

**PDF/SOLUTIONS™**

***2023 PDF Users Conference:  
AI for tomorrow's  
manufacturing and R&D***

**Santa Clara Marriott** - 2700 Mission College  
Boulevard Santa Clara, California 95054 USA

# **Sapience Data and Integration Platform**

**24<sup>th</sup> October 2023**

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# AGENDA

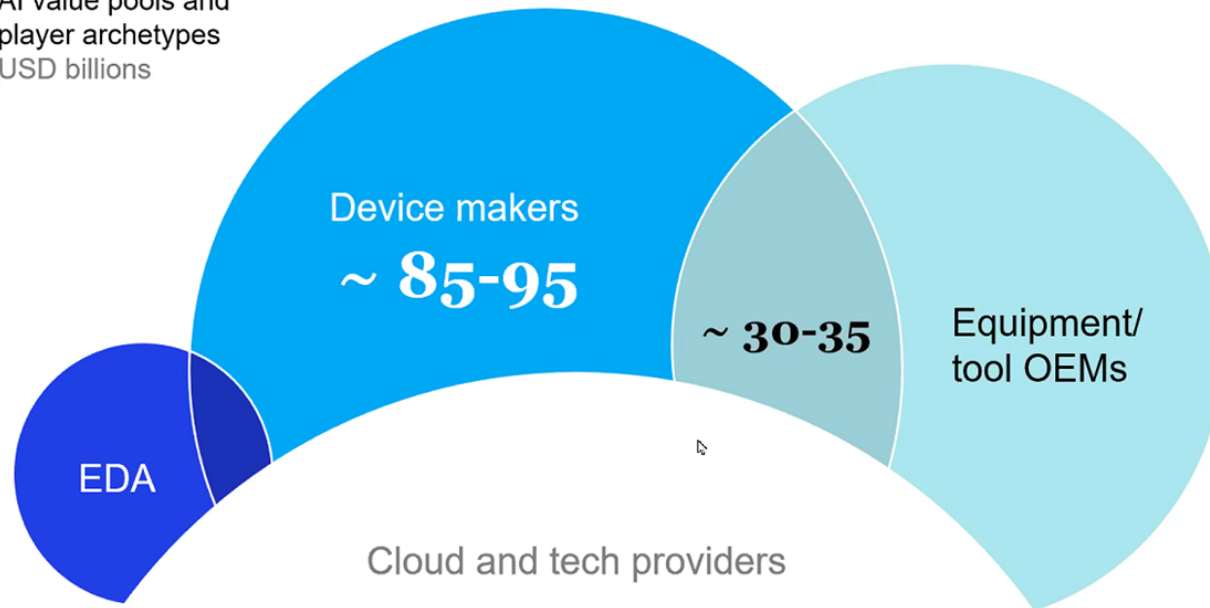
- ▶ Smart Manufacturing Solution
  - Sapience Integration Platform and Applications
  - Questions

# Industry Can Benefit from AI/ML with a Cross Supply Chain Platform



**A significant fraction of value unlock requires cross-value chain collaboration**

AI value pools and  
player archetypes  
USD billions



Source: McKinsey analysis

McKinsey & Company 13

1. McKinsey & Company - **Applying Artificial Intelligence in the Semiconductor industry**, McKinsey webinar Future of Semiconductors, Jan 2021

## ■ Equipment Makers

- Domain knowledge
- Need to protect IP
- Can create “data businesses”
- Additional data from manufacturers make models work

## ■ Manufacturers

- Need to utilize end to end data across the value chain to optimize quality & reliability
- Don’t often provide data to equipment makers
- Want a standard analytics platform

