Transforming Supply Chains powered by IoT and Blockchain

08 May 2019

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We are Modum

Enabling trusted insights by creating an intelligent and transparent supply chain

- We were **founded in 2016** by a group of entrepreneurs with a technology and pharmaceutical background,

- We are a **fast growing company** with ~30 employees located in Zurich

- We did a traditional seed round in 2016 and an ITO in 2017

- We connect the **physical world of goods transportation** with a **digital supply chain ecosystem**

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Modum - Mastering supply chain synchronization

The challenge of logistics in a digital world

Physical
Goods

Physical world

Digital world

Supply
Chain
Mgmt.

Financial Transactions

Shipment Information
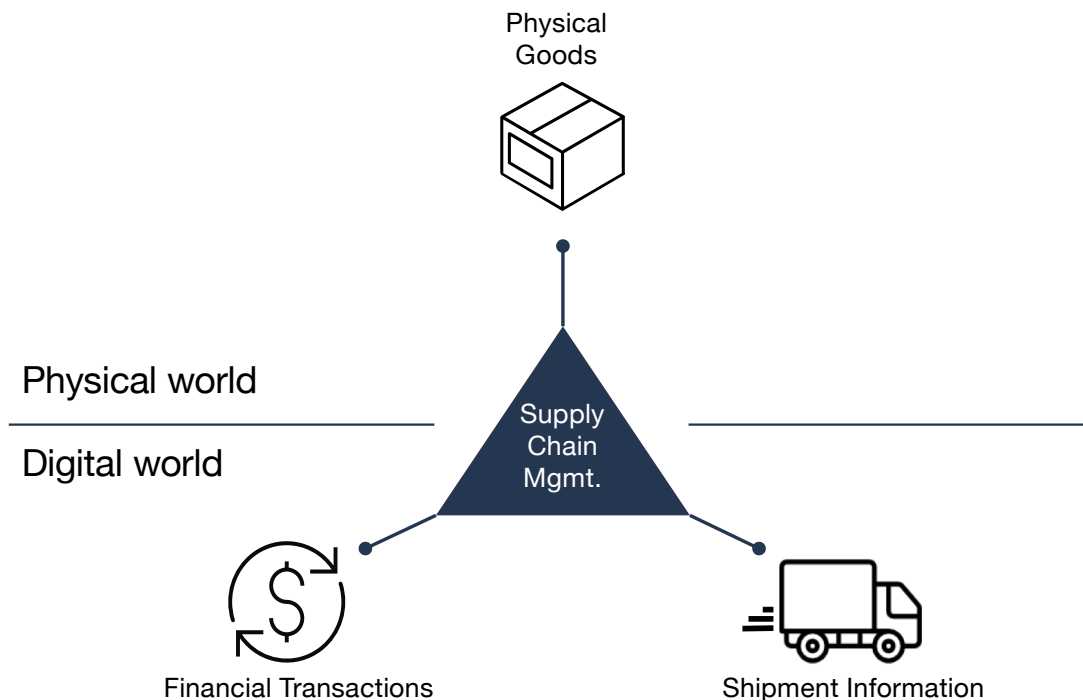
- Financial information and shipment details usually available in digital IT systems
- Discontinuity in data handling, with many documents relating to the physical shipment on paper

Companies still battle with their supply chain[1]:

69% do not have full visibility into their supply chains

65% experienced at least one supply chain disruption

41% still rely on Excel spreadsheets to keep track of supply chain disruptions

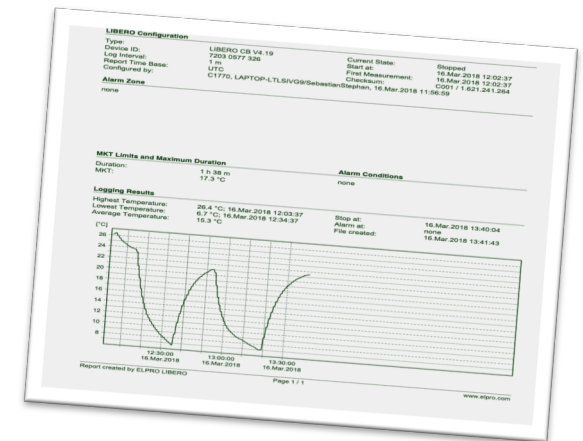# Status Quo - Companies still battle with supply chain monitoring

