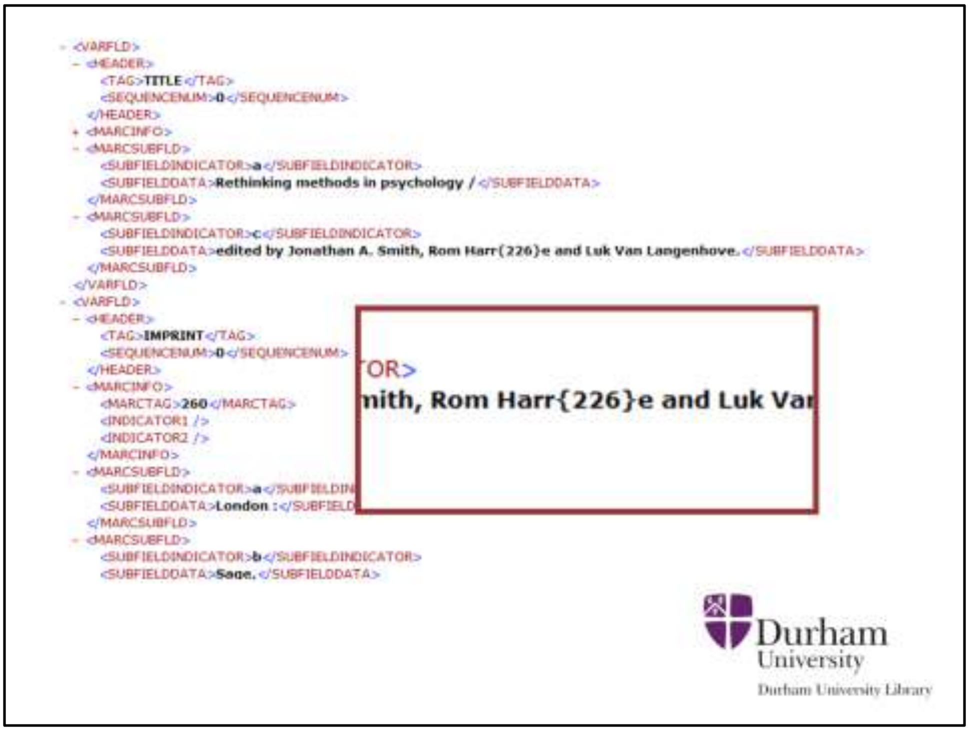
Can access the whole record in XML. Not a standard MARC representation like XML-MARC, but usable nonetheless.
Cannot use other keys to look up records.
No access to checkin records.



```
- <VARFLD>
  - <HEADER>
      <TAG>TITLE</TAG>
      <SEQUENCENUM>0</SEQUENCENUM>
    </HEADER>
  + <MARCINFO>
  - <MARCSUBFLD>
      <SUBFIELDINDICATOR>a</SUBFIELDINDICATOR>
      <SUBFIELDDATA>Rethinking methods in psychology /</SUBFIELDDATA>
    </MARCSUBFLD>
  - <MARCSUBFLD>
      <SUBFIELDINDICATOR>c</SUBFIELDINDICATOR>
      <SUBFIELDDATA>edited by Jonathan A. Smith, Rom Harr(226)e and Luk Van Langenhove.</SUBFIELDDATA>
    </MARCSUBFLD>
  </VARFLD>
- <VARFLD>
  - <HEADER>
      <TAG>IMPRINT</TAG>
      <SEQUENCENUM>0</SEQUENCENUM>
    </HEADER>
  - <MARCINFO>
      <MARCTAG>260</MARCTAG>
      <INDICATOR1 />
      <INDICATOR2 />
    </MARCINFO>
  - <MARCSUBFLD>
      <SUBFIELDINDICATOR>a</SUBFIELDIN
      <SUBFIELDDATA>London :</SUBFIELD
    </MARCSUBFLD>
  - <MARCSUBFLD>
      <SUBFIELDINDICATOR>b</SUBFIELDINDICATOR>
      <SUBFIELDDATA>Sage.</SUBFIELDDATA>
```

