

ISSN-H

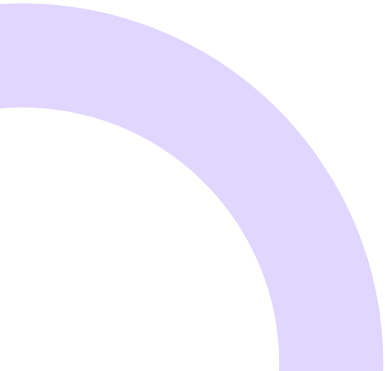
White paper

Addressing User Needs through
Cluster-Based Identification for
Continuing Resources



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Executive Summary

The evolution of the ISSN system reflects the growing complexity of continuing resources within an interconnected, digital publishing ecosystem.

Stakeholders have consistently emphasised the need for mechanisms that can represent relationships between serials more clearly and systematically.

ISSN-H, an automated clustering mechanism based on bibliographic links, has been developed in response to these needs.

This white paper presents the rationale, design and implementation of ISSN-H, emphasising how it addresses user requirements and is operationalised within the ISSN Portal.

Overall, ISSN-H is a user-driven enhancement of the ISSN system that aligns technical capabilities with real-world expectations.

Background and Rationale

The International Standard Serial Number (ISSN), as defined in ISO 3297, is a unique and persistent identifier for continuing resources within a specific medium. Although highly effective for unambiguous identification, the standard has historically offered limited mechanisms for expressing relationships between resources, primarily through the ISSN-L, which collates different media versions of the same title. However, as publishing ecosystems have evolved – particularly with the expansion of digital publishing, title transformations and complex editorial lineages – this limitation has become increasingly evident. Continuing resources now exist as part of dynamic networks involving title changes, mergers, splits, and parallel editions, which are difficult to represent using identifiers designed for single manifestations.

A stakeholder consultation conducted in 2018 confirmed these challenges and provided quantitative evidence of user needs. The majority of respondents expressed a strong interest in improved mechanisms for tracking title history, with around 90% indicating a high or medium level of interest. They stressed the need for improved visibility of title history, including predecessor and successor relationships, and complex scenarios such as mergers and splits. Respondents emphasised the importance of grouping related resources into coherent 'families' to facilitate discovery and navigation. Enhanced discovery mechanisms and intuitive navigation tools were also identified as essential requirements, particularly for library systems and databases. Finally, the importance of high-quality, timely and reliable metadata was repeatedly cited, as it underpins all automated processes and user trust.

However, the survey also revealed a paradox: while users clearly needed better relational tools, they expressed concern about the proliferation of identifiers and the complexity this could introduce. Although conceptually aligned with some of these needs, ISSN-L was found to be insufficiently understood and underutilised, often due to limited visibility in systems and workflows.

These findings demonstrate that the International Standard Serial Number (ISSN) system requires an additional layer of relational modelling capable of representing the full complexity of continuing resource networks, while remaining usable and scalable. ISSN-H was developed in response to this requirement, extending the concept of cluster identifiers to encompass not only medium-based grouping, but also title history. This bridges the gap between identification and relational representation, enabling the ISSN system to evolve from a static identifier framework into a dynamic infrastructure that supports the navigation, discovery and analysis of serial publications over time.

ISSN-H: Concept and Definition

ISSN-H is designed to be a cluster identifier that groups together ISSN records based on the explicit bibliographic relationships that are encoded within the MARC21 linking fields. These fields represent format equivalence, preceding titles and succeeding titles, thereby capturing the full spectrum of relationships between continuing resources. ISSN-H identifiers are automatically assigned from a reserved block of ISSNs beginning with 9, ensuring scalability and consistency. Unlike the ISSN-L identifier, which focuses on linking different media versions of a single resource, the ISSN-H identifier extends this concept to encompass broader relational structures, including title history and complex publication networks. This distinction is important because it enables the ISSN-H system to respond directly to user demand for historical cluster identifiers. As such, ISSN-H introduces a new conceptual layer within the ISSN system, enabling the comprehensive representation of relationships between serials.

