

# ANZREG 2018



## Resource Sharing Partner Synchronisation

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**Macquarie University Library**



# Outline

## Resource Sharing Partner Synchronisation

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- Previous system – VDX
- Moving to Alma
- Resource Sharing Partners
- Solution Design
  - Harvester
  - Sync
- Future Directions



# Previous System - VDX

Where we were...

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- Not great:
  - External System
  - Second user login
  - Additional user management
  - AD integration required with customised attributes
  - Request path not very transparent to end user
- Great:
  - Partners managed centrally



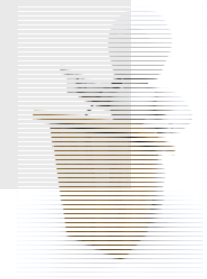
# Moving to Alma



Where we are...

- Great:
  - Single system
  - Supports multiple protocols (we use ISO)
  - End user XP is much richer
  - Works for users from within Primo
  - No additional user system integrations required
  - No additional user management
- Not great:
  - Partner management is up to each institution!

A screenshot of the MyLibrary Alma interface. The top navigation bar includes "Search", "NEW SEARCH", "TAGS", "JOURNALS A-Z", and "CITATIO SEARCH". Below this is a "MyLibrary" header. The main content area has tabs for "OVERVIEW", "LOANS", "REQUESTS", "FINE + FEES", and "BLOCKS + MESSAGES". The "OVERVIEW" tab is active. It displays three sections: "Loans" with a "RENEW ALL" button, "Requests" with three items, and "Fine + fees" with a "Credit" button. The "Loans" section shows a loan for "Small Brown Dog's bad remembering ..." by Gibbie, Mike, due on 07/12/17. The "Requests" section shows three items: "Empress of the world" (ILL. Renewed by partner), "The marriage / Gombrowicz, Witold." (ILL. Physically received by library), and "The Philosophy of Paul Ricoeur" (ILL. Request sent to partner). The "Fine + fees" section shows a current fines balance of -150.00 and a credit of -150.00 AUD. The "Blocks + messages" section shows a message icon and the text "There are no blocks or message". A "VIEW ALL 17 REQUESTS" link is at the bottom.



# Broker vs Peer to Peer

## Connection options

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- Broker
  - All requests to a partner go through an intermediary
  - Connection configuration for each partner points to broker
  - Handles billing
- Peer to Peer
  - System to system communication between partners
  - Connection configuration is custom for each partner
- MQ uses LADD as broker
  - Primarily because of billing



# Managing Partners

There is no Data, only Zuul!

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- Two pieces of information required from each country:
  1. Contact information for all partners in Australia and New Zealand
    - addresses
    - phone numbers
    - email
  2. Suspension status
    - whether partner is currently accepting requests
    - changes regularly

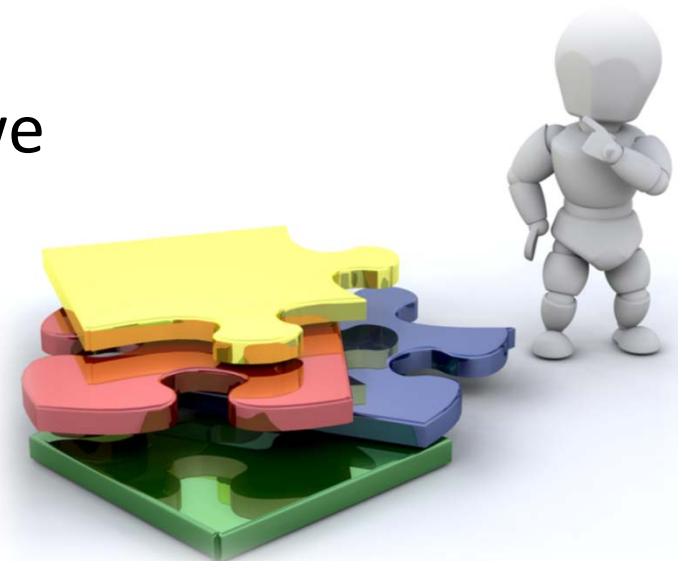


# Where is the data?

The bad, the bad, the bad and the ugly...

