

# Refworks and ExLibris

June 18<sup>th</sup> 2018

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**ExLibris**  
a ProQuest Company



## Key Categories of Integration

- Infrastructure
- Monitoring
- Development processes
- Handling customer issues
- Performance & Quality Improvements

# The Plan

## *6+ months since Refworks was integrated with ExLibris*

- What we set out to do in Development:
  - **Shore up our infrastructure**
    - ExLibris Cloud Operations, 24x7 On call Coverage
  - **Provide stability to applications**
    - Monitoring
    - Understanding customer issues
    - Reviewing code
    - Fixing bugs
  - **Provide value to customers**
    - DOI integration, Deduplication improvements, Document Compatibility, UI improvements, Progress bar...etc
  - **Clean up development processes**
    - Monthly releases
    - Development scrum process
    - Daily support meeting
  - **Getting more help**
    - Increasing the size of the team
  - **Plan for the future**
    - CI Env, Deeper analysis of RCM, Test Coverage improvement, Dataware housing,...etc

# Why did we do it?

- **Shore up our infrastructure**
  - High Uptime. Watch for patterns. Remediate issues as soon as we can
- **Provide stability to applications**
  - Provide stable and high performant applications
- **Provide value to customers**
  - Continuing to add features and functionality across our applications
- **Clean up development process**
  - To create a high quality, repeatable and predictable release cycle, while addressing hot fixes expediently
- **Getting more help**
  - To do more
- **Plan for the future**
  - Providing customers a commitment to continual progress



6 months later....  
Where are we now?



A woman with blonde hair, wearing a pink long-sleeved shirt and a small earring, is looking down at a laptop. She is in a classroom or office setting with other people in the background. A dark grey rectangular box is overlaid on the lower left of the image.