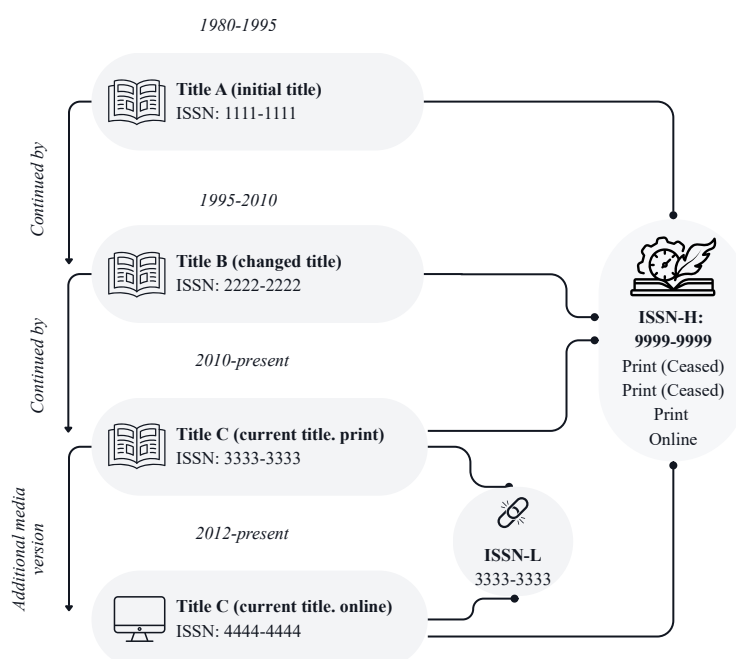


Figure 1: Example of ISSN-H clustering across title changes and formats

Implementation in ISSN Systems and evolution of bibliographic formats

ISSN-H is implemented through automated clustering processes that utilise existing bibliographic linking fields. This automation ensures that clusters are created, updated and maintained without manual intervention, enabling the system to scale efficiently. Clusters have a dynamic lifecycle: new clusters form when linked records emerge; records inherit identifiers when added to clusters; clusters merge when new links connect them; and clusters dissolve when relationships are removed. All changes are recorded in MARC21 field 023, ensuring traceability and historical continuity. Within the ISSN Portal and ISSN+ environment, ISSN-H is integrated as a user-facing feature, providing graphical visualisations of clusters and enabling intuitive navigation across related records. These visual tools enhance user understanding of publication relationships and history. As a result, the implementation of ISSN-H combines automation, traceability and user-centred design to deliver a robust, scalable solution.

The ISO 3297 standard has progressively incorporated the concept of persistent, machine-actionable identifiers by formalising the use of Uniform Resource Identifiers (URIs) in conjunction with ISSNs. Within this framework, a URI is defined as a 'compact sequence of characters that identifies a resource', positioning the ISSN as both a human-readable identifier and a resolvable reference in digital environments. Implementing standardised URI patterns, such as the ISSN Portal model (<https://portal.issn.org/resource/ISSN/xxxx-xxxx>), ensures that each ISSN can be directly linked to authoritative metadata in the ISSN Register. This approach transforms ISSNs into persistent web identifiers, providing reliable access to up-to-date bibliographic information and supporting interoperability across systems.

By aligning the ISSN with the principles of web architecture, the standard facilitates its integration with linked data frameworks and enhances the discoverability of continuing resources in online environments.

Importantly, this URI model is designed to be scalable across all types of ISSN, including cluster identifiers such as ISSN-L and ISSN-H. ISO 3297 explicitly recognises the need to group related resources through cluster ISSNs, which are distinguished by specific prefixes. The URI structure mirrors this logic by enabling consistent resolution paths (e.g. /ISSN-L/ or /ISSN-H/). This uniformity enables not only seamless linking to individual manifestations, but also to higher-level groupings, such as medium versions or title-history clusters. Consequently, URIs become essential for navigating complex networks of continuing resources, facilitating automated linking, metadata exchange and integration with external systems, including library catalogues, indexing services and knowledge graphs. Thus, standardising ISSN URIs reinforces the transition of the ISSN system towards a fully interoperable, web-compatible identification infrastructure.