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- Australia
  1. LADD Members and Suspensions
  2. ILRS
- New Zealand
  3. Te Puna Online CSV (updated regularly)
  4. Email sent to subscribers (we subscribe)



# LADD

## Members and Suspensions (AU)



Browser window: LADD members & suspen... X  
Address bar: www.nla.gov.au/librariesaustralia/services/docdel/members-suspensions/

Last updated: 10 Sep 2017

| NUC symbol ▲ | Organisation ▲                          | ISO ILL ▲ | Suspension status ▲ | Suspended from | Suspended to |
|--------------|---|-----------|---------------------|----------------|--------------|
| AAAR         | National Archives of Australia          |           | Suspended           | 20 Jul 2016    | 31 Dec 2018  |
| AACOM        | Aust. Competition & Consumer Commission |           | Suspended           | 05 Jun 2017    | 31 Dec 2017  |
| AAGD         | Attorney Generals Department Library    |           | Suspended           | 06 Jun 2017    | 31 Oct 2017  |
| AAIS         | National Sports Information Centre      |           | Not suspended       |                |              |
| AATO         | Australian Taxation Office              |           | Not suspended       |                |              |
| AAUD         | Australian National Audit Office        |           | Not suspended       |                |              |
| AAWM         | Australian War                          |           | Not                 |                |              |

Left sidebar menu items:  
LADD Payments Service  
Email alerts for LADD  
Enhanced requesting for LADD  
LADD members & suspensions  
ISO ILL interoperability with LADD  
Archiving requests on the LADD Gateway  
LADD error messages  
Known issues & workarounds in LADD  
Tips for using LADD  
Topics of Interest (LADD)  
Release notes for LADD  
Maintenance on our services  
Recent Australian Publications (RAP)  
Search service  
Service connection details



# ILRS

## Address and Contact Information (AU)



A screenshot of the Australian ILRS Directory search page. The browser address bar shows 'www.nla.gov.au/app...'. The page title is 'AUSTRALIAN INTERLIBRARY RESOURCE SHARING DIRECTORY'. Below the title are navigation links: SEARCH, ABOUT THIS SITE, FEEDBACK, HELP. A search section includes a 'NUC symbol' input field, a 'Name' input field with a dropdown set to 'Keyword', and a 'Location' dropdown set to 'All'. There are 'Search' and 'Clear' buttons. A small map of Australia is visible. At the bottom, there are links for Home, Search, About this Site, ILRS Code, Feedback, Help, and Contact ILRS Administration. The National Library of Australia logo is in the bottom right corner.



A screenshot of the Australian ILRS Directory resource page for Macquarie University. The browser address bar shows 'www.nla.gov.au/app...'. The page title is 'AUSTRALIAN INTERLIBRARY RESOURCE SHARING DIRECTORY'. Below the title are navigation links: SEARCH, ABOUT THIS SITE, FEEDBACK, HELP. The Macquarie University logo is on the left. The text reads: 'Macquarie University, Macquarie University Library - Document Supply Service, NUC symbol/s: NMQU'. Below this are links for Macquarie University, Macquarie University Library, and Document Supply Service. The page lists three addresses: Main address (Balaclava Rd, cnr Epping Rd, NORTH RYDE NSW 2109 AUSTRALIA), Postal address (Building C3C, Macquarie Drive, MACQUARIE UNIVERSITY NSW 2109 AUSTRALIA), and Billing address (Same as Postal address). It also provides an ILL email (lib\_ill@mq.edu.au), ILL phone (02 9850 7514), and ILL fax (02 9850 6516). A note at the bottom states: 'NB\* International callers, add the +61 prefix for Australia and drop the 0 from the area code from phone and fax numbers. For example, 01 2345 6789 becomes +61 1 2345 6789.' The page footer includes the URL 'www.mq.edu.au/library'.

# Te Puna

## Members, Address and Contact Information (NZ)



**MACQUARIE**  
University

directory-of-new-zealand-libraries.csv - Excel

Nishen Naidoo

File Home Insert Draw Page Layout Formulas Data Review View OFFICE REMOTE ACROBAT Tell me what you want to do