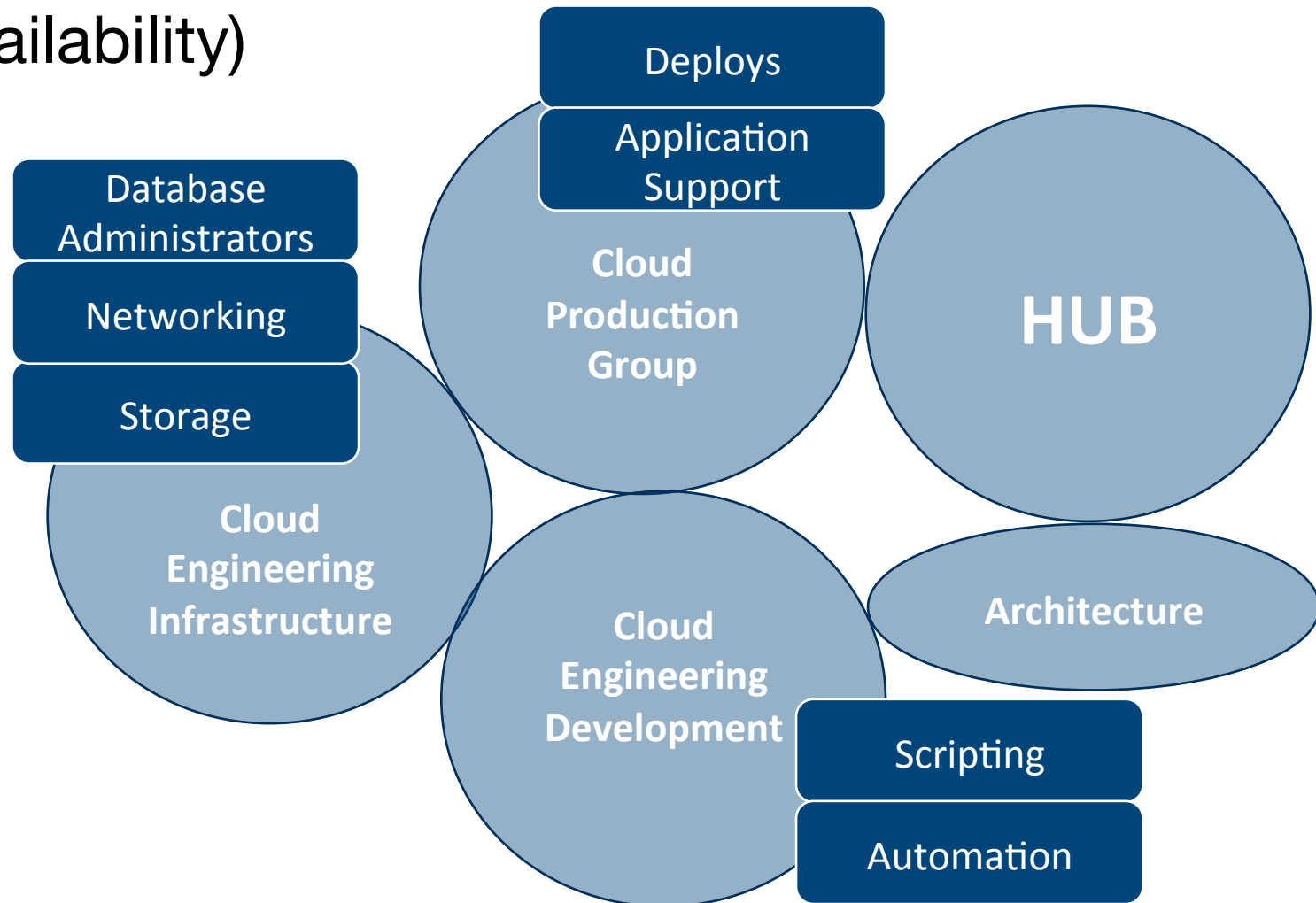
**Shore up our Infrastructure**

A small rainbow-colored arc above the word "ExLibris".

**ExLibris**  
a ProQuest Company

# Shore up our infrastructure

Integrated into the software support structure of the Ex Libris cloud team (Focus on Uptime and Availability)



# Shore up our infrastructure

## Hardware Monitoring

centreon

Welcome Dmitriym | Logout

2018/06/05 18:01

Home Monitoring Reporting Configuration Administration

Status Details Performances Map 4 Business Activity Downtimes Event Logs

By Status

- Services
- Hosts
- Services Grid
- Services by Hostgroup
- Services by Servicegroup
- Hostgroups Summary

Monitoring > Status Details > Services

Service Status: All  
Host: rwweb  
Status:   
Service:   
Poller:   
Hostgroup:   
Servicegroup:   
Output:   
Filters:   
More actions...   
30

	Hosts	Services	Status	Duration	Last Check	Tries	Status information
<input type="checkbox"/>	rwweb101.refworks.com	App-LegacyRefWorks-Web	OK	7h 27m	2m 17s	1/3 (H)	HTTP OK: HTTP/1.1 200 OK - 2732 bytes in 0.737 second response time
<input type="checkbox"/>	rwweb102.refworks.com	App-LegacyRefWorks-Web	OK	1h 31m	15s	1/3 (H)	HTTP OK: HTTP/1.1 200 OK - 6402 bytes in 1.076 second response time
<input type="checkbox"/>	rwweb103.refworks.com	App-LegacyRefWorks-Web	OK	1d 6h	2m 36s	1/3 (H)	HTTP OK: HTTP/1.1 200 OK - 5436 bytes in 0.822 second response time
<input type="checkbox"/>	rwweb104.refworks.com	App-LegacyRefWorks-Web	OK	1d 1h	1m 15s	1/3 (H)	HTTP OK: HTTP/1.1 200 OK - 7339 bytes in 2.158 second response time
<input type="checkbox"/>	rwweb105.refworks.com	App-LegacyRefWorks-Web	OK	1d 4h	2m 40s	1/3 (H)	HTTP OK: HTTP/1.1 200 OK - 6143 bytes in 1.134 second response time
<input type="checkbox"/>	rwweb106.refworks.com	App-LegacyRefWorks-Web	OK	17h 56m	5m 3s	1/3 (H)	HTTP OK: HTTP/1.1 200 OK - 7734 bytes in 1.458 second response time
<input type="checkbox"/>	rwweb107.refworks.com	App-LegacyRefWorks-Web	OK	1d 6h	2m 41s	1/3 (H)	HTTP OK: HTTP/1.1 200 OK - 7201 bytes in 1.065 second response time
<input type="checkbox"/>	rwweb108.refworks.com	App-LegacyRefWorks-Web	OK	1h 21m	25s	1/3 (H)	HTTP OK: HTTP/1.1 200 OK - 6809 bytes in 0.884 second response time
<input type="checkbox"/>	rwweb109.refworks.com	App-LegacyRefWorks-Web	OK	2h 52m	1m 9s	1/3 (H)	HTTP OK: HTTP/1.1 200 OK - 708 bytes in 0.454 second response time
<input type="checkbox"/>	rwweb110.refworks.com	App-LegacyRefWorks-Web	OK	10h 33m	6s	1/3 (H)	HTTP OK: HTTP/1.1 200 OK - 709 bytes in 0.425 second response time
<input type="checkbox"/>	rwweb111.refworks.com	App-LegacyRefWorks-Web	OK	8h 11m	26s	1/3 (H)	HTTP OK: HTTP/1.1 200 OK - 709 bytes in 0.390 second response time
<input type="checkbox"/>	rwweb112.refworks.com	App-LegacyRefWorks-Web	OK	1d 11h	3m 3s	1/3 (H)	HTTP OK: HTTP/1.1 200 OK - 708 bytes in 0.331 second response time
<input type="checkbox"/>	rwweb113.refworks.com	App-LegacyRefWorks-Web	OK	4h 4m	2m 50s	1/3 (H)	HTTP OK: HTTP/1.1 200 OK - 708 bytes in 0.386 second response time
<input type="checkbox"/>	rwweb114.refworks.com	App-LegacyRefWorks-Web	OK	6h 29m	1m 9s	1/3 (H)	HTTP OK: HTTP/1.1 200 OK - 709 bytes in 0.481 second response time

