

# CAUGHT ON TAPE

A consolidated tape for Europe

  
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# EXECUTIVE SUMMARY

The introduction of a Consolidated Tape (CT) is a priority action within the Capital Markets Union 2020 Action Plan to integrate national capital markets into a genuine single market. A CT will impact the entire Capital Markets industry in Europe and hence it is critical that the design and ultimate implementation of a CT follows a careful assessment of all involved benefits, costs and risks. The objective of this study is to assess which CT option is the most suitable for Europe. It includes a cost-benefit analysis of different CT options and has been informed by close to 40 interviews with market participants across buy- and sell-side and market infrastructures with different business models, including those serving issuers and investors.

European markets have structural limitations that MiFID II aimed to address, but that have not yet been fully resolved. MiFID II also introduced the role of a CT for Europe that covers post-trade information in a consolidated fashion, irrespective of whether transactions are executed on a trading venue or not. Nevertheless, no CT provider according to the MiFID II definition has emerged, mostly due to structural difficulties in obtaining high-quality data from Over-the-Counter (OTC) and Systematic Internalizer (SI) execution venues across Europe, which challenges the commercial viability of a CT over existing market data solutions.

As no CT provider emerged, a CT will likely be mandated by the European Commission in line with the MiFID II regulation. Different CT options have been subject to recent public debate and investigation, including a pre-trade real-time CT, a post-trade close-to-real time CT, a post-trade 15-minute delay CT and a post-trade end of day CT.

There is no regulatory-mandated use case which would require the introduction of a CT. Hence, the different CT options need to be measured against requirements from MiFID II, according to which a CT shall contribute to creating a more integrated European market and make it easier for market participants to gain access to a consolidated view of trade transparency information.<sup>1</sup> These goals can be achieved with all CT options that provide post-trade data, including the easiest to implement end of day CT option.

Nevertheless, market data lies at the heart of almost all capital markets processes and even though comprehensive market data solutions exist today, some market structure imperfections limit access to high-quality market data, specifically in less transparent

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<sup>1</sup> Directive 2014/65/EU (117)

markets like fixed income. The most critical imperfections include poor data quality from many SI and OTC execution venues, as well as long deferral allowances. As a result, we believe that significant benefits for stakeholders can be realized if reforms address market structure imperfections and enable better access to comprehensive, high-quality and timely market data. A CT is no panacea for market structure limitations and these limitations need to be mitigated to enable any CT to provide value to European capital markets. For our analysis, we have assumed that market structure limitations are mitigated. We have then analyzed the different CT options against their benefits to use cases for stakeholders along the capital markets value chain, as well as the associated implementation challenges and costs.

We conclude that a pre-trade real-time CT is the least recommended option and should not be pursued. A pre-trade real-time CT would face difficulties relating to technical feasibility and overall limited incremental benefits above existing solutions for sophisticated users, whilst not being required by less sophisticated users. Most importantly, we find that a pre-trade real-time CT could introduce substantial arbitrage risk, specifically for less sophisticated users like retail investors. We also note that none of our interviewees advocated for this CT option.

A post-trade CT, with comprehensive and high-quality data from all trading and execution venues, specifically from OTC and SI, can improve outcomes of investment decisioning, evaluation, processing and risk/compliance management. It can also support overall operational simplification, as frictions stemming from non-available or varying data between stakeholders and within different functions at financial institutions can be overcome more easily with one independent source of market data. The benefit of such a tape arises from the pooling of all market data, combining both difficult and easy to access data sources for a 100% coverage of market data. A tape with incomplete or low-quality coverage of market data will be deprived of value-add above existing solutions and practical significance. The timelier this post-trade data is available, the more business processes will be able to benefit from this CT data. At the same time, more timely data creates more challenges and costs for the implementation of a CT.

Our analysis suggests that a post-trade 15-minute delay CT provides the best cost-benefit characteristics and is the option of choice, covering equity, equity-like (including ETFs) and fixed income markets.

Once such a CT is established, a shortening of the delay time towards post-trade close to real-time with a sensible "speed limit" could be investigated, although this will come with further implementation challenges. Moving "too close" to real-time risks introducing misuse risk and increasing costs to users and contributors unnecessarily, hence a sensible "speed limit" needs to be calibrated that maximizes value to the industry without introducing a technical arms race for ultra-low latency.

This staggered approach to shortening the delay time in the future will also ensure that the CT has proven its value to users and that additional investments into the CT are justified.

Benefits of the CT will mostly accrue to institutional market participants. Marginal benefits for retail investors exist, but are limited overall and may only be realized if retail brokers pass on potential benefits of a CT to their clients.

Given the mission-critical role of such a CT in European capital markets, we suggest it is administrated by an independent and pan-European body like the European Securities and Markets Authority (ESMA), powered by specialized technology and advised by users and contributors. The CT should have a commercial focus that allows it to cover its costs while compensating data contributors adequately for their costs related to their role in price formation as well as data creation, capturing and delivery.

Overall, a well-calibrated CT can provide significant benefits to European capital markets, improving outcomes and reducing cost/frictions across the entire capital markets value chain, provided that the appropriate decisions and policy choices are made. It can also be a further step to accelerate the Capital Markets Union.

A badly-calibrated CT will not just be a failed initiative, it risks creating significant downsides, ranging from financial stability risks over market integrity and consumer protection concerns. A badly-calibrated CT also risks increasing the costs for the overall capital markets ecosystem, which are ultimately borne by issuers and investors and risks setting back the overall integration of European capital markets.

# BACKGROUND TO THIS STUDY

## OBJECTIVES OF THIS STUDY

**This study aims to evaluate which Consolidate Tape (CT) option is most suitable for Europe, its issuers and investors.** The first section provides the background to this study by elaborating on the context of the CT in Europe. The second section focuses mainly on potential use cases and users of a CT and provides case studies from other markets, pointing out key differences to Europe, where no "regulatory-mandated" use case for a CT exists. The third section outlines key design options for a CT in Europe and describes potential benefits associated with each option. Section four assesses challenges and costs associated with creating and running different CT options. Section five concludes with a summary of the cost-benefit analysis and provides recommendations for governance options. Section six assesses assumptions to financial sustainability of a CT in Europe and, lastly, section seven summarizes the overall recommendation of this study.

**This report has been informed by close to 40 interviews with market participants across buy and sell-side and market infrastructure providers.** It aims to provide a neutral, objective and comprehensive view, reflecting the whole capital markets ecosystem.

**The study was commissioned and paid for by FESE, but has been independently written and produced by Oliver Wyman.** We considered the feedback we received from FESE member institutions in the same way as the feedback we received from buy- and sell-side stakeholders (incl. retail investors/brokers). The number of interactions were well distributed across the different capital markets stakeholders.

## MARKET BACKGROUND

**European markets have structural limitations that MiFID II aims to address but has not yet resolved.** Market structure and market data are intrinsically linked. The European market structure is characterized by a high degree of fragmentation, a wide geographical and jurisdictional footprint and a significant share of off-exchange trading. European securities, combining equities and bonds, are traded on over 400 trading venues and over 200 Systematic Internalisers (SIs), across 30 European Economic Area (EEA) jurisdictions, Switzerland and the United Kingdom (UK). Approximately 3,500 kilometres separate Lisbon and Helsinki or Dublin and Nicosia, with trading and execution venues and data centres scattered across each financial market, impacting the latency of information exchange across the region.

At least 30 National Competent Authorities (NCAs) supervise and enforce European legislation with different standards in their definition and implementation of key provisions. According to ESMA, approximately 50% of equity and 75% of bond trading activity occurs on "dark" venues such as SIs and Over The Counter (OTC), as opposed to "lit" venues such as the major part of Regulated Markets (RMs), Multilateral Trading Facilities (MTFs) and Organised Trading Facilities (OTFs). This results in opaque markets with limited data availability and quality. The Markets in Financial Instruments Directive II (MiFID II) sets out a clear objective to establish "a safer, sounder, more transparent and more responsible financial system that works for the economy and society as a whole." We note that MiFID II has not yet resolved key structural limitations of European markets and may have even aggravated some of those.

