

Today & tomorrow:  
*A brief history (& future) of  
library systems in the 2020's*

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# A brief history (& future) of library systems in the 2020's

- A brief history of library systems
  - Noting the recent history of market consolidation
- Current state of library systems
  - The rise of SaaS
  - Implications on system choice
- The promises (& pitfalls) of open source
  - Theoretical implications for libraries

## Some contextualizing thoughts

- Library systems exist in an administrative interzone that contains both patron/institutional needs & vendor/developer *decisions*<?>
- Our selection and implementation of library systems have implications for institutional workflows and impact how information is presented & delivered to users
- Systems, the vendors/developers that create them, and the institutions that use them are not neutral entities
- I am a higher education librarian, YMMV

## A brief history of library systems

- Initially developed in 1960's / 1970's
- Boutique applications, mainframe dependency
- Highly refined by 1990's
  - MARC support
  - OPAC support
- Market shifts in 1990's and beyond due to consolidation, changes in library ecosystem, applications refocus

Kinner & Rigda (2009); Gallup Fayen (2010)

The library system as we conceive of it today had its initial development in the 60s and 70s, arriving at the automated library system (or ALS) of the late 70's and 80's. These applications were by and large boutique applications, "purpose built" is the phrase quoted by Kinner and Rigda, and largely depended on system mainframes built onsite specifically for the purpose of housing the ILS (at great cost and infrastructural commitment)

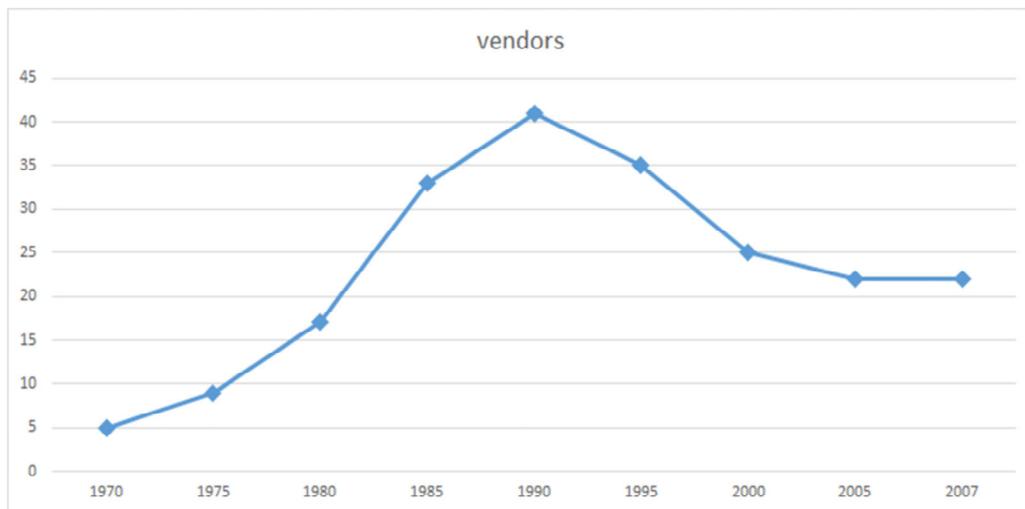
By the 90's the integrated library system as it was then known began to coalesce in the shape that we know recognize. Iterative enhancement over the years led to the greater support of MARC cataloging standards and supported traditional cataloger interactions of writing and updating catalog entries. The integration of OPAC functionality supported information access and retrieval, giving credence to the term 'integrated'.

With the increased usability of the ILS came new entrants into the applications market. Options soared during the late 80's due to varied needs of differing library types and open competition in the marketplace. Yet, market offerings began to shift in the 90's different forces came into play

- As some companies grew, they acquired smaller operations, integrating their developer corps and customer base into their growing corporate entities. Marshall Breeding referred to this as the "great reshuffling" and we still feel the effects of it today (i.e. Ex Libris, Proquest)
- Changes in library media types also shifted the market, introducing the need for direct access to digital resource via digital publishers and license management functions
- And the modularization of ILS functions -- the introduction of task-centered

applications such as the Discovery Layer, ILL services, ERMs, and so on.