Transparency is crucial for smooth operations and requires efficient data collection
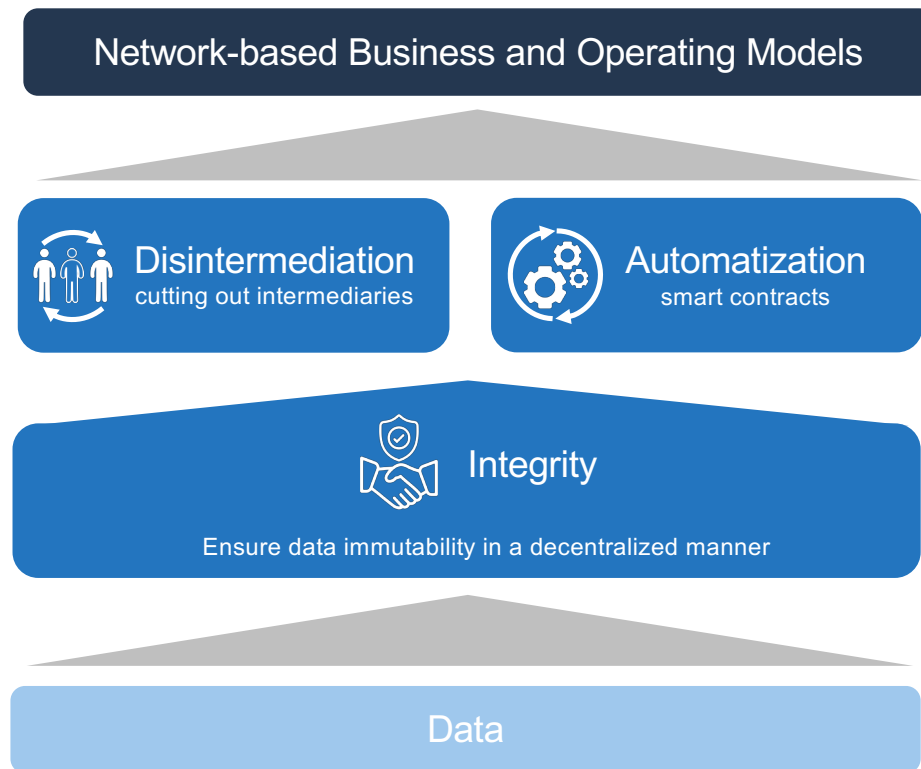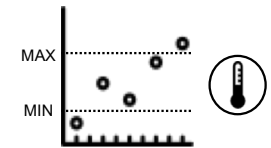

Hardware-centric
products

Manual
handling

Physical and/or
single-purpose data

Monitoring of sensitive Goods in a Supply Chain

A Pharma Supply Chain Example

90% of all shipments
~200 mn/year in EU

APIs

Excipients

Packaging

Manufacturer

Distributor

Hospitals

Pharmacies

Doctors

Users

Regulatory Requirements   **EU GDP 2013/C 343/01**

Obligation to demonstrate that temperature conditions
do not compromise quality during distribution.

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Blockchain Applications – what we are working on at Modum

Blockchain promises new network-based business and operating models

Network-based Business and Operating Models

Disintermediation
cutting out intermediaries

Automatization
smart contracts

Integrity
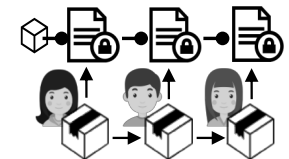Ensure data immutability in a decentralized manner