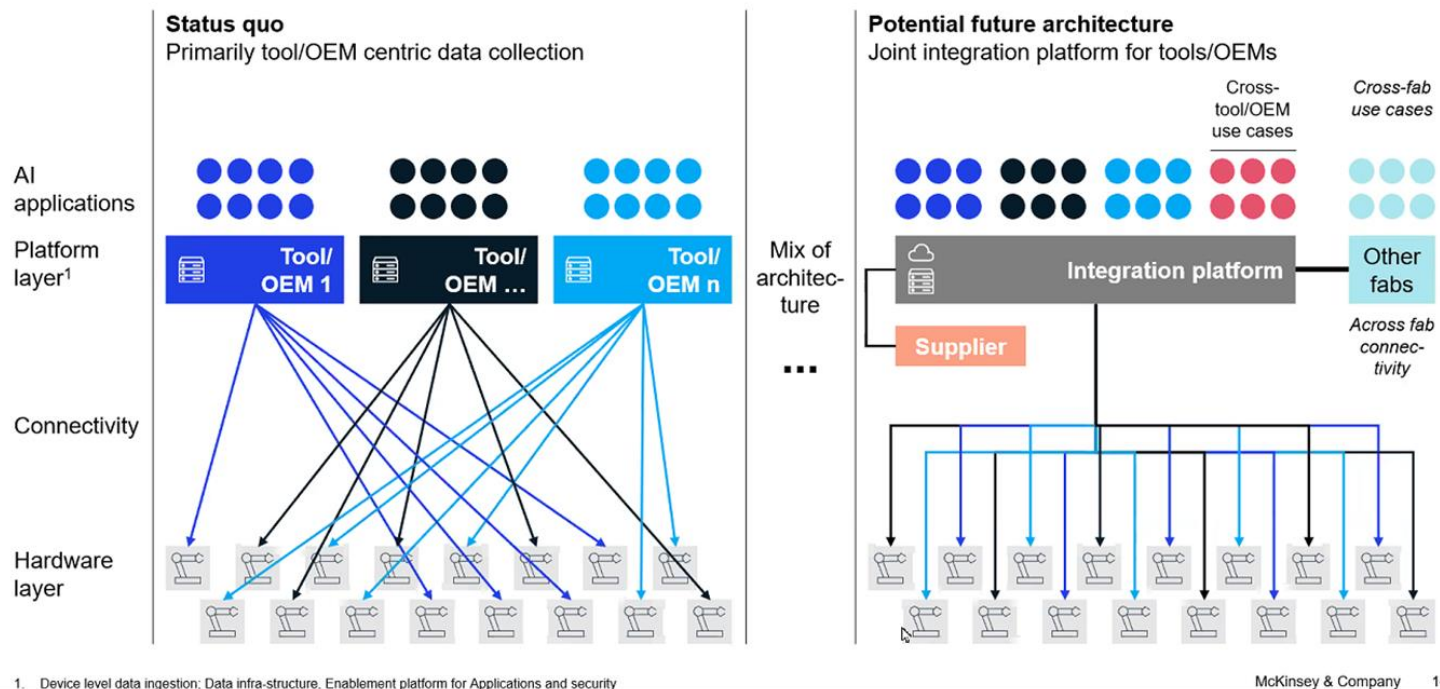
## ■ Challenges

- Equipment makers integrate models and IP on the tools – how can data be used by device makers to derive value
- How can they still protect IP?
- How can they utilize manufacturing data to optimize their models?

# Sapience Industry Wide Solution



To capture full value, Machine Learning requires integrated data sets across tool platforms



2. McKinsey & Company - **Applying Artificial Intelligence in the Semiconductor industry**, McKinsey webinar Future of Semiconductors, Jan 2021

- Leverage emerging SEMI standards to enable sharing benefits of new data while protecting IP
- Common platform is needed for equipment vendors and device makers to fully leverage information
- Apply multiple AI/ML platforms (SW/HW) for learning/training
- Open and plug and play to avoid need to build redundant systems