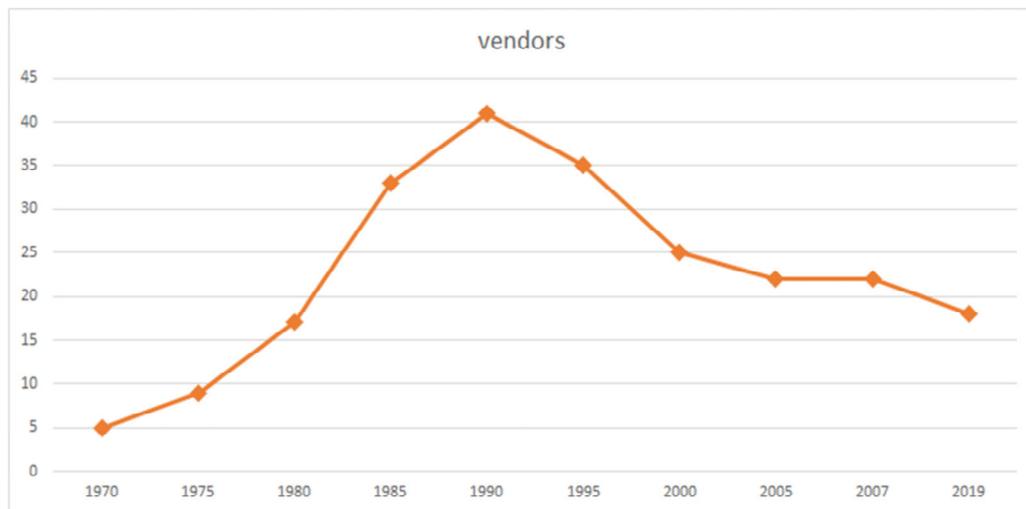
## The arc of the market



Kinner & Rigda (2009)

This is a rather instructive graph as it charts the rise and fall of library system vendors from the inception of library systems to the near modern day. We see a peak in 1990 of around 40 separate vendors offering library system solutions for a variety of purposes and institutions. We also see an associated dip in companies as the market retracted after the early 1990s, trending downwards towards where we are today. (click)

## The arc of the market



From Kinner & Rigda (2009), modified by Koivisto (2019)

In 2019, the total number of unique ILS vendors has been reduced to approximately 18 depending on how you count. This number also requires a bit of contextualizing as it does not represent open source solutions such as FOLIO and Koha nor does it include the variety of vendors that specialize in supporting OS applications for libraries. Another important bit of context worth noting is that this number is arrived at by considering all possible vendors that service libraries, regardless of institutional types. When narrowing your consideration to specific institutional types -- academic, public, school, etc. -- the real number of available applications is reduced further to about 3 or 4. This demonstrates that even in our current start-up culture -- filled with endless varieties of boutique applications for personal use -- the market consolidation for library systems that has occurred over the past decades continues its trend.

## Drivers of consolidation

- Vertical and Horizontal Consolidation -- Breeding
- Resist new entrants [or] advancement of regional companies...  
uncomfortably narrow...  
-- Breeding
- Move to Library Management Systems (LMS)
- Software-as-a-service (SaaS)

Breeding (2016-2019)

Unsurprisingly, one of the major drivers for consolidation is the market behavior of corporate acquisition and integration. As mentioned before, the ILS environment morphed from one captured largely by boutique, standalone platforms to more fragmentary, modular approaches. To adjust to this new system model, many large vendors acquired disparate software vendors in a hope of promoting synergistic offerings and growth. One need only look at the example of ProQuest -- a content publishing company -- and their acquisition of Ex Libris -- a more conventional ILS vendor -- as a prime illustration of the business potential (or perhaps a more instructive metaphor would be Taco Bell acquiring Procter & Gamble, makers of Pepto Bismol).

