

Enabling End-to-End Supply Chain Orchestration

Miklos Fodor, Senior Solutions Consultant
Henry Ames, GM Logistics Orchestration



A background image showing three business professionals (two men and one woman) in a warehouse or industrial setting. They are gathered around a tablet held by one of the men, appearing to be in a collaborative meeting. The image is overlaid with a semi-transparent green filter.

Leave with an **actionable strategy** to source real-time supply chain data

– **affordably and predictably** –

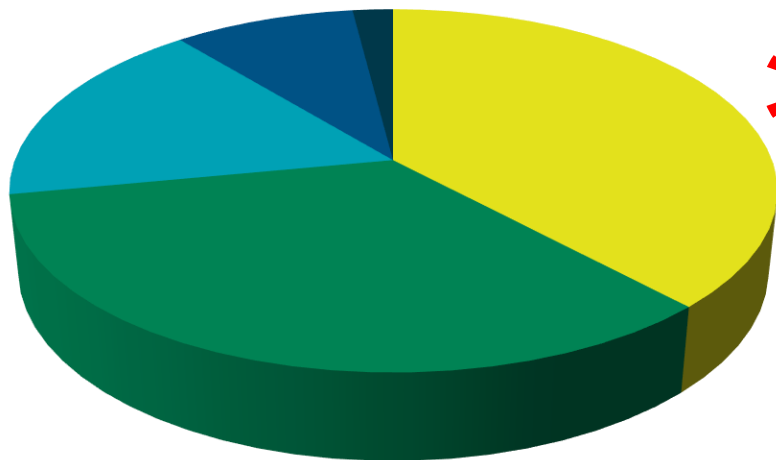
from **100% of your trading partner network** for making, better and more agile business decisions.

A photograph of two industrial workers in a warehouse, wearing hard hats and safety glasses. One worker is pointing towards the right, while the other looks on. The background shows industrial shelving and equipment. The image is overlaid with a semi-transparent green filter.

Voice of the Industry

The State of End-to-End Supply Chain Digitalization

If my company could rapidly and cost-effectively digitalize information sharing with any segment of our trading partner network, we would focus on:



38%

Third-party logistics providers to enhance metrics like inventory visibility and service levels through order-to-cash and inventory data orchestration.

34%

Contract manufacturers to optimize metrics like working capital through production tracking orchestration.

17%

Carriers and freight forwarders to optimize costs through shipment tracking orchestration.

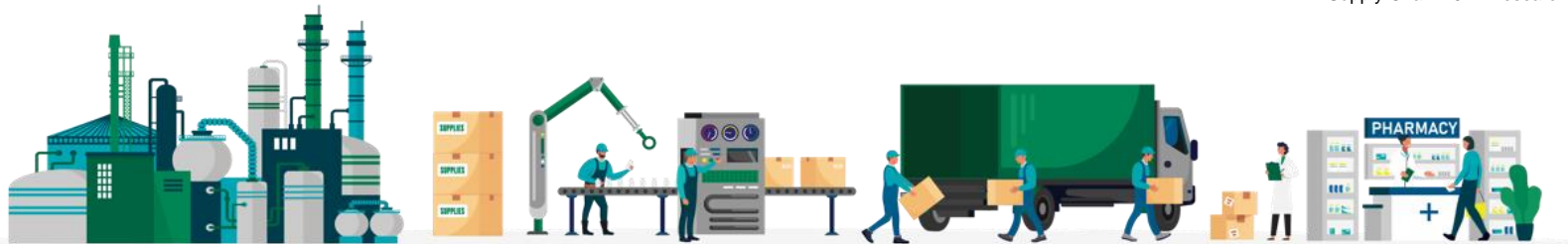
9%

Direct suppliers to improve metrics like lead time predictability through procure-to-pay data orchestration.

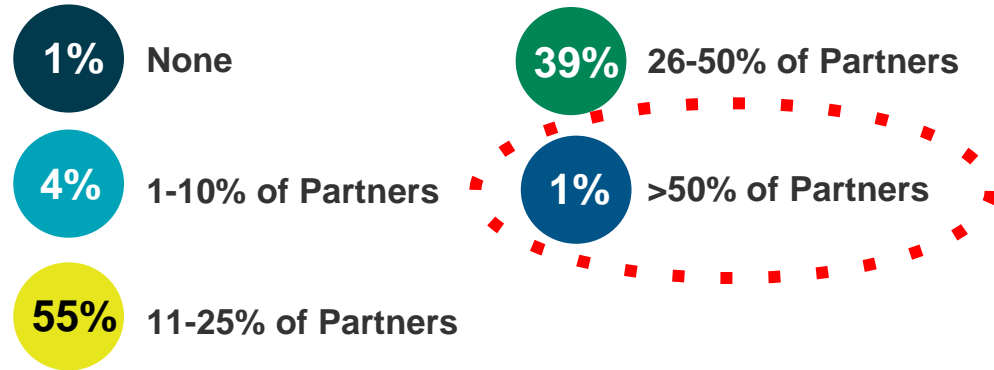
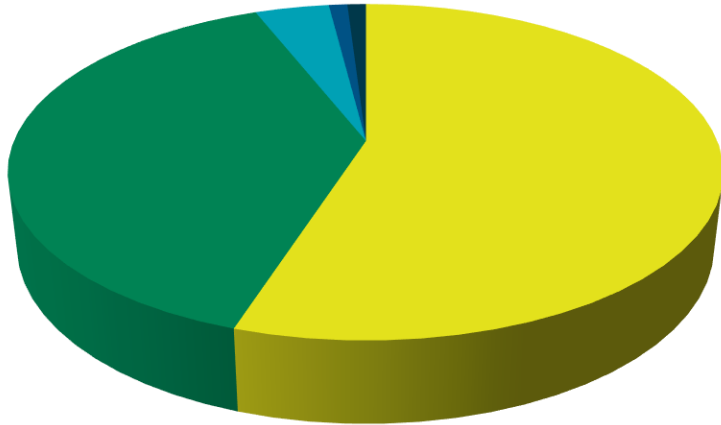
2%

Customers (retail pharmacies, hospitals, etc.) to increase demand visibility through direct commerce orchestration.

WBR AI in Supply Chain 2024 Research Report



By partner count, from **what estimated percentage of your supply chain trading partners** (e.g., Direct Suppliers, CMOs, 3PLs, Customers, etc.) do you receive continuous, **real-time supply chain information** directly integrated into your enterprise operating systems (e.g., ERP, S&OP, QMS, Inventory Management, CRM, etc.)?



WBR AI in Supply Chain 2024 Research Report



Leaders are accelerating investments – especially those enabled by generative AI

AI, Advanced Machine Learning in support of:

- Autonomous decision making
- Advanced simulations
- Continuous improvement



Most Mature Industries:

Utilities, High-Tech, Metals, and Mining



Least Mature Industries:

Life Sciences, Consumer Goods, and Chemicals



From Individual Silos to **End-to-End Supply Chain**



Digital Twin can leverage interconnected data to inform network design and operations



Supply chain visibility leads to planning accuracy by bringing together sales, financial, and supply chain plans.



