cedalo AG

Orchestrating IoT and the Digital Industry

Founded 2017
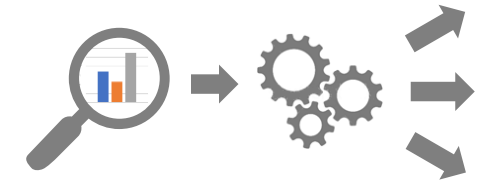
EU Patent pending

U.S. Patent pending

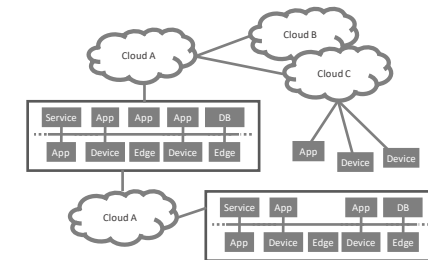# Opportunity: New value from IoT and real-time processing

Smart devices, connected vehicles, mobile apps, stream enabled enterprise applications and many data sources more are currently starting to provide an **exploding** swell of **real-time** data streams.

Interrelating and **processing** these real-time data streams as well as instantly responding with customized actions will be a **key success factor** in manufacturing, automotive, healthcare, retail, administration and many other areas.
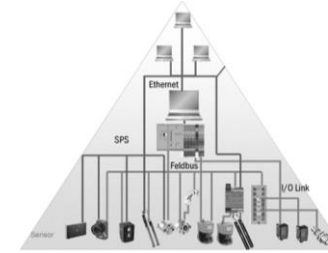
But each device, data stream and app must be able to **connect with any other** in the complete value chain, not only on-premise but also across company boundaries and between federated industrial cloud infrastructures.
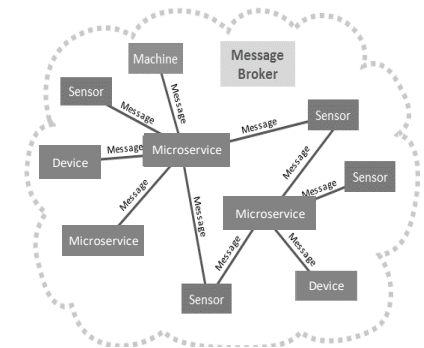
Challenge: Today's IT architectures

Today's IT architectures are typically **closed**, **batch oriented**, **monolithic** and **hierarchically** structured. They are simply not designed for the upcoming disruption in IT processing needs.