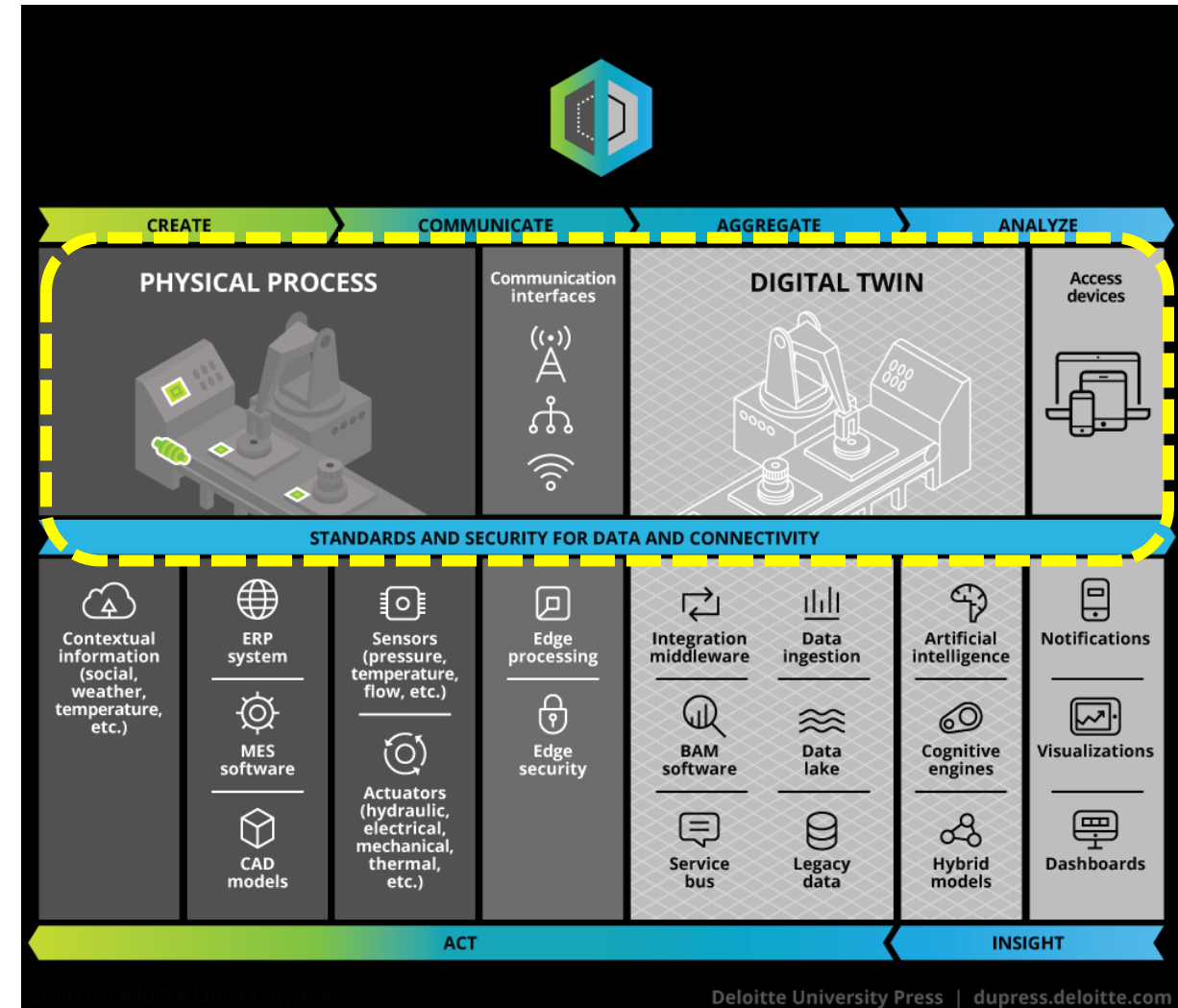
# PDF Enables Common Platform for Equipment & Device Manuf.

- Provides a secure connectivity platform that enables high speed tool connects for the equipment manufacturers
  - Protects both equipment and device manufacturers proprietary data while enabling each to benefit from the information
  - High speed model driven data to feed advanced analytics & control
  - Enables equipment manufacturers to control its own destiny (not a black box solution)
  - Ability to connect simulation modeling
- Multiple deployment architectures supported (cloud, on-prem, on-tool, & hybrid) easily adopted by both Si-device makers & OEM's
- Open Platform developed through leadership roles in the SEMI standards definitions enabling look-ahead planning and development (like EDA Freeze-III) for tool connects and communication platforms enabling your own or PDF applications