**MiFID II has mandated a European CT to support its ambition, which is a supportive yet insufficient step to achieve its ultimate objective.** Given the greater competition between multiple trading and execution venues, MiFID II introduced a provision for a CT to "contribute to creating a more integrated European market and make it easier for market participants to gain access to a consolidated view of trade transparency information that is available." The provision covered equity and equity-like instruments as a first priority, post-trade information, for all Trading Venues (TV) and Approved Publication Arrangements (APA). It should be implemented with a commercial solution if possible, or otherwise via a public procurement process run by ESMA.<sup>2</sup>

**However, a European CT is no panacea for European market structure limitations.**

While all information is already available from trading venues and APAs, the data quality from OTC and SI execution venues remains the main hurdle to achieving the ultimate MiFID II objective of more transparent, unified, fair, and efficient European financial markets. The CT itself cannot solve the issue of fragmented market structure, as it relies on high-quality data to fulfil its purpose of serving as a unified source of market data. Other measures are required, including legislative alignment and enforcement, improved, and more consistent data standards, prioritization of liquidity on transparent "lit" venues and accessibility of liquidity pools across jurisdictions. Market structure limitations need to be mitigated in order to enable any CT to provide value to European capital markets.

**A number of existing solutions come close to a CT; however, the current cost/benefit of a comprehensive CT does not support a commercial solution.** APAs already aggregate market data from various execution venues (i.e., SI and OTC) and commercial market data solutions also provide consolidated market data information, where available. However, a CT has not yet emerged due to the operational complexity and high associated costs to collect this data comprehensively. Without mandatory contribution, this would require the CT provider to negotiate with every trading and execution venue and APA in Europe, with enormous associated effort.

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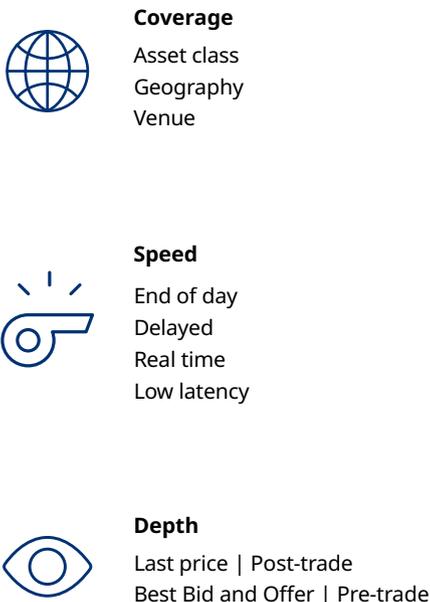
<sup>2</sup> Directive 2014/65/EU (117)

Also, a CT does not resolve the key industry pain-points such as the lack of available data and poor data quality specifically from OTC and SI execution venues. By excluding OTC and SI execution venues, it would not provide a comprehensive view of the market, and the value add above and beyond existing commercial solutions will be low. A CT will not automatically improve data availability and quality, which needs to be resolved by regulators and at the source, and therefore will not solve one of the biggest hurdles to meet MiFID II objectives. A tape with incomplete or poor market data will be deprived of "value add above existing solutions" and struggle with practical significance.

**Since no commercial solution has emerged, the European Commission is considering mandating one, with various options currently subject to public debate.** A number of different design options are possible, varying across three dimensions: coverage, speed and depth. This report will focus its assessment on the four main options put forward by industry participants: (1) pre-trade real time, (2) post-trade close to real time, (3) post-trade 15-minute delay, and (4) post-trade end of day.

**Exhibit 1: Different CT design dimensions and options**

**DESIGN CRITERIA**



**CT OPTIONS**

- 1 Pre-trade**  
 Real-time  
 Prices and volumes of orders and quotes, at minimum latency technically feasible, and BBO depth
- 2 Post-trade**  
 Close to real-time  
 Prices and volumes of executed trades, as close to real-time as technically feasible
- 3 Post-trade**  
 15-minute delay  
 Prices and volumes of executed trades, published 15-minute after execution
- 4 Post-trade**  
 End of day  
 Prices and volumes of executed trades, made available at the end of the trading day

Source: Oliver Wyman Analysis

**In terms of coverage, a true CT would ultimately need to cover all possible segments of the market. However, this comes with significant challenges and costs that need to be considered:**

- **Asset class:** MiFID II prioritized equity and equity-like instruments including ETFs. This could be expanded to other asset classes such as fixed income and derivatives in the future. We note that the need for a consolidated tape is probably the highest in fixed income due to the lack of post-trade information available. Given the importance for issuers and investors, we believe that equity, equity-like and fixed income asset classes shall be prioritized for the CT.
- **Geography:** The tape should cover all European financial markets, but equally all trading in European securities by EEA investors. Such securities may be traded outside of the EU (depending on long-term outcomes of equivalence discussions with third-party states). Omitting this trading data from the tape will reduce the usefulness of it and weaken core use cases, hence a way to include this data in a consolidated tape needs to be found.
- **Venue:** A European CT should include all trading and execution venues, including RMs, MTFs, OTFs, OTC and SIs, in order to provide a comprehensive view of European financial markets. We note that OTC and SI trading data is reported to APAs, but that poor data quality and long deferrals pose significant challenges today. A CT needs to rely on adequate data; hence data quality needs to be ensured across all trading and execution venues with consistent reporting requirements and data quality controls, where those controls are not already existing today. We note that this may create significant costs in order to be able to contribute an adequate data quality in a timely manner, but if a CT is to deliver a benefit, data quality issues need to be solved first.

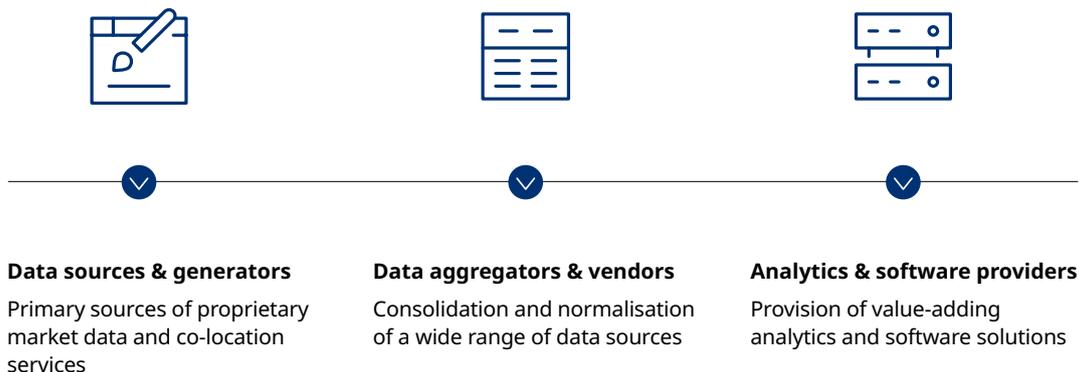
# USE CASES AND CASE STUDIES

## STAKEHOLDER NEEDS AND USE CASES

**There is a wide spectrum of commercial market data solutions today.**

Different providers offer market data solutions to meet stakeholder needs. These providers range from data sources and generators, such as trading venues offering direct feeds and co-location services, data aggregators and vendors consolidating different data sources, to analytics and software providers adding services on top of market data. All use cases across the capital markets value chain are largely supported by existing solutions. It is crucial to assess the marginal benefits a CT will provide above and beyond existing solutions, and whether those marginal benefits outweigh the associated costs.