Driven by this disruption new networks of **agile apps -** called microservices – are evolving that connect through real-time data pipes and deliver smart, quickly adjustable, autonomous processing logics in a **decentralized** manner.
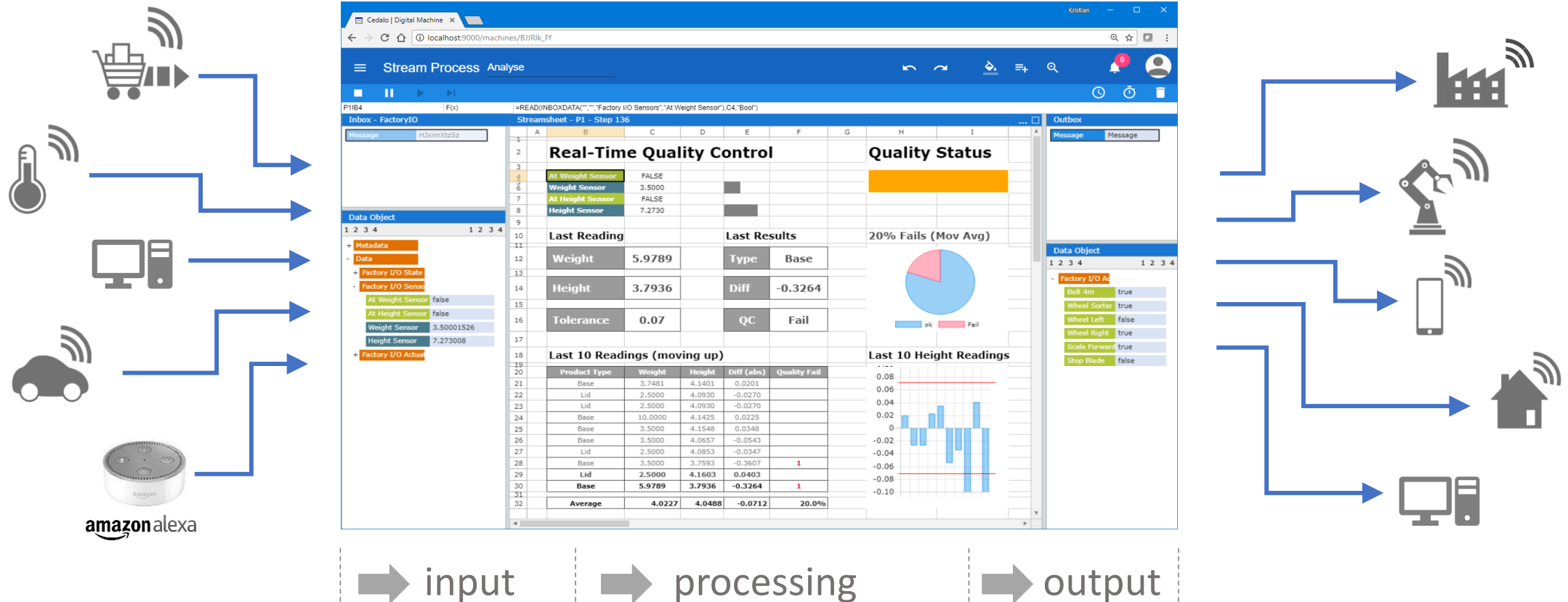
Businesses which want to stay competitive will build hundreds of these new microservices each year. Looking at time, cost and the **lack of programmers,** process owners and power users must be able to build these services **themselves** and **without coding**.
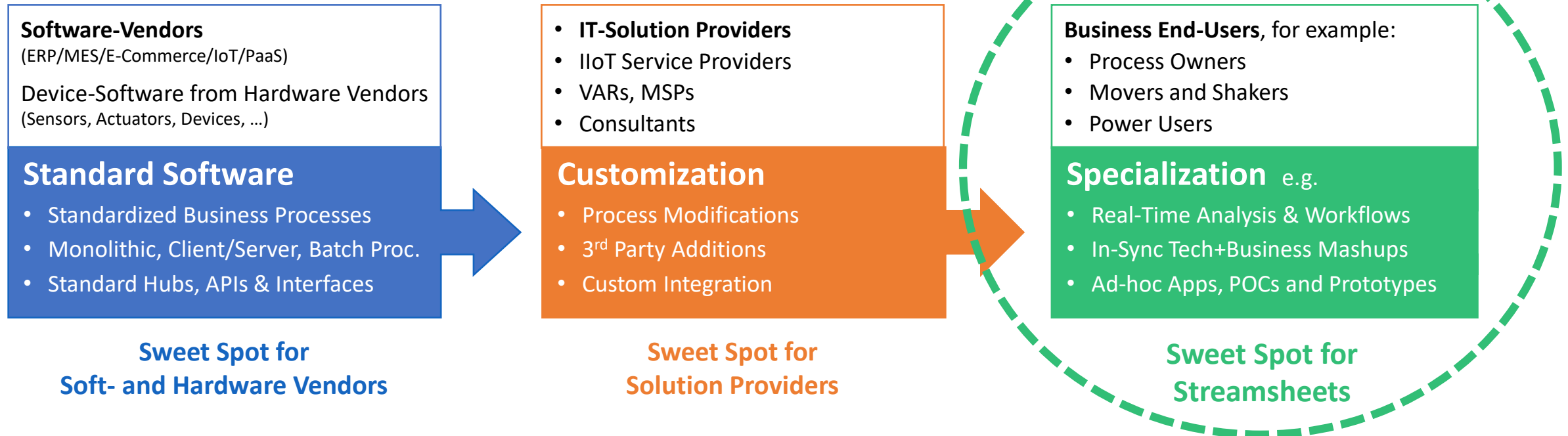
Solution: Streamsheets - familiar, interactive, code-free