A1 Symbol

|    | A      | B              | C                        | D                   | E                                   | F                        | G                          | H             | I         | J               | K           | L                         | M                                      | N                      | O                   | P                        | Q                                       | R                                      | S | T | U |
|----|--------|----------------|--------------------------|---------------------|-------------------------------------|--------------------------|----------------------------|---------------|-----------|-----------------|-------------|---------------------------|--|------------------------|---------------------|--------------------------|---|--|---|---|---|
| 1  | Symbol | Library type   | Name                     | Web address         | Street address                      | Postal address           | Email                      | Main phone nu | NZ int sc | Te Puna int mem | IBS member  | Status in NZ IL Sch       | Manager                                | Manager email          | Interloan librarian | Phone interloan          | Email interloan                         | Notes                                  |   |   |   |
| 2  | AAF    | Health         | New Zeala                | http://www.nz       | PO Box 6663, Well                   | PO Box 6663, We          | librarian@+64 9 303 3124   |               | TRUE      | FALSE           | FALSE       | Non-Charter               | Wayne C wayne.carter@r                 | Wayne Carter           |                     | +64 9 300 6960           | wayne.carter@nzaf.org.nz                |  |   |   |   |
| 3  | AART   | Other Special  | Auckland                 | http://www.au       | cnr Wellesley and                   | PO Box 5449, We          | library@a+64 9 307 7714    |               | TRUE      | FALSE           | FALSE       | Charter                   | Catherine catherine.hammond@           | aucklandartgallery.com |                     |                          | OCLC:AUAAR                              |  |   |   |   |
| 4  | ABAL   | Law            | Baldwins                 | http://www.ba       | Level 15, HSBC Buil                 | PO Box 5999, We          | louis-a-dav+64 9 373 3137  |               | TRUE      | TRUE            | TRUE        | Charter                   | Louisa-Da louisa-dawn.kic              | Louisa-Dawn Kidd       | +64 9 373 3137 x    |                          | louis-a-dawn.kidd@                      | OCLC: NZBDW. No domestic charges; sole |   |   |   |
| 5  | ABCS   | Music Hire     | Bach Mus                 | http://www.ba       | 8A Miri Rd Aucklar                  | PO Box 5767, We          | admin@ba+64 9 309 222      |               | FALSE     | FALSE           | FALSE       | tba                       | ABCS Music Hire                        |                        |                     |                          | OCLC: ABCS                              |  |   |   |   |
| 6  | ABF    | Law            | Buddle Fir               | http://www.bu       | PricewaterhouseCi                   | PO Box 1433, Aui         | BFLibrary@+64 9 358 2555   |               | TRUE      | TRUE            | TRUE        | Non-Charter               | Louise Be louise.bailey@l              | Louise Bailey          | +64 9 358 7035      |                          | louise.bailey@bi                        | OCLC: NZABF                            |   |   |   |
| 7  | ABG    | Law            | Bell Gully               | http://www.be       | Vero Centre, 48 Shi                 | PO Box 4199, Aui         | bgis@bellj+64 9 916 8800   |               | TRUE      | TRUE            | FALSE       | Non-Charter               | Therese T therese.duffin@bellgully.com |                        |                     |                          |   | OCLC: NZABG Welcomes speculative jour  |   |   |   |
| 8  | ABI    | Tertiary       | Deane Me                 | http://www.la       | 80 Central Park Dr                  | Private Bag 93 1         | (circulation+64 9 836 7800 |               | TRUE      | TRUE            | TRUE        | Charter                   | Vicky Chi Vchurch@laidl                | Jeremy Adams           | +64 9 836 7800      |                          | jadams@laidlaw                          | OCLC: NZABI                            |   |   |   |
| 9  | ABM    | Business       | Boffa Mis                | http://www.bc       | P.O. Box 11-340, W.P.O. Box 11-340, |                          | intranet@l+64 4 385 9315   |               | TRUE      | FALSE           | FALSE       | Non-Charter               | Merryn H intranet@boffa                | Merryn Hedley          | +64 4 385 9315      |                          | intranet@boffamiskell.co.nz             |  |   |   |   |
| 10 | ABOS   | Business       | The Boston Consulting G  | Level 30, 23-29 Alb | Level 30, 23-29 A                   | cormack.ki+64 9 377 2297 |                            | FALSE         | FALSE     | FALSE           | tba         | Kate Corri cormack.kathry | Kate Cormack                           | +64 9 377 2297         |                     | cormack.kathryn@bcg.com  |   |  |   |   |   |
| 11 | ABP    | Business       | Babbage Consultants Ltd  | 109 Fanshawe Stre   | PO Box 2027, Aui                    | admin@ba+64 9 379 9980   |                            | FALSE         | FALSE     | FALSE           | Non-Charter | Tammy A admin@babbag      | interloans Contac                      | +64 9 379 9980         |                     | admin@babbage            | Architectural engineering documents & s |  |   |   |   |
| 12 | ABR    | Business       | Lion Technical Library   | 55 Ormiston Road    | PO Box 23, Short                    | library@li+64 9 250 8664 |                            | TRUE          | FALSE     | FALSE           | Charter     | Edna Car library@lionco   | Edna Carson                            | +64 9 250 8664         |                     | library@lionco.c         | OCLC: NZAEH                             |  |   |   |   |