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TOR>
nith, Rom Harr{226}e and Luk Va
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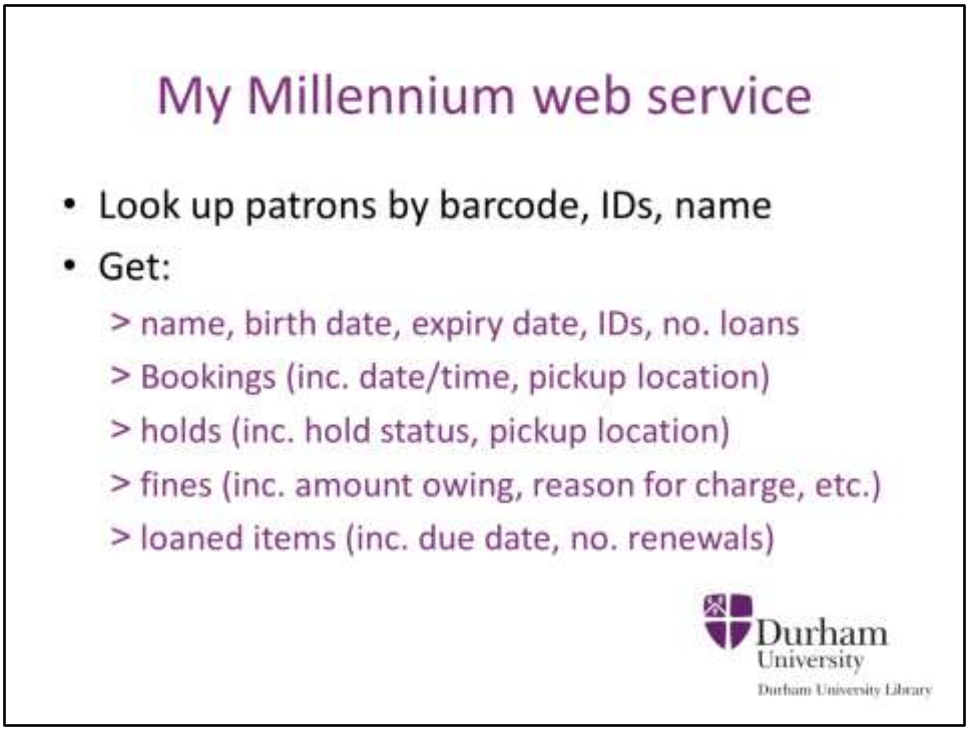
The records say their returned in UTF-8 but actually diacritics might be encoded in Millennium’s internal representation, in our case MARC-8. So extra work may be required if you are going to use this API.



My Millennium web service

- Look up patrons by barcode, IDs, name
- Get:
  - > name, birth date, expiry date, IDs, no. loans
  - > Bookings (inc. date/time, pickup location)
  - > holds (inc. hold status, pickup location)
  - > fines (inc. amount owing, reason for charge, etc.)
  - > loaned items (inc. due date, no. renewals)

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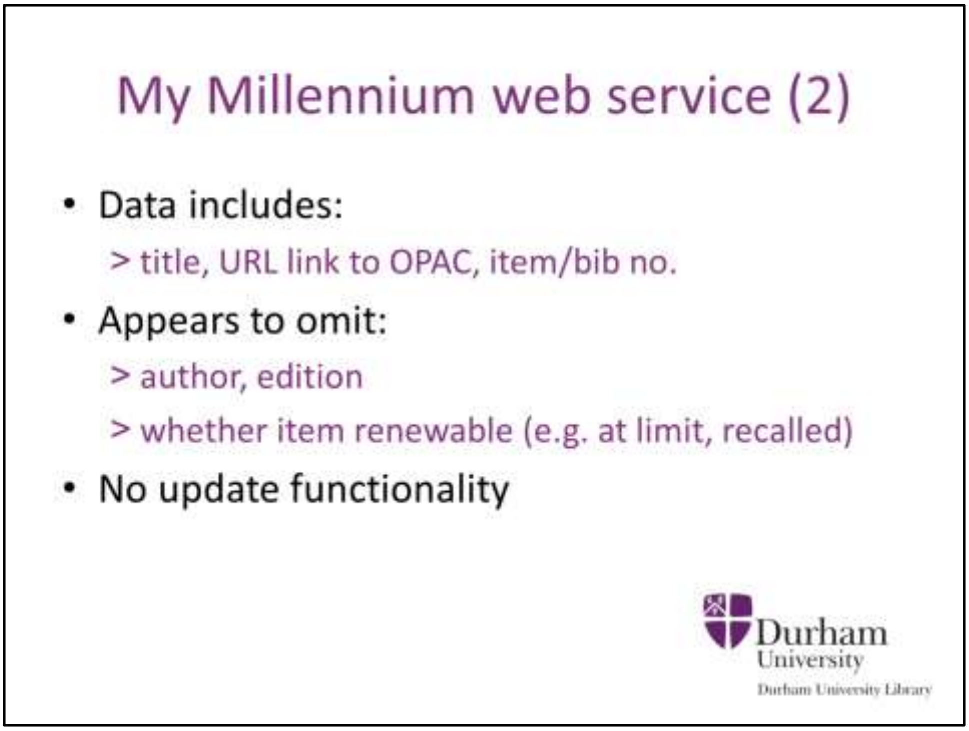
A fairly modern SOAP API.



My Millennium web service (2)

- Data includes:
  - > title, URL link to OPAC, item/bib no.
- Appears to omit:
  - > author, edition
  - > whether item renewable (e.g. at limit, recalled)
- No update functionality

