

The Interoperability Imperative

Building the foundations for the next
generation of loan market infrastructure

JULY 2026





Content

Executive summary	03
Introduction	04
The causes of innovation inertia	05
What is interoperability?	08
Standardisation and digitisation: The enablers	09
Benefits of interoperability	10
Loan identifiers: A central challenge	11
Lessons from other markets	12
Moving forward: A call for action	13

Executive summary

The European loan market is supported by a resilient and highly effective operating model that has evolved to accommodate the flexibility and complexity of syndicated lending. However, as the market has grown in scale, participant diversity and distribution activity, the limitations of its fragmented technology landscape have become increasingly apparent.

Today, loan data is represented across multiple systems spanning origination, legal documentation, servicing, settlement, risk management and accounting. These systems often use different identifiers, data models and formats, requiring information to be repeatedly translated, reconciled and re-keyed as it moves between institutions. The result is operational friction that increases costs, constrains scalability and limits the industry's ability to innovate.

This paper argues that interoperability, not standardisation of loan products themselves, is the key to addressing these challenges. Loans are, and should remain, bespoke instruments. The objective is not uniformity, but rather the creation of common foundations that allow information to move reliably between systems, whilst preserving meaning.

To support this objective, the paper proposes a number of practical, market-wide initiatives:

- Establish a common industry taxonomy and shared data definitions for key loan concepts.
- Develop a universal, hierarchically structured loan identifier capable of persisting across lifecycle events and distribution chains.
- Standardise the digital representation of common lifecycle events.

- Create machine-readable representations of key legal concepts.
- Introduce standardised operational notices that can support straight-through processing across institutions.
- Promote technology-neutral standards that can be adopted by firms at different levels of operational maturity.
- Establish open and neutral governance arrangements that serve the interests of the market as a whole.

The benefits extend well beyond operational efficiency. Greater interoperability can improve risk aggregation, strengthen market resilience, reduce vendor dependency, lower barriers to entry for new participants and create the foundations necessary for emerging technologies, including artificial intelligence and distributed ledgers.

The challenge is not primarily technological. It is a collective industry effort requiring collaboration across lenders, borrowers, agents, law firms, technology providers and regulators. By acting now, the European loan market can preserve the flexibility that defines it and build the common foundation needed to support its future growth.



Introduction

The European loan market is in solid shape. The technical infrastructure and operational processes underpinning it is reliable and enable the economic activity that benefits millions of people globally every year. However, this robust foundation also has a downside.

While other asset classes have embraced innovation to unlock higher-quality market data, greater secondary liquidity and improved operational efficiency, the Loan Market has evolved more slowly. Much like Roman pillars that have withstood the passage of time, the Loan Market remains strong, dependable and highly bespoke, built to exacting requirements, with no two transactions exactly the same.

Modern structures, however, are not constructed from handcrafted stone, but from standardised components designed to work together. Common beams, joints, wiring and engineering standards enable vastly different structures to be built efficiently and reliably. The buildings themselves remain bespoke, but the interoperability of their underlying components reduces construction complexity, lowers costs and improves resilience throughout their lifecycle.

The Loan Market faces a similar challenge. Today, a loan and its associated economic exposure are represented across multiple technology platforms including origination, legal documentation, agency operations, risk management, settlement and accounting. Each system typically maintains its own data structures, identifiers and formats. Where connections exist, they are often supported by bespoke integrations, manual re-keying and reconciliation processes.

The result is an ecosystem characterised by operational friction. Data must be repeatedly translated as it moves between institutions and systems, increasing costs, technical debt and vendor dependency, while limiting efficiency and scalability. As the market grows in size, complexity and distribution activity, these challenges become increasingly difficult to ignore.

This paper is a call to action for the European loan market. It examines the sources of this fragmentation, explores why they have persisted and proposes practical steps towards a more interoperable market infrastructure, one that preserves the flexibility that makes loans valuable and enables the efficiency, resilience and innovation required for the future.