| 13 | ABT    | Tertiary       | Ayson Clif               | http://www.ca       | 473 Great South Rd                  | PO Box 12 149, P         | library@ci+64 9 526 0347   |               | TRUE      | TRUE            | TRUE        | Charter                   | Siong Ng siong.ng@carey.ac.nz          |                        |                     |                          |   | OCLC: NZABT                            |   |   |   |
| 14 | ACA    | Health         | New Zeala                | http://www.ch       | PO Box 113-044, N                   | PO Box 113-044,          | library@n+64 9 526 2103    |               | TRUE      | FALSE           | FALSE       | Non-Charter               |  | Helen Bennett          | +64 9 526 2103      |                          | library@nzchiro.co.nz                   |  |   |   |   |
| 15 | ACAD   | Tertiary       | Whitecliff               | http://www.wl       | 24 Balfour Road, P                  | 24 Balfour Road,         | interloans+64 9 302 7374   |               | TRUE      | TRUE            | TRUE        | Charter                   | Erich Rarerichr@whitecl                | Kate Ayre              | +64 9 302 7374      |                          | katea@whitecliff                        | OCLC: NACAD                            |   |   |   |
| 16 | ACS    | Music Hire     | Auckland                 | http://www.au       | PO Box 7228, Well                   | PO Box 7228, We          | bandamilli+64 9 576 7280   |               | FALSE     | FALSE           | FALSE       | tba                       | ACS Music Hire                         |                        |                     |                          | OCLC:                                   |  |   |   |   |
| 17 | ACT    | Tertiary       | Unitec Ins               | http://www.ur       | Hub Library, Build                  | Private Bag 92 0:        | interloans+64 9 849 4185   |               | TRUE      | TRUE            | TRUE        | Charter                   | Gail Dall gdallimore@un                | Anne Fowke             | +64 9 815 4321 x    |                          | interloans@unit                         | OCLC: ZSU                              |   |   |   |
| 18 | ACTS   | Law            | Chapman                  | http://www.ch       | ANZ Centre, 23-29                   | ANZ Centre, 23-2         | alf.luapo@+64 9 357 9094   |               | TRUE      | TRUE            | FALSE       | Charter                   | Alf Luapalf.luapo@char                 | Alf Luapo              | +64 9 357 9094      |                          | alf.luapo@chapl                         | OCLC:NZACT                             |   |   |   |
| 19 | ADC    | Music Hire     | Dorian Choral Music Lib  | 63/67 Ranfurly Ro   | Dorian Choral M                     | pamelakiri+64 9 630 8501 |                            | FALSE         | FALSE     | FALSE           | tba         | ADC Music Hire            |  |                        |                     |                          | OCLC:                                   |  |   |   |   |
| 20 | ADHB   | Health         | Auckland                 | http://www.sti      | Private Bag 92024                   | Private Bag 9202         | ssfis@adh+64 9 307 4955    |               | FALSE     | FALSE           | FALSE       | tba                       |  | Susan Cato-Symor       | +64 9 307 4955      |                          | SusanCS@adhb                            | govt.nz                                |   |   |   |
| 21 | ADYM   | Theological    | Edenz Col                | http://library.     | Edenz Colleges, 85                  | PO Box 10222, A          | library@e+64 9 309 5208    |               | TRUE      | TRUE            | TRUE        | Charter                   | Eleanor M library@edenz.ac.nz          |                        |                     |                          |   | OCLC:NZEDZ Open Mon, Tues, Thurs, Fri. |   |   |   |
| 22 | AEE    | Other          | EEO Librai               | http://www.ee       | Level 5, James & W                  | PO Box 12929, Pr         | admin@ee+64 9 525 3023     |               | FALSE     | FALSE           | FALSE       | tba                       | RenÄ@e rschick@eootru                  | RenÄ@e Schick          | +64 9 580 4448      |                          | rschick@eootrus                         | Formerly EEO Trust Library             |   |   |   |
| 23 | AEM    | Health         | Ernest & Marion Davis Li | Private Bag 92 024  | Private Bag 9202                    | emdavislib+64 9 307 4945 |                            | TRUE          | FALSE     | FALSE           | Non-Charter | Juliet Ha emdavislib@ad   | Juliet Hawkins                         | +64 9 307 4949 3       |                     | emdavislib@adl           | Lend post-1900 material. Do not borrow  |  |   |   |   |
| 24 | AESRA  | research       | ESR Mt Albert Science Ce | Hampstead Road, I   | Private Bag 92 0:                   | library.ma+64 9 815 3670 |                            | TRUE          | TRUE      | TRUE            | Charter     | Beryl Anc beryl.anderson@ |  | +64 9 815 3670         |                     | library.masc@es          | OCLC: NZAES                             |  |   |   |   |
| 25 | AEY    | Business       | Ernst & Young New Zeala  | 41 Shortland Stree  | PO Box 2146, Aui                    | evelyn.joh+64 9 377 4790 |                            | FALSE         | FALSE     | FALSE           | tba         | Evelyn Jo evelyn.johnson@ | Evelyn Johnson                         | +64 9 377 4790         |                     | evelyn.johnson@nz.ey.com |   |  |   |   |   |
| 26 | AFB    | Special Librar | Blind Fou                | http://www.bl       | Awhina House, 4 M                   | Private Bag 99 9:        | library@b+64 9 355 6965    |               | TRUE      | FALSE           | FALSE       | Charter                   | Greg Hur ghurn@blindfo                 | Veronica Hogan         | +64 9 355 7326      |                          | vhogan@blindfo                          | OCLC: NZAFB                            |   |   |   |
| 27 | AFH    | Other          | Fred Holl                | http://www.hc       | Level 6, 12 Morgar                  | Private Bag 9990         | kboockock+64 9 304 0524    |               | TRUE      | FALSE           | FALSE       | Non-Charter               | Kate Boo kboockock@hol                 | Kate Boockock          | +64 9 304 0524      |                          | kboockock@hollows.org.nz                |  |   |   |   |