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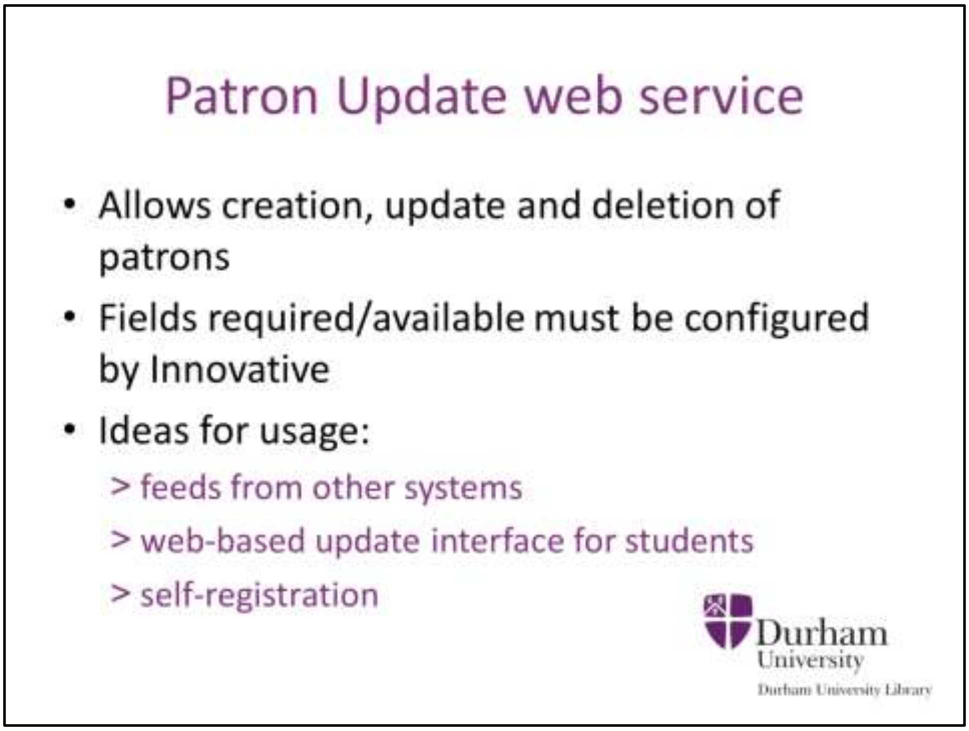
The item/bib no. are marked “internal use only” but may be handy for getting further details via XML record API, for example. Could look up barcode and thereby cancel hold request or renew via SIP2?

What happens to OPAC link if you’re using Encore or another OPAC replacement?



Patron Update web service

- Allows creation, update and deletion of patrons
- Fields required/available must be configured by Innovative
- Ideas for usage:
  - > feeds from other systems
  - > web-based update interface for students
  - > self-registration

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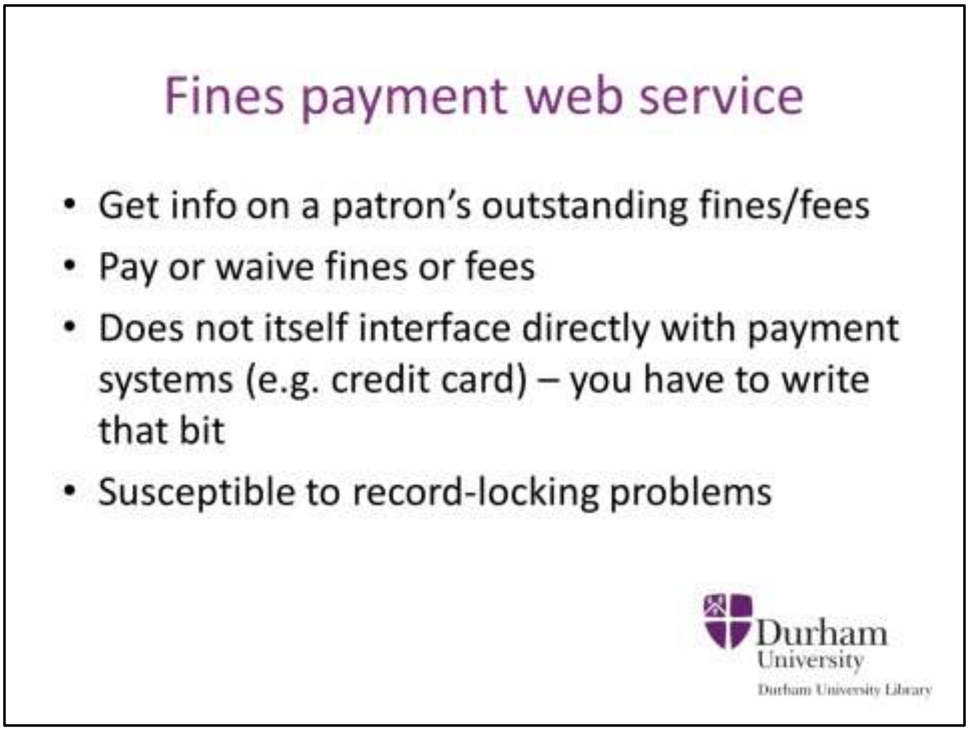

Fines payment web service

- Get info on a patron’s outstanding fines/fees
- Pay or waive fines or fees
- Does not itself interface directly with payment systems (e.g. credit card) – you have to write that bit
- Susceptible to record-locking problems