Streamsheets are **end-user**-friendly, **business logic** enabled, **next-gen** spreadsheets that run on a **server**, take **high loads** of complexity, connect to any app or device and can analyze, process & forward data streams and actions **continuously** and in **real-time**.

input   processing   output

Streamsheets' position in the <u>real-time</u> value chain

Ability and agility to adapt to individual customer needs

Software-Vendors
(ERP/MES/E-Commerce/IoT/PaaS)

Device-Software from Hardware Vendors
(Sensors, Actuators, Devices, …)

Standard Software
- Standardized Business Processes
- Monolithic, Client/Server, Batch Proc.
- Standard Hubs, APIs & Interfaces

**Sweet Spot for
Soft- and Hardware Vendors**

- **IT-Solution Providers**
- IIoT Service Providers
- VARs, MSPs
- Consultants

Customization
- Process Modifications
- 3rd Party Additions
- Custom Integration

**Sweet Spot for
Solution Providers**

Business End-Users, for example:
- Process Owners
- Movers and Shakers
- Power Users

Specialization e.g.
- Real-Time Analysis & Workflows
- In-Sync Tech+Business Mashups
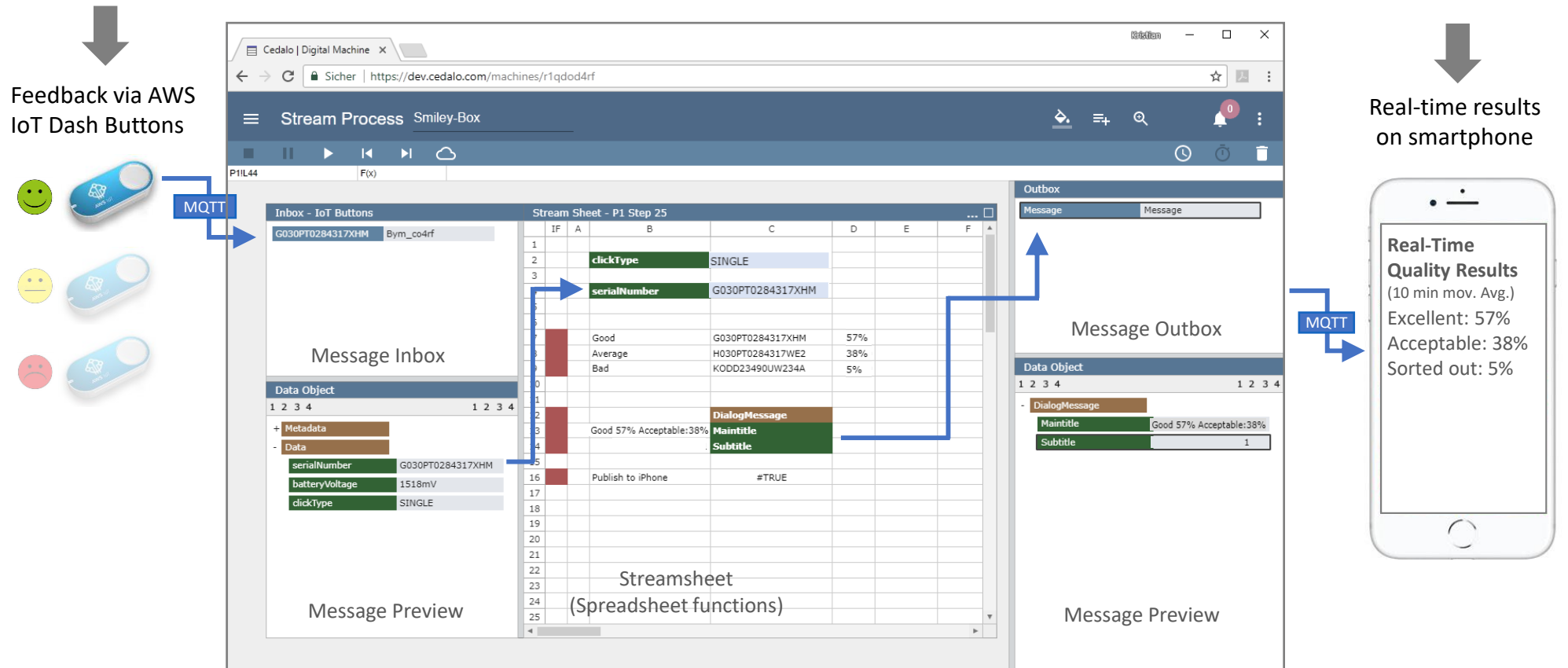- Ad-hoc Apps, POCs and Prototypes