Generated in 1.797 seconds

Documentation | Centreon Support | Centreon | Github Project

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# Where are we now

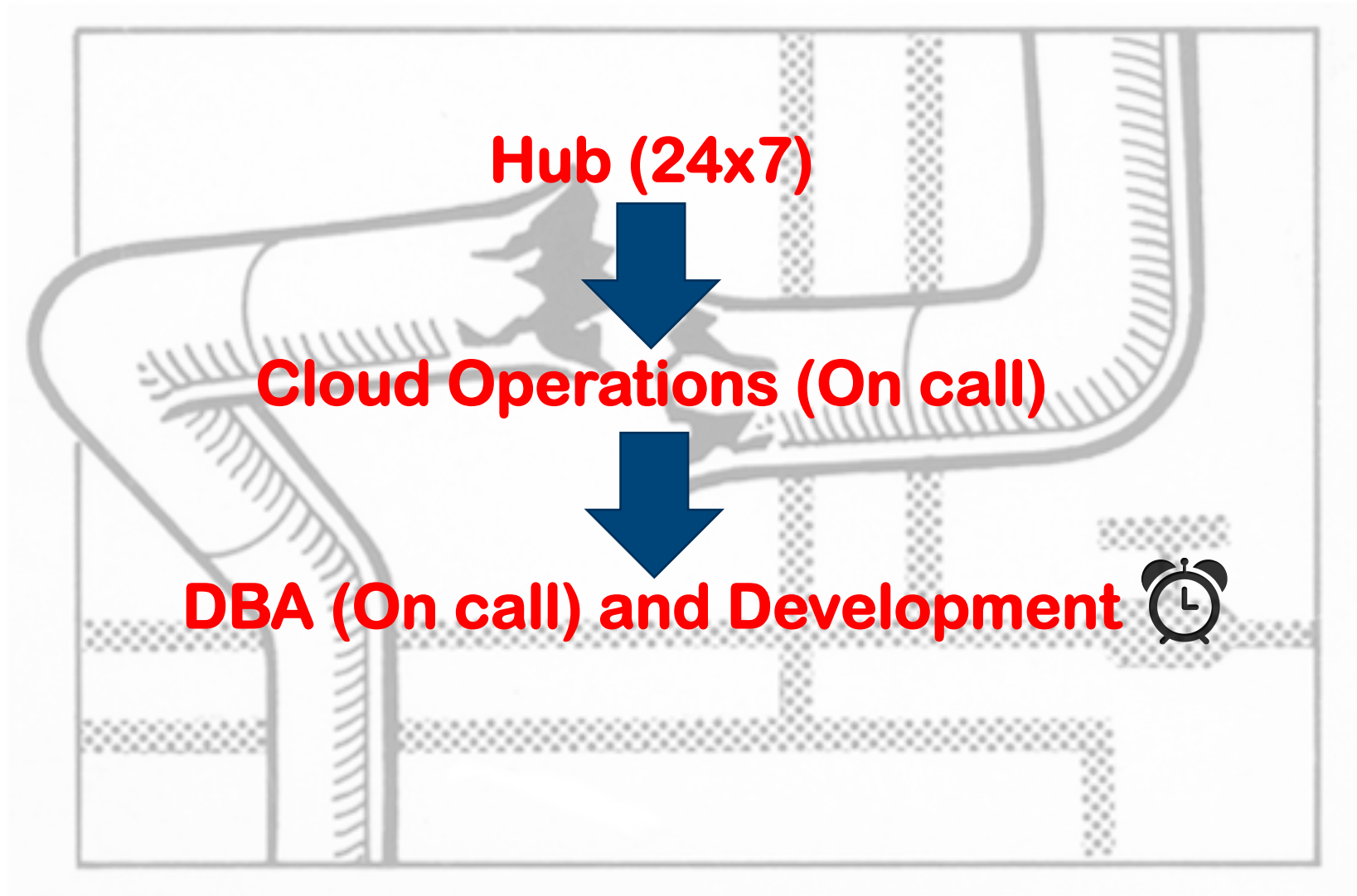
## Integration with 24x7 Hub Team

<https://youtu.be/NYfoWwH6kTs>



# Shore up our infrastructure

## Escalation Path



## Monitoring our applications through healthchecks

```
{
  s3: "Ok 41 millis",
  - server: {
    uptime: "04:03",
    status: "Ok"
  },
  status: "200",
  elasticSearch: "Ok 8 millis",
  RW2API: "Ok 47 millis",
  mongo: "Ok 1 millis"
}
```

```
{
  server: "Ok",
  mongo: "Ok",
  - elasticSearch: {
    status: "green",
    timed_out: false,
    number_of_nodes: 9,
    number_of_data_nodes: 6
  },
  s3: "Ok",
  status: "200"
}
```