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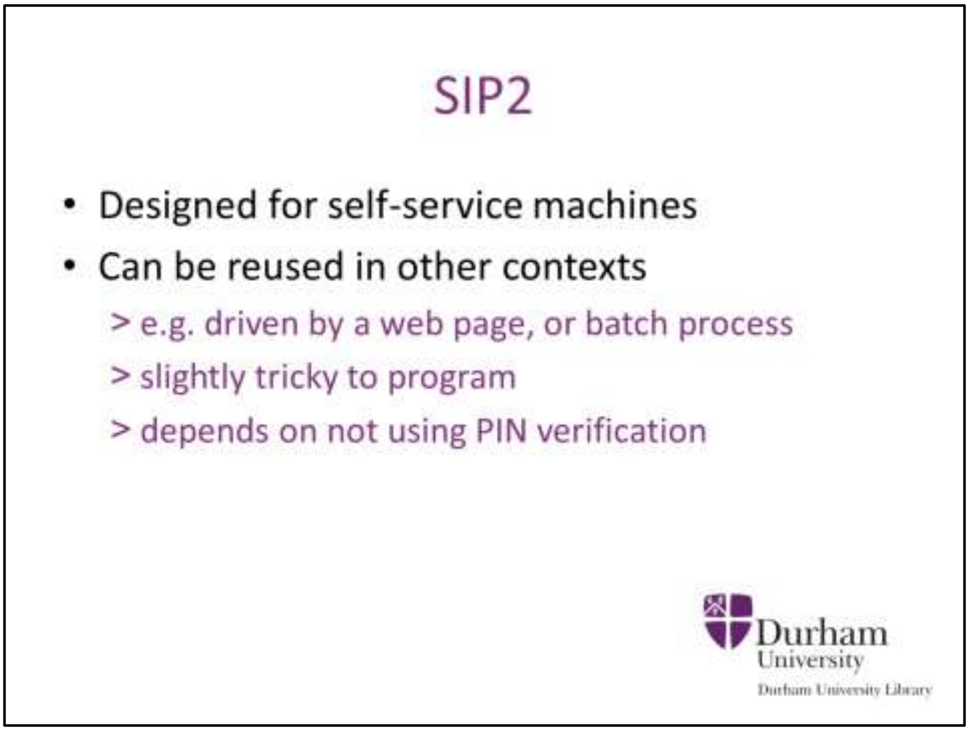
If a patron’s record is busy then you may be unable to pay the fines once the payment has cleared: bear this in mind in your software design.



SIP2

- Designed for self-service machines
- Can be reused in other contexts
  > e.g. driven by a web page, or batch process
  > slightly tricky to program
  > depends on not using PIN verification

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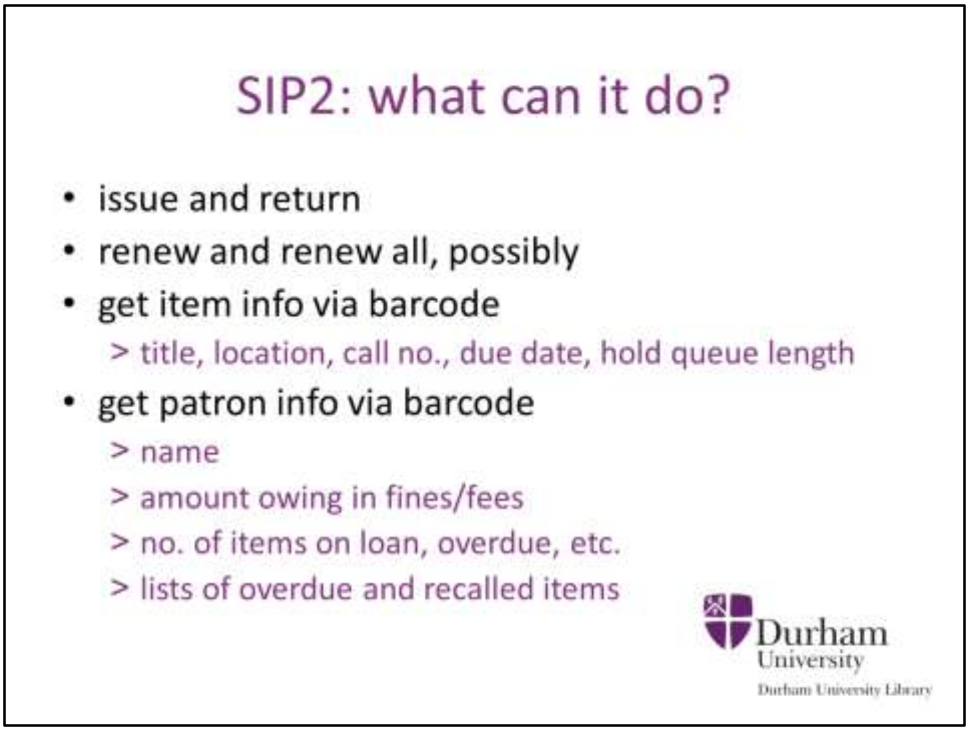
No use for re-use if PIN verification turned on.



SIP2: what can it do?