The causes of innovation inertia

Any industry effort needs to start by understanding why structural inertia exists. For the European loan market, this is due to five overarching issues.

01 Loans are built for flexibility, not for scale.

There are fundamental characteristics of loans which make them far from an ideal asset class to standardise and trade:

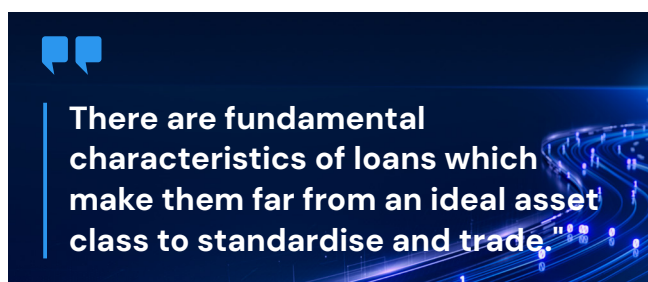
Loans are bespoke by design. Loans are not commodities, and never will be. Every credit agreement is negotiated. Covenants, security packages, margin grids and more are all bespoke characteristics of the transaction, the borrower and the lenders.

Loan facilities are persistent. Loans can be repriced, extended, amended and can generate dozens of events over their lifetime, each requiring updates across multiple institutions and systems.

Loans have a diverse participant base. A syndicated loan involves many parties: borrowers, arrangers, administrative agents, security trustees and an increasingly diverse lender base with institutional investors sitting alongside traditional banks.

Loans are a private market. Confidentiality provisions, borrower consent rights and restrictions on information flow are built into most loan relationships. Some borrowers actively resist distribution and are cautious about any arrangement that might expose their financing terms.

This structural complexity is not only intentional, it is *the* fundamental reason that a loan exists in the first place—credit which offers flexibility for borrowers, matched with safeguards for lenders. Achieving this flexibility, however, has come at a cost. And that cost has been scalability.



02 Incentive misalignment

The benefits of interoperability are diffused. The costs sit with individual firms where, in benign market conditions, operational friction is tolerated and efficiency projects trickle down the prioritisation queue, in favour of allocating budget to more pressing issues. It is only under stress, when settlement delays, position uncertainty and reconciliation failures become visible to clients and senior leadership, when the scale, and costs, of historic underinvestment becomes hard to ignore.

Conversely, borrowers have limited incentive to support market-wide transparency beyond the leveraged finance segment where distribution and trading are core features. Hence, agents and lenders bear most of the operational burden.

This misalignment in incentives between borrowers, lenders and agents, coupled with the cyclic nature of the market has created a reality in 2026 where market infrastructure lags the requirements of the modern market.

As the loan market has grown in complexity and scale over the past two decades, we have arrived at a reality where no single system covers the full loan lifecycle."

03 Technical fragmentation

As the loan market has grown in complexity and scale over the past two decades, we have arrived at a reality where no single system covers the full loan lifecycle. Across a typical transaction, data flows through:

- ➔ Origination platforms
- ➔ Legal platforms
- ➔ Servicing and agency systems
- ➔ Secondary settlement platforms
- ➔ Trading and risk management systems
- ➔ Collateral management systems
- ➔ Accounting and reporting tools

Each of these systems may structure the data differently, but more importantly, none of these systems are designed to talk to each other in a unified way. Instead, every data exchange in every institution requires bespoke interfaces, using data mappings, transformations and reconciliations. Every lifecycle event triggers a cascade of re-keying by armies of operational teams across the market, with any error being compounded until discovered.

As the market continues to evolve, this fragmentation is no longer irritatingly inefficient and morale sapping. It inflates settlement risk, delays decision-making and conflicts with regulatory expectations on data quality and risk aggregation under frameworks such as BCBS 239.



04 Distribution proliferation

Over the last decade, the distribution chain for loan credit has lengthened materially. A single loan exposure can now flow through assignments, funded or risk participations, total return swaps or synthetic risk transfer transactions.