### Exhibit 2: Current market data solutions



Source: Oliver Wyman Analysis

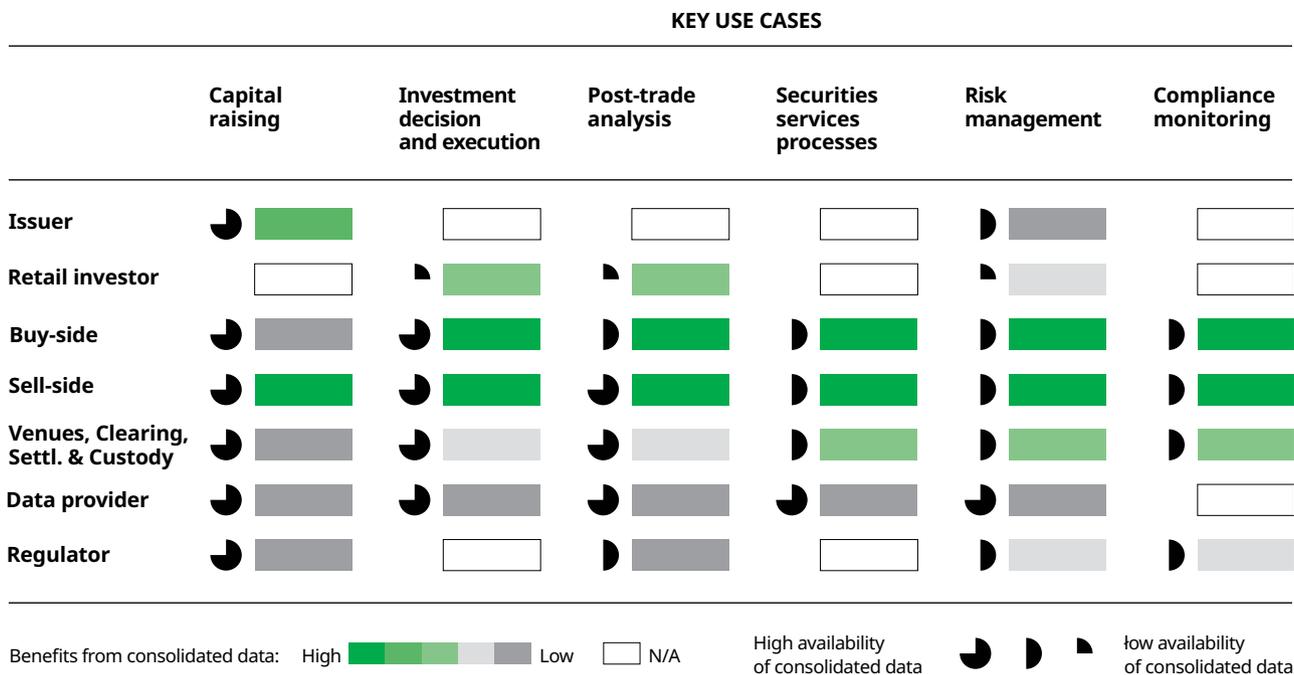
**For the purpose of the cost-benefit analysis, we have assessed use cases from the perspective of different stakeholder groups.** We acknowledge that a CT may ultimately benefit the European economy and society, for which capital markets, its issuers and investors are an important cornerstone. Nevertheless, we need to consider broader stakeholders in the entire ecosystem, which ultimately facilitate capital markets and may pass on any benefits and costs to investors and issuers. We define the stakeholder groups in our analysis as follows:

- **Issuers** defined as public institution issuers, corporate issuers and fund issuers
- **Retail Investor** defined as all retail users in Europe (B2C)
- **Buy-side** defined as asset and wealth managers and asset owners
- **Sell-side** defined as banks, brokers and market makers
- **Venues, Clearing, Settlement and Custody** defined as trading and execution venues, CCPs, GCMs, CSDs/ICSDs and custodians
- **Data and service providers** defined as software, benchmark/index and analytics provider
- **Regulators**

**We note that there is currently no regulatory-mandated use case for a consolidated tape in Europe and hence assess applicable use cases along a typical value chain of activities in the capital markets space.** We define the use cases in our analysis as follows:

- **Capital raising** defined as pricing and providing visibility for new issuances
- **Investment decision and execution** defined as activities ranging from initial asset allocation up to trade execution management
- **Post-trade analysis** defined as transaction cost/execution analysis as well as performance attribution
- **Securities services processes** defined as middle office and back office processing activities including margin and collateral management as well as securities financing
- **Risk management** defined as liquidity, market, credit and operational risk management across lines of defences
- **Compliance monitoring** defined as trade/market surveillance as well as regulatory reporting and audit activities

**Exhibit 3: Overview of benefits and current access to consolidated data (equities)**



Source: Oliver Wyman Analysis

**All the outlined use cases are served and supported by market data solutions today and consolidated data can only bring marginal benefits.** Based on our interviews, we have found that higher marginal benefits exist for institutional market participants on the buy- and sell-side. Secondly, we found that post-trade activities, across the entire capital markets ecosystem, would benefit more from a regulatory approved source of data. This "independent source" of data will be helpful in reducing process frictions between capital market stakeholders and between individual functions within institutions. The real marginal benefit of a CT will come from the availability of high-quality and timely data from all trading and execution venues, including OTC and SI.

Marginal benefits to retail investors exist, but are limited. Most retail investors (via their brokers) do only have access to a small number of trading and execution venues. As a result, the consolidated price information is supportive information for retail investors, but in many cases without practical relevance. Depending on the design option of a CT (see later chapters in this report), a CT could even come with significant risks for retail investors, if the CT would allow more sophisticated investors to make use of their superior market access/shorter latencies at the disadvantage of retail investors. A well-calibrated CT, however, could enable retail brokers to provide retail investors with a better and potentially more cost-effective service, as consolidated market data could be embedded in brokerage applications more conveniently and the cost-benefit from streamlined broker middle and back offices could be passed on to retail investors.

## CONSOLIDATED TAPES IN THE US AND CANADA

**The US and Canada have implemented their own CTs some time ago, providing a comprehensive view of their markets.** It is important to note the specificities of the US and Canadian market structures, before looking at the design and governance of their CTs.

**In the US**, since the Unlisted Trading Privilege (UTP) Act, stocks can be traded on any venue, regardless of their listing venue. This reinforces the importance of having one single and comprehensive CT across different venues. The US CT covers pre- and post-trade data for all listed securities (equities and bonds), and data must be reported regardless of the execution venue, with off-exchange data typically reported via a Trade Reporting Facility (TRF). This setup generally ensures data quality and comprehensiveness in the CT. Eligible OTC fixed income securities must be reported via the Trade and Reporting Compliance Engine (TRACE) within 15-minutes of execution. The three listed securities' CTs (covering NYSE, regional and Nasdaq securities, respectively) are operated by the Securities Industry Automation Corporation (SIAC, owned by NYSE) and Nasdaq on behalf of the Consolidated Tape Association (CTA) and UTP plans that govern their operations. TRACE is operated by FINRA. The use of CT is mandatory for market participants with a clear regulatory-driven use case, notably in the context of best execution by using their National Best Bid and Offer (NBBO) in combination with prescriptive best execution requirements and interconnected trading venues. Nevertheless, the introduction of the CT in the US has not been without challenges, although a harmonized capital market already exists. Specifically, the impact of the US CTs on the market structure for equity securities has been subject to a recent public debate, e.g., that in terms of best execution, concerns are arising from the fact that NBBO may not provide a full and accurate representation of the market.

**In Canada**, while multiple trading venues exist across exchanges and Alternative Trading Systems (ATS), Toronto Stock Exchange (TSX) acts as centralised information processes of market data in Canada. The Canadian CT covers pre- and post-trade data for all listed equities. Shares must be traded on-exchange, so the CT reflects the overall market. Eligible OTC fixed income securities must be reported to the Investment Industry Regulatory Organisation of Canada (IIROC), two days after the trade occurs. The equity tape is run by TSX and bond tape by IIROC. The use of CT is also mandatory in the context of best execution by referring to the Canadian Best Bid and Offer (CBBO).

## EU MARKET STRUCTURE COMPARISON

**A CT similar to the US and Canada is currently not implementable in Europe due to significant market structure differences and, most importantly, the fragmentation and the lack of a regulatory-mandated use case.** While the US and Canada examples can be instructive, they cannot be simply replicated, given the structural differences between the US, Canada and Europe:

- **European markets are geographically more dispersed**, with data centres distributed all over Europe, whilst even in the US, where all three data centres are located in New Jersey, latency issues still exist. This has implications for the feasibility, latency, benefits and costs of a comprehensive European CT solution, specifically for a CT covering pre-trade data, as latency poses significant challenges and policy risk.
- **European liquidity is substantially more fragmented.** While in the US interconnectivity is available in combination with stricter best execution requirements, the EU is much more fragmented with regards to trading and execution venues. Full interconnectivity to all trading and execution venues would neither be sensible, nor economical in Europe. Hence, the liquidity shown in a CT in Europe may potentially not be accessible for many market participants. This European problem is further exacerbated by a lack of homogenous post-trade infrastructure, e.g., for clearing and settlement, across Europe.
- **European market structure consists of many smaller venues.** Economies of scale in the EU financial markets is significantly smaller than for example in the US and market infrastructures in many smaller European markets are highly dependent on market data revenues. A CT, which reduces revenues for these venues, will challenge smaller markets in their ability to innovate and develop their local capital markets.
- **European legislation is more fragmented.** While the US and Canada have one regulator each, the EEA, UK and Switzerland have > 30 NCAs, which makes it harder to coordinate on joint legislation for a CT.