Data

- **Environmental condition monitoring** of sensitive goods shipments

MAX

MIN

- **Process automation** between different supply chain actors using Smart Contracts and Trusted Events
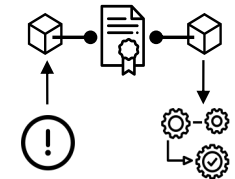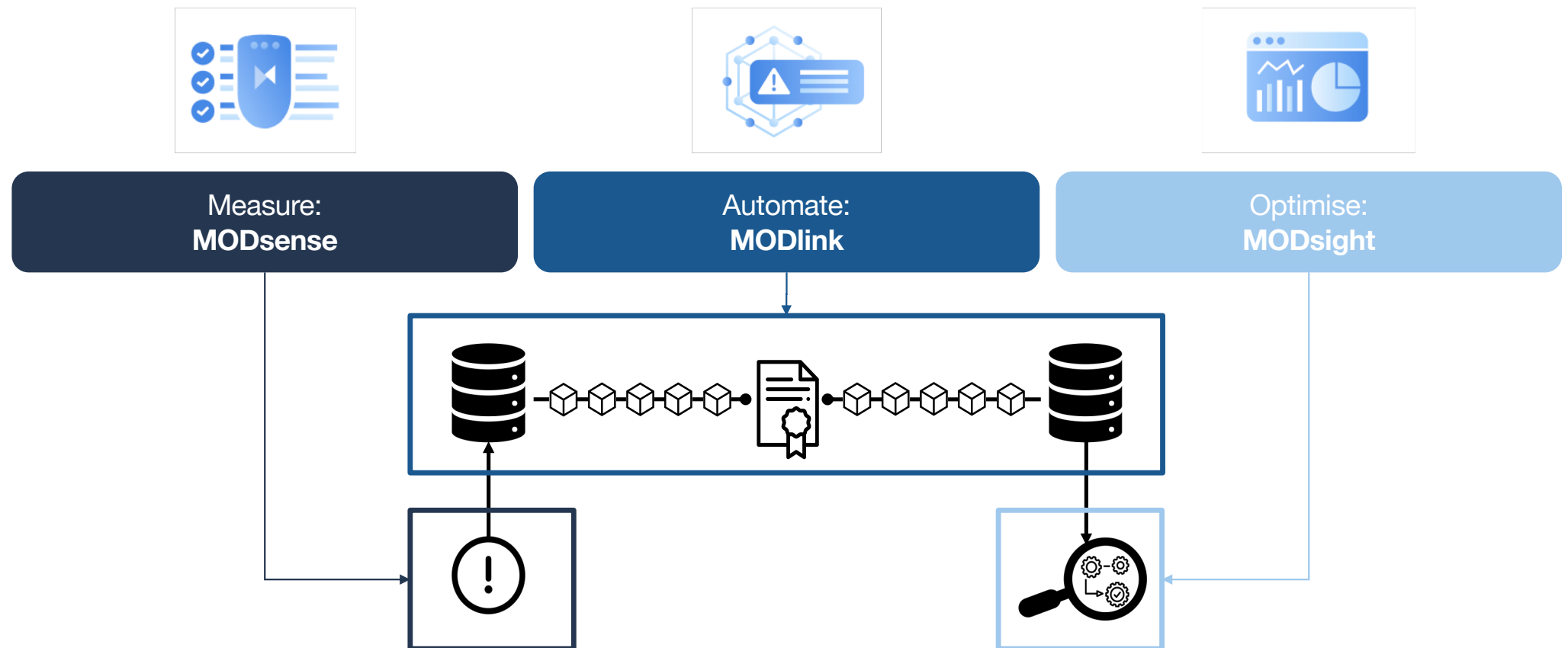