Accompanying vertical consolidation is the more traditional horizontal consolidation: purchasing companies within the same product group and market share. Marshall Breeding speculates that the horizontal consolidation of the ILS market is “near complete”, leaving a few behemoth companies to control the largest portion of the economy. This has left us with “an industry of established companies and few startups” that “resists new entrants or even the advancement of local or regional companies on a global sphere”. He editorializes a tad, describing the state of market competition and innovation “uncomfortably narrow”.

With all this consolidation, vendors are now shifting their modus operandi even further away from the modular growth of the system environment, returning to centralized, monolithic platforms, now enabled with the panoply of system functionalities made possible through vertical integration. These new tools or Library Management Systems (LMS) will reduce system complexity by purportedly serving all system needs within a single tool -- from acquisitions and cataloging to circulation and e-resource management. This has, in turn,

also lead to a software trend of deploying library systems as software-as-a-service by default. For those unfamiliar, SaaS is the practice of vendors hosting platforms on their own servers and providing purchasing institutions access, service, and -- to a certain extent -- in exchange for regular fees akin to subscription rates. This, may in fact, be one of the biggest shifts in the market as it shifts responsibility for system infrastructure and support to the vendor. This reduces the institutional overhead for selecting a system and reduces investment by obviating the need for sys admins and support personnel, or even in-house knowledge of programming and system architecture.

## Is this good? Is this bad?

- Decreased institutional investment
- Quicker integration of enhancements
- Presumption of module interoperability

- Decreased institutional investment: No longer a need to host servers at institution; no need to higher system admin, architects, or developers; no need for custom in-house development
- Quicker integration of enhancements: Development completed by vendor can be seamlessly integrated; decreased likelihood of fatal issues;
- Presumption of module interoperability: As all development and all system functionality is system specific, data and processes are presumed to work with all modules

All of this represents time and money savings, decreases specialization of staff, lower need for reskilling or professional development (in regards to maintaining and using tool)

## Is this good? Is this bad?

- Less direct control; Widening gap between system users and system governance
  - Vendor paternalism -- Askey & Askey
- Potential to introduce system errors & biases
  - Matthew Reidsma
  - Safiya Noble "Algorithms of Oppression"
  - Frank Pasquale "Black Box Society: The secret algorithms that control money and information"
- Does SaaS align with our professional values?
  - "When we look to Silicon Valley to explain the future of libraries, we give up our ability to actively shape it ourselves"

Reidsma (2016); Mirza & Seale (2017); Askey & Askey (2017)

- While SaaS models may decrease the direct involvement necessary to run library systems, it also... decreases direct involvement necessary to run library systems. Less interaction with the tool at all levels (end user, system user, admin user) may decrease in-depth knowledge of system functionality and the ability to control features
- This wider gap then places the system within the proverbial black box. Data and behavior goes in, results come out; no need to look behind the curtain. In addition to decreased awareness of how & why systems behave as they do, we become less empowered to dictate the projection of future development and design. Vendors attempt to mitigate this through a series of enhancement proposal and development cycles (something that is already common for most library systems), but when this becomes the sole avenue for input on application design, one must speculate on what is lost. Speaking as someone that works at an institution that uses numerous speciality in-house features, I feel like there is something irrevocably lost when all requests and enhancements must be mediated
- With this loss of direct control comes the potential for issues, errors, and bias to be introduced into our systems. Matthew Reidsma wrote about his experience of testing ProQuest Summons, a proprietary, closed-box discovery system. Through systematic testing -- through the interface only -- he found numerous biased results in search algorithm results. As Summons is SaaS, his only recourse was to contact the vendor and to trust them to adequately address the issue (spoiler: they didn't)
- Safiya Noble has written broadly about the issue of algorithmic bias as has Frank Pasquale, but this just represents a small amount of research being done on the dangers and pitfalls of closed systems. Certainly suggested reading for anyone

- exploring the ins and outs of closed systems
- And we must ask, do these closed systems align with library professional values of openness and accountability. While they may facilitate increased service through reduced expenditures and maintenance time, do we sacrifice our ability to explicitly express to patrons and users why a system does or doesn't meet their information needs?