directory-of-new-zealand-librar

Ready 90%

# E-Mail

Suspensions (NZ)



## ISO-ILL Location Updates



delivery-anz@vdxhost.com

Sat 29/07, 3:04 AM

Resource Sharing Partners

ISO-UPDATE-SOURCE LADD

###

###

### This is a location which needs to be updated in your ISO-ILL System.

### The Preferred Public Alias Symbol follows after the 'STATUS' keyword.

### The next keyword is the Naming Authority for this location.

### Following this is the information to be updated.

###

STATUS WHP NLNZ BEGIN SUSPENSION LIST

STATUS WHP NLNZ 31-JUL-17 01-AUG-17 SUSPENDED\_REQUESTING\_OK INTERLOANS\_UNAVAILABLE

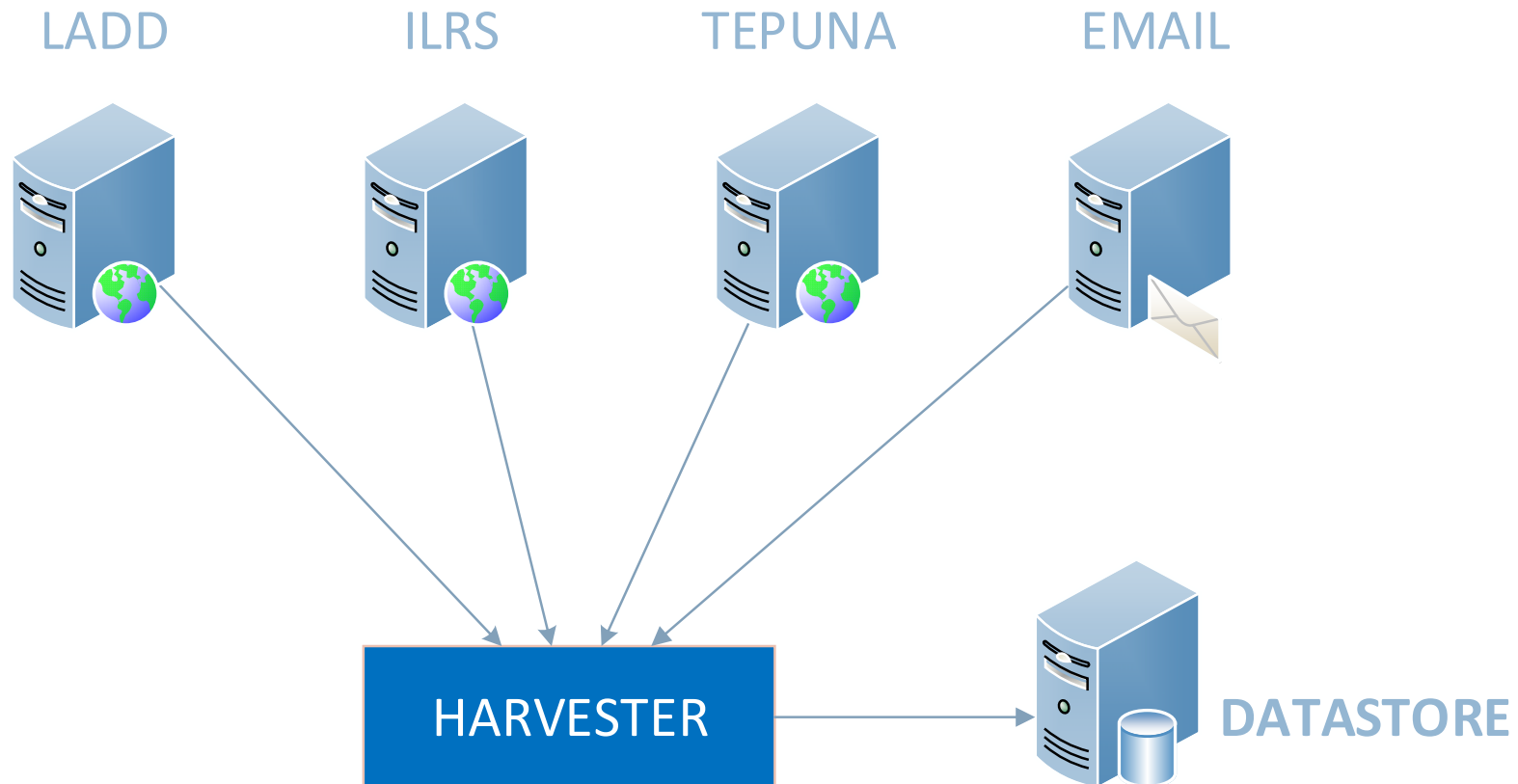
STATUS WHP NLNZ 14-AUG-17 15-AUG-17 SUSPENDED\_REQUESTING\_OK Interloans\_Unavailable