**Exhibit 4: Key European and North American market structure differences**

|                  | <br><b>Geography</b>           | <br><b>Liquidity</b>  | <br><b>Venue</b>  | <br><b>Legislation</b> |
|------------------|---|--|---|---|
| <b>Europe</b>    | Data centers distributed all over Europe, with some markets at >3,500km distance, which results in high latency | Many small markets with low market capitalization and fragmented liquidity<br><br>Liquidity visible but not always executable, due to missing interconnectivity between venues | High number of venues; low economies of scale and less well-developed capital markets, specifically in smaller countries<br><br>Higher effort/cost to consolidate data across more venues | At least 30 NCAs in EEA and CH  |
| <b>US/Canada</b> | Data centers located in physical proximity (e.g., New Jersey for US), which results in low latency              | Interconnected markets with high market capitalization and liquidity<br><br>Visible liquidity is executable  | Limited number of venues; high economies of scale and well-developed capital markets<br><br>Lower effort/cost to consolidate data across venues   | One regulator each for US and Canada  |

Source: Oliver Wyman Analysis

# CONSOLIDATED TAPE OPTIONS AND BENEFITS

## COVERAGE AND SCOPE OF THE CT

**A CT in Europe needs to increase the coverage of instruments above and beyond what is currently available via commercial market data solutions to provide a benefit to the industry and justify its creation.** In our cost-benefit analysis we assume that a CT would cover equities and equity-like instruments including ETFs as well as fixed income (potentially with different CTs covering the separate asset classes). We also assume that a CT would aggregate data from all trading and execution venues in Europe (including SIs and OTC) either directly or via APAs as well as EU investors trading on equivalent trading venues outside of the EEA. We also assume that market structure imperfections leading to data quality issues in the status quo will be overcome.

**This report will evaluate four possible CT options for Europe, spanning pre and post-trade and different speed of data.** In our cost-benefit analysis we assess four options for consolidated tape: (1) pre-trade real-time (best bid and offer depth), (2) post-trade close to real-time, (3) post-trade 15-minute delay and (4) post-trade end of day. Our assessment starts by considering the benefits associated with different CT options and comparing them for all stakeholder groups and their underlying use cases. We then move over to assessing the challenges and costs associated with building and running each CT option.

## BENEFITS FOR DIFFERENT CT OPTIONS

**A CT can have a positive macroeconomic impact and support the overarching objective of moving closer towards the European ambition of a Capital Markets Union (CMU).** Increased transparency, if adequately designed, can help improve price formation thereby increasing liquidity, improving conditions and access to financing, support further capital markets integration and innovation. The positive effects of increased transparency and the detrimental effects of in-transparent markets have been confirmed in several studies. Nevertheless, we note that the quantitative estimation of the exact benefit for users and the European economy at large is very difficult and unreliable and hence stem away from doing so in this report.

**Different CT options will enhance different use cases: although one could argue that a pre-trade real-time CT could in theory help improve execution quality, this in reality would not work in Europe due to the high latencies from geographical dispersion and could even have adverse effects on less sophisticated investors. On the other hand, a post-trade CTs could enhance and simplify key middle and back office processes.**

We assess the benefits of each option use case by use case, for all stakeholders.

**A pre-trade real-time CT could in theory improve pre-trade and real-time processes for some stakeholders but could have adverse impacts for others and overall, replicating some of the negative elements of the US market structure in Europe.** Both buy and sell-side can always benefit from better execution quality. Nevertheless, the latency of the CT can only be inferior to direct feeds. This means that a CT and direct feeds will have to co-exist, creating potential arbitrage challenges and policy risk. Moreover, the shown liquidity will not be accessible by everyone given the European market structure. Furthermore, most of the other use cases identified rely on delayed processes that do not require pre-trade data.

**A post-trade CT would enhance a number of post-trade, middle and back office processes due to increased consistency and comprehensiveness of data sources.** These processes are carried out with inconsistent and incomprehensive data sources, which leads to frictions and ultimately cost for capital markets participants. This is specifically true for processes that rely on a single, centralised, regulatory-approved, independent source of information, for example in middle office and back office processing and risk management. The additional data in the consolidated tape from sources that do not provide timely and high-quality data today will enhance the investment decision process at various stages and allow for better performance management of own investment decisions or other stakeholders' services.

**More timely post-trade data would provide additional incremental benefit to users but moving too close to real-time can be disadvantageous.** Currently many post-trade processes are executed with delayed and inconsistent data and improving timeliness and reducing the need for reconciliation will provide significant additional benefits to users. We note that comprehensive data with a 15-minute delay will provide already significant benefit to the industry, but more incremental value could be created by moving incrementally closer to real-time in the future subject to successful implementation and testing of a post-trade 15-minute delay CT. Moving "too close" to real-time can introduce misuse risk with disadvantages for less sophisticated market participants like retail investors. It also risks introducing a technical arms race for ultra-low latency that introduces costs to users and contributors without providing enough marginal value in return. Hence, a sensible "speed limit" needs to be calibrated that maximizes value to the industry. An end-of-day tape will potentially be "too delayed" for various use cases and provide only minimal additional value to users.

**Exhibit 5: Benefits per use case for different CT options**

| CT design options                  | 1<br>Pre-trade<br>Real-time  | 2<br>Post-trade<br>Close to real-time                              | 3<br>Post-trade<br>15-minute delay                                 | 4<br>Post-trade<br>End of day                     |
|------------------------------------|--|--|--|---|
| <b>Capital raising</b>             | Some improvement for pricing and risk mgmt.  | More accurate pricing and visibility of issues                     | More accurate pricing and visibility of issues                     | More accurate pricing and visibility of issues    |
| <b>Inv. decision and execution</b> | Theoretical potential for better execution mgmt., but introduction of arbitrage risk | Better input for portfolio monitoring/ rebalancing                 | Better input for portfolio monitoring/ rebalancing                 | Better view on inv. universe/ risk- return        |
| <b>Post-trade analysis</b>         |  | Better/more timely data (helps e.g., execution quality assessment) | Better/more timely data (helps e.g., execution quality assessment) | Op. simplification with independent single source |
| <b>Securities services</b>         | Benefits for SecLend/ Collateral Mgmt.   | More accurate data for reconciliation                              | More accurate data for reconciliation                              | Op. simplification with independent single source |
| <b>Risk mgmt.</b>                  | Real-time risk mitigation  | More accurate risk mgmt. processes                                 | More accurate risk mgmt. processes                                 | Operational risk processes simplification         |
| <b>Compl. monitoring</b>           | Ability to identify misdeeds live  | Enhanced oversight capabilities                                    | Enhanced oversight capabilities                                    | Consistent data sources for ex-post checks        |
| <b>Aggregate assessment</b>        | Most processes don't need pre-trade real-time data, introduction of arbitrage risk   | Incremental value increase from more timely data                   | Benefits from operational simplification and some more timely data | Benefits from operational simplification          |

Benefits: High  Low

Source: Oliver Wyman Analysis

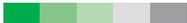
**The four different CT design options will benefit each stakeholder group differently:**

The buy and sell-side and retail investors benefit most from a consolidated tape with differences depending on the tape option. Whilst benefits for issuers can be realized, such as with a CT they will know where the trading in their stock takes place (something that is difficult for them to assess today), but those benefits are overall low due to their limited market data needs. Regulators as well as post-trade service providers will have some upside.