**Sweet Spot for
Streamsheets**

A very, very basic demo: real-time quality control

Ad-hoc solution that to monitor quality problems and forward results to a smartphone
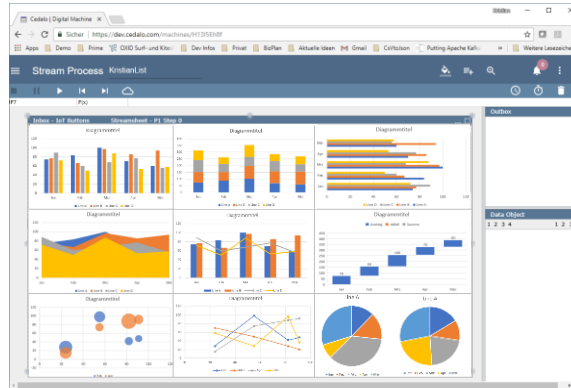
Streamsheet realization effort: 0,5 hrs.

Real-time feedback from production site

Feedback via AWS IoT Dash Buttons

Real-time results on smartphone

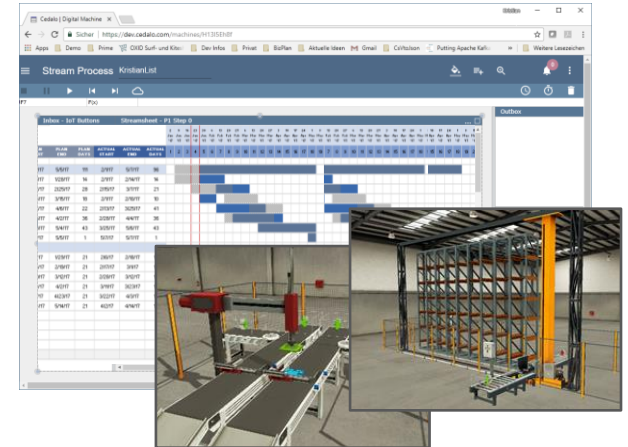# Random picks of real-time use cases for Streamsheets

Monitoring, Analyzing, Predicting and Acting

- Real-Time Dashboards and Cockpits
- Automated Decision Engines
- Optimization of Processes with self-learning Business Heuristics
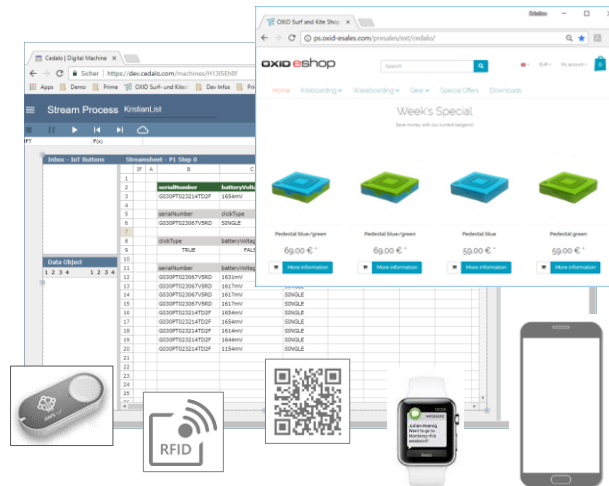- Discovery and Prediction of critical Process Conditions in Real-Time