# Shore up our infrastructure

## Common Remediation Steps

- Each Team (Hub, Cloud, DBA) is trained on common remediation steps in case the application encounters issues that are easily solved by known solutions
- This lowers time to resolution and lower customer impact

Pages / RefWorks Home (NFWC) / RefWorks Outage Remediation    Save for later  Watching  Share 

### RW3 Outage Identification and Repair

Created by Joseph Wyrantowski, last modified on May 30, 2018

#### Outage Identification

Outages are usually fairly easy to diagnose and can almost always be remediated by a quick [RW3 Redeploy](#). If that doesn't work or we have indications that the Outage is of a different type, the following chart might help give direction.

#### Symptom → Recommended Remediation

Symptom	Interpretation	Diagnosis Techniques	Recommended Remediation
When heading to <a href="#">refworks.proquest.com</a> "We'll be right back" is rendered in the browser	Either the AP11 machines are overloaded or not responding in time to Apache.	nil	<a href="#">RW3 Redeploy</a>

# Where are we now

## Status Page

<input type="checkbox"/>	Leganto NA03								2018-Jun-03
<input type="checkbox"/>	Leganto NA04								2018-May-13
<input type="checkbox"/>	campusM AP01								
<input type="checkbox"/>	campusM EU01								
<input type="checkbox"/>	campusM NA01								
<input type="checkbox"/>	PC CR01								
<input type="checkbox"/>	bx CR01								2018-May-27
<input type="checkbox"/>	360 EJP CR01								
<input type="checkbox"/>	360 Link CR01								
<input type="checkbox"/>	Intota CR01								
<input type="checkbox"/>	Intota Assessment CR01								
<input type="checkbox"/>	Pivot CR01								
<input type="checkbox"/>	Legacy RefWorks CR01								
<input type="checkbox"/>	New RefWorks CR01								
<input type="checkbox"/>	MLPlus CR01								2018-May-27
<input type="checkbox"/>	Summon CR01								
<input type="checkbox"/>	Primo MT APAC01								
<input type="checkbox"/>	Primo MT APAC03								2017-Jun-17

# Shore up our infrastructure

## Investment in Legacy Refworks

- Transition of LRW databases to virtualized servers to upgrade hardware (stability)
- Upgrade DB version to SQL Server 2014



A photograph of three people, two women and one man, smiling and looking at a computer monitor in a library or study setting. Bookshelves filled with books are visible in the background. A semi-transparent grey box is overlaid on the lower left portion of the image, containing the text 'Provide Stability to Applications'.

**Provide Stability to Applications**

  
**ExLibris**<sup>®</sup>  
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# Provide Stability to Applications

Improve logging verbosity to better understand errors (Send Error Reports in Write N Cite)

Occurrence	Location	Message
2245	LocalStorageGateway	Failed to Update Last Sync Status java.util.concurrent.ExecutionException: java.io.EOFException java.util.concurrent.ExecutionException: java.io.EOFException at java.util.concurrent.FutureTask\$Sync.innerGet(FutureTask.java:222) at java.util.concurrent.FutureTask.get(FutureTask.java:83) at com.refworks.bibliotech.LocalStorageGateway.waitForFutures(LocalStorageGateway.java:412) at
11	LocalStorageGateway	
63	LocalStorageGateway	Synchronizing user's OutputStyle Infos
147	LocalStorageGateway	Synchronizing user's references.
		Error adding context menu items.:System.Runtime.InteropServices.COMException (0xE004000D): Exception from HRESULT: 0xE004000D at Microsoft.Office.Core.CommandBarControls.Add(Object Type, Object Id, Object Parameter, Object Before, Object Temporary) at Refworks.WriteNCite4.RefworksRibbon.AddEditCiteItemToContextMenu()
1	Citations	
1	Word Native	An error occurred in checking RW2 document for conversion : Object reference not set to an instance of an object.
2	DocumentConversion	An unexpected exception occurred when listing reference to convert document: Expected value at 1:0
510	LogGateway	After making Report ID API call
477	LogGateway	After making Upload API call
8	DocumentConversion	An unexpected exception occurred when listing reference to convert document: null
2944	RWAPI	Before making API Call in executeJsonNoCatch com.bur.proxy.util.ProxyException: java.net.ConnectException: Connection refused com.bur.proxy.util.ProxyException:

# Provide Stability to Applications

## Application Performance Monitoring

- Metrics from Google Analytics
  - (average page load time, comparing pages to average load time...etc)
- Slow queries from MongoDB
  - Average time, in-memory sort...etc
- Additional process logging planned
  - Specific event logging

# Provide Stability to Applications

## Google Analytics

Primary Dimension: **Page** [Page Title](#) [Other](#)