- **Decentralized chain of custody** for legal accountability and product provenance
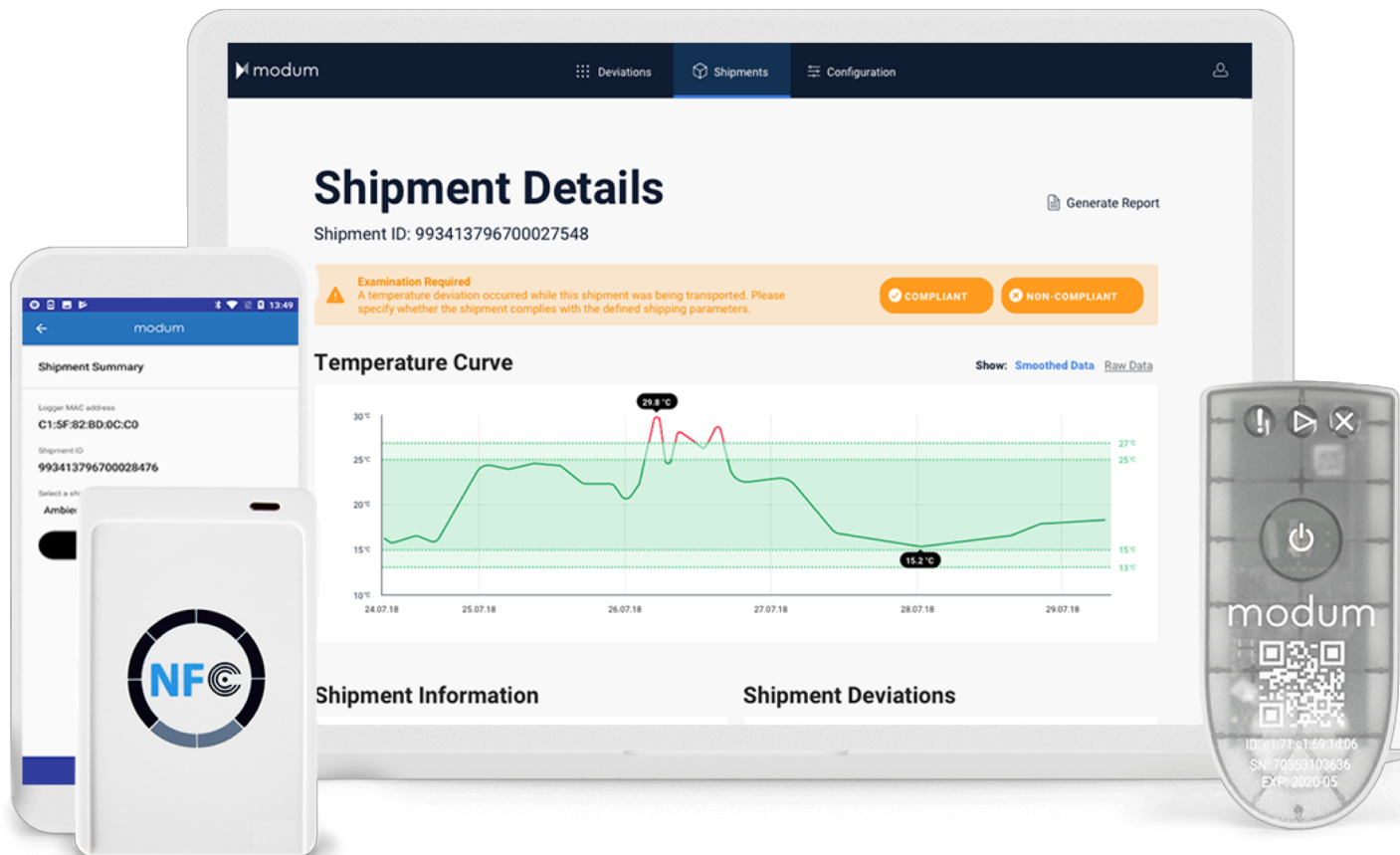
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The Modum Solution Scope