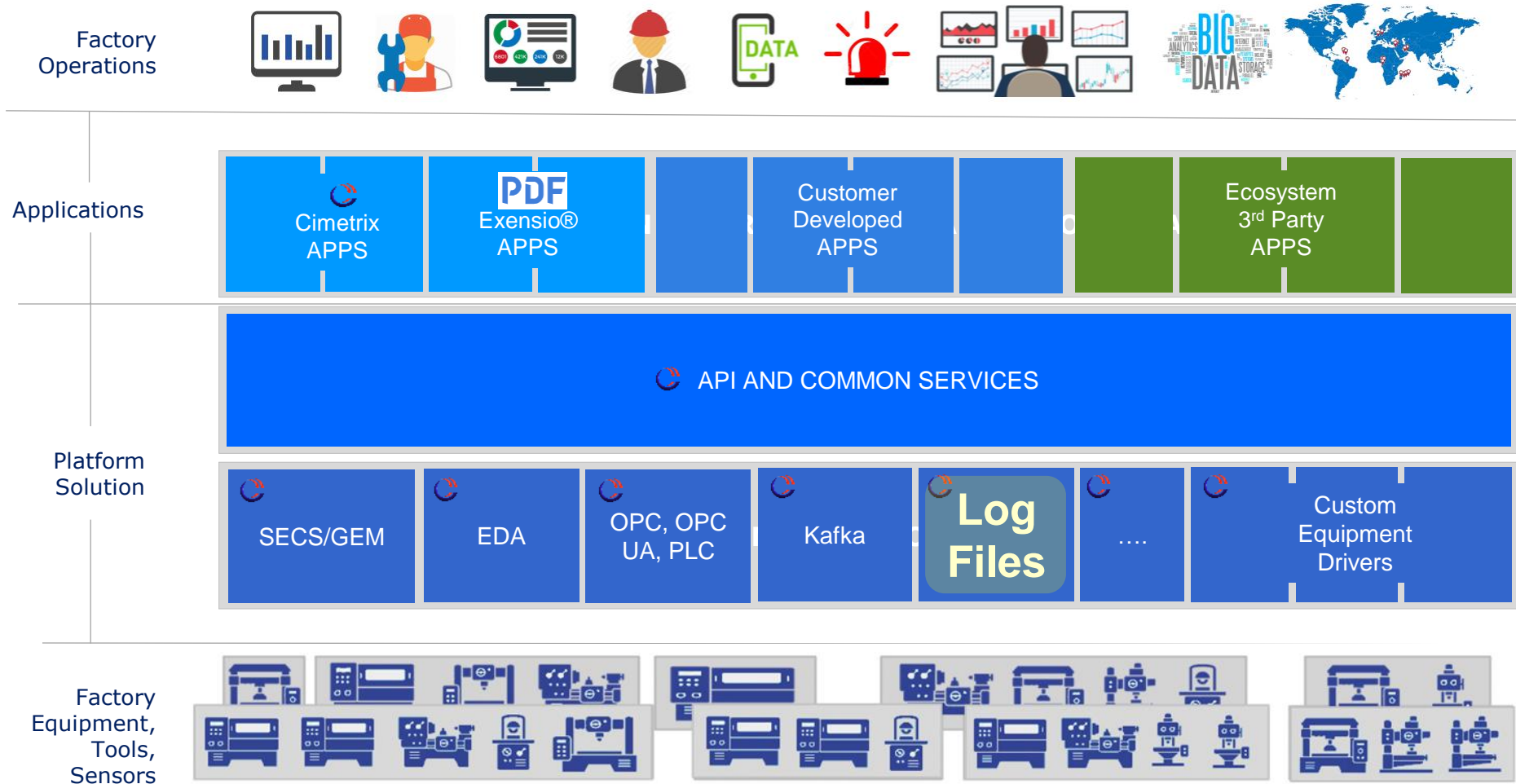
# Equipment Connectivity and Control is Essential to Industry 4.0

- Cimetrix® connectivity and control products provide industry standard interfaces for manufacturing equipment
- Cimetrix Sapience® provides a common platform to provide access to all equipment generated data on the factory floor



Source: Deloitte University Press

# Sapience Smart Factory Platform



Explained With A Story



Presented Visually



Sorted / Aggregated



Shop Floor Data



# Latest Version

- Fortune 20 company based in California wanted to view productivity and KPIs in their contract manufacturing plants in China
- Installed in < 1 day.
- Factory, Lines, Machines configured remotely over the web
- Expanded to second site in summer of 2020

## Contract Manufacturer

- **Replaced Legacy File-based System**
- **Enables Machine Learning and Data Analytics in Supply Chain**

# High Availability Version

- Large Foundry wants a platform that is capable of high availability
- Microservices are Deployable in Containers and managed with Kubernetes
- Upgrades and maintenance occur without downtime
- Each of the services can be horizontally scaled as needed to ensure performance

## Foundry Deployment

- **Replaced Legacy Single Host System**
- **Security and HA are Primary Concerns**

# Case Study: Quick Connections @Plessey

## Cimetrix Sapience®

Cimetrix Sapience® is a data integration platform that distills data into a single source of truth. It supports the scaling up of sophisticated digital and advanced-analytics programs that translate data into business value. In developing and prioritizing use cases for your data and analytics platform, the single most important criterion is speed to business impact. *"The speed at which we can automate our line using Cimetrix Sapience has become dramatically apparent," said Myles Blake, Business Information Director at Plessey Semiconductors.*

Sapience abstracts common functions away from the specific application logic. Application developers want to focus on a specific problem like productivity, quality, or traceability and use common capabilities for connecting, computing power, storage or security. By doing this, Sapience dramatically reduces the cost and time of developing and maintaining applications.