**Overall, there is little benefit from a pre-trade real-time CT. A post-trade 15-minute delay CT can already bring significant value, with incrementally more value being generated by a post-trade close to real-time CT. However, implementation challenges for a post-trade close to real-time CT are significantly higher than for a post-trade 15-minute delay CT, which is discussed in section 4 of this report.**

**Exhibit 6: Benefits per stakeholder for different CT options**

| CT design options                         | 1<br>Pre-trade<br>Real-time  | 2<br>Post-trade<br>Close to real-time                               | 3<br>Post-trade<br>15-minute delay   | 4<br>Post-trade<br>End of day  |
|---|--|---|--|--|
| <b>Issuer</b>                             | Not required   | Better ability to react to price changes in own issues              | Better ability to react to price changes in own issues                     | Better visibility, e.g., of own issues for other market participants       |
| <b>Retail investor</b>                    | Displayed liquidity not accessible, risk for arbitrage                         | Enhanced timeliness and frequency of account information            | Enhanced timeliness and frequency of account information                   | Some benefits from ex-post execution quality analysis                      |
| <b>Buy-side</b>                           | Potentially better execution (probably not possible due to latency challenges) | Benefits for portfolio monitoring/rebalancing and MO/BO             | Front-to-back benefits for securities processes, risk mgmt. and compliance | More accurate NAV, amendments and cancellations inclusion                  |
| <b>Sell-side</b>                          | Low additional benefit over existing faster direct feeds and co-location       | Benefits for real-time risk mgmt. and pricing (trading and issuing) | Front-to-back benefits for securities processes, risk mgmt. and compliance | Operational simplification from golden source data and overnight processes |
| <b>Clearing, settlement &amp; custody</b> | Some limited benefits of real-time data (e.g., for clearing risk mgmt.)        | Improved sec. services process stability/timeliness and risk mgmt.  | Improved sec. services process stability and timeliness                    | Low additional benefit over existing solutions                             |
| <b>Data provider</b>                      | Data already collected across sources  | Data already available, but not consolidated                        | Data already available, but not consolidated                               | Data already available, but not consolidated                               |
| <b>Regulator</b>                          | Anonymous by nature, preventing full regulatory audit                          | Opportunity for real-time surveillance                              | Enhanced surveillance via more accurate and comprehensive data             | Simpler surveillance via more accurate and comprehensive data              |
| <b>Aggregate assessment</b>               | Limited need across most stakeholders  | Incremental value increase to most stakeholder groups               | Significant benefits for most stakeholder groups                           | Some benefits for selected stakeholders                                    |

**Benefits:** High  Low

Source: Oliver Wyman Analysis

# CHALLENGES AND COSTS BY CT OPTION

## CHALLENGES ASSOCIATED WITH DIFFERENT CT OPTIONS

**A European CT comes with significant implementation challenges.** A number of technological, operational, commercial and legal hurdles hinder the feasibility of each CT option. This report assesses these along the data value chain, from the initial data collection to data consolidation, dissemination and final utilisation.

**A pre-trade real-time CT introduces the greatest complexity, driven by the impracticality of collecting real-time information across the geographically dispersed and fragmented European financial markets.** The technical hurdles of doing so are prohibitively high, as sourcing and consolidating highly dispersed pre-trade data requires not only significantly more resources, but is also stale and outdated once available to users. Also, there is no current legal mandate to collect pre-trade data. As ultra-low latency is not feasible, market participants who rely on high-frequency information will continue to use direct venue feeds. As a result, their willingness to use and pay for the dissemination of less performant CT will be limited. A pre-trade real-time CT also creates significant challenges and concerns with respect to its utilization. Its inferior latency compared to direct feeds could lead to a risk of arbitrage, most likely at the expense of retail and less sophisticated investors, thus creating significant policy risk. In addition, geographical and venue fragmentation realities mean that the CT visible price will not necessarily be accessible to all and the related cost would be very high due to the significantly higher message load for pre-trade data.

**Post-trade CTs introduce fewer challenges, primarily due to the more standardised and comprehensive nature of the data, and for the options with 15-minute or more delay, the fact that the provision of such data is already mandated under MiFID II.** As a result, the infrastructure and operations are already mostly in place to collect this information. A close to real-time solution presents significantly more challenges as it will require significant systems and operations enhancements, additional legal provisions that for example require trading and execution venues, specifically OTC and SI, to conduct data cleansing and reconciliation at the source. Hence, cost to contributors and users and challenges overall are almost comparable to the pre-trade CT option. However, overcoming data quality issues will also be challenging for a post-trade tape and many OTC and SIs will likely need to upgrade data capture and reporting infrastructure to deliver the required data quality. For OTC and SIs this will entail significant investments.

**Exhibit 7: Overview of challenges for different CT options**

| CT design options           | 1<br>Pre-trade<br>Real-time  | 2<br>Post-trade<br>Close to real-time   | 3<br>Post-trade<br>15-minute delay  | 4<br>Post-trade<br>End of day   |
|-----------------------------|--|---|---|---|
| <b>Data collection</b>      | Insurmountable geo./ latency issues, connectivity to venues, no legal mandate                      | Systems/ops enhancements, deferrals/delayed reporting to be revised                                   | Provision of data already mandated, infrastructure and operations in place    | Provision of data already mandated, infrastr. & ops in place, no streaming solution |
| <b>Data consolidation</b>   | Varying rule books, formats, standards, low data quality, not comprehensive                        | Sequencing issues from diff. timestamps, low data quality and accuracy from SI/OTC                    | Standardised data, more comprehensive data incl. amendments and cancellations | Standardised data, more comprehensive data incl. amendments and cancellations       |
| <b>Data dissemination</b>   | Insurmountable geo./ latency issues, limited incentive on top of direct feeds                      | Complex distribution requiring a streaming solution   | Complex distribution requiring a streaming solution                           | Streaming solution not required   |
| <b>Data utilisation</b>     | Latency arbitrage risk, liquidity not necessarily accessible                                       | Implementation into use cases will likely lead to adoption cost                                       | Implementation into use cases will likely lead to adoption cost               | Data already used by different participants across use cases                        |
| <b>Aggregate assessment</b> | Option almost impossible, due to latency issues, arbitrage risk and complex technical requirements | Complexity dependent on how close to RT (e.g., with 5 seconds more feasibility than 200 microseconds) | Connection, infra. and ops mostly in place or limited adoption cost           | Connection, infra. and ops mostly in place  |

Challenges: High  Low

Source: Oliver Wyman Analysis

**A post-trade close to real-time tape, will nevertheless require a highly sophisticated technological setup, which is almost, but not fully, comparable to the technology required for a pre-trade tape.** Nevertheless, it does not need to be continuously tuned for high performance, throughput and ultra-low latency, which reduces build and ongoing run/development cost. It will also have significantly lower capacity requirements, provided that a minimum time delay "speed limit" is built into the system that prevents a potential race to implement the newest technological standards and protects users/contributors from a technical arms race and less sophisticated investors from misuse risk.

**A post-trade end of day tape of record poses the smallest implementation challenges.** It could be achieved with an end of day drop-copy or file transfer solution and does not require a streaming solution that aggregates and disseminates data continuously throughout the day.

## **COSTS FOR DIFFERENT CT OPTIONS**

**Overcoming these challenges will result in very significant associated costs, in particular for the pre-trade real-time and post-trade close to real-time options.**

Post-trade delayed options on the other hand are expected to be less expensive as the connectivity, infrastructure and operations are already in place.

**We estimate the European CT will require a €20–100 MN upfront investment cost, depending on the delay option.** Our build cost estimates include a team covering leadership and project management, proposition design and architecture, business development and go-to-market. We expect the technology implementation to be outsourced to a third-party vendor for €5–25 MN and connectivity costs to amount to €7–65 MN depending on the type and speed of data required. We size connectivity as the largest cost block, as new interfaces need to be adopted. This will lead to a significant one-off cost per venue that is attributed to the consolidated tape in our analysis.