- issue and return
- renew and renew all, possibly
- get item info via barcode
  > title, location, call no., due date, hold queue length
- get patron info via barcode
  > name
  > amount owing in fines/fees
  > no. of items on loan, overdue, etc.
  > lists of overdue and recalled items

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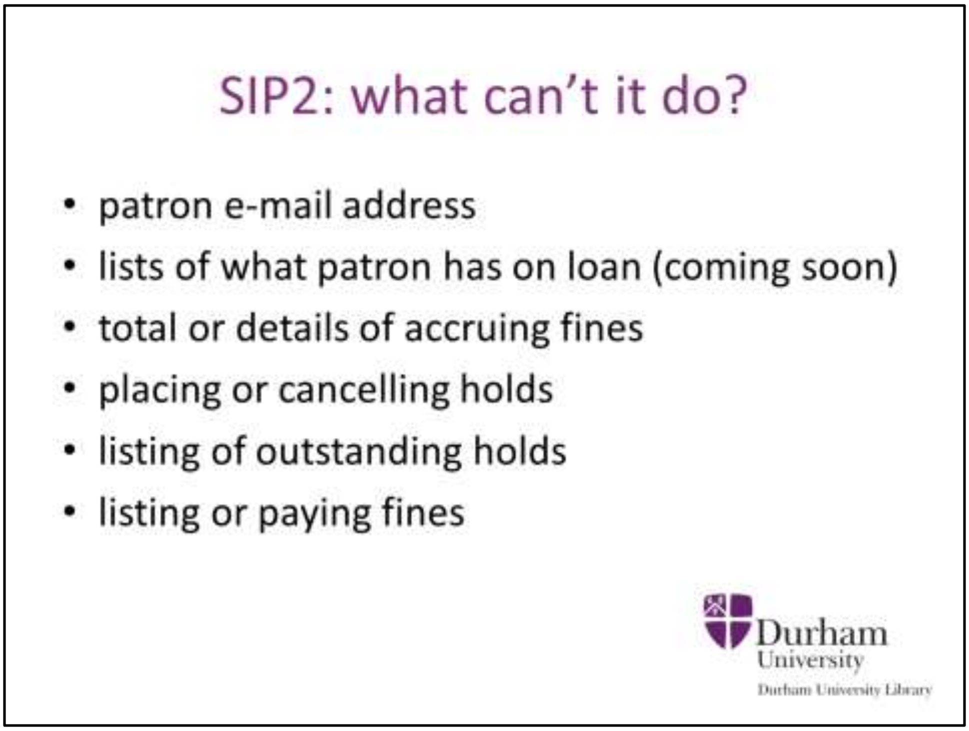
I have not been able to test renew and renew all, but Chad Nelson from London Metropolitan has reported success with this. In our case, we have had to disable renewing on self-service because users were getting round their fines by exploiting a loophole.



SIP2: what can’t it do?

- patron e-mail address
- lists of what patron has on loan (coming soon)
- total or details of accruing fines
- placing or cancelling holds
- listing of outstanding holds
- listing or paying fines

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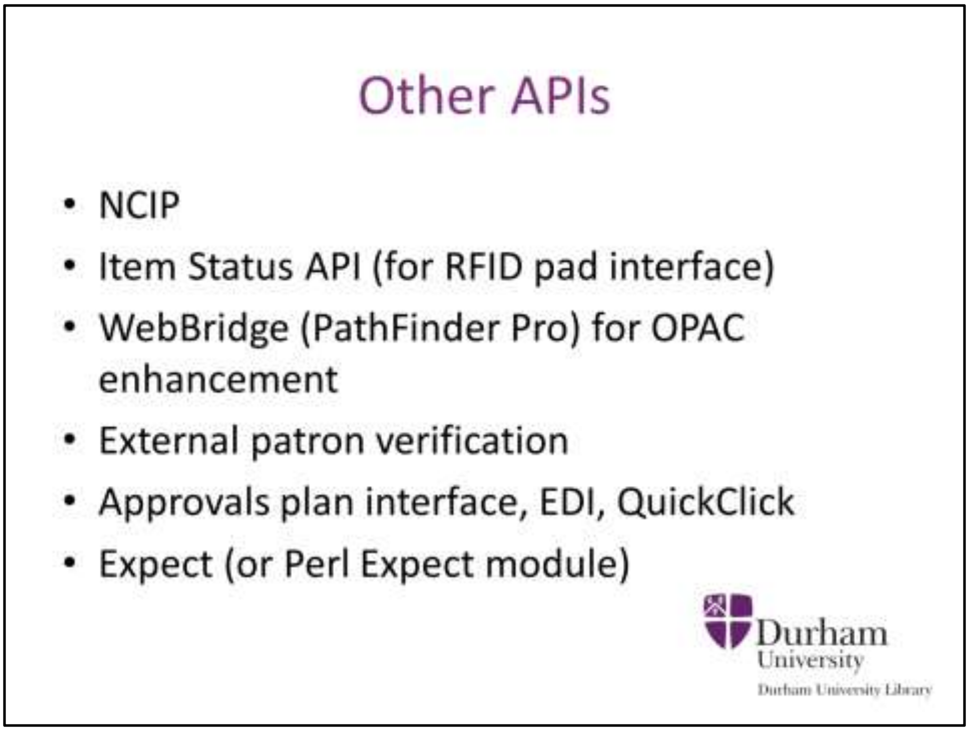
These are things the protocol supports but which are not implemented by Innovative.
E-mail address would be useful for 3M machines to offer e-mail receipts.
Lists of current loans can be shown on 3M and Intellident machines and allow selection for renewal. (Betsy’s talk hinted that this will be supported by Millennium soon.)
Placing holds is a bit odd in self-service context: how do you find what you want? Maybe for items you cannot renew? Would be very handy for implementing alternative OPAC interfaces, especially mobile.
Fines payment in SIP2 is a difficult area: some systems have implemented non-standard extensions to the protocol, and the support from self-service machines is a bit patchy. If your machines support Innovative’s fines payment API that will offer a better experience, but it’s not a standard API so it depends on your supplier.