## Dramatically Reduced Connect Time

- **Plessey's customer was demanding data along with their physical product**
- **Sapience enabled machine connections in days – a task they feared would take months.**

# SAP and PDF Solutions Partnership

- In order to meet the challenges of improving semiconductor manufacturing yield and reducing operational cost, PDF and SAP have partnered to provide a connectivity platform to link financial and operational data for solutions that provide complete visibility and strong ROI
- New platform product “Sapience Manufacturing Hub” from PDF combines proven capabilities from Exensio & Sapience for a common central interface for accessing Manufacturing Execution Systems (MES) and MFG & TEST data and merging with SAP ERP data in an analysis ready system.
- This enables KEY solutions targeting industry supply chain issues and manufacturing challenges: 1) Product Costing; 2) WIP Control; 3) Cost of Yield Analytics; 4) Return Material Authorization; and 5) Lot Genealogy



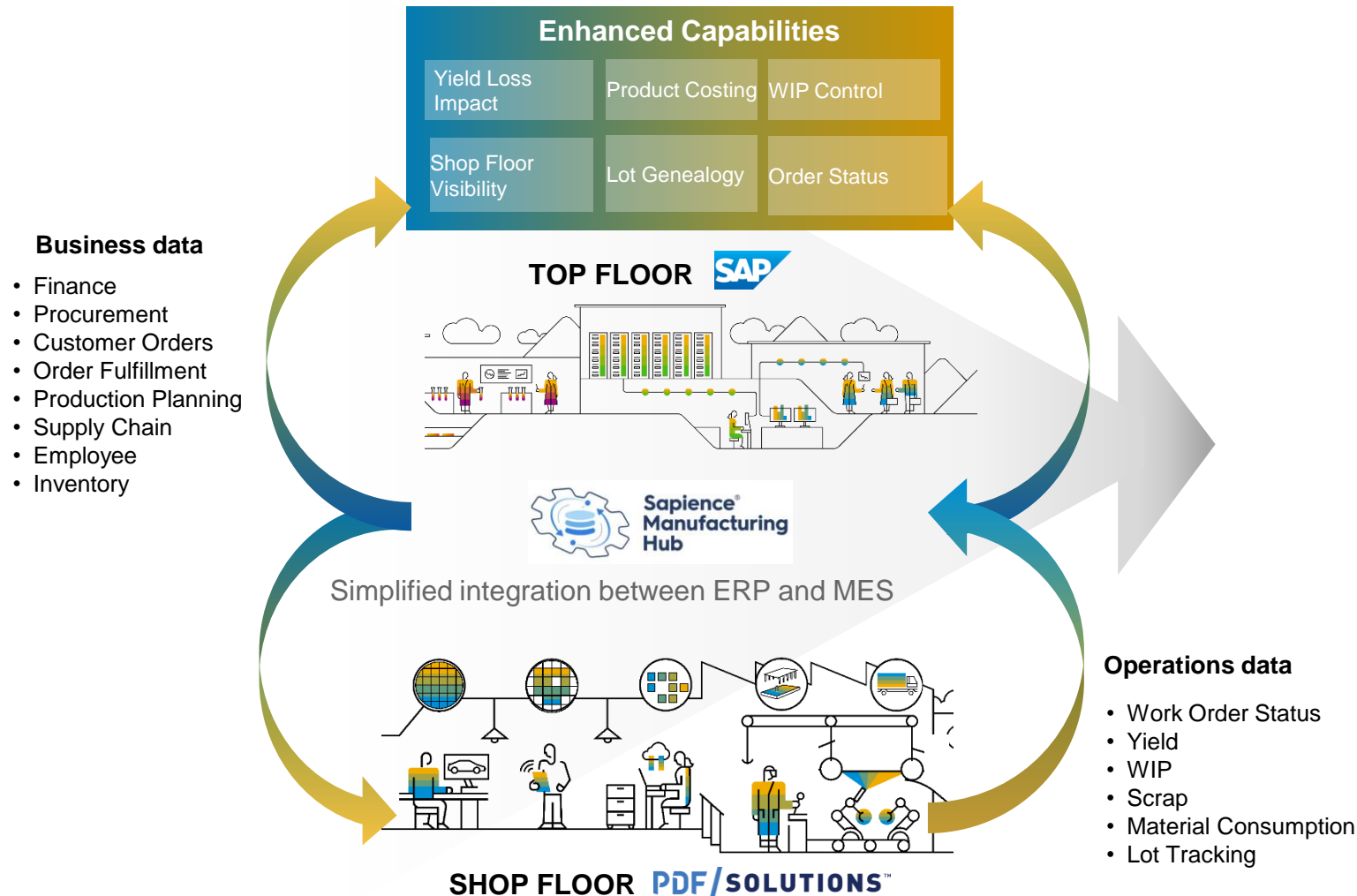
Leader in semiconductor manufacturing solutions



