

# Improve End-to-End Lead Times





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lead times

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**Understand and  
optimize supply  
chain processes  
to accelerate cash  
conversion and  
exceed service  
levels**



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# The long shadow of supply chain disruption

**“We’re working closely with our suppliers, as I think all companies are doing, thinking about our supply chain. And certainly, resilience is very important.”**

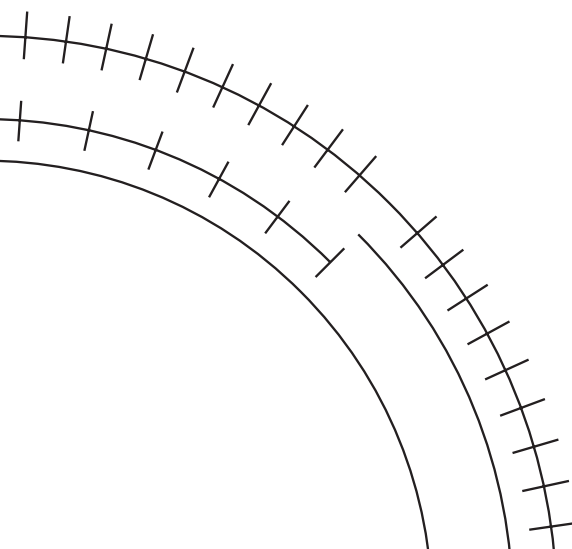
— James Umpleby, CEO of Caterpillar

**“We’re seeing pockets of improvement in the supply chain, but it remains fragile. So, we’re not assuming that our operations will return to normal levels of productivity and efficiency in our forecast.”**

— Josh Jepsen, CFO of John Deere

These comments give us a sense of the prevailing outlook among supply chain leaders.

While the disruptions of the past few years may be behind us, a number of problems that existed even before the pandemic still persist. So the pressure is on to keep up momentum in solving the many challenges plaguing complex supply chain operations both now and in the future.





# A major opportunity: end-to-end **lead times**

One supply chain metric that's being prioritized as a route to value right now is end-to-end lead times. A snapshot of your supply chain captured in a single KPI, end-to-end lead time is a measure of the time it takes to acquire materials, move them to their plants, produce the finished good, and move the finished good to the distribution center, ready for customer orders to be fulfilled.

It's also the key to solving many of the supply chain problems that persist from pre-pandemic days. For example, excess inventory is a major issue, and solving it requires a fine balancing act. But due to the highly complex, siloed, and decoupled nature of supply chains, this is impossible until you can effectively incorporate end-to-end lead times into planning parameters.

That's just one example of the critical role lead times play in modern supply chains. Optimizing end-to-end lead times enables you to:

- **Reduce working capital** and **accelerate cash conversion**
- Identify ways to **exceed service levels** by customer
- Know if you can **meet service levels** when unexpected disruptions occur

But it's not easy. There are many barriers, like the silos that exist across supply chain processes, teams and metrics. Without a full picture of your supply chain data, fragmentation will continue to cause frustration. Fingers will be set to 'point'. And the blame chain will continue.

If you can gain a better understanding of end-to-end lead times, however, you can begin to break the blame chain and make real strides in fixing far-reaching supply chain issues. And the first step is to achieve end-to-end visibility.

# The missing piece: an end-to-end picture

There's no question that supply chain resilience relies on your ability to build a complete picture of all the connected processes within it. In fact, the number one characteristic of a resilient supply chain, as identified by McKinsey & Company partner Julian Fischer, is end-to-end visibility on risks across the value chain.

But the "end-to-end" part of end-to-end process visibility is, of course, where things get tricky (– to put it mildly). Understanding and optimizing end-to-end lead times remains an extremely difficult challenge due to the sheer volume of goods in question, the number of locations they pass through, and the variations that exist in the paths to a finished good.