The MARC21 standard has been formally extended to accommodate cluster ISSNs, particularly ISSN-H, through the introduction of a new dedicated data field (field 023), as proposed in MARC Proposal 2023-06. This change recognises that cluster identifiers constitute a distinct category of data, separate from traditional ISSNs recorded in field 022. The proposal explicitly defines cluster ISSNs as identifiers that group related continuing resources, such as different media versions (ISSN-L) or title histories (ISSN-H). Therefore, they require a separate, repeatable field to store them unambiguously. By introducing field 023 across bibliographic, authority and holdings formats, MARC21 ensures that these higher-level identifiers can be recorded systematically without being confused with identifiers assigned to individual manifestations.

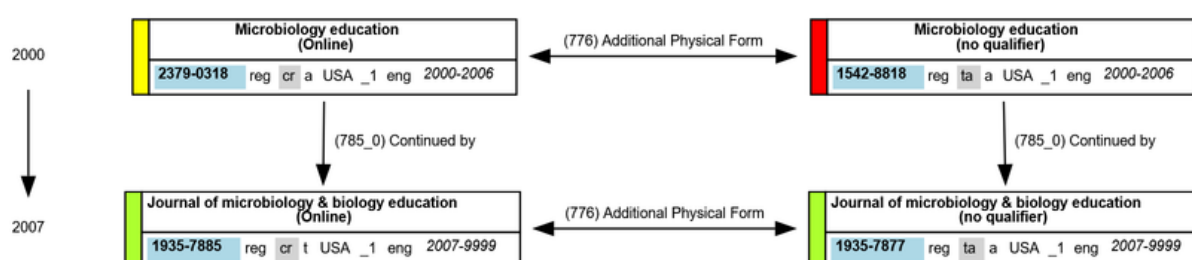
Additionally, the new field facilitates the association of URIs with each cluster ISSN, aligning with broader linked data practices and enabling machine-actionable relationships between clusters and their metadata.

The MARC21 modification goes beyond simply adding a new field by introducing a structured approach to distinguishing different types of cluster ISSNs, including ISSN-L and ISSN-H, through indicator values and subfield coding. In this model, the ISSN-H is explicitly identified as a cluster that links successive and related titles, limited to predecessors and successors in any media version. It remains independent of any single record within the cluster. Field 023 can be repeated to allow multiple cluster identifiers to coexist within a single record when necessary. Additional subfields support the recording of incorrect or cancelled cluster ISSNs, ensuring traceability over time. Therefore, this evolution of MARC21 provides the structural foundation required for implementing ISSN-H within cataloguing systems, enabling the consistent encoding of title history clusters and facilitating their integration into discovery tools and the ISSN Portal.

The UNIMARC bibliographic format has also been adapted to explicitly accommodate cluster ISSNs within field 011, which was traditionally used to record standard ISSNs assigned to continuing resources. According to the updated manual (2025 edition), the scope of field 011 has been broadened so that it 'may also include cluster ISSNs to identify specific groups of ISSNs', such as different media versions or serials linked through preceding and succeeding titles. This reflects a conceptual shift: the field now represents not only identifiers for individual manifestations, but also higher-level identifiers that express relationships between resources. The field can therefore be used more than once when both a standard ISSN and one or more cluster ISSNs (e.g. ISSN-L or ISSN-H) need to be recorded. This ensures that clustering information is integrated directly within the core identification structure of the record.

To support this evolution, UNIMARC has introduced new structural elements within field 011 that explicitly encode cluster identifiers. A dedicated subfield (\$f) is used to record a cluster ISSN, while additional subfields (\$g, \$y and \$z) allow for the management of cancelled or erroneous cluster identifiers alongside standard ISSNs. A second indicator has also been defined to distinguish between types of cluster ISSN, with the value "0" representing an ISSN-L and the value "1" representing an ISSN-H. This enables precise identification of title-history clusters. The manual further clarifies that the ISSN-H functions as a linking identifier for earlier and later titles within a continuing resource's lifecycle. These enhancements demonstrate UNIMARC's evolution from a format focused on single-resource identification to one capable of expressing complex bibliographic relationships through structured, machine-readable cluster identifiers.