**Exhibit 8: Build cost estimates for different CT options**

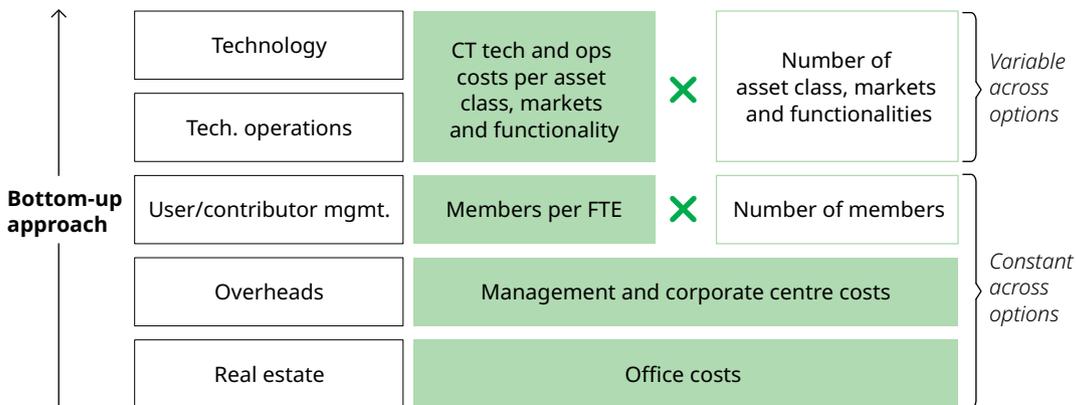
| CT design options                     | 1<br>Pre-trade<br>Real-time   | 2<br>Post-trade<br>Close to real-time  | 3<br>Post-trade<br>15-minute delay   | 4<br>Post-trade<br>End of day   |
|---------------------------------------|---|--|--|---|
| <b>Leadership &amp; project mgmt.</b> | <b>€1 MN</b><br>5 functional managers   | <b>€1MN</b><br>5 functional managers   | <b>€1MN</b><br>5 functional managers   | <b>€1 MN</b><br>5 functional managers                                       |
| <b>Proposition design</b>             | <b>€0.6 MN</b><br>3 architect and design leads (dep. on design option)        | <b>€0.6 MN</b><br>3 architect and design leads (dep. on design option)       | <b>€0.4 MN</b><br>2 architect and design leads (dep. on design option)       | <b>€0.4 MN</b><br>2 architect and design leads (dep. on design option)      |
| <b>Bus. dev. &amp; go-to-market</b>   | <b>€6 MN</b><br>1 representative per country                                  | <b>€6 MN</b><br>1 representative per country                                 | <b>€6 MN</b><br>1 representative per country                                 | <b>€6 MN</b><br>1 representative per country                                |
| <b>Technology implementation</b>      | <b>€25 MN</b><br>Outsourced vendor support                                    | <b>€20 MN</b><br>Outsourced vendor support                                   | <b>€10 MN</b><br>Outsourced vendor support                                   | <b>€5 MN</b><br>Outsourced vendor support                                   |
| <b>Connectivity</b>                   | <b>€65 MN</b><br>Connection costs of €100 k per venue (dep. on design option) | <b>€49 MN</b><br>Connection costs of €75 k per venue (dep. on design option) | <b>€33 MN</b><br>Connection costs of €50 k per venue (dep. on design option) | <b>€7 MN</b><br>Connection costs of €10 k per venue (dep. on design option) |
| <b>Total build cost</b>               | <b>~€98 MN</b>  | <b>~€77 MN</b>   | <b>~€50 MN</b>   | <b>~€19 MN</b>  |

Source: Oliver Wyman Analysis

**Additional upfront investment cost is required by consolidated tape contributors and users.** Our analysis assumes that the cost for data production and quality control processes is covered by the trading and execution venues, i.e., at the source, where required and not already existing today. In reality, this likely means that data contributors will incur a significant cost which shall not be underestimated, for upgrades and changes to existing data technology and processes. This will require a significant change programme that may pose challenges specifically for smaller trading venues, OTC and SIs. Users will also face significant implementation costs for using the tape, as all systems and processes that rely on market data will need to be reconfigured and connectivity to the consolidated tape to be established in various technical implementations.

**We use a bottom-up approach to estimate the CT run costs.** Our assessment considers each key cost item, across technology and tech operations, user/contributor management, corporate overheads and real estate. Our sizing approach has been informed by benchmarks collected publicly and privately from our experience in the capital market space and covers the recommended asset classes equity, equity-like and fixed income.

**Exhibit 9: Run cost estimation methodology**



Source: Oliver Wyman Analysis

**We estimate the European CT will cost €15–40 MN per annum to operate.**

This includes user/contributor management, corporate functions, real estate and other cost blocks. Technology for the CT can likely be procured by a vendor and paid via annual license fees. License fees for a streaming solution are significantly higher than for a drop-copy end of day solution. A larger team for technology operations is required for a real-time pre-trade solution than for a post-trade solution. Such a team is responsible for monitoring connectivity to contributors and users and managing the vendor relationship, including some smaller refinements to the software. The biggest cost block in our analysis is for a team that manages CT contributors and users and carrying out activities like onboarding, account management and billing, technical and services questions. The nature of this cost block must not be underestimated, as the market data obtained via the tape will fuel almost all key processes in the capital markets ecosystem and users will have questions and need a minimum service level and assurance on the data provision, otherwise the CT will not be implemented due to the risk that a CT appears as “black box.” For this team, we assume one manager per country (30 FTE in total) and one manager per 100-300 users (50 to 150 FTE in total). Due to the higher applicability and technical complexities, more FTE will be required both in operations, but also for user/contributor management in lower delay tape options.

### Exhibit 10: Run cost estimates for different CT options

| CT design options                      | 1<br>Pre-trade<br>Real-time   | 2<br>Post-trade<br>Close to real-time  | 3<br>Post-trade<br>15-minute delay                       | 4<br>Post-trade<br>End of day                            |
|--|---|--|--|--|
| <b>Technology</b>                      | <b>€12 MN</b><br>Software cost for ultra low latency streaming solution | <b>€10 MN</b><br>Software cost for high performance latency streaming solution | <b>€8 MN</b><br>Software cost for streaming solution     | <b>€2 MN</b><br>Software cost for drop-copy solution     |
| <b>Tech. operations</b>                | <b>€3 MN</b><br>25 operations specialists                               | <b>€2 MN</b><br>15 operations specialists                                      | <b>€1 MN</b><br>5 operations specialists                 | <b>€2 MN</b><br>5 operations specialists                 |
| <b>User/contributor mgmt.</b> of which |   |  |  |  |
| from venue managers                    | <b>€3 MN</b><br>One manager per EFTA contributor country                | <b>€3 MN</b><br>One manager per EFTA contributor country                       | <b>€3 MN</b><br>One manager per EFTA contributor country | <b>€3 MN</b><br>One manager per EFTA contributor country |
| from user managers                     | <b>€15 MN</b><br>One manager per 100 users                              | <b>€15 MN</b><br>One manager per 100 users                                     | <b>€10 MN</b><br>One manager per 150 users               | <b>€5 MN</b><br>One manager per 300 users                |
| <b>Corporate functions</b>             | <b>€3 MN</b><br>15 employees in corporate functions                     | <b>€3 MN</b><br>15 employees in corporate functions                            | <b>€3 MN</b><br>15 employees in corporate functions      | <b>€3 MN</b><br>15 employees in corporate functions      |
| <b>Real estate and other</b>           | <b>€3 MN</b><br>15 employees in corporate functions                     | <b>€3 MN</b><br>15 employees in corporate functions                            | <b>€3 MN</b><br>15 employees in corporate functions      | <b>€3 MN</b><br>15 employees in corporate functions      |
| <b>Total run cost</b>                  | <b>~€38 MN</b>  | <b>~€35 MN</b>   | <b>~€27 MN</b>   | <b>~€16 MN</b>   |

Source: Oliver Wyman Analysis

#### Two important assumptions need to be considered for the build and run cost analysis.

Firstly, additional run cost incurred by data contributors are not captured in this representation and need to be considered on top of estimated cost numbers in this report. Secondly, upfront remuneration to data providers is not considered in the run cost, as the assumption is made that data contributors are adequately remunerated based on the profits of a CT.

# COST-BENEFIT ANALYSIS AND GOVERNANCE

## RECAP OF THE CONSOLIDATED TAPE'S OBJECTIVES

**European markets have structural limitations that MiFID II aims to address but has not yet resolved.** The CT's objective is to help achieve the goals of MiFID II, namely improving transparency in European markets, creating a unified EU market, as well as fair and efficient markets. However, a CT cannot serve as a single source to solve all issues MiFID II aims to address. For example, the CT will not automatically improve data availability and quality, which need to be resolved at the source, and therefore will not solve one of the biggest hurdles to meet MiFID II objectives. Nonetheless, the CT can still provide value to capital markets participants. Its greatest benefit lies in access to more comprehensive and high-quality data sources, operational simplification from an independent source for market data, which will reduce process frictions amongst and within institutions and the ability to carry out various processes in a timelier manner than today.