Unable to map out all the different ways materials are procured, manufactured, distributed, and fulfilled, supply chain leaders are left with:

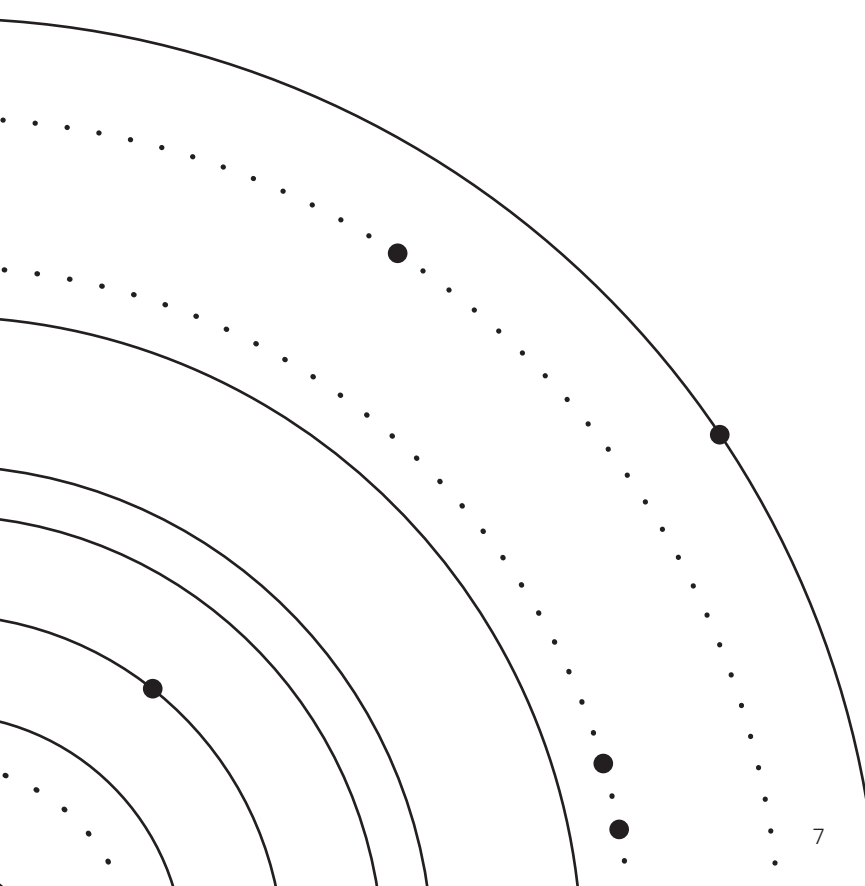
- Assumptions about end-to-end lead times based on their personal experience or that of their peers, which don't factor in all process variations
- Solutions at the mercy of (unreliable) master data accuracy in source systems, which can result in outdated or inaccurate lead times
- No way to know where to start when they want to improve their end-to-end lead times

# Alternative solutions and their limitations

The market for supply chain analytics and visualization tools – and business intelligence tools in general – is seeing a convergence of planning and execution capabilities, but there’s still a long way to go before they square that circle, and the promise of end-to-end process visibility has gone unfulfilled.

Control towers offer limited command center-style benefits, but they lack the end-to-end process visibility that supply chain leaders need in order to control and optimize the right things. Then there are big data solutions, which offer restricted visualization capabilities and off-the-shelf tools requiring lots of configuration.

Even traditional process mining has struggled to master the complexity of end-to-end lead times.



# Going beyond traditional process mining

Event data is stored in dozens, hundreds, or even thousands of tables within information systems, such as enterprise resource planning systems. Traditional process mining extracts this event data and uses it to discover how your processes actually run.

With complete transparency into how work flows through your organization, process mining identifies where and when common problems occur, like unnecessary delivery blocks impacting on-time delivery. Process mining can even be paired with automation to trigger corrective action within your processes and improve operational efficiency through execution management.

Traditional process mining and execution management have provided tremendous results. In 2021, BP's CFO Murray Auchincloss attributed Celonis with helping them save \$800M in procurement in their 2Q 2021 earnings report.

However, there are limitations with traditional process mining. And these limitations constrain the value of novel use cases like capturing end to end lead times.

## **1. Decoupled processes can't be linked by mapping single cases**

First, traditional process mining requires a transactional link between individual processes in order to capture an end-to-end picture. The traditional approach captures a single process and events related to that single process easily.

It does this by following a case ID (like a purchase order number, PO item, Sales Order item, etc.), the activities occurring to that case ID (like when it was created), and when those activities occurred. But in order to capture related processes and link them to these processes, the case ID has to share a specific attribute with the processes in question. But as we all know, supply chain processes operate in silos.

For example, if it takes 30 days to create a car engine but deliveries must be made within seven days of an order, a material planner must keep inventory on hand to meet those orders.