Secondary dimension: **Sort Type: Default**

Page		Page Views	Avg. Page Load Time (sec) (compared to site average)
		223,287 % of Total: 100.00% (223,287)	6.47 Avg for View: 6.47 (0.00%)
1.	<a href="#">/library/recent/</a>	63,133	26.95%
2.	<a href="#">/library/all/</a>	30,656	0.71%
3.	<a href="#">/pme/item/0/</a>	20,069	-57.64%
4.	<a href="#">/biblio/quickcite/citation-style/?collectionId=recent</a>	4,576	-56.59%
5.	<a href="#">/tools/</a>	4,218	-51.63%
6.	<a href="#">/reference/upload/recent/</a>	3,930	-61.24%
7.	<a href="#">/library/recent/?eml=activation</a>	3,366	9.57%
8.	<a href="#">/biblio/quickcite/citation-style/?collectionId=all</a>	2,803	-70.90%
9.	<a href="#">/reference/upload/all/</a>	1,946	-47.64%
10.	<a href="#">/settings/account/</a>	1,320	-69.21%

Show rows: 10 Go to: 1 1-10 of 68758

# Provide Stability to Applications

## Slow Queries from MongoDB

Last analyzed  
2 hours ago at 2018-06-12 13:54 (2018-06-12 20:54 UTC)

Log lines read  
11 hours of logs starting at 2018-06-12 02:44 (2018-06-12 09:44 UTC)

### Query Reports

namespace

flow.users

find command

```
{"$or":[{"email":{"$regex":"<val>","$options":"<val>"}},{"firstName":{"$regex":"<val>","$options":"<val>"}},{"lastName":{"$regex":"<val>","$options":"<val>"}]}
```

total time (all occurrences)

2 minutes, 25 seconds (approx.)

average documents / index keys examined

1 / 2,095,103

last seen

2018-06-12 12:53 (2018-06-12 19:53 UTC)

average time

4,702 milliseconds

in-memory sort

no

query count

31

recommendations: ([view existing indexes](#))

index: {"email": 1} (satisfied by existing index)

index: {"firstName": 1} (satisfied by existing index)

index: {"lastName": 1} (satisfied by existing index)

# Provide Stability to Applications

Understanding our customers:

*Not good enough to watch logs and metrics....*

## Engagement with our Customers

Development are now/have been involved in engaging our customers in meetings and discussions

- London based customers dealing with RCM loading issue
- University of Hawaii ezProxy issue
- Denver University ezProxy issue
- University of Haifa WNC installation issues

## Listening to our Customers

Development participating in UX Research Sessions with Customers

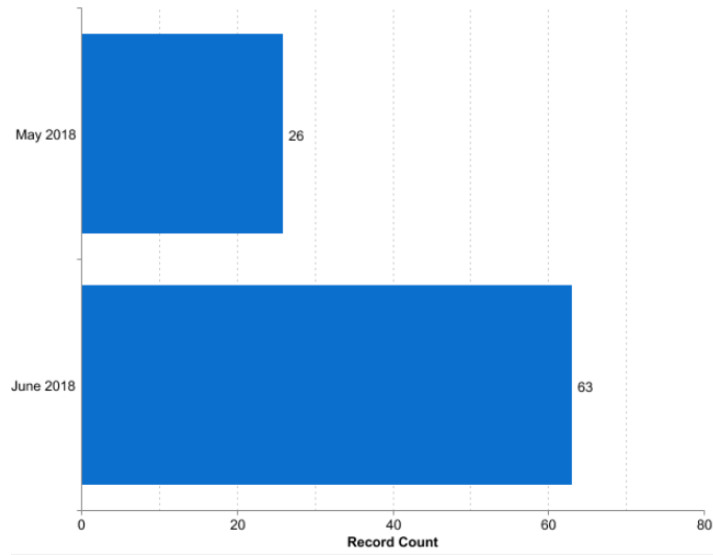
- Get a better sense of how customers are using our product
- Educate development on common issues

## Talking to our Account Reps

- Korean customer issues with direct export and deduplication

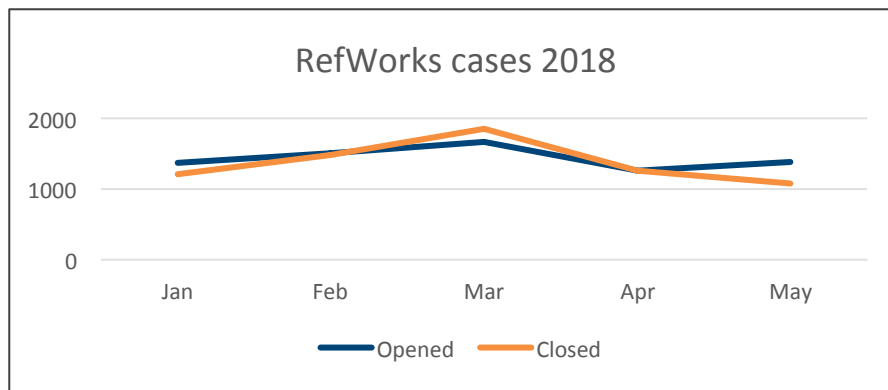


# Provide Stability to Applications



Reports of defects that are resolved per month.