## COST BENEFIT CONSIDERATIONS

**Currently no "mandated" regulatory use case exists for a CT in Europe, as such all post-trade CT options fulfil MiFID II provisions.** The primary use case for a CT from a MiFID II perspective is to contribute to creating a more integrated European market and make it easier for market participants to gain access to a consolidated view of trade transparency information that is available. This goal could already be achieved with a post-trade end of day CT. Nevertheless, we argue there are further benefits for the ecosystem, and subsequently issuers and investors, along the entire capital markets value chain that need to be looked at.

**A real-time pre-trade CT will provide little incremental benefits and result in high build-and run costs, which cannot offset the technical infeasibility of properly implementing such a tape.** Most users who would benefit from pre-trade real-time data already have access to this data via direct feeds and co-location to venues. We also note that such data is required for machine-based processes in specific institutions and not by retail investors and issuers. Given the latency challenges such a CT will have, it will very likely be inferior to existing solutions and adoption (incl. willingness to pay) amongst institutions who require such data will be low. The cost for building and running such a tape is significant and is not justified compared to the value such a CT would bring and the additional arbitrage risk it introduces.

**The inclusion of a real-time pre-trade information within the scope of a CT would open arbitrage risks that are potentially detrimental to less sophisticated and retail investors.** A key concern is that a real-time pre-trade CT could set the reference price which is used as execution benchmark for less sophisticated and retail investors, whilst sophisticated investors have access to low latency direct feeds and could subsequently exploit the latency difference.

**None of the participants in our interviews advocated for a pre-trade real-time consolidated tape.** Interviewees noted the limited incremental benefits of a pre-trade real-time consolidated tape above existing solutions, the high challenges of creating such a tape that may only partially be overcome and hence limit the usability of the tape and the high cost/likelihood associated with the establishment of such a tape.

**A post-trade CT will provide the biggest benefits for most stakeholders stemming from more comprehensive and consistent data.** The increased intelligence that can be generated by the larger scope and better quality of the data is significant and the "independent source" nature of the data will allow for significant operational simplification at various capital markets participants. The closer to real-time such post-trade data can be provided, the larger the incremental benefits for users, whilst potential misuse risk from moving "too close to real-time" needs to be considered.

**A post-trade end-of-day CT will already allow for operational simplification.** Whilst not enabling intra-day processes, an end-of-day tape will allow for some operational simplification, specifically at processes that happen overnight or that require time series of historic data. The operational complexity to build and run such a tape is the lowest in our assessment, not requiring a sophisticated streaming software. However, some fixed cost for running a CT will be incurred as a result and 15-minute data is already mandated and largely available (specifically in Equities), albeit not in a useable fashion from many SIs and OTC. We hence argue that a CT in Europe will provide more timely data than at the end of the day.

**A 15-minute CT has the best cost/benefit characteristics and is the most recommended solution.** More timely data will enable CT usage at even more processes, specifically those that are carried out on an intra-day basis, multiple times per day and hence provide more value to stakeholders. For most of these processes, 15-minute delay in the data is fully sufficient. This increases the benefits significantly. Whilst such a CT requires a more complex technical streaming solution, it does not need to support real-time and ultra-low latency and hence is not as sophisticated and costly. Overall, such a tape has the best cost/benefit characteristics. It provides significant value for users and the implementation is feasible. We argue that such a CT should be the strived for CT solution in Europe.

**A close to real-time post-trade CT could be investigated for Europe after the successful implementation and testing of a 15-minute delay CT, provided market structure deficiencies are addressed.** Close to real-time data could provide additional incremental benefits over a 15-minute delay option and support a few additional processes that would actually benefit from more real-time data.

Nevertheless, the technical challenges and costs associated with this outweigh additional incremental benefits. We argue that a post-trade 15-minute delay CT should be implemented, already supporting the majority of existing use cases. Only after a successful implementation period in which the CT has proven itself to provide genuine benefits, the delay time should get incrementally decreased until a sensible "speed limit" has been reached.

**Exhibit 11: Overview of benefits, challenges and costs for different CT options**

| CT design options                          | 1<br>Pre-trade<br>Real-time  | 2<br>Post-trade<br>Close to real-time                                | 3<br>Post-trade<br>15-minute delay                                  | 4<br>Post-trade<br>End of day                      |
|--|--|--|---|--|
| <b>Improved Europ. market transparency</b> | ✗  | ✓  | ✓   | ✓  |
| <b>Benefits and broader use cases</b>      | Limited need across most stakeholders  | Operational simplification and use case improvement                  | Operational simplification and use case improvement                 | Some operational simplification                    |
| <b>Challenges</b>                          | Option almost impossible, due to latency issues and complex technical requirements | Higher complexity dependent on how close to RT                       | Connection, infra. and ops mostly in place or limited adoption cost | Connection, infra. and ops mostly in place         |
| <b>Costs</b>                               | Run: ~€38 MN<br>Build: ~€98 MN   | Run: ~€35 MN<br>Build: ~€77 MN                                       | Run: ~€27 MN<br>Build: ~€50 MN                                      | Run: ~€16 MN<br>Build: ~€19 MN                     |
| <b>Assessment conclusion</b>               | Limited benefits, arbitrage risk and technical impracticality or impossibility     | Additional benefits beyond 15min option, but more complex and costly | Clearest benefits at a manageable cost and complexity               | Some benefits, but also lowest cost and complexity |
| <b>Recommendation</b>                      |  |  |   |  |
| <b>Challenges:</b>                         | High     Low   |  | ✗ Option does not improve European market transparency              | ✓ Option improves European market transparency     |
| <b>Benefits:</b>                           | High    Low  |  |   |  |

Source: Oliver Wyman Analysis

## GOVERNANCE CONSIDERATIONS

**A CT in Europe needs a strong governance framework which can only be provided by one independent pan-European entity.** The consolidated tape outlined and recommended in this paper can be used for various mission-critical processes and administration/operation needs to satisfy the highest quality standards. In order to do that, there should be a single CT per asset class. A solution with multiple CTs per asset class would counter the aim for consolidation, fragment and diminish revenues, and introduce latency issues and diverging versions of the data. Contributors across various member states and beyond need to be held accountable for data quality in a fair and transparent way. We argue that such a role can only be performed if a regulatory body (for example ESMA) is responsible for the administration of the "mandated" CT.

**Adequate industry representation shall be established in the governance.** CT contributors alongside representatives from key user groups shall be represented in the governance of the CT to provide subject matter input from the industry into the processes of the CT.

**Appropriate regulations and legislation need to be put in place to support the mandate of the CT via mandatory contribution.** This will need to include provisions that require all venues (incl. OTC and SI, via APA or not) to provide data to the CT. The CT also requires the authority to enforce data quality via NCAs, in case necessary.

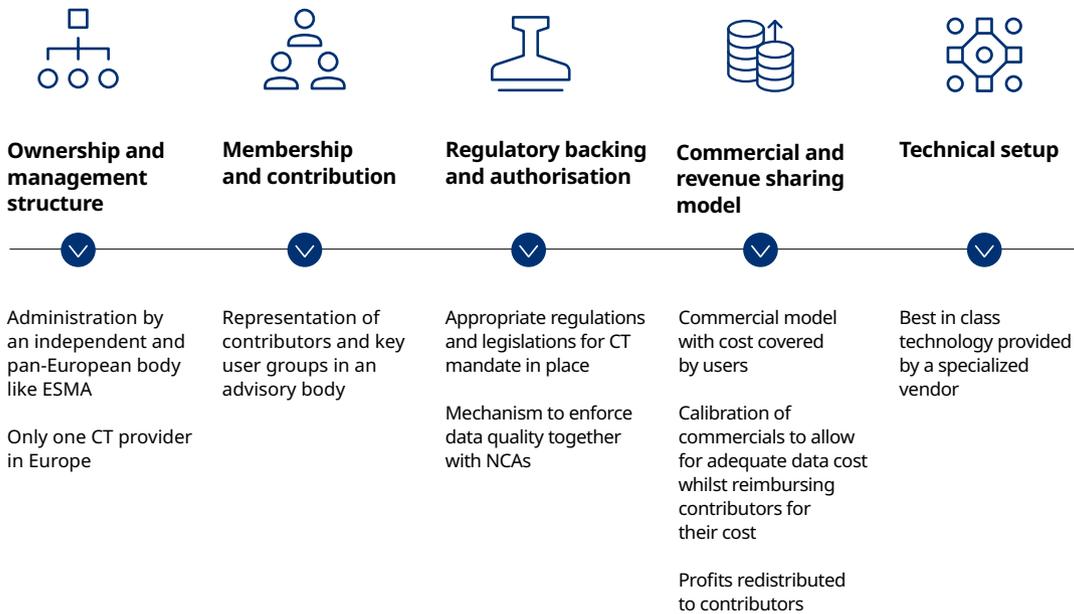
**A CT should have a commercial focus to reinforce and assure the value it brings to the industry without mandatory consumption.** The only way the value of a CT to the industry can be measured is if a CT needs to be procured by users at an adequate cost. This will also ensure that adequate countermeasures can be taken if commercial adoption and value to the industry are lower than expected. The fact that there is currently no "regulatory-mandated" use case in the EU does not allow for a mandatory consumption provision.