SIP3 is being talked about. Let’s hope when it launches that Innovative offer full support from the outset.



Other APIs

- NCIP
- Item Status API (for RFID pad interface)
- WebBridge (PathFinder Pro) for OPAC enhancement
- External patron verification
- Approvals plan interface, EDI, QuickClick
- Expect (or Perl Expect module)

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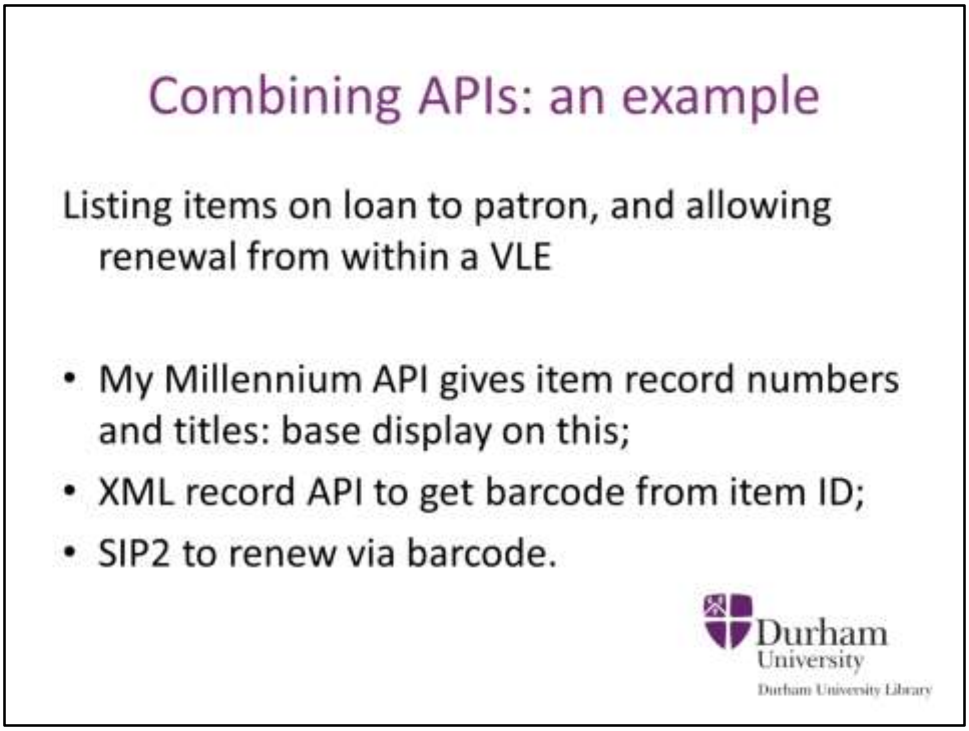
NCIP is a bit like a standards-based SIP2 with added ILL functionality.
Various acquisitions protocols would allow you to get in there and develop process enhancements.
While we still have terminal access, Expect can help you automate stuff at the most basic level.



Combining APIs: an example

Listing items on loan to patron, and allowing renewal from within a VLE

- My Millennium API gives item record numbers and titles: base display on this;
- XML record API to get barcode from item ID;
- SIP2 to renew via barcode.

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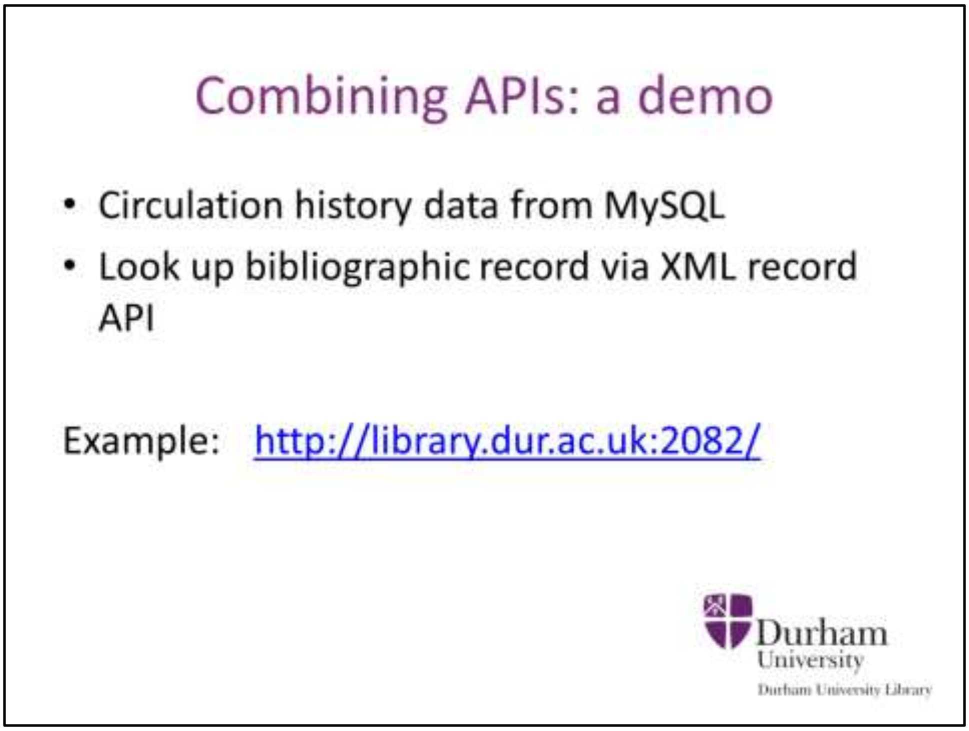
If you want the author to display with the title, SIP2 allows access to full 245 field via item barcode. Some titles are hard to distinguish from title alone. Or use OPAC link from My Millennium, screen scrape for description (or bib record no. + Z39.50)