(Data available since late-March move to ExLibris Support Portal)



Important trend is to see that roughly the same number of cases that are opened are closed showing that the Support team is able to stay on top of customer inquiries.



**Provide Value to our Customers**

# Provide Value to our Customers

Fixing and Stabilizing is Core, BUT, we cannot forget that we need to enhance and increase our feature offerings for Refworks

- DOI Integration with Summon
- Deduplication improvements
- Document Compatibility
- UI improvements for all components
- Password Reset workflow improvements
- Usage Analytics
- Bulk user administration (Activate, Deactivate)
- Language Support
- GDPR
- CSL Integration (coming in July)
- ...and lots more

Talk to Todd about our future releases

A photograph of four people (two men and two women) looking intently at a laptop screen. They are in a casual setting, possibly a meeting or a collaborative work environment. The background is a brick wall.

# Clean up Development Process

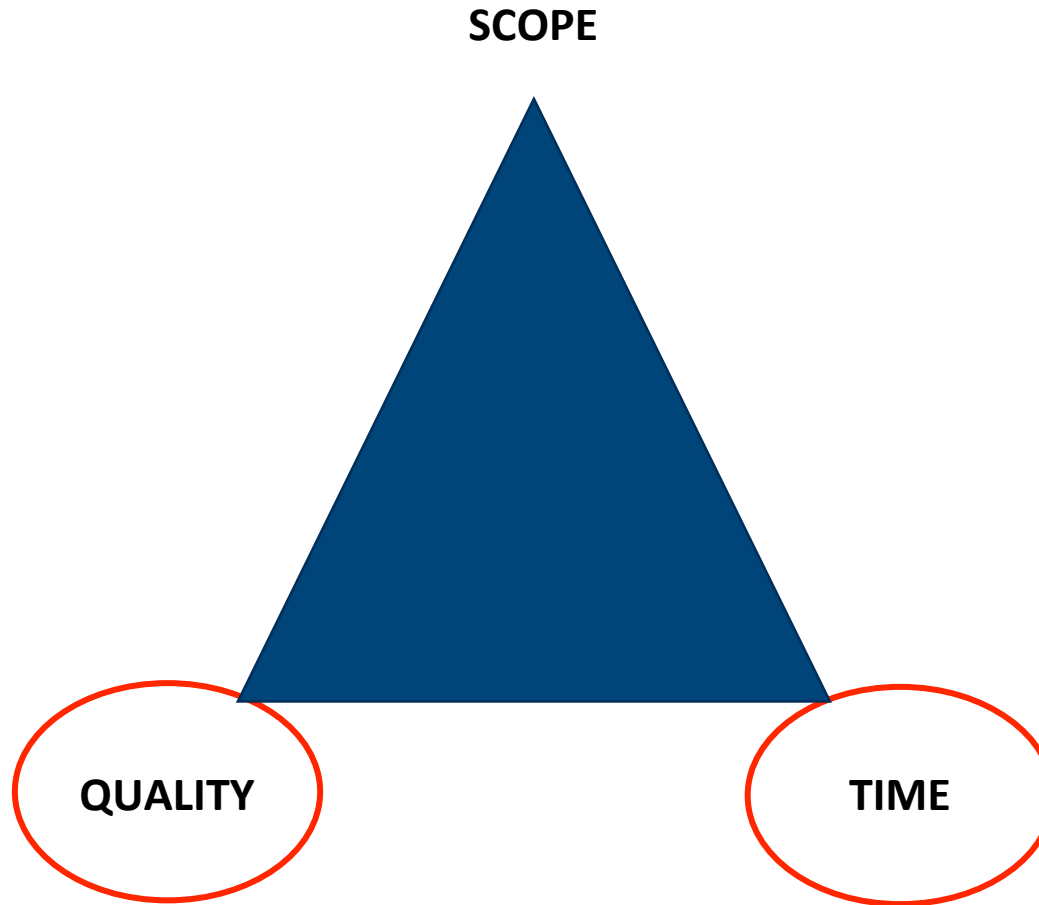
# Clean up Development Process

## Predictable Release schedules

- **Predefined release dates** for the entire year (1<sup>st</sup> Tuesday of each month \*\* unless there is holiday)
- Following the same **monthly release cycle** as Ex Libris
- Team transitioned to release cycle since **Feb 2018**
- High priority production issues will be in patch releases
- Patch releases are released as soon as issues are fixed and tested
- Development is always working on the release the month before
- Each release will have a spread of:
  - Product enhancements
  - Technical upgrades
  - Bug fixes
- Allows for:
  - Quick turnaround on issues
  - Change in product/feature direction