STATUS WHP NLNZ END SUSPENSION LIST

# Solution Design

## The Harvester

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# Harvester

## Technology Stack

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- Datastore
  - Kubernetes
  - Elasticsearch Cluster
- Harvester Application
  - Java
  - Jersey (Web Client)
  - JAXB
- Deployment
  - Scheduled job
  - Java executable - can be run from anywhere with access to the internet and the datastore.



# Harvester



## Data Representations: Partner in the Datastore

```
{
  "nuc": "ADFA",
  "updated": "2017-09-06T01:10:50+1000",
  "name": "Academy Library UNSW Canberra",
  "enabled": true,
  "iso_ill": true,
  "status": "not suspended",
  "suspensions": [
    {
      "suspension_added": "2017-08-28T03:01:22Z",
      "suspension_reason": "SUSPENDED_REQUESTING_OK",
      "suspension_end": "2017-09-09T00:00:00+1000",
      "suspension_start": "2017-09-02T00:00:00+1000",
      "suspension_code": "SUSPENDED_REQUESTING_OK",
      "suspension_status": "suspended"
    },
    {
      "suspension_added": "2017-09-10T03:01:32Z",
      "suspension_status": "not suspended"
    }
  ],
}
```

```
"addresses": [
  {
    "address_detail": {
      "country": {
        "@desc": "Australia",
        "value": "AUS"
      },
      "city": "CANBERRA BC",
      "state_province": "ACT",
      "postal_code": "2610",
      "line2": "PO Box 7916",
      "line1": "Academy Library UNSW Canberra"
    },
    "address_type": "postal",
    "address_status": "active"
  },
  {
    "email_main": "ill@adfa.edu.au",
    "email_ill": "ill@adfa.edu.au",
    "phone_fax": "02 6247 2324",
    "phone_ill": "02 6268 6158"
  }
]
```

# Harvester

## Data Representations: Change Record Examples

---

### Change of Name

```
{  
  "time": "2017-09-13T16:49:03+1000",  
  "source_system": "TEPUNA",  
  "nuc": "NLNZ:HAE",  
  "field": "name",  
  "before": "Pipfruit New Zealand Inc  
Information Resource",  
  "after": "New Zealand Apples & Pears  
Incorporated Information Resource"  
}
```

### Change of main E-Mail

```
{  
  "time": "2017-09-13T16:49:03+1000",  
  "source_system": "TEPUNA",  
  "nuc": "NLNZ:HAE",  
  "field": "email_main",  
  "before":  
"christine.mcrae@pipfruitnz.co.nz",  
  "after":  
"christine.mcrae@applesandpears.nz"  
}
```