Enables a company to more **accurately predict** and meet market/customer demands.



Supports the effective allocation and use of manufacturing, packaging, and logistics resources

Life Sciences Companies Must Digitalize to Drive Outcomes

Business Performance Goals

Maximize Revenue



By avoiding stockouts, improving OTIF, and reducing failure-to-supply penalties

Free Up Working Capital



By optimizing inventory and reduce carrying costs

Improve Operational Efficiency



By digitalizing all manual processes end-to-end

Drive End-to-End Digitalization



With a single platform to fuel AI-driven decision-making

Growth Goals

- New Market Expansion
- Product Launch Excellence
- New Commerce Channel Development
- C> Commercialization
- Ensure Regulatory Compliance
- Enhance Value of ERP Migration
- Improve Sustainability Performance



994

2024 Unique Supply Chain
Orchestration Account Meetings*



61%

Pharmaceutical/ Medical Device
Manufacturers



39%

CMO, CPO, Wholesalers,
3PLs, & Dispensers

What Use Cases are Important to You?

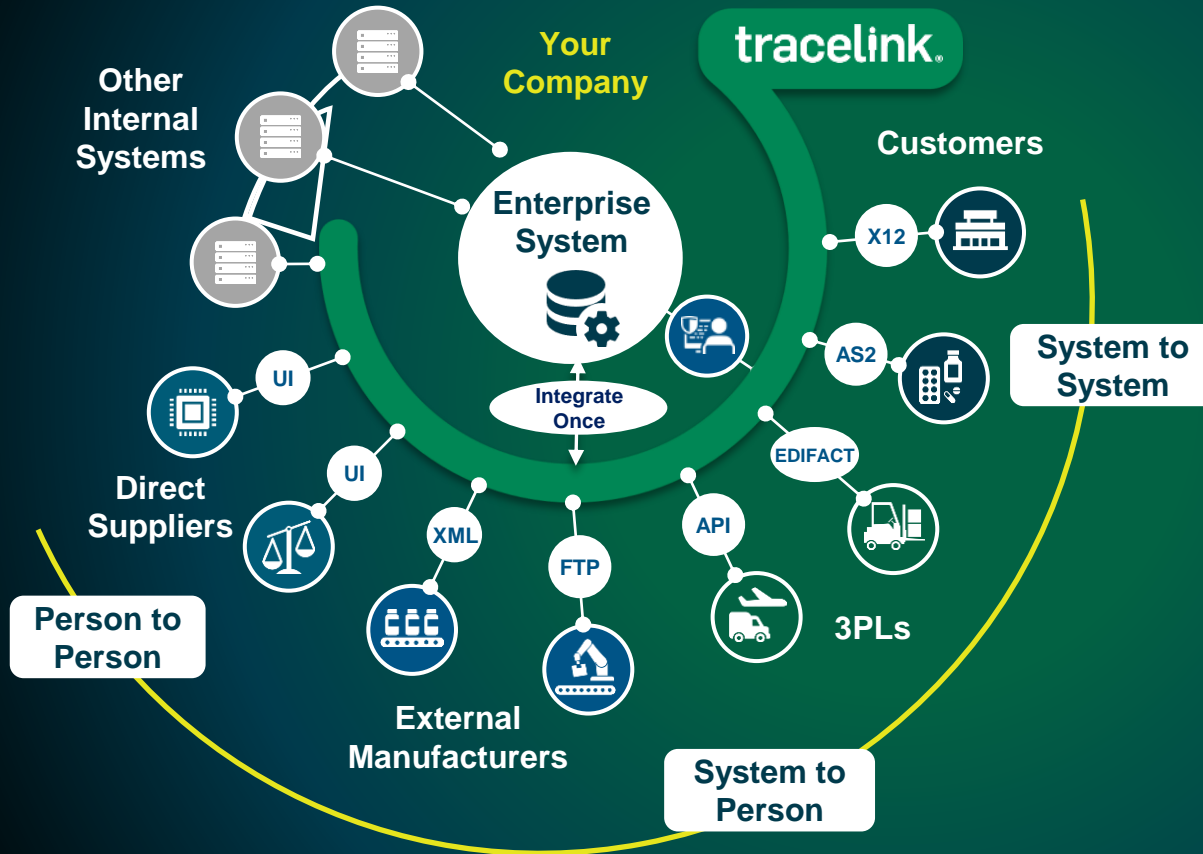
- **Pharmaceutical Traceability**
- Procure-to-Pay Digitalization
- **Order-to-Cash Digitalization**
- Shipment Visibility
- PO Confirmation
- Consignment Inventory
- **CMO Production Tracking**
- 4PL Order-to-Cash Digitalization
- **3PL Warehouse Inventory Visibility**
- Direct-to-Patient Fulfillment
- Invoice Tracking
- **API Inventory Visibility**
- Product Returns Reconciliation
- Financial Reconciliation
- **Forecast Collaboration**
- **Cell & Gene Orchestration**
- **Clinical Supplies Management**
- Medical Device Traceability
- Channel Inventory Visibility
- **Supplier-Managed Inventory**





Can we use the **proven model** pioneered in track-and-trace for other supply chain business processes?

Exchange Real-Time Supply Chain Information via **MINT Integrate-Once™** Capability



- **MINT** bridges the gaps across capability levels and needs of supply chain partners
- **MINT** delivers real-time data even if supply chain partners are not capable of B2B integration
- **MINT** provides the external data to fuel AI-driven orchestration across 100% of your supply chain

Requirement: New Approach to Digital Integration

Network your way, on a network of networks, where everyone can join and scale together