**Revenues of the consolidated tape shall be used to cover its cost, which shall reinforce operational efficiency of the CT operation.** Remaining profits shall be re-distributed to contributors according to their role in price formation and their share of data contribution. Overall profit levels of a CT should however be calibrated in a way that costs to users are as low as possible whilst adequately remunerating/incentivizing contributors for their cost and role in price formation and data contribution.

**A CT needs best-in-class technology, which can only be provided by a specialized vendor.** We argue that technology and software shall not be developed "internally" for a European CT, but that a recognized technology with well-known interfaces is used which facilitates adoption and increases operational stability.

The special situation of smaller data contributors needs to be considered. Those might have little ability to invest into own systems and technology in order to support a CT. A solution needs to be found for these markets and market participants both in the cost and revenue contribution to a CT that considers their size and ability.

**Exhibit 12: Overview of governance dimensions**



Source: Oliver Wyman Analysis

## **RISKS OF A BADLY CALIBRATED CT**

A well-calibrated CT provides benefits to European capital markets, but a badly calibrated CT can create very significant downsides, ranging from financial stability risks over market integrity questions through to consumer protection concerns. Following the global financial crisis as well as certain manipulation scandals, it remains key to remember that market data constitutes the starting point to any integer investment decision, financial stability and overall consumer protection which should never be compromised. Therefore, any CT must guarantee the highest level of data quality.

In addition, it should not be forgotten that the introduction of a CT will create costs for the overall ecosystem and require significant efforts from contributors, users and public authorities. As the anticipated benefits remain unproven yet, it will be key to avoid an introduction approach that unnecessarily creates high costs to the ecosystem which are ultimately borne by issuers and investors, leaving them potentially worse off than today in the status quo.

A badly calibrated CT also risks aggravating market structure challenges and set back European integration. It could further increase the share of trading on "dark" venues, which do not contribute to overall price formation and overall decrease market transparency rather than increasing it. Moreover, it could introduce policy risk and discriminatory treatment by further widening the gap in market accessibility between less sophisticated investors (e.g. retail) and highly sophisticated investors, for example if the CT allows sophisticated investors to use low-latency direct feeds to their advantage against less sophisticated investors who only have access to high latency CT data with prices that are, on top of that, not accessible anyways. Also, a badly designed CT could exacerbate market and trade execution practices that are prone to conflicts of interests.

Therefore, any potential CT that gets artificially injected into the market via public intervention should be fully in-line with the objectives of the capital markets union, recognize the importance of transparent price formation, avoid further fragmentation to the detriment of transparency and not run contrary to years of efforts in developing capital markets structurally across the EU.

# FINANCIAL ANALYSIS

**The significant costs of building and running such a tape need to be considered in comparison to the potential benefits such a tape can bring and the revenue it could generate.** Participants in our interviews indicated the willingness to pay a €10–15 k annual subscription fee for a post-trade delayed tape. With around 15,000 trading participants in Europe, this would result in a potential revenue of €150–225 MN per year (vs. ca. \$400 MN in the US).

**The post-trade 15-minute delay CT would be profitable and self-sustainable at a user adoption rate of only 17%.** Assuming an annual fee of €10 k per institution, which is at the lower border of ranges mentioned in our interviews, a CT with comprehensive and high-quality data can be self-sustainable. A break-even would occur if only 17% of applicable European users sign-up for the tape which, based on our interviews, appears feasible.

**For these estimations to hold, the CT will need to deliver the outlined benefits, which largely depend on the quality and comprehensiveness of the data.** If the CT does not include high-quality data from all trading and execution venues (incl. OTC and SI), the incremental benefit over existing solutions is low and so will be the industry adoption. This emphasizes the need to resolve market structure limitations before or simultaneously with introducing a CT.

**Exhibit 13: Sustainability scenarios for different adoption rates**

| CT design options  | 1   | 2                                |        |        | 3                             |        |        | 4   |
|--|---|----------------------------------|--------|--------|-------------------------------|--------|--------|---|
|  | Pre-trade<br>Real-time                                | Post-trade<br>Close to real-time |        |        | Post-trade<br>15-minute delay |        |        | Post-trade<br>End of day                              |
| <b>Adoption rate</b>   |   | 100%                             | 50%    | 22%    | 100%                          | 50%    | 17%    |   |
| <b>Total revenue</b>   | <i>No data regarding willingness to pay available</i> | €150 MN                          | €75 MN | €34 MN | €150 MN                       | €75 MN | €26 MN | <i>No data regarding willingness to pay available</i> |
| # users  |   | 15 k                             | 15 k   | 15 k   | 15 k                          | 15 k   | 15 k   |   |
| Revenue per user   |   | 10 k                             | 10 k   | 10 k   | 10 k                          | 10 k   | 10 k   |   |
| <b>Run cost</b>  |   | €34 MN                           | €34 MN | €34 MN | €26 MN                        | €26 MN | €26 MN |   |
| <b>Surplus available for remuneration of data contributors</b> |   | €117 MN                          | €42 MN | -      | €125 MN                       | €50 MN | -      |   |

XX% = Break-even adoption rate

Source: Oliver Wyman Analysis

# RECOMMENDATION

**Based on our analysis, we recommend the introduction of a post-trade 15-minute delay CT in Europe.** This CT shall cover all equity, equity-like instruments (including ETFs) and fixed income instruments from all trading and execution venues (i.e., including SI and OTC). The different asset classes shall be covered by separate CTs ideally.

**Data and quality gaps need to be addressed before the introduction of the CT otherwise a CT will provide little value.** Without high-quality data from all applicable trading and execution venues, specifically OTC and SI, and a reduction of deferral rules, a CT will not deliver the outlined benefits. In such a case, a CT will only introduce unnecessary costs to the system, while potentially having further adverse impacts on the European market structure.

**Once such a CT is established, a shortening of the delay time towards post-trade close to real-time with a sensible 'speed limit' could be investigated, although this will come with further implementation challenges.** Moving "too close" to real-time risks introducing misuse risk and increasing costs to users and contributors unnecessarily, hence a sensible "speed limit" needs to be calibrated that maximizes value to the industry without introducing a technical arms race for ultra-low latency. This staggered approach to shortening the delay time in the future will also ensure that the CT has proven its value to users and additional investments into the CT are justified.

**Given the mission-critical role of such a CT in European capital markets, we suggest it is administrated by an independent and pan-European body like the ESMA,** powered by specialized technology and advised by users and contributors. The CT, while operating as a single provider to ensure a consistent CT offering across the EU, should have a commercial focus that allows it to cover its cost, while remunerating data contributors adequately for their costs related to their role in price formation as well as data creation, capturing and delivery.

**Overall, a well-calibrated CT can provide significant benefits to European capital markets** — to both issuers and investors — provided that the appropriate option and policy choices are made. It can also serve as an important building block towards the Capital Markets Union.

**A badly calibrated CT will not just be a failed initiative,** it risks increasing the cost for European capital markets, aggravating market structure challenges, further disadvantaging less sophisticated users like retail investors and setting back the overall European capital markets integration.

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