M-Trust™: Cyber-physical trust, enabled

Transforming the reliability of complex value chains

M-Trust™

MERCK

The value of cyber-physical trust

Unpredictable supply chain disruptions, counterfeit threats, and product quality concerns are challenges facing businesses across the world, particularly those serving highly regulated industries.

These complex challenges require companies to move from traditional manual processes to more reliable digital frameworks.

Cyber-physical trust allows companies to digitalize critical business processes, make verifiable claims about products and processes, and maintain control over the authenticity of their products and materials.

Supply chain disruptions cost, on average,

45%

of one year’s cash profit.

An estimated

86%

of companies surveyed by McKinsey are investing in supply chain transformation to respond to industry disruptions.

Source: McKinsey & Company 2023

introducing the latest in cyber-physical trust

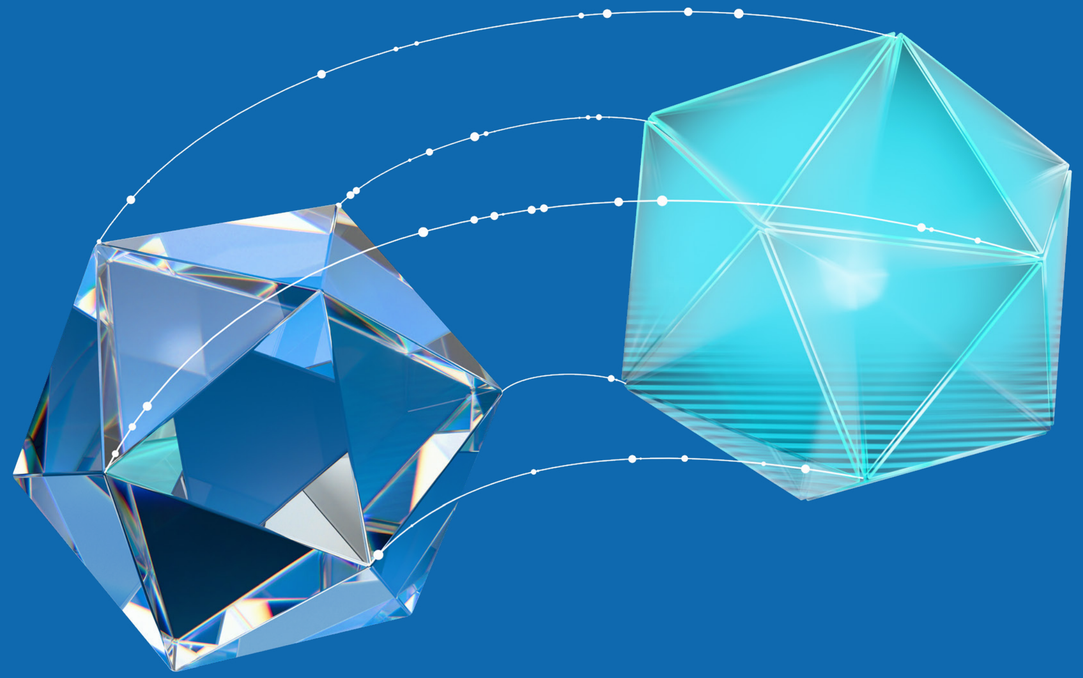
M-Trust™ is a secure cyber-physical trust platform that enables organizations to improve product quality and authenticity across their value chains by immutably linking the physical and digital worlds.

Powered by Web 3.0 technology, the new platform enables the creation of digital twins to ensure product authenticity and supports the translation of human capabilities in quality control into more efficient, and less error-prone, machine-to-machine interactions.

The M-Trust™ platform offers solutions to help customers navigate their value chain with confidence and implement cyber-physical trust into their processes and systems.

Potential applications for this first-of-its kind technology include:

- Digitally tracking products and their constituent parts
- Automating audits and QA processes
- Secure data exchange



unrivalled security for highly regulated industries

Created to help solve issues of product safety, traceability and counterfeiting, the M-Trust™ platform can add value to industries who rely on consistent product quality to remain competitive, such as automotives, chemicals, electricals, food and beverage.

The technology is particularly beneficial for use in complex, highly regulated industries, such as pharma/biotech and Life Sciences, due to the need for robust product and materials safety and supply chain transparency.

Pharma & Life Sciences

Electronics

Food & Beverage

Chemicals

Automotive

FMCG

Enabling authenticity with crypto anchor technology

The M-Trust™ platform uses the latest crypto anchor technologies to securely identify and authenticate objects, linking physical products to their digital identities.

The p-Chip® microtransponder (MTP) is a digital crypto anchor that enables the identification of an object.

The chip itself is 500x500x100 µm in size and is powered using a photocell. Its design allows the p-Chip® MTP to achieve a remarkably small footprint making its use in a wide variety of applications possible.

Securalic® Taggants are already used as proof of authenticity in a wide range of products.