Our supply chain solutions address key challenges regarding monitoring, collaboration and analytics

Measure:
MODsense

Automate:
MODlink

Optimise:
MODsight

MODsense – Easy to use, secure and designed to scale

Sensing, monitoring and reporting for goods that are sensitive to environmental conditions
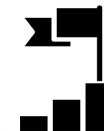

Certified and validated

Award winning

Simple & intuitive

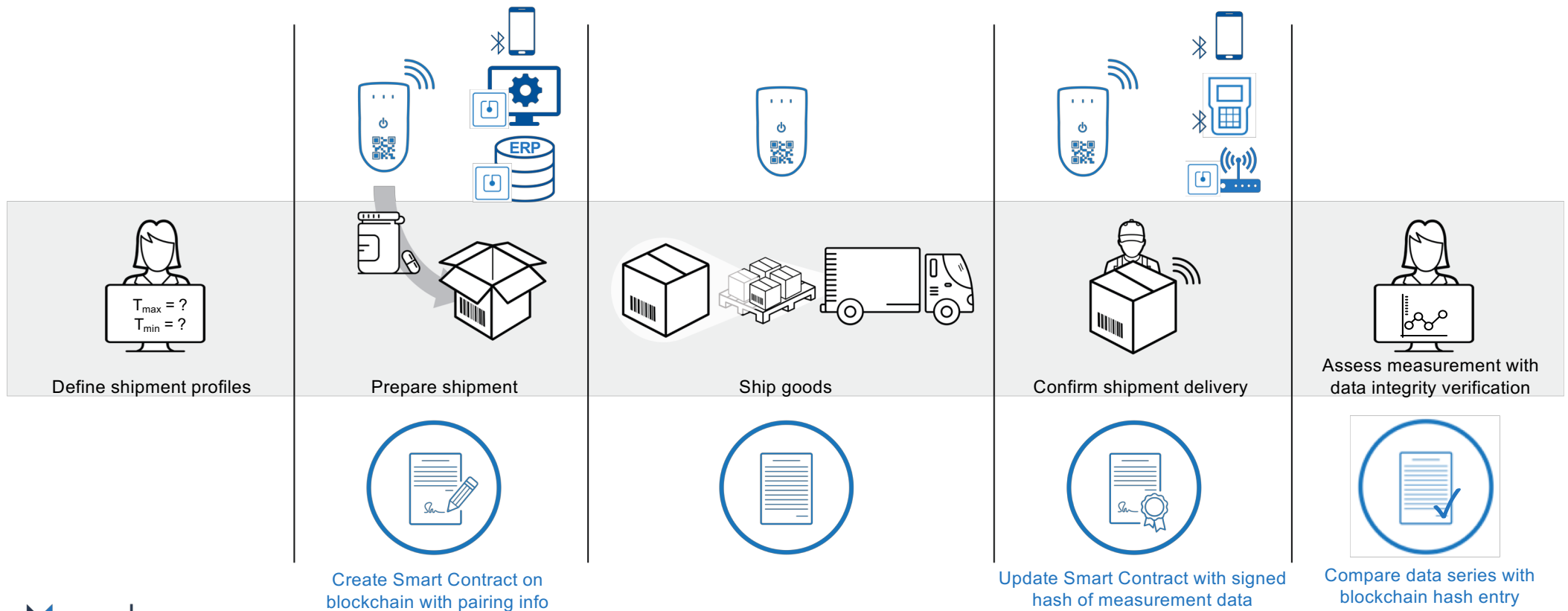Step-by-step integration

Scalable & economical

Environmental Condition Monitoring

Our MODsense monitoring solution ensures data integrity utilizing immutability of Blockchain

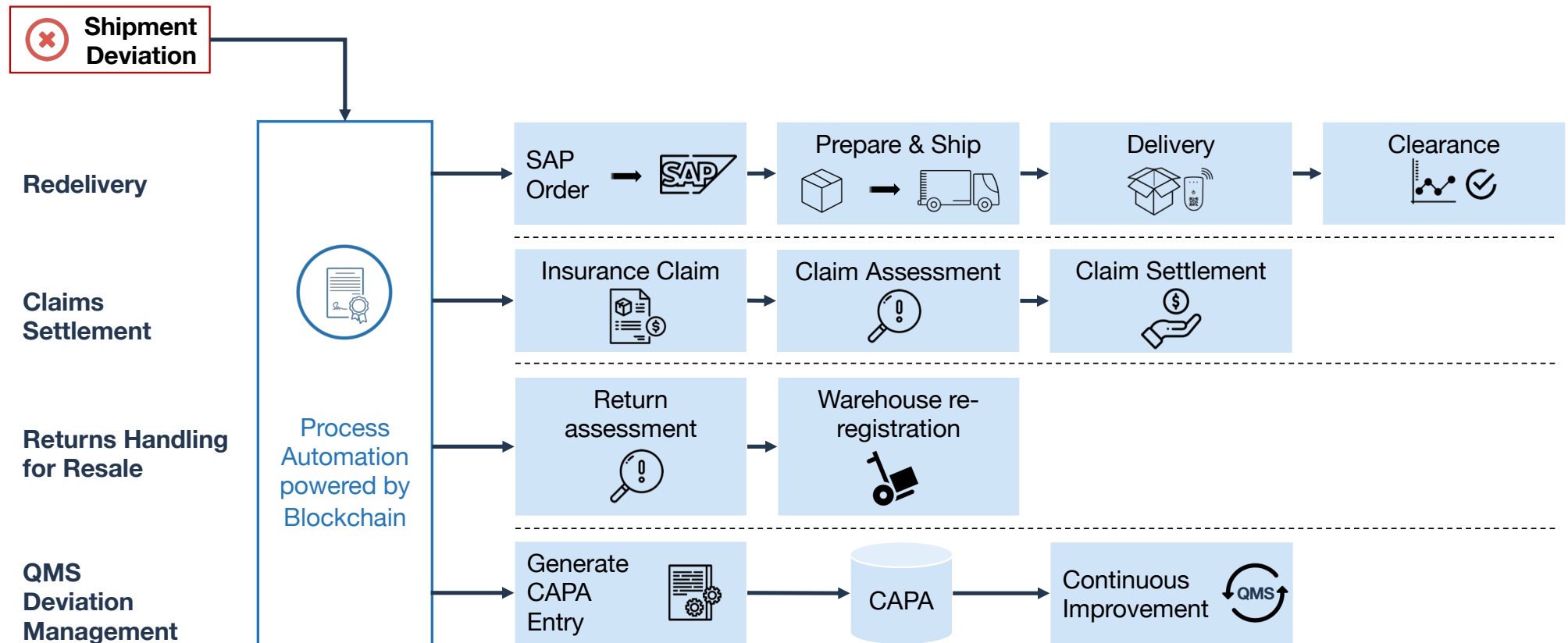Pair logger and shipment ID via smart phone or NFC station (semi- or fully automated)