These risk transfer transactions are proliferating rapidly, driven by increasing capital requirements and growing investor appetite for loan credit exposure. Each new link in the chain adds another system, another representation, another reconciliation requirement.

A lifecycle event on the underlying loan must propagate across every linked structure across more institutions and systems than ever before.

As the chain lengthens, the impact of the fragmentation compounds.

05 Vendor lock-in has compounded the problem.

As a result of the above issues, where shared foundations have been absent, proprietary platforms have filled the gap. The lack of standardisation compounds further by necessitating market participants to build bespoke interfaces and adapters to link to their internal systems, often rendering them unable to upgrade or switch providers. Over time, this deepens switching costs and locks participants into existing vendors and their software, where information may exist in digital form in one node, but cannot be reused across the ecosystem.

As a practical illustration, some widely-used loan identifiers are governed within commercial platforms. Their adoption reflects genuine utility. But platform governance limits their role as neutral market-wide references, hence participants face constraints that would not exist with an openly governed equivalent.



What is interoperability?

Put simply, interoperability is the ability for systems to exchange information in a way that preserves the original meaning. Achieving this in the Loan Market requires alignment along four dimensions:



Technical interoperability: Systems can exchange data through compatible formats and interfaces.



Semantic interoperability: Key concepts sharing a single common definition (e.g., a "deal") can be referred to as a facility, commitment, utilisation and more.



Lifecycle interoperability: Events such as utilisations, repayments and amendments should be interpreted consistently. The underlying event triggering the action, generates the same impact on the state of the loan being represented across systems.



Legal and regulatory interoperability: Machine-readable data representations are anchored to the legal documentation that governs the underlying loan.

Most asset classes have addressed at least some of these aspects. In the Loan Market, all four remain largely unresolved.

Inclusivity: designing for the whole market

For interoperability to truly deliver the transformation that meets the market's ambitions, any adopted standards must work for institutions at different levels of maturity, from global banks to regional lenders. Fundamental processes (e.g., a standardised notice template must be defined in a technology agnostic method so that it can be followed whether performed manually on paper or automated within an enterprise IT system. Such a model is more valuable to the market than a complex digital-only format that only large global institutions have the means to implement.



The underlying event triggering the action generates the same impact on the state of the loan being represented across systems."

Standardisation and digitisation: the enablers

Standardisation of taxonomy is the foundational step. Before any system can exchange loan data reliably, the market needs shared definitions of what that data represents: common terms for common concepts.

Digitisation needs that foundation to build on. Once concepts are defined consistently, they can be represented in machine-readable form and exchanged programmatically.

Digitisation does not require uniformity across systems. It requires shared reference structures, common enough to reduce translation effort, but flexible enough to preserve each actor's architecture.

A common misconception is that progress can only be made if the market achieves the nirvana condition of standardising the entire loan agreement. It does not. Loan documentation is negotiated and will remain bespoke in many areas. The real question for the market is: what subset of concepts is sufficiently repeatable that it can be represented consistently?

In the Loan Market, two areas offer the clearest and most immediate digitisation potential: legal documentation and lifecycle events.

Legal documentation

Credit agreements are the legal foundation of every transaction. As discussed above, they are bespoke by design, but there are key elements which can be represented in machine-readable form, such as:

- Facility structure and commitments
- Interest rate definitions and pricing grids
- Covenants definitions and schedules
- Security and guarantee coverage

LMA documentation already provides much of the conceptual scaffolding for this. The next step is representing it digitally to enable consistency across institutions.



Common misconception is that progress can only be made if the market achieves the nirvana condition of standardising the entire loan agreement. It does not.

