

Technical services workflows in the age of linked data

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Abstract: *The transition from MARC-based cataloging to linked data paradigms represents the most significant operational disruption to library technical services since the adoption of the computer. While the theoretical benefits of semantic web technologies are well documented in professional literature, the practical reconfiguration of daily workflows, staff competencies, and quality control mechanisms remains critically underaddressed. This article examines the tangible challenges and strategic opportunities inherent in restructuring technical services departments to function within a linked data ecosystem. Drawing upon recent pilot projects and institutional migration reports, the analysis proposes a phased framework for workflow transformation that prioritizes incremental change, cross-departmental collaboration, and the redefinition of professional roles. The argument posits that successful adaptation depends less upon the adoption of specific software platforms and more upon a fundamental cultural shift away from record-centric thinking toward data-centric stewardship. Technical services librarians must evolve from creators of discrete bibliographic surrogates into managers of interconnected data entities that participate in a global web of knowledge. The article concludes with actionable recommendations for assessing local readiness, designing iterative implementation strategies, and establishing sustainable metrics for evaluating success in this new environment. Ultimately, the linked data transition offers technical services an opportunity to reclaim a central strategic role within the broader library organization, provided that workflows are redesigned with intentionality and foresight.*

Keywords: *linked data, BIBFRAME, technical services workflows, cataloging transformation, semantic web, library data management, professional development, metadata quality, interoperability, library systems migration*

For the better part of five decades, the operational backbone of library technical services has rested upon a remarkably stable foundation. The MARC format, conceived in the late nineteen sixties and codified over subsequent decades, provided a structural consistency that allowed libraries to share cataloging records, build union catalogs, and offer predictable discovery experiences to generations of library users. This stability engendered workflows that were, by their very nature, repetitive, linear, and highly procedural. Copy cataloging, original cataloging, authority control, physical processing, and database maintenance each occupied distinct functional silos, with handoffs between units occurring according to well-established schedules and quality benchmarks. The predictability of MARC-based work made it relatively straightforward to measure productivity, train new staff, and allocate resources across technical services divisions. Yet this very predictability now constitutes the primary obstacle to meaningful transformation, as the emergence of linked data and the BIBFRAME initiative demand not merely an update to existing practices but a fundamental reimagining of what technical services does and why it matters.

The conceptual shift from MARC to linked data is often characterized in technical terms, with emphasis placed upon the replacement of fixed fields with entity-relationship models, the adoption of resource description framework syntaxes, and the necessity of uniform resource identifiers in place of textual access points. These technical dimensions are undeniably significant, yet they obscure a

more profound transformation that has received comparatively less attention in the professional literature. The transition to linked data fundamentally alters the ontological status of the bibliographic record itself. Under the MARC paradigm, the record functions as a self-contained surrogate, a discrete object that carries within its structure all the information necessary to describe, locate, and manage a library resource. The record is portable, replicable, and essentially atomic. In the linked data environment, however, the record dissolves into a network of interrelated statements, each of which references external authorities and participates in a distributed web of meaning that extends far beyond the boundaries of any single library's catalog. This dissolution of the record as a unit of work carries profound implications for how technical services staff conceptualize their daily tasks and measure their professional accomplishments.

The first and perhaps most challenging area of workflow reconfiguration concerns the division of labor between original and copy cataloging, a distinction that has structured technical services departments for generations. In traditional workflows, original catalogers are the experts who create new records according to national standards, while copy catalogers perform the economically essential but intellectually less demanding work of adapting existing records to local practices. This hierarchy, while often problematic in its implicit valuation of certain skills over others, at least offered clarity regarding responsibilities and training pathways. Linked data environments complicate this binary arrangement considerably. When bibliographic description becomes a matter of linking to existing entities rather than transcribing new data, the distinction between creating and copying begins to blur. Every cataloger, regardless of seniority, must engage with the same universe of authorities, make similar judgment calls about the appropriateness of existing entities, and contribute to the ongoing refinement of the library's knowledge graph. The result is a flattening of the traditional hierarchy that demands not the elimination of expertise but its redistribution across the entire technical services workforce.