As a result, multiple processes are involved, but not necessarily linked, when providing a finished good to a customer – perhaps a customer placed an order when there was sufficient material on hand or a finished good was created well before any customer orders came in.

In other words, these decoupled processes cannot be linked by mapping single cases, like purchase orders or production orders, which is how we visualize processes using traditional process mining.

## **2. Duplication causes a significant data drag**

Second, while it's possible to create this link with traditional process mining, the data extraction results in a significant volume of duplicate data that requires heavy validation – especially if multiple ERPs are required. Classic process mining requires extraction from multi-table, relational databases of the source systems into an event log where each event refers to a case, an activity, and a timestamp. This allows you to answer questions about the individual process, like what is the most common reason for a blocked order (if you were analyzing an order to cash process).

But if you wanted to understand how long it takes to get a finished good to a customer, you would need an event log and a data model for order management, procurement, and production, for each ERP instance used to get that finished good to a customer.

Particularly in the current macroeconomic environment, the faster you can identify and act on process insights, the more successful your investment in process mining will be. So the lengthier or more custom any process mining use case is, the harder it will be to ensure value is realized due to the significant data drag created.

This is why a new approach is needed.

# The new enabler: object-centric process mining

Object-centric process mining is a revolutionary technology that allows businesses to see all the connections, interdependencies, and most importantly areas for improvement in – and between – their processes for the first time.

It does this by creating something called an Object-Centric Event Log (OCEL) that captures the one-to-many and many-to-many relationships between multiple objects (e.g., sales orders, sales order items, production orders and the like).

## **Want to learn more about exactly how this works?**

Check out [What is object-centric process mining?](#)

The wonderful thing about object-centric process mining is that you don't need the multiple data models we discussed in the section above. You just create one data model that can show you all the different processes that a single object touches.

You can see all the way upstream and downstream, and can see the relationship between different objects and events – bringing those decoupled processes together on the same page.

You can see how long each part of the process takes, and where upstream actions cause downstream delays. You can see where stockouts are causing delays, or where you've got surplus inventory negatively affecting your working capital. You can improve service levels.

And because all of this is done using objects that are fairly universal – invoices, orders, deliveries, etc. – you can now work in a model that uses the same language you do, rather than the language of your source systems. Plus, it's system agnostic so it works the same across SAP, Oracle, or other ERPs.

This model is called the [Object-Centric Data Model](#) and if it doesn't sound simple enough already, we've made it even simpler to use by baking it into a dedicated off-the-shelf app called [The Celonis End-to-End Lead Times App](#).

You can use the End-to-End Lead Times App to:

- **Track the movement and location of components** through each and every process required to create a finished good
- **Surface the finished good with the lowest service level or any finished good with excess inventory**, making it easier to improve end-to-end lead times
- **Identify potential root causes to the end-to-end lead time bottlenecks**, so you can take immediate corrective action

Ultimately, the End-to-End Lead Times App enables supply chain leaders to unlock the value of optimized lead times, including the ability to reduce working capital, accelerate cash conversion, and exceed service levels.

[Learn more about the app](#)

## **One company reduced working capital by “about 10 percent” using the End-to-End Lead Times App**

- » Furthermore, with this end to end transparency, we can find ways to deliver the same service in an even shorter time frame and act faster and be more flexible even when disruptions occur.  
I’ve worked in Supply Chain for over 20 years. This level of transparency has never been possible.  
But with Celonis we can stop arguing over the variations and align on a path forward to create a more agile and resilient supply chain. «

– Kai Führer, Director Global Supply Chain Controlling,  
Freudenberg Sealing Technologies