Decentralized Control

- Automated Deal-making between Production & Resource Agents
- Autonomous Job Scheduling
- Self-organizing Systems in Procurement and Logistics
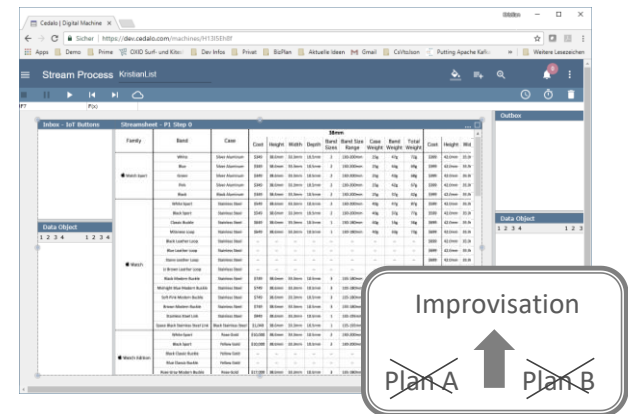- Kanban-like Material Supply Management on the Shop Floor

Assistance and Integration

- Assisted Assembly and Commission Systems (using mobile Devices)
- In-Sync Coupling of mobile Devices (Handhelds, Smartphones, Smartwatches, Wearables, etc.)
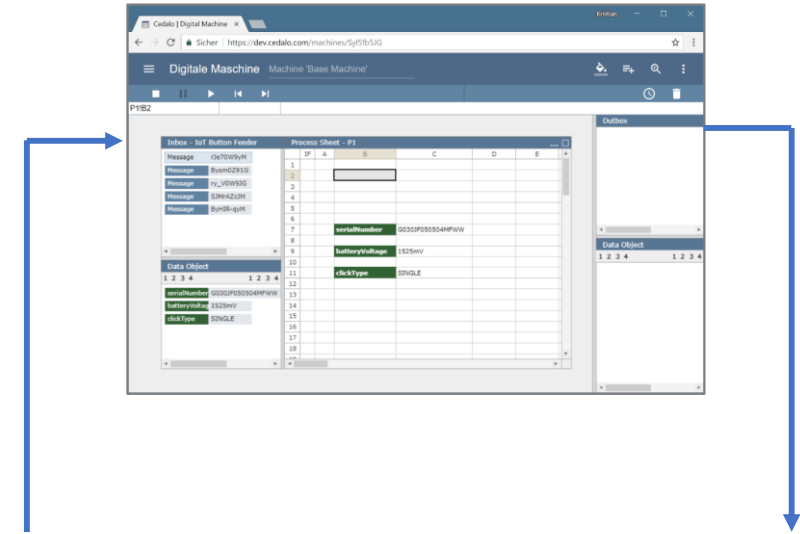- Process Integration of 3rd Party Applications along the Value Chain

Quick-Win Solutions

- Order-specific Workflows
- Process Integration for Consortiums and Joint Ventures
- Provisional Solutions
- Proof-of-Concept Workflows
- Educational Applications

Improvisation

Plan A ← ↑ → Plan B

Highlights & Advantages

- **Cost savings**: Process owner does not need to hire a programmer

- **Time savings**: No lengthy briefings, instant start and deployment

- **Accepted** and familiar user interface → little training required*

- **Interactive** development and testing → early error detection

- Ideal for modelling technical and business **heuristics** quickly

- Also perfect for **prototypes**, **simulations** and **education**

Supports all leading Cloud- and IoT-Platforms	amazon web services	Microsoft	MindSphere	IBM Watson IoT	SAP Leonardo	...