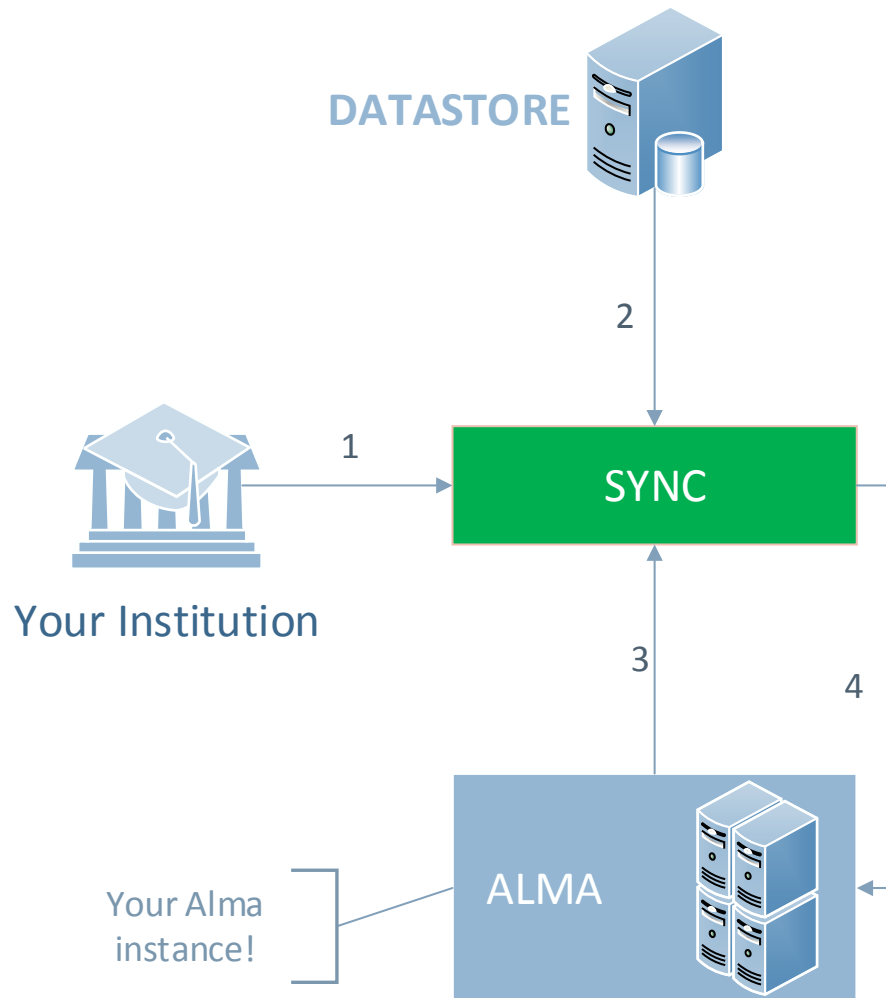
```
{  
  "time": "2017-09-13T16:49:00+1000",  
  "source_system": "LADD",  
  "nuc": "VBOR",  
  "field": "suspension",  
  "before": null,  
  "after": "{\"suspension_status\": \"suspended\", \"suspension_start\": \"2017-09-13T00:00:00+1000\", \"suspension_end\": \"2017-09-15T00:00:00+1000\"}"  
}
```

### Adding a suspension



# Solution Design

## Sync



1. Sync service API call
  - a. Alma API Key  
Resource Sharing Partner read/write access
  - b. NUC symbol
2. Sync service:
  - a. Loads your config data
  - b. Loads partners
3. Pulls all partner data from your Alma institution
4. Sync service:
  - a. Creates partner record from datastore partner + institution config
  - b. Compares Alma record and rendered Datastore record matched on NUC
  - c. Creates a change record list with every field value change and persists it
  - d. Creates and saves updated Alma record for every changed record



# Sync

## Technology Stack

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- Datastore
  - Kubernetes
  - Elasticsearch Cluster
- Sync Application
  - Java
  - Guice
  - JAXB
  - Jersey (REST Server)
  - Grizzly (Embedded HTTP application server runtime)
  - Docker
- Deployment
  - Kubernetes
  - Docker container
  - API Gateway (Kong)



# Sync



## Requirements to use

---

1. API KEY with read/write to Resource Sharing API
2. Your NUC symbol e.g. NMQU for Macquarie
3. A configuration in the Elasticsearch Index

Elasticsearch ID: /config/scope/NMQU

```
{
  "linkBase": "https://api-ap.hosted.exlibrisgroup.com/almaws/v1/partners/",
  "currency": "AUD",
  "borrowingSupported": true,
  "borrowingWorkflow": "LADD_Borrowing",
  "lendingSupported": true,
  "lendingWorkflow": "LADD_Lending",
  "avgSupplyTime": 4,
  "deliveryDelay": 4,
  "locateProfileDesc": "LADD Locate Profile",
  "locateProfileValue": "LADD",
  "systemTypeDesc": "LADD",
  "systemTypeValue": "LADD",
  "isoAlternativeDocumentDelivery": false,
  "isoIllServer": "nla.vdxhost.com",
  "isoIllPort": "1612",
  "isoRequestExpiryTypeDesc": "Expire by interest date",
  "isoRequestExpiryTypeValue": "INTEREST_DATE",
  "isoSendRequesterInformation": false,
  "isoSharedBarcodes": true,
  "isoSymbol": "NLA:NMQU"
}
```

DATASTORE RECORD  
+  
CONFIG  
=  
ALMA RECORD

# Sync

## API Endpoints (not finalised)

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All requests are GET requests with the api key passed in via the Authorization header exactly as used by Ex Libris APIs.

### Endpoints:

1. GET `/v0/partner-sync/{nuc}/sync`

Sync data in the datastore with Alma instance. Returns all the records that were updated in the response (Alma Partners record structure, JSON or XML)

2. GET `/v0/partner-sync/{nuc}/preview`

This will give you all the records that would be updated if you run the sync. This does not run the sync. Returns all the records that would be updated in the response (Alma Partners record structure, JSON or XML)

3. GET `/v0/partner-sync/{nuc}/changes`

Returns all the change records that would be generated from performing the sync. Returns all change records in the response (Change Record structure, JSON or XML).