Logger measuring during transit

Read out logger data via smart phone, carrier scan device or NFC powered warehouse mgmt. system

$T_{max} = ?$
$T_{min} = ?$

Define shipment profiles

Prepare shipment

Ship goods

Confirm shipment delivery

Assess measurement with data integrity verification

Create Smart Contract on blockchain with pairing info

Update Smart Contract with signed hash of measurement data

Compare data series with blockchain hash entry

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Process Automation powered by Blockchain

Simple processes should be used first as PoC when thinking about blockchain powered automation

Shipment Deviation

Process Automation powered by Blockchain

Redelivery

| SAP Order | Prepare & Ship | Delivery | Clearance |

Claims Settlement

| Insurance Claim | Claim Assessment | Claim Settlement |

Returns Handling for Resale

| Return assessment | Warehouse re-registration |

QMS Deviation Management

| Generate CAPA Entry | CAPA | Continuous Improvement |

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Case: Swiss Post "Thermomonitoring"

Delivering temperature monitoring at scale for Switzerland

The challenge

- Swiss Post has over 500k medical shipments per year in the last stage/mile, serving hospitals, doctors and pharmacies

- Swiss Post is using special insulated packaging to secure the ambient temperature band for parcels in transit

- Swiss Post was looking for a cost and process efficient GDP compliant temperature monitoring solution which allows every postman to read out and provide the temperature data upon delivery of the parcel

The technology stack

- Backend Application, Database and Blockchain Nodes running on SAP Cloud

- Trusted Insights served with smart contracts (chain-code) on Hyperledger Fabric

- Deployment of Android SDK to scanning device of Swiss Post for convenient readout of sensor data

- High volume pairing application via NFC Pads

The achievement

- Swiss Post and Modum delivered the solution in multiple customer pilots to the Swiss market

- Easy pairing and readout process, as well as logger return process on shipment arrival

- Temperature data and compliancy check secured with a smart contract is immediately available for sender, receiver and the logistics provider upon arrival of the package

Thank you.