End-to-End Network



Custom



EDI



Industry Exchange

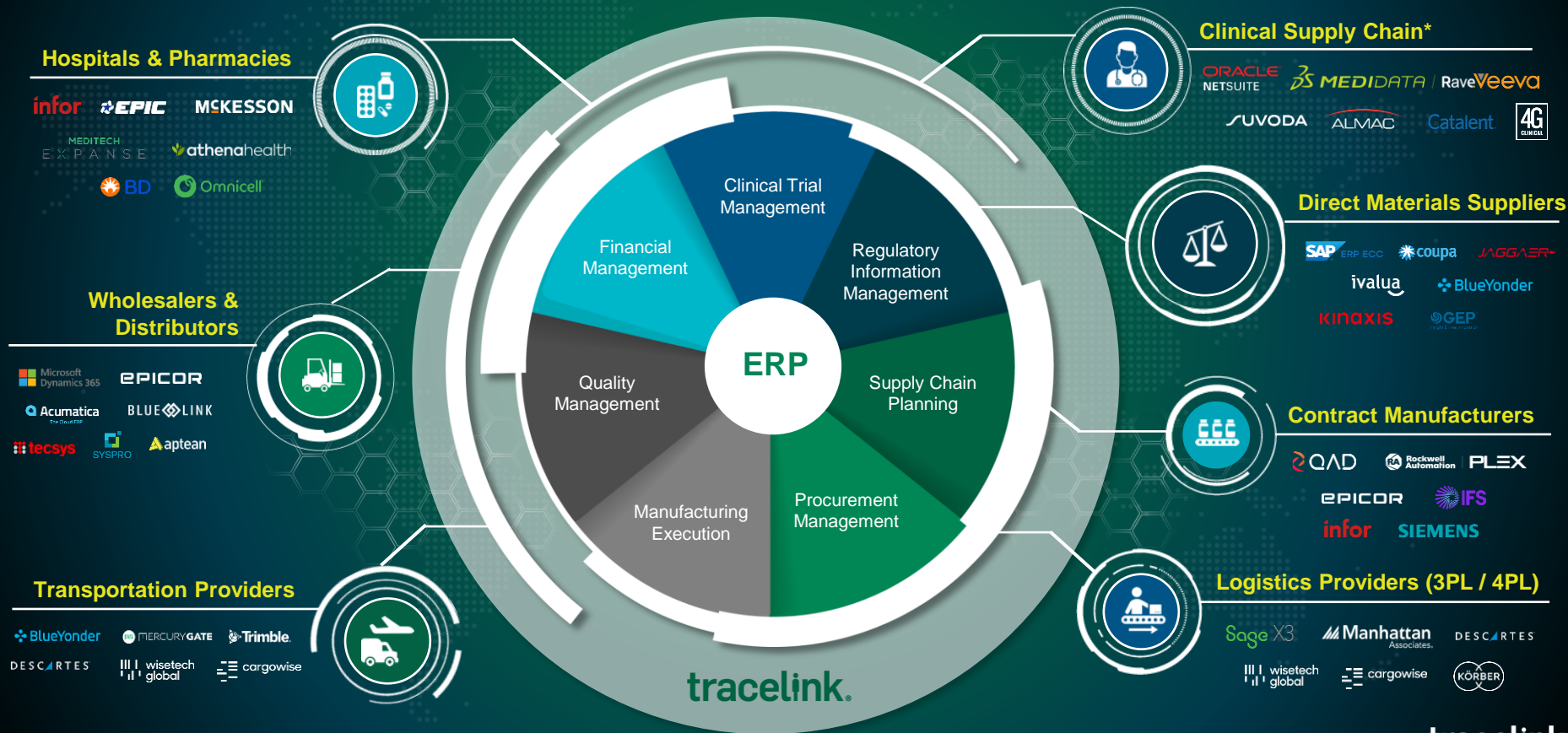


Portals



API

Requirement: Support All End-to-End Processes For All Partners



Requirement: Support All Commercial Transactions End-to-End



Introducing OPUS: The Orchestration Platform for Universal Solutions

1 Common Network Data Model & Metadata-Driven

AI-ready, end-to-end supply chain info enabled by flexible objects and workflows

2 Universal Integration for All Partners & Transactions

Each company chooses its own integration formats (API, B2B, EDI, UX, etc.)

3 No-Code UX Design & Solution Configuration

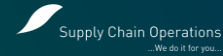
Empower users with no-code UX design to create seamless experiences

4 End-to-End Supply Chain Reports & Dashboards

Single integrated view of supply chain business processes in a single location

5 Open Partner Ecosystem for Digitalization Success

Tap into an extensive ecosystem of partners with OPUS & industry expertise



OPUS DEMO



Search Business Transactions

Filter

- All Transactions
- Business Transactions**
- Serialization Transactions
- Manufacturing - Customer
- Manufacturing -- Supplier
- Manufacturing - Supplier
- Commerce - Supplier
- Logistics - Client

Search all your MINT business transactions here.

State	Result	Type	Transaction...	Sender	Receiver	Input File	Output File	Last Updated
Sent	Delivered	Purchase Order	PO2025040701	FG Distributors	MUNDOS PHAR...	PO2025040...	..... (0 bytes)	4/25/25, 6:53 PM (GMT)
Sent	Delivered	Purchase Order	PO2025040301	FG Distributors	MUNDOS PHAR...	PO2025040...	..... (0 bytes)	4/25/25, 6:45 PM (GMT)
Sent	Delivered	Purchase Order	PO2025040302	FG Distributors	MUNDOS PHAR...	PO2025040...	..... (0 bytes)	4/25/25, 6:44 PM (GMT)
Sent	Delivered	Purchase Order	PO2025040204	FG Distributors	MUNDOS PHAR...	PO2025040...	..... (0 bytes)	4/25/25, 6:39 PM (GMT)
Sent	Delivered	Purchase Order	PO2025040202	FG Distributors	MUNDOS PHAR...	PO2025040...	..... (0 bytes)	4/25/25, 6:37 PM (GMT)
Sent	Delivered	Purchase Order	PO2025040203	FG Distributors	MUNDOS PHAR...	PO2025040...	..... (0 bytes)	4/25/25, 6:37 PM (GMT)
Sent	Delivered	Purchase Order	PO2025040203	FG Distributors	MUNDOS PHAR...	PO2025040...	..... (0 bytes)	4/25/25, 6:37 PM (GMT)
Sent	Delivered	Purchase Order	PO2025040201	FG Distributors	MUNDOS PHAR...	PO2025040...	..... (0 bytes)	4/25/25, 6:37 PM (GMT)
Sent	Delivered	Purchase Order	PO2025040101	FG Distributors	MUNDOS PHAR...	PO2025040...	..... (0 bytes)	4/25/25, 6:28 PM (GMT)
Sent	Delivered	Purchase Order	PO2025040102	FG Distributors	MUNDOS PHAR...	PO2025040...	..... (0 bytes)	4/25/25, 6:27 PM (GMT)

CASE STUDIES



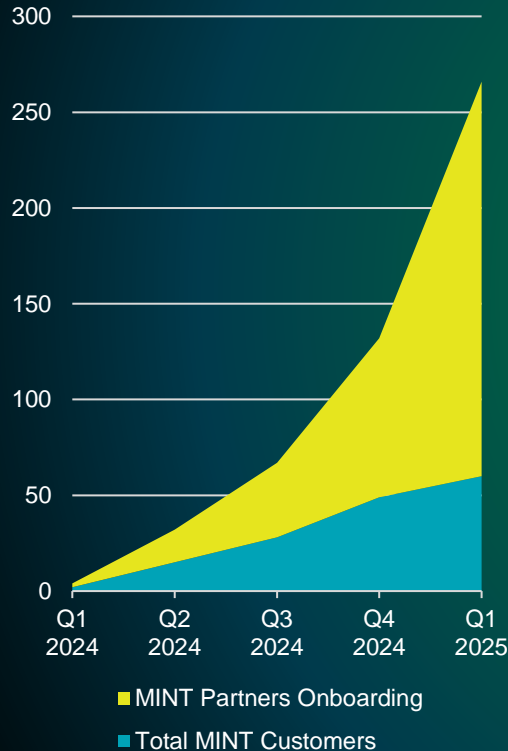
Companies Scaling the E2E Digitalisation Mountain