This redistribution of expertise necessitates a corresponding rethinking of professional development pathways. The skills required for effective linked data work extend well beyond the traditional cataloger's toolkit of classification schemes, subject heading structures, and descriptive cataloging rules. Contemporary technical services staff must develop fluency in data modeling, understand the principles of semantic web technologies, become comfortable with query languages such as SPARQL, and acquire at least a working knowledge of application programming interfaces and data serialization formats. These are competencies that have historically belonged to systems librarians or information technology specialists rather than to cataloging and metadata staff. The integration of these technical skills into the professional identity of the technical services librarian represents one of the most significant human resource challenges facing library administrators today. It is insufficient to offer occasional workshops or webinar series on linked data concepts; what is required is a sustained, longitudinal approach to staff development that embeds continuous learning into the fabric of daily work. Institutions that have made meaningful progress toward linked data implementation consistently report that their most valuable investments have been in cross-training, mentoring, and the creation of dedicated experimentation time, rather than in the acquisition of particular software products.

The reconfiguration of technical services workflows also demands a critical examination of the quality control mechanisms that have long governed cataloging practice. In the MARC environment, quality is typically assessed through the lens of completeness and correctness, measured against code lists, content designators, and the Anglo-American Cataloguing Rules or Resource Description and Access. A high-quality record contains all required fields, adheres to prescribed punctuation conventions, and provides sufficient access points to enable discovery. Linked data introduces a

fundamentally different conception of quality, one that privileges connectivity, consistency, and contextual richness over formal correctness. A high-quality linked data statement is not merely accurate in its assertions but also useful in its connections, linking local resources to established authority files, contributing to the global pool of linked data, and enabling novel forms of discovery that were impossible under the MARC paradigm. This shift in quality criteria requires technical services staff to develop new evaluative frameworks and to abandon certain long-held assumptions about what constitutes good cataloging practice.

The relationship between linked data workflows and the larger library systems infrastructure presents another layer of complexity that cannot be overlooked. Most libraries currently operate within an ecosystem of integrated library systems, discovery layers, interlibrary loan platforms, and electronic resource management tools that were designed with MARC compatibility as a fundamental requirement. The gradual replacement of these systems with linked-data-native platforms will occur unevenly across the library landscape, with some institutions adopting new systems rapidly while others maintain legacy infrastructure for years or even decades to come. This heterogeneity creates a workflow challenge of considerable magnitude, as technical services departments must simultaneously maintain traditional MARC-based processes while gradually building capacity for linked data creation and management. The dual workflow requirement strains already stretched staffing resources and introduces significant risks of data inconsistency and duplication. Successful institutions are those that approach this transition with a clear understanding of their local constraints and a realistic timeline that acknowledges the necessity of parallel operations for an extended period. Project management methodologies that have proven effective in other areas of library operations offer valuable frameworks for navigating the linked data transition. Agile approaches, with their emphasis on iterative development, regular assessment, and flexible response to changing requirements, are particularly well suited to the uncertainties inherent in linked data implementation. Rather than attempting to design perfect workflows before any actual linked data work begins, technical services managers would be better served by adopting a learn-by-doing approach that begins with small, bounded projects and expands incrementally based on lessons learned. Pilot projects focused on a single format, such as monographs or serials, or on a particular collection, such as rare books or institutional repositories, allow staff to develop competencies in a controlled environment while generating tangible outputs that demonstrate progress to institutional stakeholders. These early projects also provide invaluable opportunities to test local decisions regarding entity identification, relationship modeling, and data reconciliation before committing to large-scale production workflows.

The organizational positioning of technical services within the broader library structure is likely to shift as linked data workflows mature. Historically, technical services has occupied a somewhat peripheral position relative to public services, with its work largely invisible to patrons and often undervalued by library administrators who prioritize front-facing activities. The linked data environment offers an opportunity to reverse this marginalization by positioning technical services as a strategic contributor to institutional priorities such as digital scholarship, open access publishing, and research data management. When bibliographic data becomes part of a wider institutional data ecosystem, the expertise of technical services staff in data modeling, metadata application, and authority control becomes relevant to domains far beyond the traditional catalog. Technical services librarians can thus recast themselves as data stewards whose contributions are essential not only to discovery but to the full lifecycle of scholarly communication. This expanded role requires not only new technical skills but also new relationship-building capabilities, as technical services staff must

engage with researchers, academic departments, and campus information technology units in ways that have not traditionally been part of their professional identity.