Open source



While we are certainly on the cusp of a peculiar point in library system market history, we alternately have more and more options for open source systems that have increased implementation around the world.

## Why open source?

- Designed for libraries by libraries
- Creates opportunities for unmediated, organic growth of system design based on institution-specific or domain-specific needs
- Places systems within reach of institutions that might not otherwise be able to afford it
- “Non-excludable public good” - Eghbal
- Accountability
- “Warm fuzzy factor”

Oberhaus (2019)

But the question remains, why open source? While we can simply say “because it’s not commercial”, that response elides many of the compelling arguments for selecting and supporting open source systems and initiatives.

- Open source systems are designed explicitly for libraries by libraries. While commercial systems are also “designed for libraries” the open source alternatives are designed with an eye to library processes and scalability that better serves the institutions. Sense of community and democratic development.
- Design is not the only facet here. Because OS systems are not corporate products and support distributed development and enhancement, OS approaches create a chance for organic growth of systems based on real observed needs within an institution. A module not acting in a way that best suits your process? You can change it, enhancement the code in such a way that your needs are met. Furthermore, you can then redistribute your enhancements for the good of other implementing institutions.
- Open source systems also place world-class applications within reach of institutions that might otherwise be excluded from the market by shifting the cost of implementation away from the software itself and towards infrastructural and staffing needs
- This adheres to what Nadia Eghbal defines as non-excludable public goods. Much like roads and parks and street lights, open source software is freely distributed for use and enjoyment even by those that cannot afford to contribute to its upkeep.
- Open source apps are also more open to accountability as all elements of the application -- source code, interfaces, developer community and comments -- are open to review and audit. Unlike many of the locked-box systems of the corporate

- sector  
Warm fuzzy factor

## Why (maybe) not open source?

- Dramatically increased need for in-house expertise & infrastructural investment
- Free like a puppy, not free like beer
- True value realized not just in implementing, but in contributing
- Which raises questions...

- Costs are shifted, not obviated. Still costs money and in many cases has a higher technical hurdle than vendor-sourced solutions
  - Sys admins
  - coding/programming/testing knowledge
  - Servers (and all the space, energy, and expertise needed)
- Free like a puppy, not free like beer
- While using open source is one thing, the real value of os is realized through contributing. Not just for the good of the order, but also selfish in-house needs. Customization, enhancement, and optimization only possible if you have the resources and time to pitch in.
- Which raises the question...

## Open source for whom?

- The economics of open source may be less equitable than its ethics
- Major contributors can become limited to a few large key players and corporate sponsors
- “Full Stack Librarians” and hyperfocus on technosolutionism - Mirza & Seale
- Systems reflect people and organizations with the privilege to build them - Kate Dohe

Oberhaus (2019); Information Maintainers (2019); Mirza & Seale (2017)

- Open source contribution can be a very divisive question in terms of economics. We can look to the larger world of computer technology for examples of how open source software is maintained by a few committed contributors that do so at an economic deficit to themselves. Arguments can be made that open source development and contribution leads, ultimately, to material gains, but it does not wipe away the fact that many pieces of essential technology are built on the backs of free labor

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## NOT FOUND

## What is the future for library systems?

- Consolidated market & SaaS models likely here to stay
  - And possibly continue
- Altered power dynamics between users & vendors
- Decisions between vendor-supplied and open-source solutions driven as much by economic exigencies as professional & ethical values
- Intentional approach of using open source to build community, not merely replicating corporate values in higher ed. / cultural heritage arena

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