4. GET `/v0/partner-sync/{nuc}/orphaned`

Returns a list of partners that exist in Alma but not in the datastore (Alma Partners record structure, JSON or XML)

```
curl -X GET \  
https://localhost:8080/partner-sync/NMQU/preview \  
-H 'cache-control: no-cache' \  
-H 'content-type: application/json' \  
-H 'Authorization: apikey 17xx5b1243514d378aa78a696190f1a4bc8'
```

# Future Directions

Hopefully

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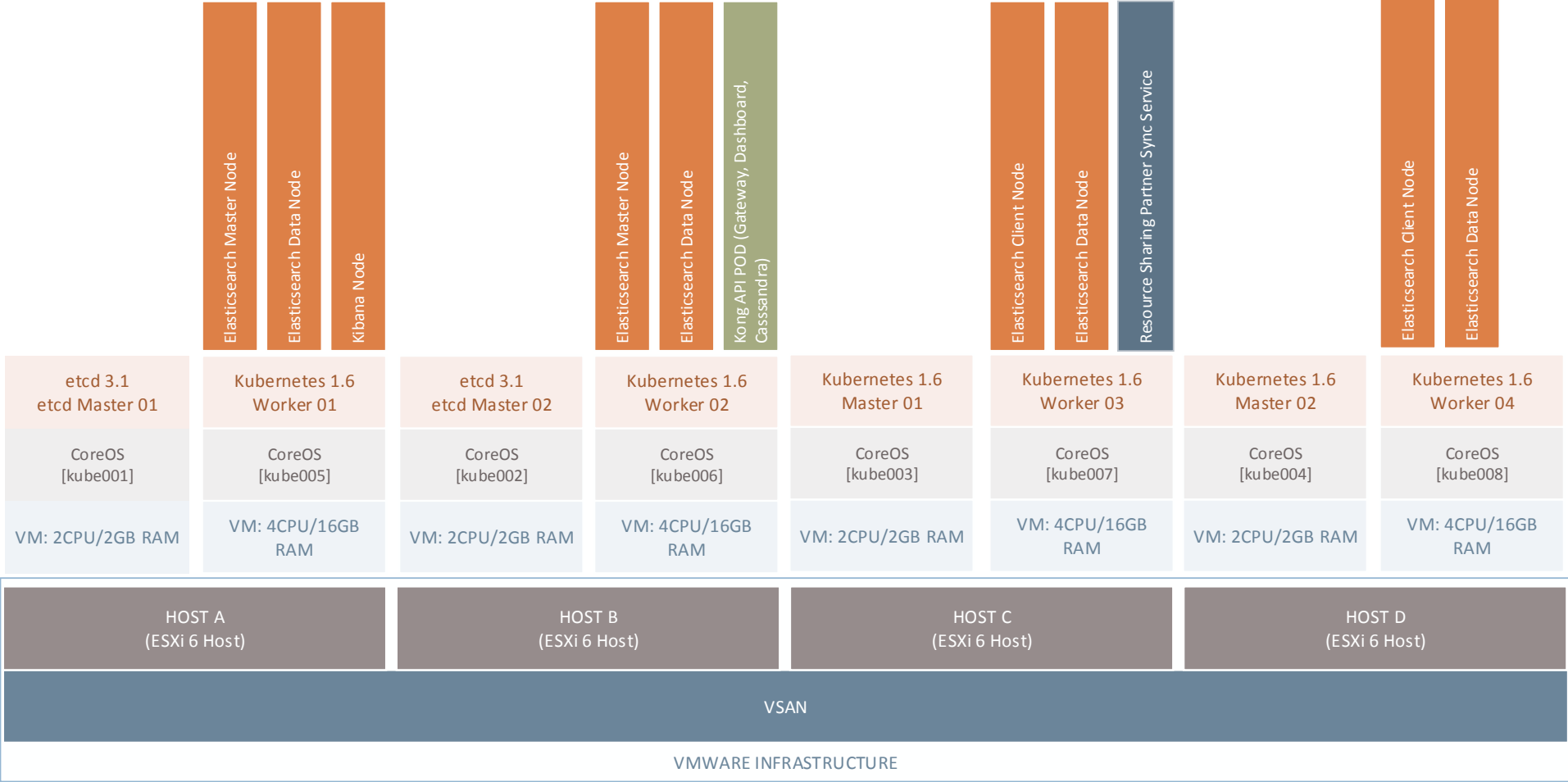


- Host in AWS
- Datastore: Amazon Elasticsearch Service
- Sync application as Amazon Lambda functions
- API Gateway to trigger Lambda functions
- Harvester app can be run from anywhere

# Current Tech Stack Diagram



FYI



# The End



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# Questions?