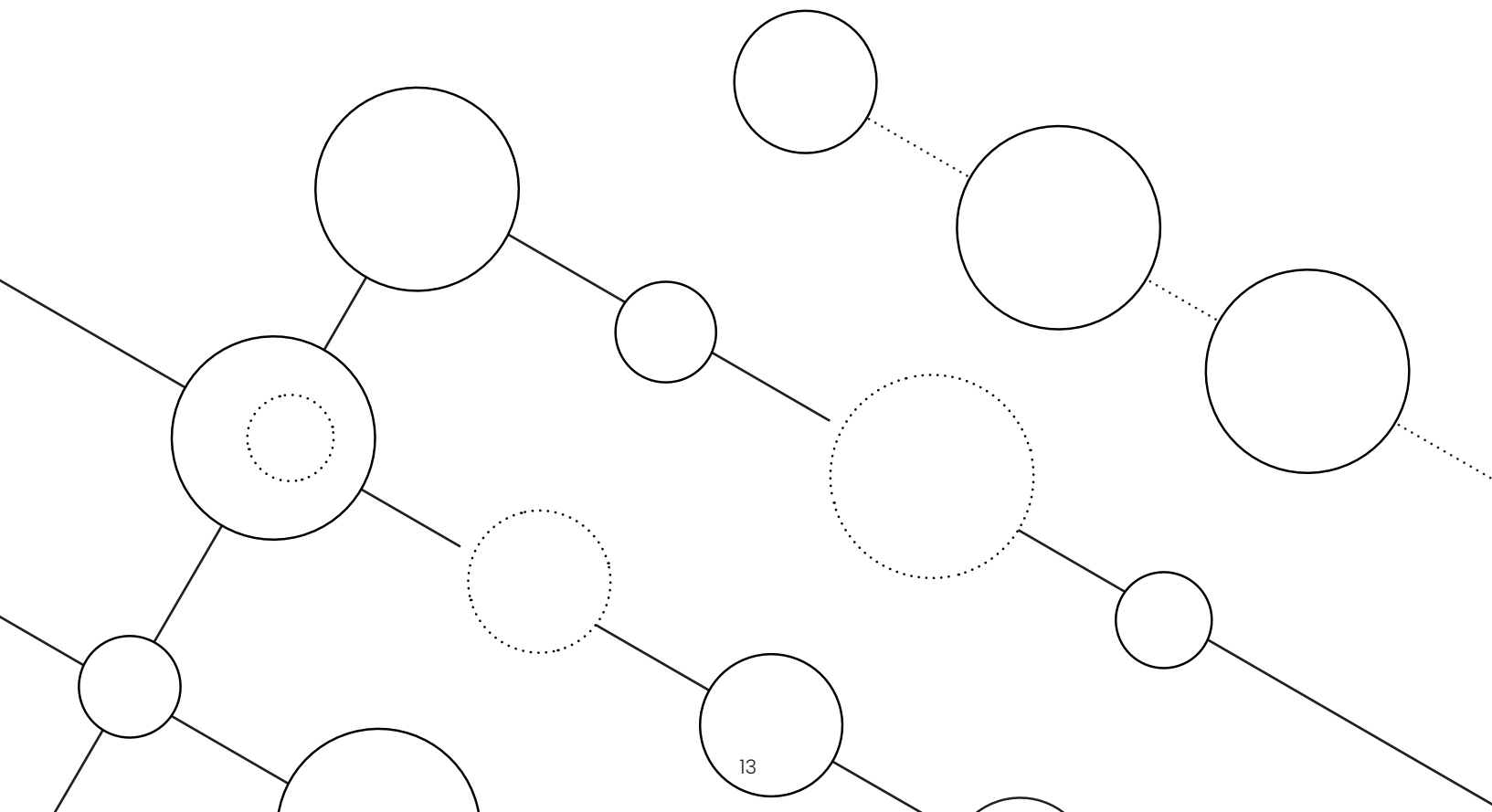
# Break the blame chain once and for all

As supply chain leaders set their sights on calmer waters, there's no room for complacency. Volatility is still everywhere, and many pressing challenges remain. The time for process fragmentation, communication breakdowns, and finger-pointing is over.

Many are taking steps right now to bring new levels of visibility, agility and resiliency to supply chains – starting with end-to-end lead times.

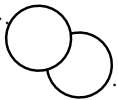
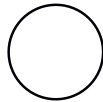
**Ready to improve your own end-to-end lead times? Start your process-led supply chain transformation now.**

**Let's go**



# About Celonis

Celonis enables customers to optimize their business processes. Powered by its leading process mining technology, Celonis provides a unique set of capabilities for business executives and users to continuously find improvement opportunities within and across processes, and execute targeted actions to rapidly enhance process performance. This optimization yields immediate cash impact, radically improves customer experience, and reduces carbon emissions. Celonis has thousands of implementations with global customers and is headquartered in Munich, Germany and New York City, USA with more than 20 offices worldwide.



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