Lifecycle events

As a loan's state changes constantly, each event must be captured and propagated across the distribution network. Structured event formats make this process machine-readable and scalable. Candidates for this include:

- 01 Utilisations
- 02 Scheduled and unscheduled repayments
- 03 Margin ratchets
- 04 PIK elections
- 05 Extensions

Benefits of Interoperability

Interoperability is not an end in itself, but rather an enabler. High-value outcomes become possible when systems can exchange loan data reliably, with shared meaning, including:



Straight-through processing

Today, a single utilisation request from a borrower triggers a cascade of manual steps across agent, lender, risk and accounting systems. With standardised event formats, events can be processed end-to-end, automatically and consistently across all institutions. Fail rates drop. Settlement cycles compress.



Lowering barriers to entry

Beyond efficiency, interoperability has two further benefits that are harder to quantify, but matter at a market infrastructure level. Where open foundations exist, new entrants can build innovative products without negotiating bespoke integrations for every counterparty. Open data formats and standard APIs reduce the integration burden that today favours incumbents and increases vendor lock-in.



Real-time risk aggregation

Institutional lenders managing large credit portfolios consolidate exposure data daily across origination, risk and accounting systems through reconciliation batches that are slow and error-prone. Shared data models replace batch reconciliation with live aggregation. This is not only an efficiency gain. Under BCBS 239 and similar regulatory frameworks, this is increasingly a compliance requirement.



Resilience

In stressed conditions, weak interoperability constrains position certainty and the ability to respond quickly to changes. A market that cannot aggregate exposures reliably across systems is a market that is slower to identify and manage risk.



AI-assisted analysis

AI tools capable of extracting covenant terms, monitoring maintenance tests and flagging early covenant breaches already exist, but have limited deployment in the loan market due to unstructured input data, both to train models and for inference. Structured legal documentation, anchored to industry-aligned taxonomy, unlocks this capability at scale.



Loan identifiers: A central challenge

In equity, bonds and listed derivatives markets, common identifiers allow any participant to refer unambiguously to the same instrument. The infrastructure of modern financial markets is built on this. In the European loan market, no equivalent exists.

The market relies on a patchwork of identifiers, each serving a specific context:

- Internal deal identifiers assigned by originating institutions
- Facility and drawdowns references within servicing systems
- Agent-assigned references used operationally
- Platform identifiers used by secondary settlement and trading systems
- ISIN, applied inconsistently, where if at all
- Regulatory identifiers such as AnaCredit (EU)

A loan is then tracked under different references in every system. Linking them requires mapping tables or manual lookups at every step, across all institutions.

The industry would benefit significantly from a single universal identifier shared across all institutions and systems.

This identifier solution should be designed to be practically workable by satisfying the following requirements:

- ➔ **Persistence:** stable across the loan's lifecycle
- ➔ **Lineage:** captures relationships across refinancings or extensions
- ➔ **Hierarchy:** reflects deal/facility/drawdown structure
- ➔ **Neutral governance:** independent of any single participant's system
- ➔ **Compatibility:** accommodates existing market practice, avoiding costly migrations

Existing identifiers – ISIN and CUSIP

ISIN and CUSIP have been applied to loan tranches in some markets, particularly for broadly syndicated leveraged loans that trade like securities.

The fit is partial at best. ISIN and CUSIP were designed for static instruments (e.g., a bond with fixed terms, a single maturity, no lifecycle complexity beyond coupon payments).

In practice, CUSIP coverage in the U.S. leveraged loan market works reasonably well for static term loan tranches that behave like bonds. It breaks down for revolving facilities and for amended and restated credits.



Lessons from other markets

The loan market is not the first to face the interoperability problem. Precedents offer practical lessons on what works and why.

FpML - ISDA (1999)

FpML was developed by ISDA to represent OTC derivatives in a common, machine-readable format covering trade economics, lifecycle events and confirmations. Two things made it work: ISDA's Master Agreement already defined the concepts, so FpML codified existing market understanding rather than inventing new definitions; and governance was open and vendor-neutral.