Combining APIs: a demo

- Circulation history data from MySQL
- Look up bibliographic record via XML record API

Example: http://library.dur.ac.uk:2082/

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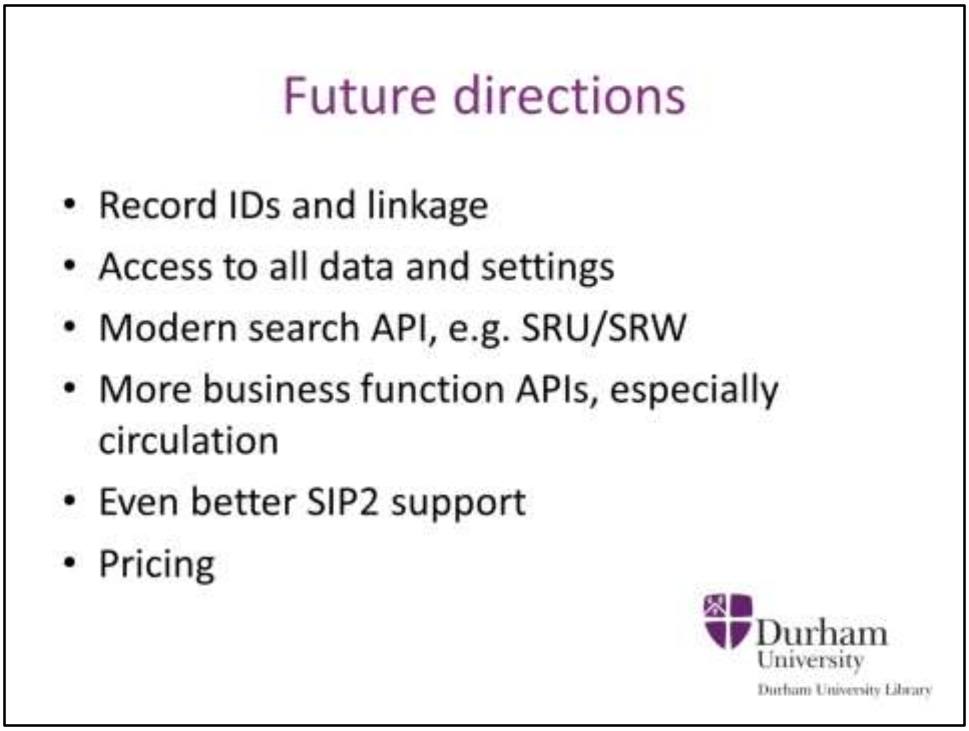

Future directions

- Record IDs and linkage
- Access to all data and settings
- Modern search API, e.g. SRU/SRW
- More business function APIs, especially circulation
- Even better SIP2 support
- Pricing