Securalic® taggants are used across many different industries, including pharmaceuticals, luxury goods, FMCG.

Invisible to the naked eye, these taggants are incorporated directly into the product material itself or applied to the surface of the product.

How it works: An adaptable platform

The M-Trust™ platform is designed as a modular portfolio, allowing users to adapt to suit their specific needs.

Its Platform as a Service (PaaS) offering includes software that can be easily integrated into existing workflows and processes, crypto anchors adaptable to different security needs, and corresponding reader hardware. All services are suitable for use in both prototyping and production environments.

Data security is paramount, so the platform employs advanced encryption methods and Web 3.0 technology to protect sensitive information.

Getting started...

Once signed into M-Trust™, Console users can simply create a project and begin. This is the gateway to exploring opportunities to embed cyber-physical trust into different systems and processes.

The console can be used with, or without, the system hardware devices, which are specifically tailored for scanning crypto anchors.

The device family

Our specialized hardware devices are designed to support secure identification and verification of products.

These components work seamlessly with the M-Trust™ software platform to provide a comprehensive and integrated solution for product verification.

SEC-Reader

The SEC-Reader is a handheld electronic device for the secure authentication of products.

It is engineered to scan and verify secure pigments that are applied directly to products. By detecting these unique pigments, the SEC-Reader helps confirm product authenticity and integrity throughout its lifecycle.

The device is designed for utilization in typical office settings, certain labs, and warehouses with controlled environmental conditions.

SEC-Reader

Technical specifications

Specification	Value	Notes
Electrical Input	5 Watt	Wireless charging. Use M-Trust™ PSU-Station
Optical output	Near-IR LED light	For detection of compatible security ink
Operating temperature	0°C to 35°C	
Humidity	Non-condensing	
Dimensions	140 mm x 50 mm x 32 mm	
Weight	150 grams	
Charging Station	M-Trust™ PSU-Station 2.0	
Certifications	CE, WEEE	
Communication	Bluetooth LE	
Taggant Detection	Merck Securalic® and compatible	
Product Label	Product number Serial number format	SEC 2.0 SEC

IMP-Reader

The IMP-Reader is a handheld electronic device for the secure identification and authentication of products.

It is built to scan a p-Chip® MTP embedded within or attached to a product, verifying the product's identity and authenticity. This device offers a robust solution for applications that require secure, non-intrusive verification of product origin and status.

The device is designed for utilization in typical office settings, certain labs, and warehouses with controlled environmental conditions.

The operation of the IMP-Reader requires the PSU-Station for wireless charging of its internal batteries. While multiple IMP-Readers can share a single PSU-Station, at least one PSU-Station is necessary to charge the IMP-Reader's internal battery.

IMP-Reader

Technical specifications

Specification	Value	Notes
Electrical Input	5 Watt	Wireless charging. Use M-Trust™ PSU-Station
Optical output	Laser light Class 3R	To activate p-Chip® MTP
Operating temperature	0°C to 35°C	
Humidity	Non-condensing	
Dimensions	170 mm x 150 mm x 40 mm	
Weight	250 grams	
Charging Station	M-Trust™ PSU-Station 2.0	
Certifications	CE, WEEE pending	
Communication	Bluetooth LE	
Cryptoanchor Detection	p-Chip® MTP	

PSU-Station

The PSU-Station is a versatile charging cradle designed for use with both the SEC-Reader and IMP-Reader. This station provides a unified charging solution, ensuring that devices are powered and ready for use whenever needed.

This station is primarily intended for use in standard laboratory or office environments. It is also suitable for deployment in warehouses and quality control laboratories, providing versatile charging solutions across various settings.

PSU-Station

Technical specifications

Specification	Value	Notes
Electrical Input	15-Watt USB-C power supply	
Electrical output	5 Watt	Wireless charging of M-Trust™ devices
Operating temperature	0°C to 35°C	
Humidity	Non-condensing	
Dimensions	120 mm x 65 mm x 100 mm	
Weight	300 grams	
Compatibility	M-Trust™ Readers	Including: SEC-Reader 2.0; IMP-Reader 2.0
Certifications	CE, WEEE	
Communication	Bluetooth LE	

Power Supply (AC adapter)

Specification	Value	Notes
Electrical Input	100-240 VAC; 50-60 Hz	
Electrical output	USB-C: 5-9 VDC; 15 Watt	

The Developer Kit

With highly interoperable and user-friendly software development kits (SDKs) and application programming interfaces (APIs), users can easily integrate our tools into workflows.

The SDKs are optimized for cross-platform mobile development, with support for iOS and Android devices. Built using the Flutter framework, they provide a unified development experience across platforms, simplifying app development and maintenance.

The Developer Kit includes a SEC-Reader, IMP-Reader, PSU-Station, accessories and manuals.

use case: enabling efficient processes for handling chemicals

M-Trust™ technology is powering cyber-physical interactions within Chemisphere™ – a new app which digitizes the process of handling chemicals and documentation in the Life Science sector.