Customer Journey #1 – Logistics & Commerce



MINT Customer:

Global Branded Pharmaceutical MAH – EMEA HQ



Business Challenge

Current EDI solution failing:

- No visibility into 3PL/customer inventory
- Lack of business agility due to manual processes to create ASNs
- Unpredictable errors and maintenance



Technical Challenge

Point-to-point EDI connections take 6+ months to establish with each new partner to be onboarded



MINT Trading Partners

- ~5 3PLs
- 30+ Customers



Supply Chain Orchestrations

- Logistics
- Commerce



Transactions Exchanged

- PO / PO Acknowledgement
- ASN, Invoice
- Product Transfers
- Credit/Debit Adjustments



Future Desired State

Single integration to TraceLink Network via MINT to receive real-time orders and inventory balances from 3PLs and major commerce partners



Improved Business Metrics

- Eliminate unpredictable EDI costs
- Reduce cost/time to onboard partners
- Right-first-time onboarding accuracy
- Improved time-to-value per integration

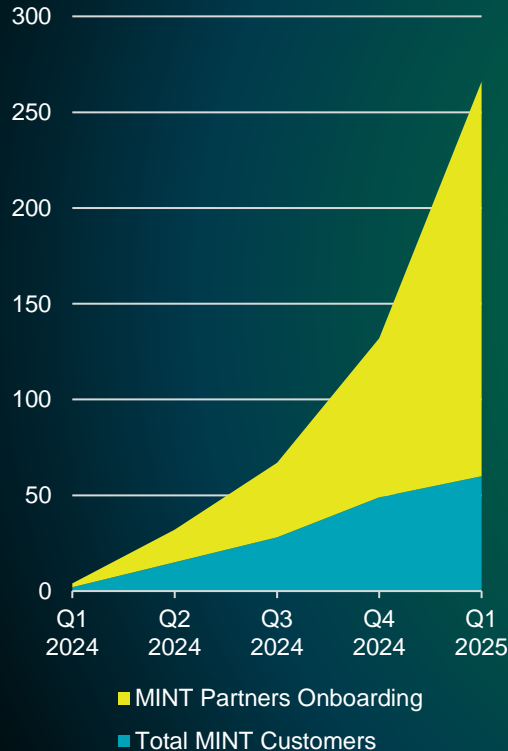
Companies Scaling the E2E Digitalisation Mountain

Customer Journey #2 – End-to-End Orchestration



MINT Customer:

Global Branded Pharmaceutical MAH – EMEA HQ



Business Challenge

- Lack of inventory visibility in 3PL network:
- >\$80M in lost revenue due to stockouts
 - Expedited shipment fees
 - Increased production costs



Technical Challenge

- Point-to-point integrations required to connect to 3PL systems for inventory balance transactions and manual data entry and exchange



MINT Trading Partners

- ~40 CMOs
- ~80 Direct Suppliers
- ~20 3PLs
- 100+ Customers



Supply Chain Orchestrations

- Manufacturing
- Logistics
- Commerce



Transactions Exchanged

- PO / PO Acknowledgement
- ASN, Invoice
- Inventory Update
- Inventory Balance



Future Desired State

Single integration to TraceLink MINT to seamlessly interface with CMOs and 3PLs in Phase 1 – expand to Commerce with Direct Suppliers and Customers in Phase 2



Improved Business Metrics

- Reduce revenue loss from stockouts from 5.5% to 2.75%
- Reduce production delays
- Better CMO + Direct Supplier alignment
- Reduction in working capital held

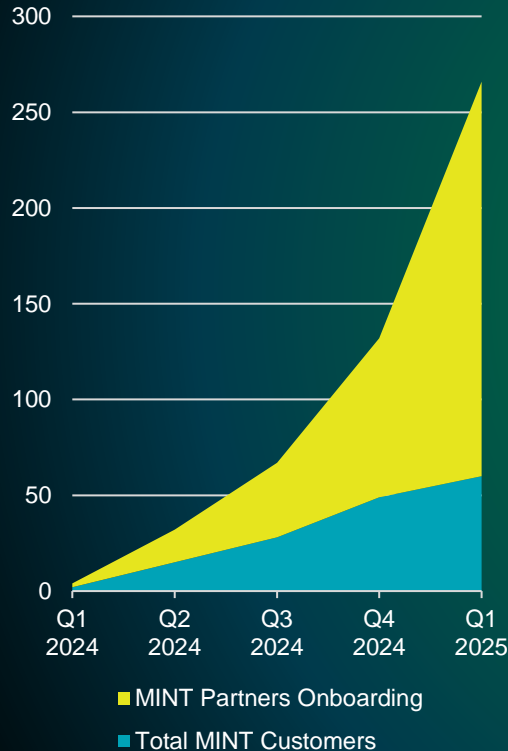
Companies Scaling the E2E Digitalisation Mountain

Customer Journey #3 – Commerce



MINT Customer:

Contract Manufacturer (CMO) – North America HQ



Business Challenge

Inability to meet Buyer (MAH) mandate to use SAP Ariba to exchange POs and Invoices leading to increased costs and decreased customer satisfaction



Technical Challenge

Multiple integrations into SAP Ariba required to meet the mandate of full global network of CMO's Customers ("Buyers")



First MINT Trading Partner

Global Multinational MAH – EMEA HQ



Supply Chain Orchestration

- Commerce



Transactions Exchanged

- PO / PO Acknowledgments
- ASN
- Invoice



Future Desired State

Single integration to TraceLink Network via MINT to seamlessly interface with any/all Customers (Buyers) using SAP Ariba



Improved Business Metrics

- Reduced time to onboard
- Reduced time to integrate
- Improved customer service level
- Reduced failure-to-supply fees

Predictable MINT Pricing Enables Digitalization of 100% of Your Partners

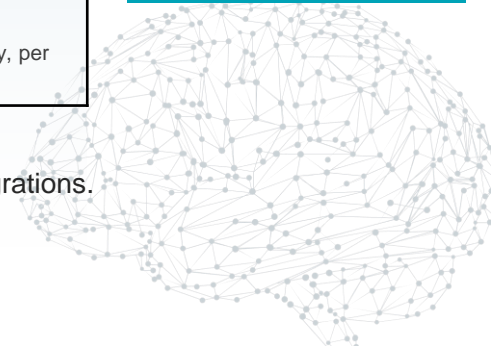
<i>MINT Pricing Tiers</i>	Essential Visibility	Extended Visibility	Full Visibility ²
<i>Annual Cost per MINT Link¹</i>	\$600	\$1,200	\$4,800
<i>Onboarding Cost per MINT Link</i>	\$0	\$0	\$0
<i>Transaction Type Count Limit per MINT Link</i>	3	7	Unlimited
<i>Transaction Volume Limit³</i>	Unlimited	Unlimited	Unlimited
<i>Customer User Count Limit</i>	Unlimited	Unlimited	Unlimited
<i>Trading Partner User Count Limit</i>	Unlimited	Unlimited	Unlimited

¹ MINT is priced per MINT Link; MINT Links can be placed into different tiers depending on the number of Transaction Types exchanged
² MINT Links leveraging the Serialized Shipment Transaction Type are subject to Full Visibility pricing.
³ With regard to MINT transaction volume limits, customer order forms may specify a maximum practical daily limit of files exchanged per day, per MINT Link and Transaction Type to protect against unnatural or abusive activity which could compromise system integrity.