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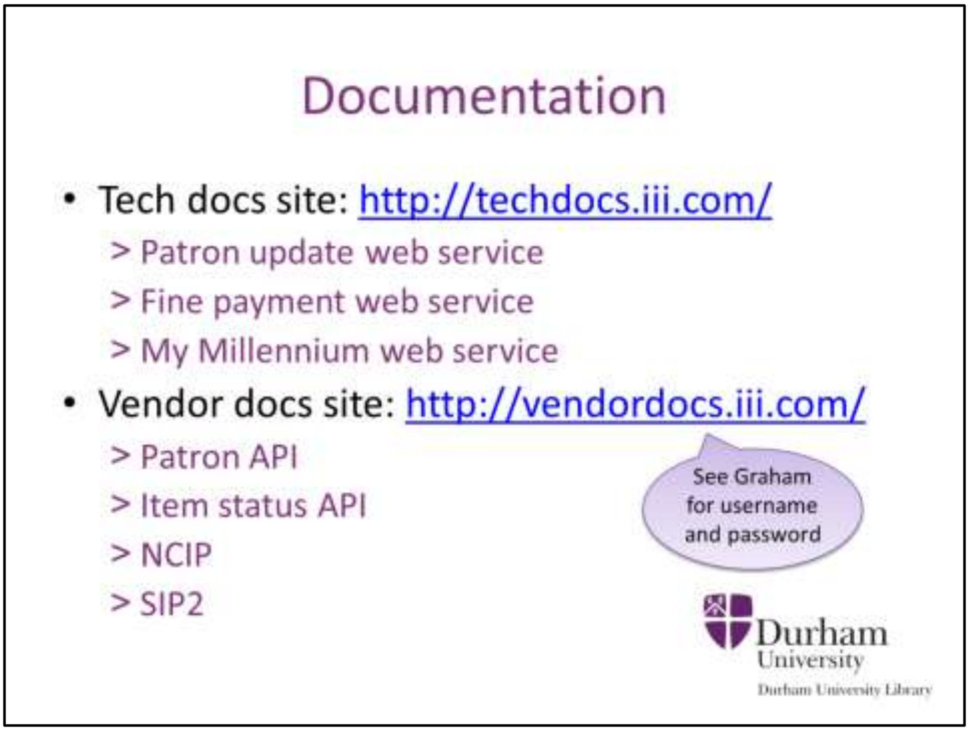
We desperately need an API that allows lookup by any conceivable record ID, and returns IDs of other linked records. For example, the bib record and associated checkins, items etc.

We need all data to be able to be read via APIs. Often just displaying our data elsewhere is a start.

Business functions such as hold request placement are not supported at present.

The APIs really need to be free if Innovative are going to see the developer take-up they hope for. If a programmer has to make a case for purchasing an API at x-thousand pounds before they've even started, it's no good. A lot of innovation comes from outside formal projects with specifications. And no-one will bother to tidy up and share code if the APIs are not widely available.



Documentation

- Tech docs site: http://techdocs.iii.com/
  - > Patron update web service
  - > Fine payment web service
  - > My Millennium web service
- Vendor docs site: http://vendordocs.iii.com/
  - > Patron API
  - > Item status API
  - > NCIP
  - > SIP2

See Graham
for username
and password

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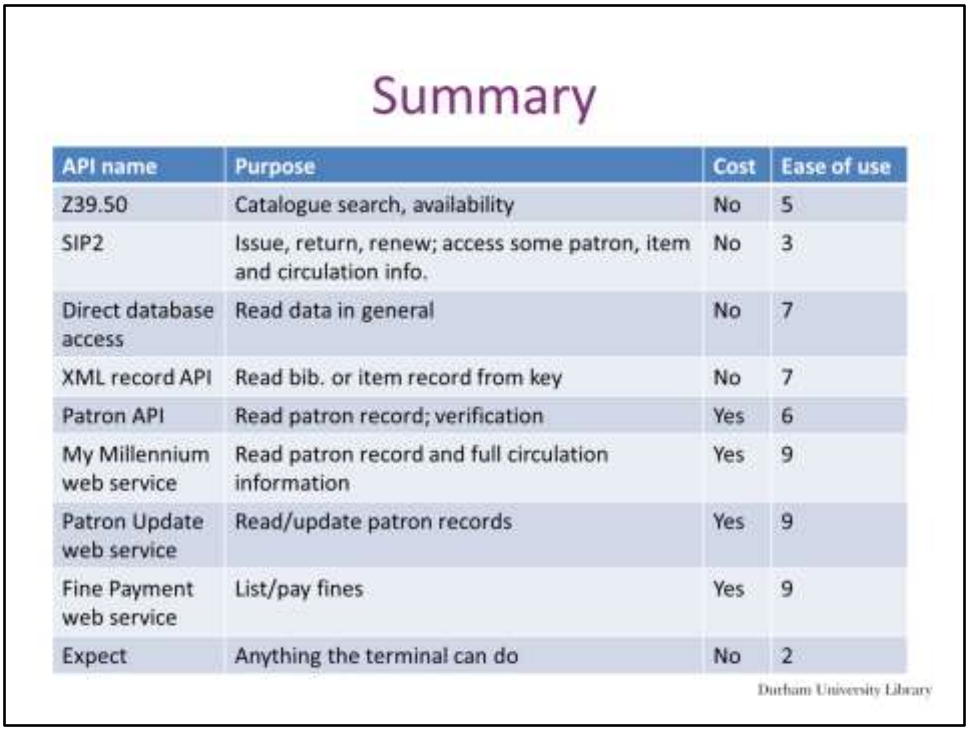
The vendor docs ones are more geared towards APIs which 3rd party products would use.



Summary

API name	Purpose	Cost	Ease of use
Z39.50	Catalogue search, availability	No	5
SIP2	Issue, return, renew; access some patron, item and circulation info.	No	3
Direct database access	Read data in general	No	7
XML record API	Read bib. or item record from key	No	7
Patron API	Read patron record; verification	Yes	6
My Millennium web service	Read patron record and full circulation information	Yes	9
Patron Update web service	Read/update patron records	Yes	9
Fine Payment web service	List/pay fines	Yes	9
Expect	Anything the terminal can do	No	2

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The ease of use is my own personal scoring of how useful and easy to use the APIs are.

Questions?

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