Yves Holenstein

Business Development

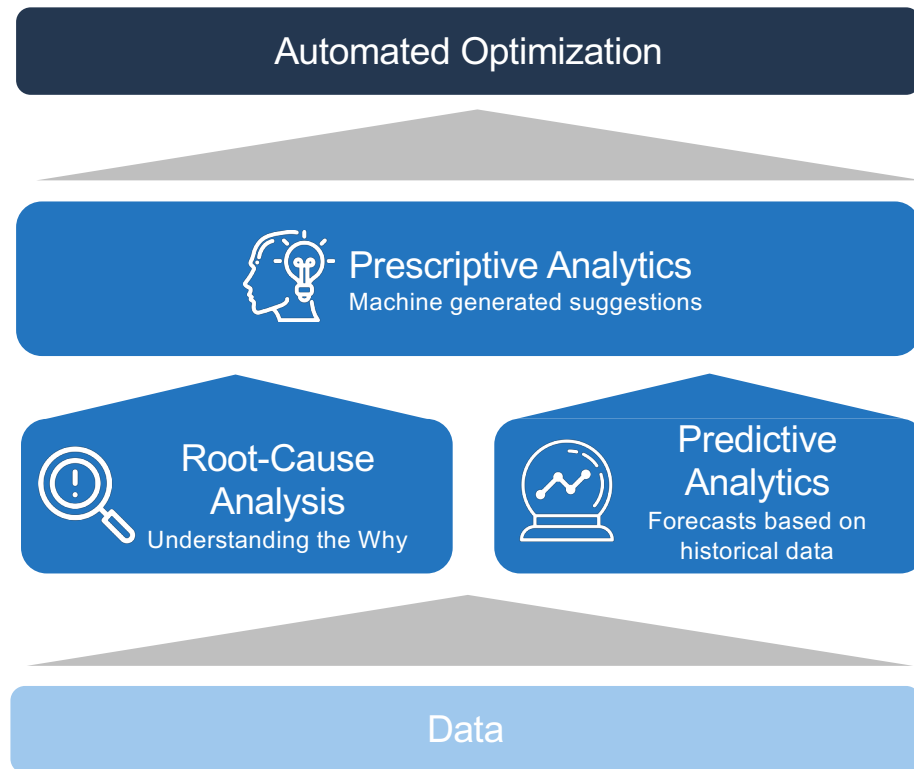yves.holenstein@modum.io

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modum.io AG
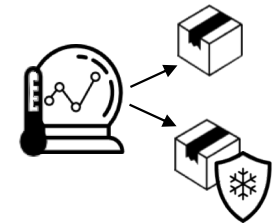
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# AI Applications – what we are working on at Modum

AI promises automated optimization to boost both effectiveness and efficiency of business processes

Automated Optimization

Prescriptive Analytics
Machine generated suggestions

Root-Cause Analysis
Understanding the Why

Predictive Analytics
Forecasts based on historical data

Data

Packaging optimization based on prediction of goods temperature during shipment
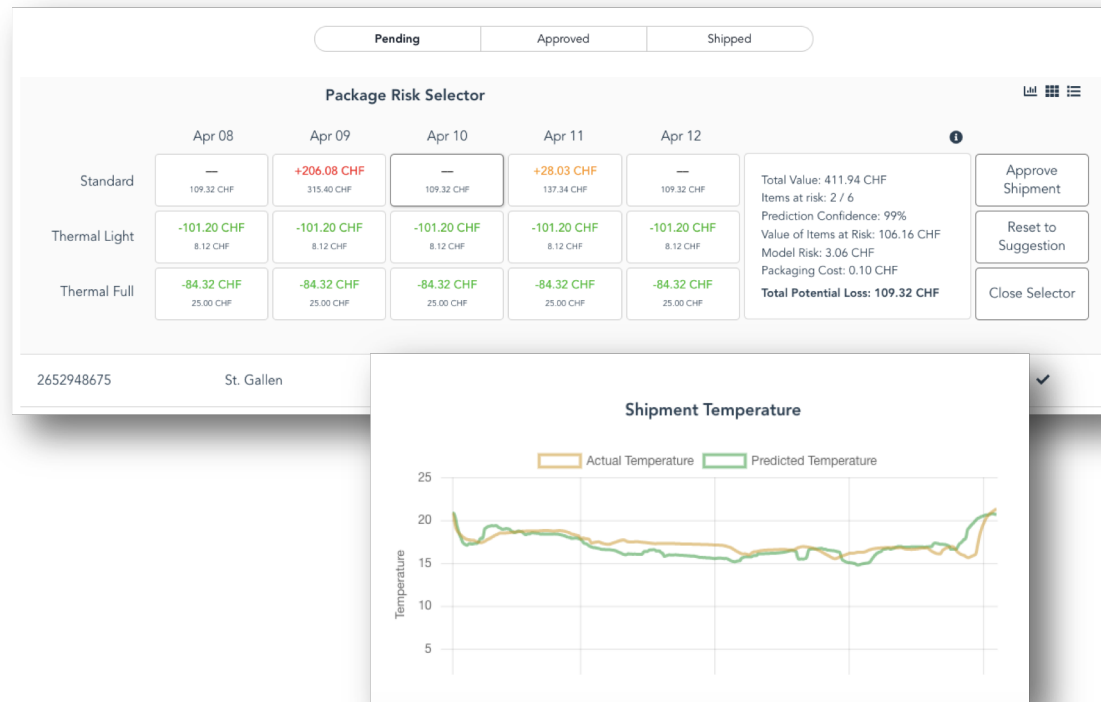
Root-cause analysis of events during shipment based on pattern recognition of multi-sensor measurements