# Clean up Development Process

**Our focus:**



Our version of the Scope Triangle



# Clean up Development Process

## Our Process:

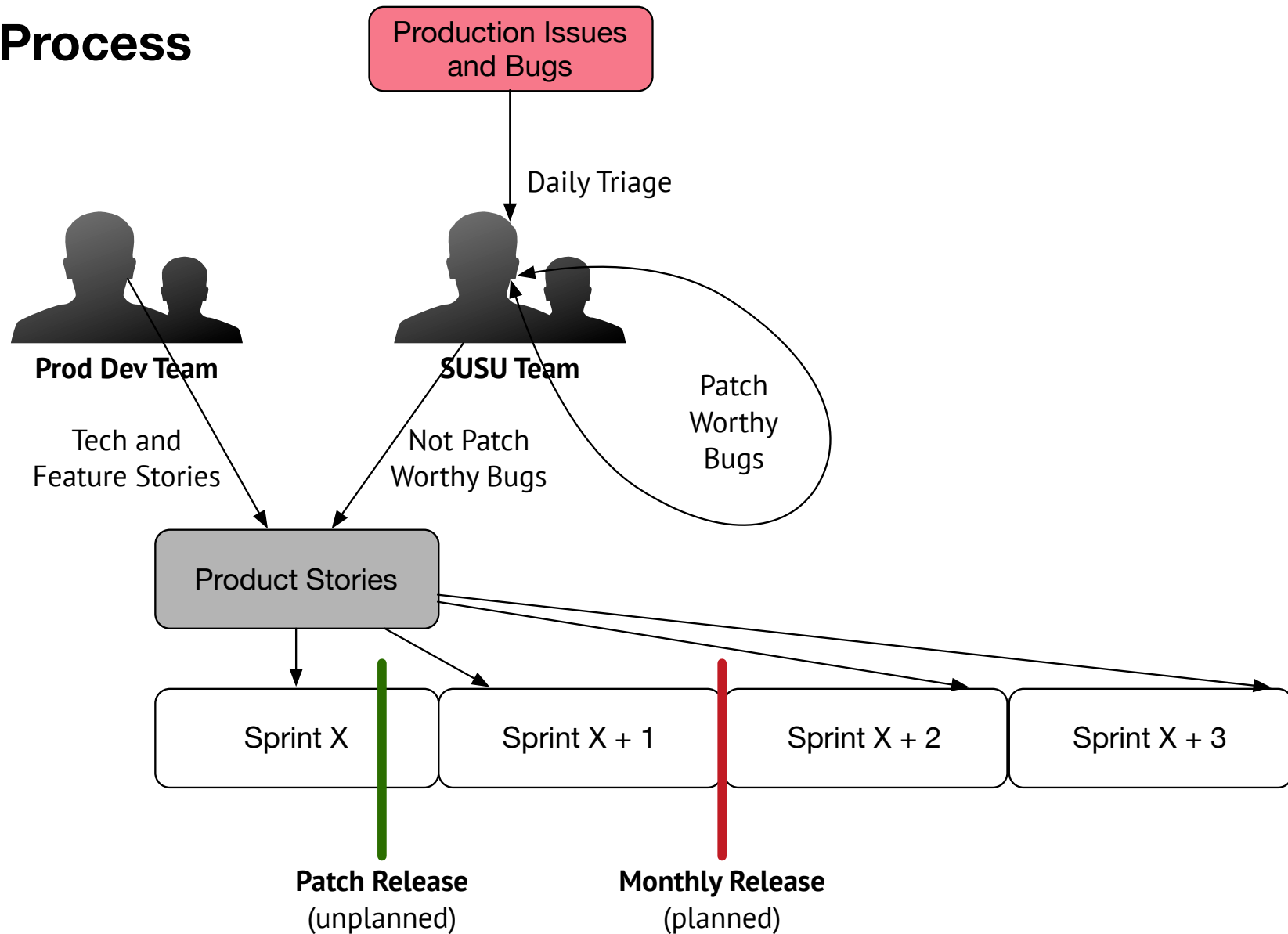
- 2 teams 2 processes: Agile Scrum and Kanban
- We run Scrum for monthly releases and use Kanban to handle production issues for patch releases

## Our Teams:

- Agile Scrum (Planned releases)
  - 2 week sprints. Flexible, but committed
  - Daily Stand Ups to gauge progress
  - Groom stories as we go along. Never looking too far ahead
- SUSU = Scale Up and Speed Up (Unplanned release)
  - Small team dealing with production issues.
  - Evaluate high priority issues right away
  - Patch release worthy bugs/issues

# Clean up Development Process

## Our Process



A photograph of two women in a library or study setting. The woman on the left has dark hair and is wearing a dark blazer over a light blue shirt. The woman on the right has curly hair and is wearing a dark pinstripe blazer over a white shirt and a patterned scarf. They are both looking down at a document or book. A large, modern lamp with a white conical shade is positioned between them, casting a warm light. In the background, there are bookshelves filled with books and arched doorways.