In the early 2000s, the industry made significant efforts to extend FpML to loan products, with workable schemas defined via industry working groups and in collaboration with ISDA. However, adoption was limited and eventually stalled as, at the time, this wasn't considered to be a priority for the market. Fifteen years later, for the reasons already outlined, the landscape has changed significantly and the market appetite for a digital standard is at an all-time high.

Common Domain Model - ISDA / FINOS (2019)

The Common Domain Model (CDM) is a machine-readable, implementation-agnostic model of how financial products behave. It encompasses how they are structured, how lifecycle events change their state and how legal terms translate into operational consequences.

CDM began with OTC derivatives and has since been extended to repo and securities lending. Its governance sits with FINOS, the Fintech Open Source Foundation, deliberately separated from any commercial platform.

The Loan Market arguably shares many of the structural characteristics that CDM was designed to address.

ISO 20022 - payments and securities

ISO 20022 became the dominant messaging standard for cross-border payments and securities settlement not through technical superiority alone, but through regulatory mandate.

The U.S. loan market: a reference point

The U.S. syndicated loan market is meaningfully ahead of Europe on several dimensions of operational infrastructure.

Settlement delays in the U.S. secondary loan market are generally shorter than in Europe, supported by automated notice processing and standardised data formats supported by market utilities.

Several structural factors drive this efficiency: The U.S. market operates under one single jurisdiction and a single currency. It is also more concentrated around a smaller number of agent banks, reducing the number of parties that need to agree on common practices. Finally, it has been secondary-trading oriented from the outset, encouraging operational efficiency.

Due to diverse jurisdictions and institutions, Europe cannot mirror the U.S. market's uniformity. It could instead prioritise standard templates, terminology, and identifiers before expanding infrastructure.

Although the U.S. has a more mature infrastructure, it still faces interoperability and governance issues that European market can use as lessons for its own development.

Moving forward: A call for action

This is not about imposing a single, centralised technical architecture. It is about agreeing shared reference concepts, common enough to reduce frictions, yet flexible enough to acknowledge the diversity of systems already in use (i.e., those standardised joints and bolts that enable the creation of unique skyscrapers).

Identifying the functional traits of a strong market infrastructure offers clear objectives. Experience from other markets, including segments of the U.S. loan market, shows that the following features define an effective infrastructure:



Shared terminology and core data definitions aligned to industry documentation and made available to market participants



An authoritative source of loan data accessible to all participants on a permissioned basis



API-based access that allows participants to consume data directly into their own systems



Loan identifiers: a hierarchical identifier framework that is stable across lifecycle events and portable across systems



Standardised notices that standardise the format of most common operational notices and deliver them in a structured format that supports straight-through processing without manual data entry



A governance model – that is neutral with respect to vendors, ensuring the infrastructure serves the market, rather than any individual commercial interest

Delivering this infrastructure is not primarily a technology problem. Multiple implementations may deliver these capabilities. What is missing is the industry-level agreement that makes it possible: shared definitions, common identifiers and standardised formats.

The LMA is uniquely positioned at the centre of these interests. Our role is to connect the ecosystem, across buy-side, sell-side, law firms, technology providers and regulators, to challenge the pace and direction of change where needed, and help turn innovation into usable market infrastructure.

LMA's Technology & Innovation Committee is actively working with members on these initiatives directly aligned with the LMA's mission to unite the loan markets to drive efficiency, liquidity and transparency.

It is only by working together that we can ensure that the EMEA loan markets of 2030 are not facing the same existential frictions that we see today. Join us to help build the market of the future.



Authors



Aman Luther

Loan Market Association,
Head of Technology &
Innovation



Jad Courbage

Murex, Head of Product –
Treasury and Balance Sheet
Management

Disclaimer:

This document is intended as an overview and is not intended to be comprehensive. Whilst every care has been taken in its preparation no representation or warranty is given by the LMA or the authors as to the accuracy or completeness of the contents of this document. Most importantly, this document is not intended to provide legal or other advice on any matter whatsoever. © Loan Market Association. All rights reserved.