The technology is used to ensure product security and enhance accessibility and information management within the app.

Enabling efficiency

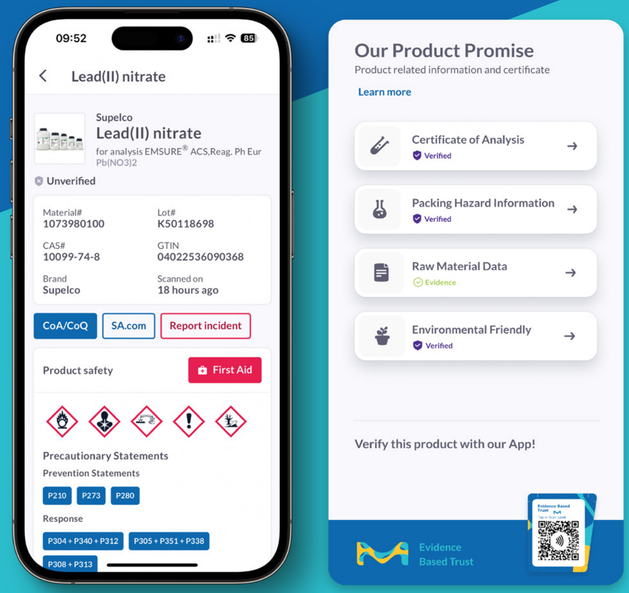
Users can scan barcodes via their smartphone camera into the platform, reducing the time it takes to access product data and eliminating manual inputting, enabling users to get back on the lab bench, as quickly as possible.

Enhancing accessibility

All existing product data is compiled and presented in a comprehensive product passport within Chemisphere™, enhancing accessibility and information management.

Supporting sustainability

The Life Science sector aspires to reduce the number of single-use containers for chemicals. However, tracking returnable containers can involve numerous manual steps. Through the app, users can attach geolocation data, helping companies locate, track and return returnable containers much more efficiently.



Chemisphere

Backed by a legacy of expertise

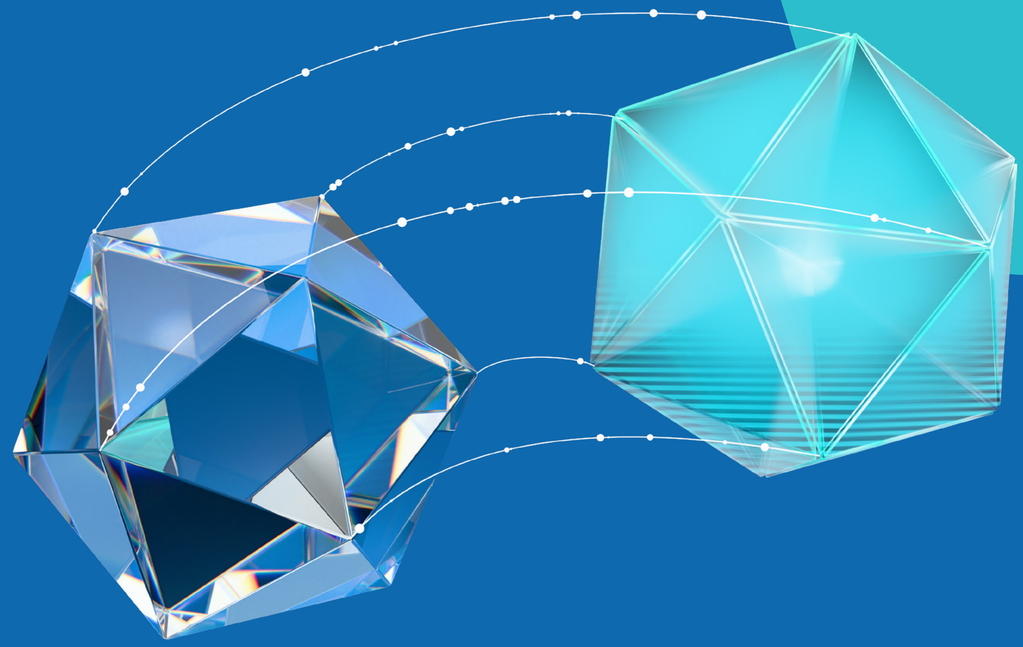
Built in-house at Merck, a leading science and technology company, the M-Trust™ technology is backed by the company's long-standing history of product quality.

For more than 350 years the company has been pushing the boundaries of possibility. It is continuously discovering and developing technologies that can change the landscape of entire industries, while aiming to build next-generation businesses. The company has an exceptional heritage of delivering ground-breaking innovations in highly regulated industries across:

- Life Science
- Healthcare
- Electronics

Built to enable cyber-physical trust today and ready to unlock the business challenges of tomorrow

Scan for details



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