Assessment and evaluation practices must evolve alongside workflows if the linked data transition is to be sustained over time. Traditional metrics such as titles cataloged per hour, record acceptance rates in copy cataloging, and timeliness of shelf-ready processing are poorly suited to measuring success in a linked data environment. More meaningful metrics would capture the quality of entity linking, the extent to which local data participates in global knowledge networks, the usability of linked data for discovery and research purposes, and the efficiency of data maintenance and enhancement processes. Developing these new metrics is a nontrivial challenge, as many of the most valuable outcomes of linked data work are difficult to quantify and may only become apparent over extended time periods. Nevertheless, the absence of appropriate metrics invites the continued application of outdated productivity standards that fail to capture the true value of linked data activities and may inadvertently discourage the very behaviors that are most essential to successful transformation.

The financial implications of the linked data transition deserve careful consideration, particularly in an era of constrained library budgets and competing institutional priorities. The costs of linked data implementation extend well beyond the obvious expenditures for new systems and software licenses. Significant investments are required in staff training, data migration and reconciliation, consultant expertise, and the administrative time necessary for planning and coordination. These costs must be weighed against the anticipated benefits, which include improved discovery, enhanced interoperability with external systems, reduced duplication of effort through shared entity management, and the potential for new services enabled by rich semantic data. Libraries that approach the linked data transition as a purely technical upgrade are likely to be disappointed by the cost-benefit equation, while those that view it as a strategic investment in the library's future relevance are better positioned to make a compelling case for the necessary resources. The most persuasive arguments for linked data investment are those that connect the transition to broader institutional goals, such as supporting emerging research practices, enhancing the visibility of institutional scholarship, or enabling new forms of pedagogical engagement with library collections.

Collaboration across institutional boundaries assumes heightened importance in the linked data environment, as the value of semantic data increases exponentially with the size and diversity of the network in which it participates. Individual libraries acting alone cannot build comprehensive knowledge graphs or establish robust entity management infrastructure; these are inherently collective endeavors that require coordinated effort across the library community. Technical services workflows must therefore be designed with an awareness of the collaborative infrastructure that supports linked data, including shared authority files, entity reconciliation services, and community-maintained ontologies and application profiles. Participation in these collaborative structures demands adherence to community norms and standards, active contribution of local data to shared pools, and willingness to align local practices with broader community directions. This collaborative imperative represents both a challenge and an opportunity for technical services departments, requiring them to look beyond local concerns while simultaneously benefiting from the collective expertise and resources of the wider library community.

The timeline for full-scale linked data adoption remains uncertain, with significant variation across institutions, formats, and functional areas. Some segments of the library community, particularly those working with special collections and archival materials, have made substantial progress in linked data implementation, while others, particularly those managing large volumes of commercial monographs, lag considerably behind. This uneven pace of adoption creates workflow complications

for libraries that must interoperate with partners at different stages of the transition. Technical services managers must exercise patience and strategic flexibility, avoiding the temptation to rush toward full implementation while also guarding against complacency that delays necessary preparations. The most prudent approach involves steady progress on multiple fronts, including staff development, data analysis and cleanup, systems assessment, and participation in community discussions and pilot projects, without committing to a predetermined endpoint that may prove unrealistic or unsuitable to local circumstances.

Ultimately, the transformation of technical services workflows for linked data is less about technology than about people, less about systems than about habits of mind. The catalogers, metadata specialists, and systems librarians who constitute the technical services workforce bring to their work a deep commitment to the library's mission and a wealth of expertise that has been developed over years of practice. The challenge of the linked data transition lies in honoring that expertise while simultaneously expanding it, in preserving what is valuable about traditional cataloging practice while abandoning what is no longer fit for purpose. The workflows that will emerge from this transition will likely look very different from those of the MARC era, but they will be built upon the same professional values of service, accuracy, and commitment to enabling discovery. Technical services librarians who embrace the linked data transition as an opportunity for professional growth and strategic relevance, rather than as a threat to established practice, will find themselves at the forefront of a revitalized and reinvigorated field, one that is poised to make contributions of enduring value to the library profession and to the communities it serves.

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