You are viewing the 9159-4049 ISSN-H family graph



Addressing User Needs

ISSN-H directly addresses the requirements identified through stakeholder consultation, providing a comprehensive overview of the relationships between continuing resources. By aggregating linked records into clusters, it helps users to understand how titles evolve and navigate complex publication histories more effectively. The system improves discovery by enabling users to interact with clusters rather than isolated records, thereby reducing fragmentation. At the same time, ISSN-H minimises additional complexity by being fully system-managed, so users do not need to assign or maintain identifiers. Furthermore, it supports interoperability and integration with linked data environments by enriching the relational structure of ISSN metadata. In this way, ISSN-H successfully translates user requirements into practical system functionalities that enhance usability and technical robustness.

Frequent title changes are an inherent feature of continuing resources, driven by editorial evolution, institutional restructuring, changes in format, or mergers and splits in publications. According to ISO 3297 rules, such changes often necessitate the allocation of a new ISSN and key title. This is the case when the issuing body mentioned in the title changes, or when the scope or edition statement undergoes significant modification for example. Similarly, structural transformations, such as mergers (where multiple titles combine to form a new one) or splits (where one title gives rise to several independent publications), systematically generate new identifiers. While this ensures precise bibliographic control, it also fragments a publication's identity over time, making it difficult for users to track continuity across successive titles and versions.

ISSN-H addresses this issue by grouping all related ISSN records into a single, dynamically cluster based on relationships such as preceding and succeeding titles, format equivalence, and structural changes. Even when multiple ISSNs are created due to legitimate cataloguing rules, therefore, ISSN-H provides a persistent, higher-level identifier that preserves the intellectual and historical continuity of the resource. Registered users accessing the ISSN Portal can therefore navigate seamlessly across title changes, mergers and splits, gaining a comprehensive view of a publication's evolution without having to interpret each change individually. This significantly improves discoverability and usability while maintaining the integrity of the principles of ISSN assignment.

Benefits for Stakeholders

The introduction of the ISSN-H brings significant benefits to different stakeholder groups by addressing long-standing challenges in representing the continuity and evolution of serial publications. For example, for libraries and cataloguing agencies, it enables a more coherent modelling of title changes over time, grouping preceding and succeeding titles under a single cluster identifier. This reduces fragmentation in bibliographic records and supports more efficient authority control, particularly in large-scale catalogues and union databases. It also enhances the end-user experience, allowing researchers to navigate complex title histories more easily without needing prior knowledge of earlier or later titles. This better aligns with intuitive search behaviours and discovery expectations.

For publishers, ISSN-H offers a strategic advantage by representing the entire lifecycle of their publications. By linking all iterations of a title – past, present and future – it provides a consolidated identity that reflects editorial continuity, even when titles change. This enhances visibility across platforms, improves citation tracking and supports branding by maintaining a persistent connection between related titles. This is particularly valuable for long-running journals that undergo rebranding, mergers or splits, as it ensures that their legacy content remains discoverable and contextually linked.

ISSN-H also significantly benefits data providers, aggregators and system developers. The availability of a structured cluster identifier strengthens the mechanisms used to link databases, enabling more accurate content aggregation and reducing duplication caused by title variations. This improves data integration across systems such as knowledge bases, indexing services, and library platforms.

In addition, ISSN-H supports more sophisticated metadata models, facilitating improved analytics such as longitudinal studies of journal evolution, citation patterns across title changes and insights into collection development. For developers, ISSN-H simplifies the implementation of clustering logic by relying on a standardised identifier rather than heuristic matching.

Finally, for the broader scholarly communication ecosystem, including researchers, funders and evaluators, the ISSN-H promotes greater transparency and continuity in the scholarly record. It helps to ensure that metrics, citations and usage data are correctly attributed across title changes, thereby reducing ambiguity and data loss. This is particularly important in research assessment and bibliometrics, where fragmented identifiers can lead to incomplete or misleading analyses. Overall, the ISSN-H is not just a technical improvement, but a strategic enhancement of the infrastructure that strengthens the integrity, usability and interoperability of serials metadata across the entire information landscape.

Limitations and Considerations

Despite its clear advantages, the implementation of ISSN-H presents a number of challenges that require structured and forward-looking solutions. First and foremost, the quality and consistency of linking metadata are critical, since ISSN-H clustering relies directly on the MARC21 linking fields, precisely 780 and 785. Any medium versions linked through 776 to the records linked through 780/785 are visible in the ISSN-H graph. Inconsistent or incomplete linking practices can result in fragmented or inaccurate clusters. To address this issue, a combination of strengthened cataloguing guidelines, cooperation with publishers, enhanced validation tools within ISSN production systems and progressive automated quality checks to detect missing or conflicting links are required. In the longer term, integrating machine-assisted cataloguing and graph-based validation techniques could further improve the reliability and completeness of cluster formation.