You will **NOT** be charged for:

- Transaction Volume
- File Size
- Custom File Maps
- Partner Onboarding
- Partner File Maps
- Integration Maintenance

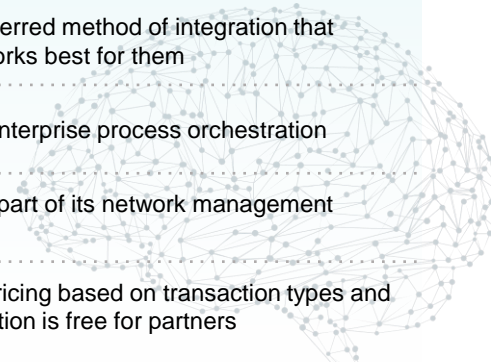
- **Services**
 - An SOW will be provided for implementation.
 - There is no cost for custom transforms (maps) development or ongoing maintenance of integrations.



Appendix

TraceLink Succeeds Where All Legacy Approaches Fail

Digitalization Requirements	Why Legacy Integration Approaches Fail	Why TraceLink B2N Integrate-Once™ Succeeds
Industry Focus & Collective Network Effect	New hub-and-spoke “networks” created for each new customer across industries	290K+ Life Sciences and Healthcare entities pre-verified and onboarded
Onboarding Scalability	Complex and expensive to scale as new partners are added	Easily onboard new partners without additional IT costs.
Integration Effort	Custom integration required for each trading partner	Single integration to the TraceLink network for each transaction type
Data Format Interoperability	Limited to pre-defined formats, often requiring significant customization.	Harmonized via universal canonical data model to support any preferred format (EDI [X12, EDIFACT], IDoc, CSV, etc.)
Modes of Data Exchange	Primarily focused on EDI or specific system-based formats	Supports B2B [AS/2, SFTP, SMTP, HTTPS], API, UI
Flexibility for Trading Partners	Partners must adhere to specific standards or formats	Partners can use any preferred method of integration that <i>they</i> choose and which works best for them
Collaboration	Limited to transactional exchanges, lacking broader collaborative tools	Enables real-time, multi-enterprise process orchestration
Ongoing Integration Maintenance	Requires ongoing customer IT involvement for updates and troubleshooting	Handled by TraceLink as part of its network management services
Overall Cost Model	Typically involves volumetric data fees and hidden costs for onboarding/maintenance; partners often must pay also	Transparent, affordable pricing based on transaction types and trading partners; participation is free for partners



Case Study: How One Customer is Using OPUS to Drive Competitive Advantage

To **streamline collaboration, enhance transparency, and drive operational efficiency**, a **global biopharma leader** partnered with TraceLink to digitally integrate its external manufacturing trading network. The company managed **73 CMOs responsible for 30% of annual sales**, but fragmented processes, manual inefficiencies, and limited supply chain visibility created opportunities for transformation.




Objectives & Goals

-  **Enhance Responsiveness & Reliability**
Improve real-time coordination with CMOs for proactive planning.
-  **Improve Cost Flexibility**
Reduce reliance on manual processes, minimizing inefficiencies.
-  **Replace Traditional Approaches**
Leverage advanced information systems to improve stock visibility.
-  **Accelerate Decision-Making**
Enable better collaboration through faster, data-driven insights.

Business Impact

-  **Enhanced Transparency & Collaboration**
Frequent data exchanges improved alignment, enabling faster and more accurate planning.
-  **Optimized Inventory Management**
Real-time visibility reduced safety stock reliance, lowering inventory costs.
-  **Proven Value & Adoption**
CMOs saw clear benefits within six months, with improved workflows and communication.
-  **Operational Efficiency Gains**
Streamlined processes reduced workload, reinforced data consistency, and set a new industry benchmark.

Challenges

-  **CMO Resistance**
Many partners hesitated to move away from manual processes.
-  **Alignment Issues**
Training was required to unify systems and workflows.
-  **Transition Risks**
Ensuring seamless adoption without operational disruptions was critical.

"At the beginning we had to convince them, but after six months most CMOs are quite impressed with this solution."

SCOR
Metrics
Improved



Reliability



Responsiveness



Flexibility



Costs

TraceLink **Links** the Global Pharma Industry for Track and Trace Orchestration

15+
Years of
Innovation

339K+
Active
Network Links

291K+
Network
Members

1,600+
Customers

\$4.4B+
Customer Savings on
Point-to-Point Integration Costs

30+
System
Integrations

454M+
Transactions
Exchanged

1,600+
Unique Transforms
Available



Proactive Network Management Programs Accelerate Digitalization

Customer Digitalization & Integration Challenge

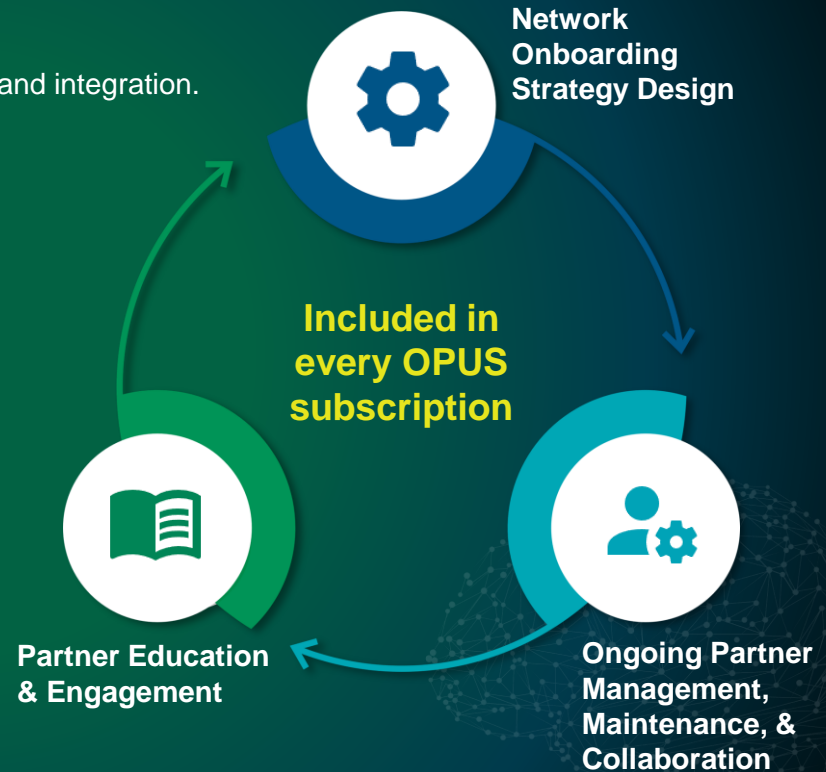
- Partner participation is essential for network digitalization.
- Customers lack resources and expertise for partner onboarding and integration.
- Partners need education on Integrate-Once™ value.