# Getting More Help

# Getting More Help

## Before Integration with Ex Libris

- Not as integrated with shared services
  - Uncertainties in product delivery
  - Missed priorities
- There were some challenges with Refworks**

## After Integration with Ex Libris

- Additional engineering headcount and renewed focus
- Foundation of a software company, supported by:
  - Cloud Team (Build deploy, hardware monitoring, networking...etc)
  - Data Team (eg. reviewing output styles)
  - Documentation Team (ownership of product documentation)
  - Support Team (integrated with ExLibris support process)
  - Senior Leadership (engaged)

Total number of people working on Refworks has increased!

A photograph of three students in a library setting. On the left, a young man in a green polo shirt is looking towards the center. In the middle, a young woman with long brown hair, wearing a white shirt and a yellow cardigan, is smiling and looking down at a book. On the right, another young woman with long dark hair is looking at the same book. A laptop is visible on the table in front of her. The background shows a large, bright library with many tables and chairs.

## Plans for the future

# And we are not done...

1

## Stability

- Increase Test Automation Coverage
- Expand QA environment (Proxy, Shib..etc)

2

## Performance

- Addressing Scalability Bugs
- RCM Rework
- WNC Syncing issues

3

## Technical Infrastructure

- Continuous Integration Environments
- Datawarehouse for Analytics
- Google Analytics

4

## Features

- RefIDs
- Deduplication Part 2
- Table View

5

## Partnership

Partner accessible  
NRW API Layer



**Plans for the  
Future**

**WE ARE COMMITTED**

BUT

**WE WILL MAKE MISTAKES ALONG  
THE WAY**

**WE WILL CHANGE**

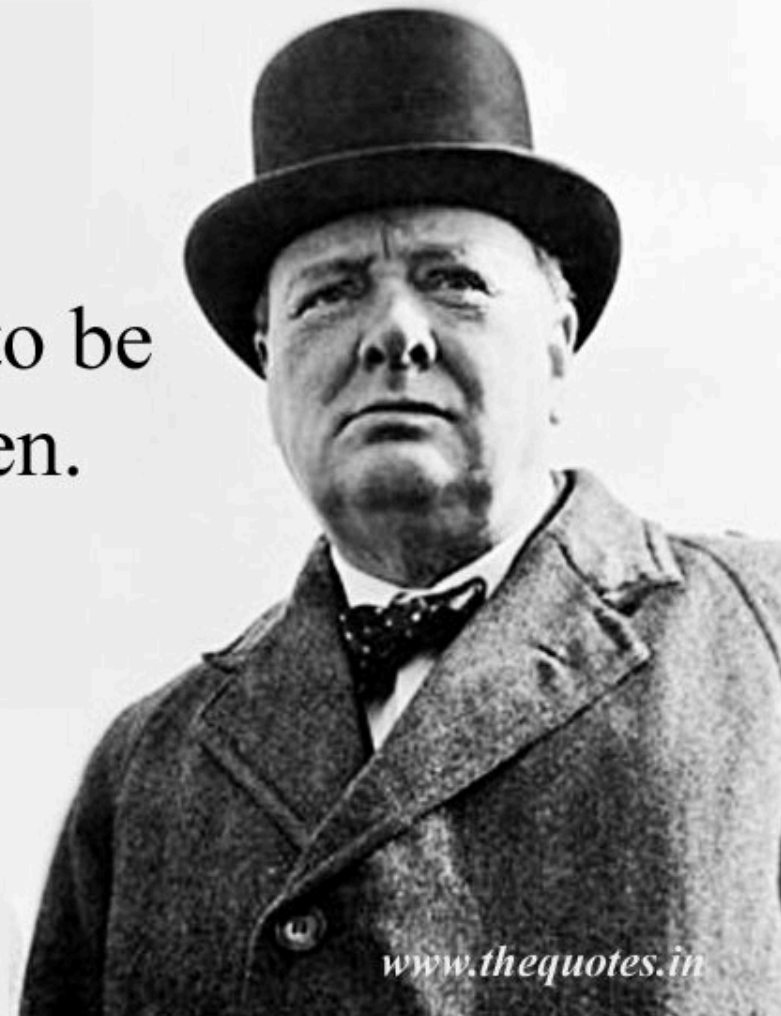
AND

**WE WILL SUCCEED**

# We are committed and We will get there

To improve is to change; to be  
perfect is to change often.

*Winston Churchill*



[www.thequotes.in](http://www.thequotes.in)

# Meet the GLOBAL Refworks Development Team



**USA**  
**Ann Arbor, MI**  
**Seattle, WA**  
**New York City, NY**

**International**  
**Parana, Argentina**  
**Montevideo, Uruguay**  
**Jerusalem, Israel**



# Questions?





**THANK YOU**

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