User understanding is another important factor. As ISSN-H introduces a new conceptual layer that is distinct from both standard ISSN and ISSN-L, clear documentation and targeted training are essential. This can be achieved by providing practical guidance and use-case-driven documentation, as well as designing an intuitive interface within the ISSN Portal that does not require deep technical knowledge to navigate clusters.

Visualisation tools that are already available in the Portal provide a strong foundation, and further enhancements, such as contextual explanations, tooltips and user-oriented narratives of title history, can help to bridge the gap between complex metadata structures and user expectations.

From a technical perspective, integrating ISSN-H into existing systems may require adaptation, especially for library management systems, knowledge bases and indexing platforms which have not yet been designed to handle cluster-level identifiers. However, this challenge also presents an opportunity to modernise metadata infrastructures. The introduction of ISSN-H is well aligned with the principles of linked data and graph-based data models, offering a pathway towards more interoperable and semantically rich systems.

Each ISSN record which is linked to an ISSN-H cluster contains this metadata element in the different export formats (MARC21, UNIMARC, linked data, tabular format and in json in the framework of the public API.

MARC21 records expressed in MARCXML will be retrievable in batch mode through a standardised application programming interface, i.e. API/SRU: Search Retrieval via URL conformant with the Contextual Query Language (CQL) as well as through an OAI-PMH harvestable source.

ISSN-H clusters will be made available in a tabular file listing for each ISSN-H all the corresponding ISSNs grouped together. This tabular file will be updated on a daily basis.

Each ISSN-H cluster will also be retrievable individually through a direct linked data request on the corresponding ISSN-H page of the ISSN Portal:

- <https://portal.issn.org/resource/ISSN-H/9102-353X>
 - [https://portal.issn.org/resource/ISSN-H/\[number\].jsonld](https://portal.issn.org/resource/ISSN-H/[number].jsonld)
 - [https://portal.issn.org/resource/ISSN-H/\[number\].turtle](https://portal.issn.org/resource/ISSN-H/[number].turtle)
 - [https://portal.issn.org/resource/ISSN-H/\[number\].rdfxml](https://portal.issn.org/resource/ISSN-H/[number].rdfxml)
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Finally, the deliberate exclusion of simple ISSN-L relationships from ISSN-H clusters is a design choice intended to preserve conceptual clarity and prevent over-generalisation. Although this may initially seem limiting, it ensures that the focus of ISSN-H remains on complex relational structures, such as title histories, mergers and splits. Over time, the complementary use of ISSN-L and ISSN-H can be articulated more clearly through documentation and system design, enabling users to benefit from both types of clustering without confusion. Looking ahead, continued stakeholder engagement, the iterative refinement of rules and alignment with international standards will be essential for the successful evolution of the ISSN-H system. From this perspective, the current limitations should be viewed as opportunities for progressive improvement and innovation within the ISSN ecosystem, rather than as obstacles.

Conclusion

ISSN-H marks a significant evolution in the development of the ISSN system, shifting its focus from identification to a relational model that reflects the realities of modern publishing. Leveraging existing bibliographic relationships and integrating seamlessly into the ISSN Portal provides a scalable, user-centred solution for managing complex publication networks. Its alignment with user requirements demonstrates the effectiveness of a user-driven development approach. In conclusion, ISSN-H enables the ISSN system to provide better support for discovery, interoperability and long-term sustainability in an ever-changing information landscape.

ISSN-H introduces a cluster-based approach to enhance the representation of relationships between continuing resources. This approach directly responds to user demand for improved tracking of title histories and consolidated resource families, while minimising additional complexity. Its automated implementation ensures scalability and consistency, and integration with the ISSN Portal provides intuitive visualisation and navigation tools. The success of ISSN-H hinges on high-quality metadata, effective communication between the ISSN Network and publishers, and ongoing alignment with the needs of stakeholders. Overall, ISSN-H shows how the ISSN system can adapt to the challenges of modern scholarly communication while retaining its fundamental role as a reliable identifier.