TraceLink Network Program Management

- Dedicated contact for partner engagement strategy.
- Analyzes data to prioritize onboarding.
- Leads webinars on partner value and tracks progress.
- Reports metrics to customers.

TraceLink Network Success Management

- Experts in B2B link setup with partners (Integrate-Once™)
- Define and align transaction requirements.
- Test and troubleshoot transactions with partners.
- Provide feedback on data formats and validations.
- Proactively resolve configuration/workflow issues.
- Manage ongoing link maintenance and updates



or-ches-tra-tion

/,ôrkə'strāSH(ə)n/



Coordinate all participants and processes to efficiently move products across the **end-to-end supply chain** for patients and consumers



Synchronize procurement, manufacturing, distribution, and logistics **information** across suppliers, distributors, regulators, and providers



Optimize for cost-effective and secure delivery of products, **enhancing visibility and responsiveness**



A fundamental requirement of orchestration is **digitalization**

60+ Customers and 200+ Trading Partners Onboarding to MINT in 12 Months

Select companies across a global, end-to-end set of supply chain participants



\$2B MAH (Japan)

10+ CMOs, PO, PO Ack, ASN



\$7B MAH (France)

100+ CMOs, PO,
PO Ack, Invoices



\$1B Hospital (US)

50+ MAHs, PO, PO Ack,
ASN, Invoice



\$0.6B MAH (Germany)

30 External Partners, 6 Inventory &
Warehouse Transactions



\$0.5B MAH (Italy)

10+ CMOs, PO, PO Ack, ASN,
Invoice, Inventory Balance Report



\$16B MAH (Germany)

100+ CMOs, ASN



\$1B MAH (China)

3PL use-case, PO, ASN
Inventory balance report



\$15B MAH (Germany)

73 CMOs, PO, PO Ack, ASN, Invoice,
Inventory, Forecast Planning & Release



\$0.1B CPO (US)

200 MAHs, PO, ASN
Inventory Adjustment



\$0.3B Pharma (Denmark)

10+ CMOs, 1 3PL,
PO, PO Ack, ASN



\$0.75B Pharma (Italy)

10+ CMOs, PO,
PO Ack, ASN



\$0.1B MAH (South Africa)

Serialized Shipments

But Digitalization **Requires** Synchronized Transaction Flows



▶ Key Performance Indicators

- Order Lead Time
- OTIF
- Working Capital
- Cycle Time
- Supply Lead Time

▶ Planning

- Channel Inventory
- Demand Forecast
- Production Schedule
- Current Inventory
- Supply Plan

▶ Transaction Flow

- Order-to-Cash
- Transportation
- Logistics
- Production Tracking
- Procure-to-Pay