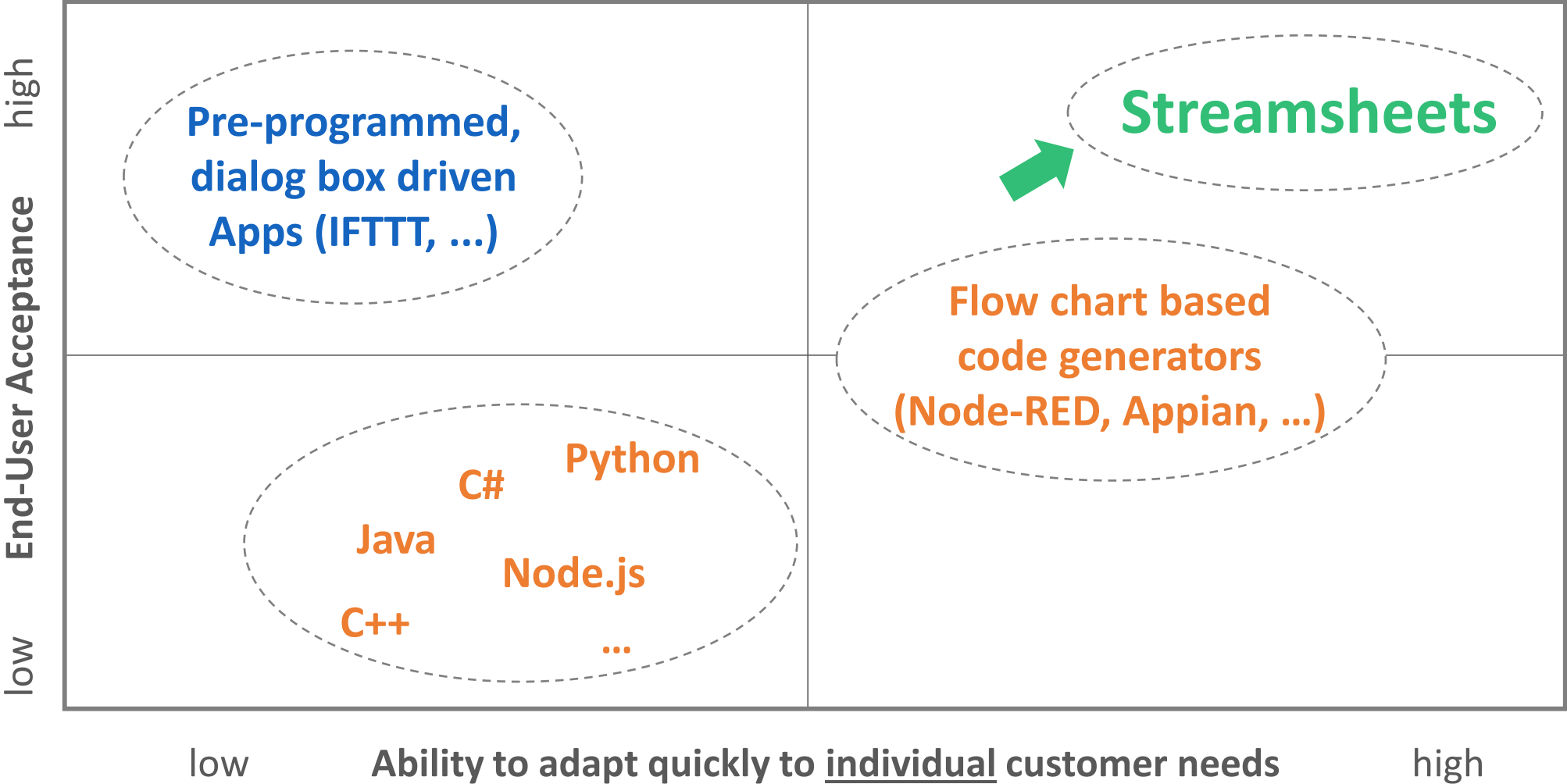| Works with all protocols (and legacy field-gateways)	Edge/Proxy	Edge/Legacy Field-Gateways		MQTT	AMQP	REST	Apache	
	OPC UA	IO Link	Field Busses	3.11 + 5.0	1.0	API	kafka	...

Connects to any sensor, actuator, device or app

* If people have used MS Excel or Google Sheets before

Competitive approaches for real-time processing

End-User Acceptance (vertical axis: low → high)

Ability to adapt quickly to <u>individual</u> customer needs (horizontal axis: low → high)

Pre-programmed, dialog box driven Apps (IFTTT, …)

Streamsheets

Flow chart based code generators (Node-RED, Appian, …)

Python

C#

Java

Node.js

C++

…

Thank you!

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