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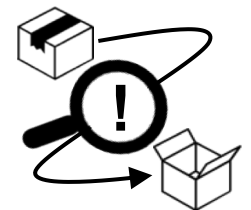
Identify Cost Savings while remaining GDP compliant

Use today's collected data to optimize tomorrow's shipment

Operational Optimization Tool

Predict the Ideal Delivery Schedule

The scope for this challenge

- Operative optimization tool to suggest packaging and shipment day based on predicted package temperature

- Simple to use and intuitive module to choose package based on monetary risk indicator

The impressive result from only 800 sample shipments

- Taking an Ambient shipment with a temperature band of 15 to 25 degrees Celsius, we found that approximately 40% of these shipments had the potential for optimization.

- Built-in feedback loop to further optimize the accuracy of the model with every measured shipment.

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Understanding the Why of Shipment Events

Using trusted data to provide contextual information of shipment events
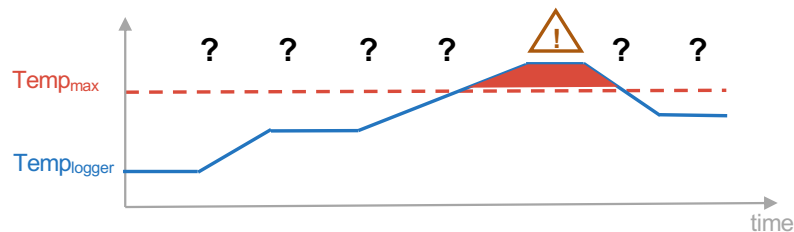
Knowing when an event happened does not necessarily help to understand why it happened

- Understanding the **root cause** of an event is essential for issue resolution

- Understanding at what **stage** in the transport chain the event took place provides additional insight on responsibility
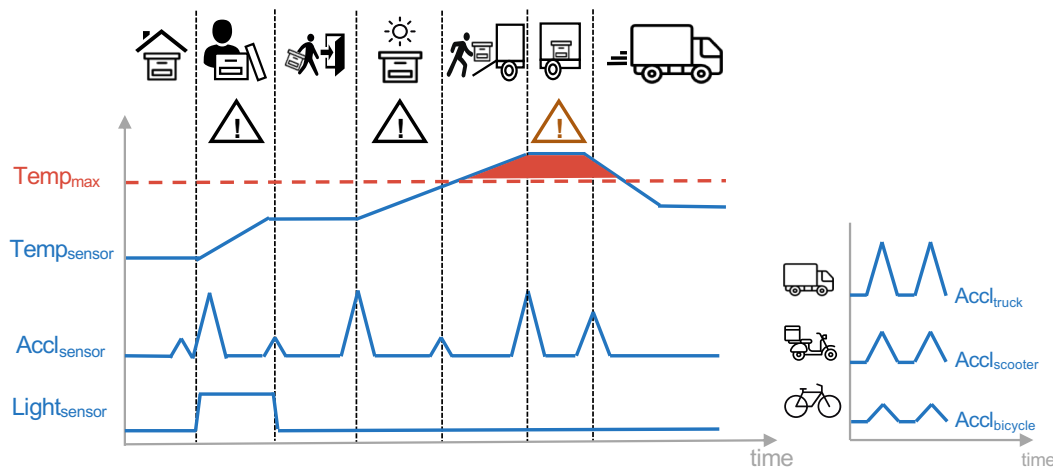
Provide more context combining data from multiple sensors using Machine Learning:

- Segmentation into transport stages

- Identification of additional events

- Classification of transport mode

Benefits:

- **Improve quality** of transport service

- **Reduce costs** by minimizing the number of suboptimal solutions

- **Identify liability** for quality issues arising from deviations

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