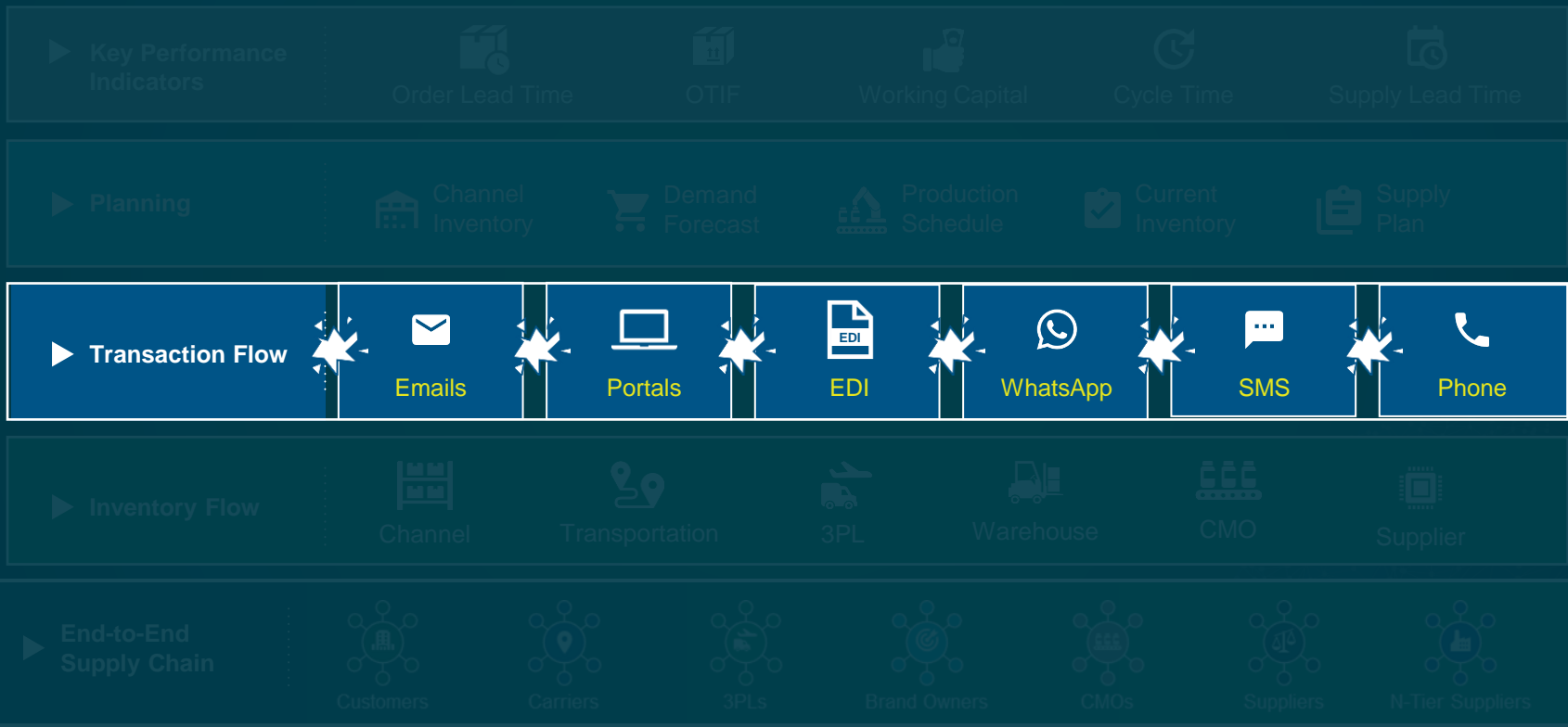
▶ Inventory Flow

- Channel
- Transportation
- 3PL
- Warehouse
- CMO
- Supplier

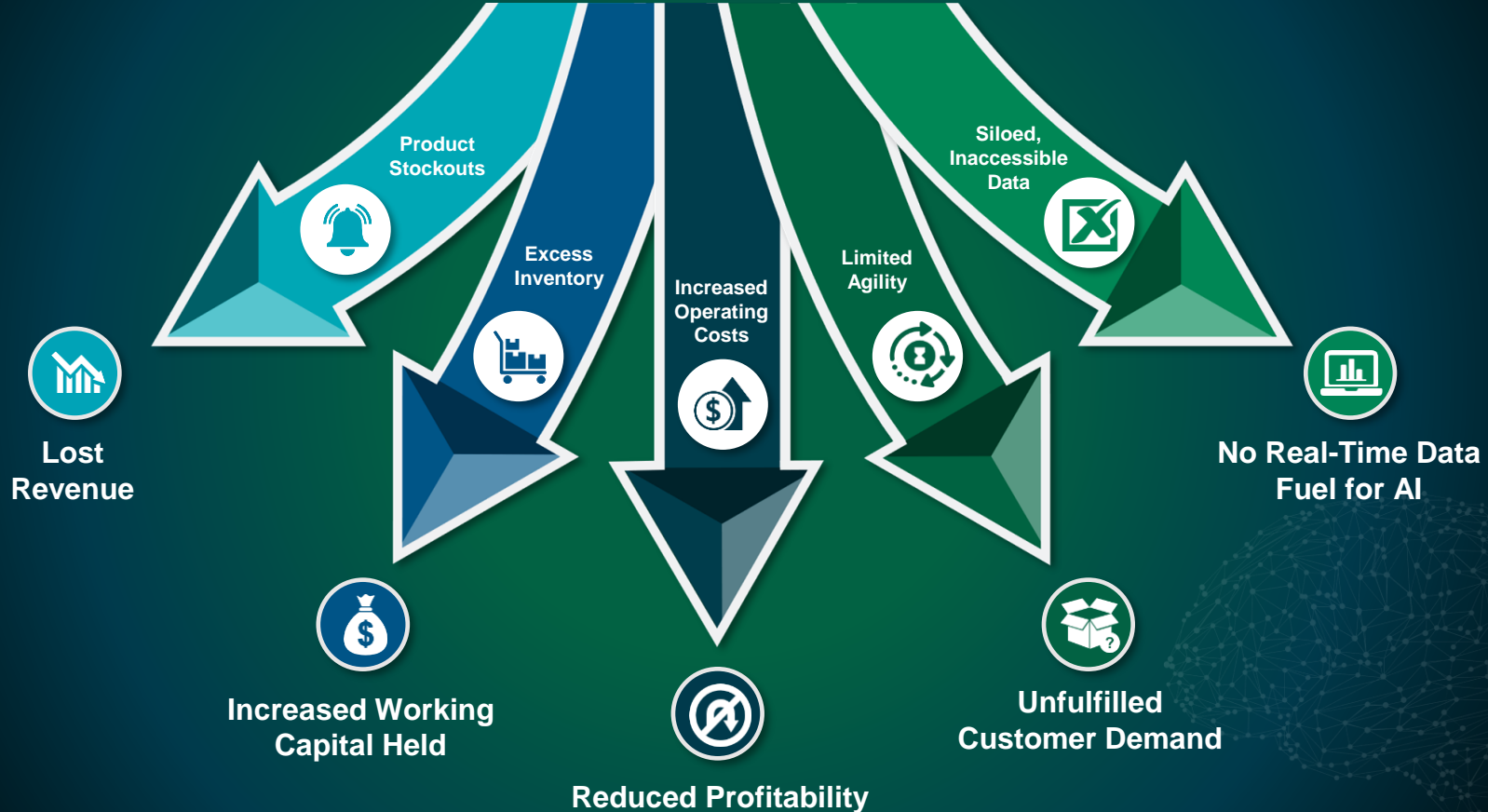
▶ End-to-End Supply Chain

- Customers
- Carriers
- 3PLs
- Brand Owners
- CMOs
- Suppliers
- N-Tier Suppliers

Manual Processes & Data Silos **Prevent** Digitalization



Siloed, Unsynchronized Data Reduces Revenue & Profitability



TraceLink Already Digitalizes End-to-End for Global Track-and-Trace

2009
Year Founded

6
Global Offices

900+
Employees

291K+
Total Network Members

1,750+ Total Customers

51 Countries with Customers

30+ System Integrations (LMS, ERP, WMS)

339K+ Active Network Links

\$4.4B+ Customer Savings on Point-to-Point Integration Costs



Distribution & Logistics
60+ Customers | 870+ Partners



Life Sciences Manufacturing
775+ Customers | 1,816+ Partners



Contract Manufacturers & Packagers
150+ Customers | 850+ Partners



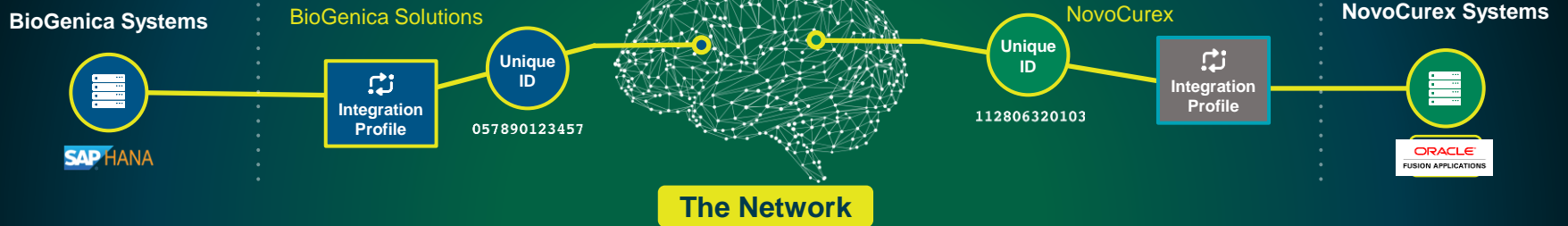
Healthcare & Pharmacy
300+ Customers | 249K+ Partners



Direct Materials Suppliers
1,650+ Partners

TraceLink's Proven B2N Integrate-Once™ Model is a Breakthrough

tracelink.



PO IDoc ↔ PO Canonical

ASN IDoc ↔ ASN Canonical

Serialized Shipment EPCIS ↔ Serialized Shipment Canonical

PO Canonical ↔ X12 PO

ASN Canonical ↔ X12 ASN

Serialized Shipment Canonical ↔ Serialized Shipment CSV



Digital Twin

TraceLink enables a digital representation for every entity, site, and product, delivering clean, real-time supply chain



Integrate-Once™

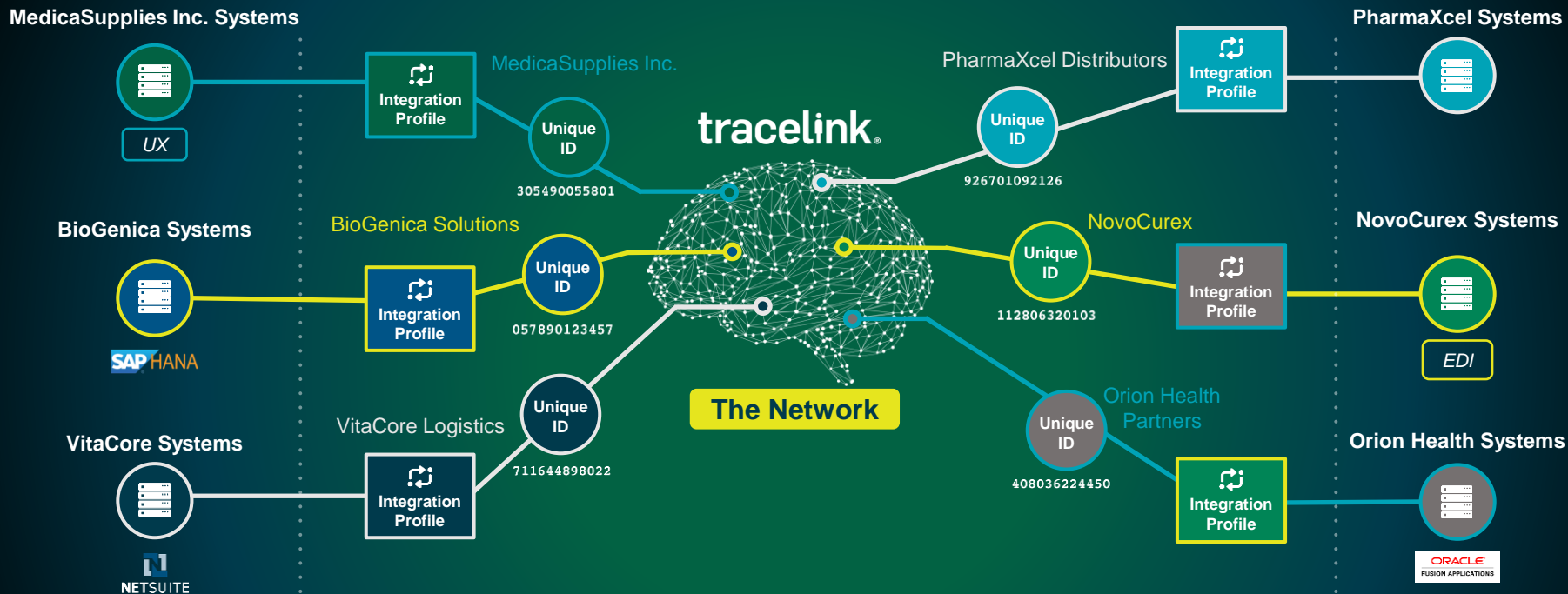
The only solution that integrates a company to all trading partners for all transactions through a single link



Interoperate-with-Everyone

All trading partners can easily link to the network, choosing their own preferred integration method and formats

TraceLink B2N Integrate-Once™ Scales Seamlessly As You Grow



Multi-Modal Integration

Companies communicate effortlessly with all network partners regardless of integration method (B2B, API, UI, Email)



Network Success

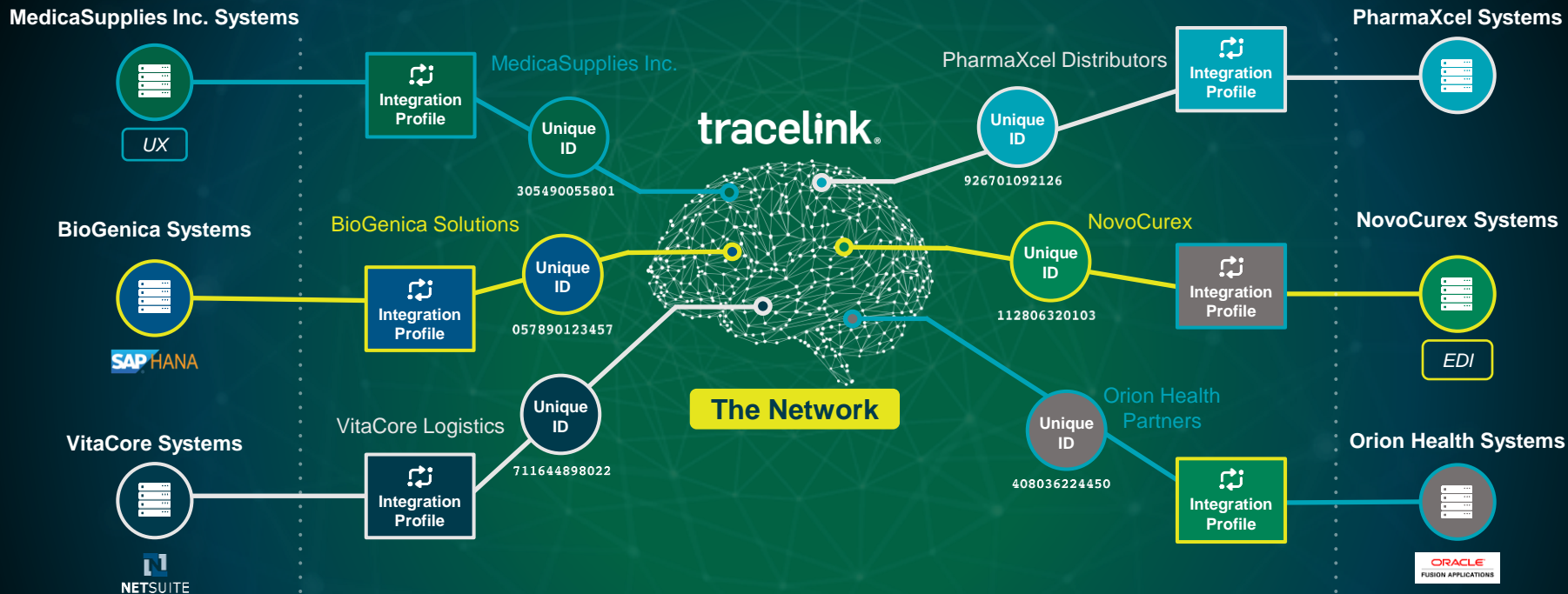
Dedicated team manages your digital twin including partner onboarding, integration, and maintenance



Independent Maintenance

The network remains operational and adaptable, insulated from trading partner changes, ensuring sustainable growth

TraceLink B2N Integrate-Once™ is the Foundation for Digitalization



No-Code Linking

Modern no-code tools simplify integration configuration and speed connectivity across diverse trade partner networks



Collective Network Growth

Each customer contributes to expanding the network, creating exponential value



Massive Scale

Over 290,000 companies, 1,600 customers, and 350,000 active links exchanging terabytes of data annually.