Market leader in enterprise application software for the semiconductor industry.

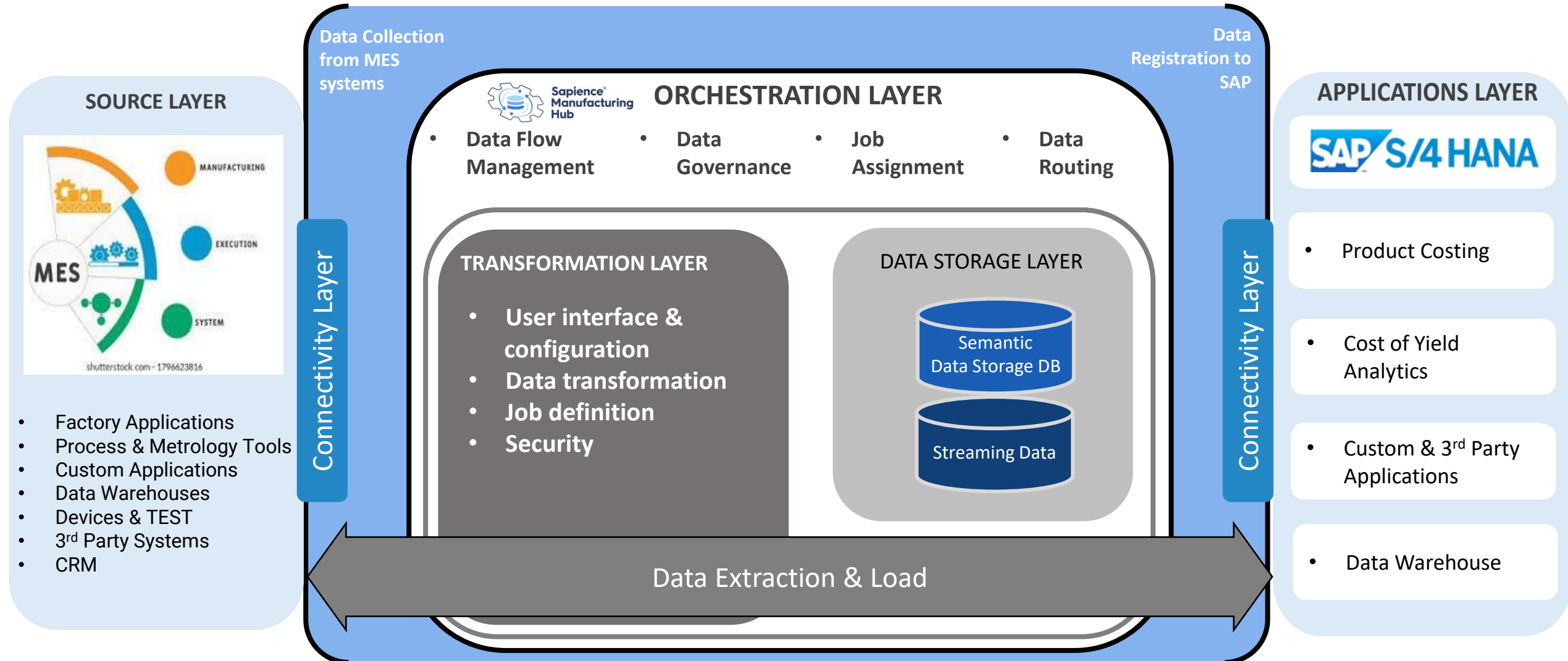
# Connecting the Shop Floor to the Top Floor

## Overview of the Scope, Capabilities and Business Benefits





# Sapience Manufacturing HUB for Collection to Registration *and everything in between*



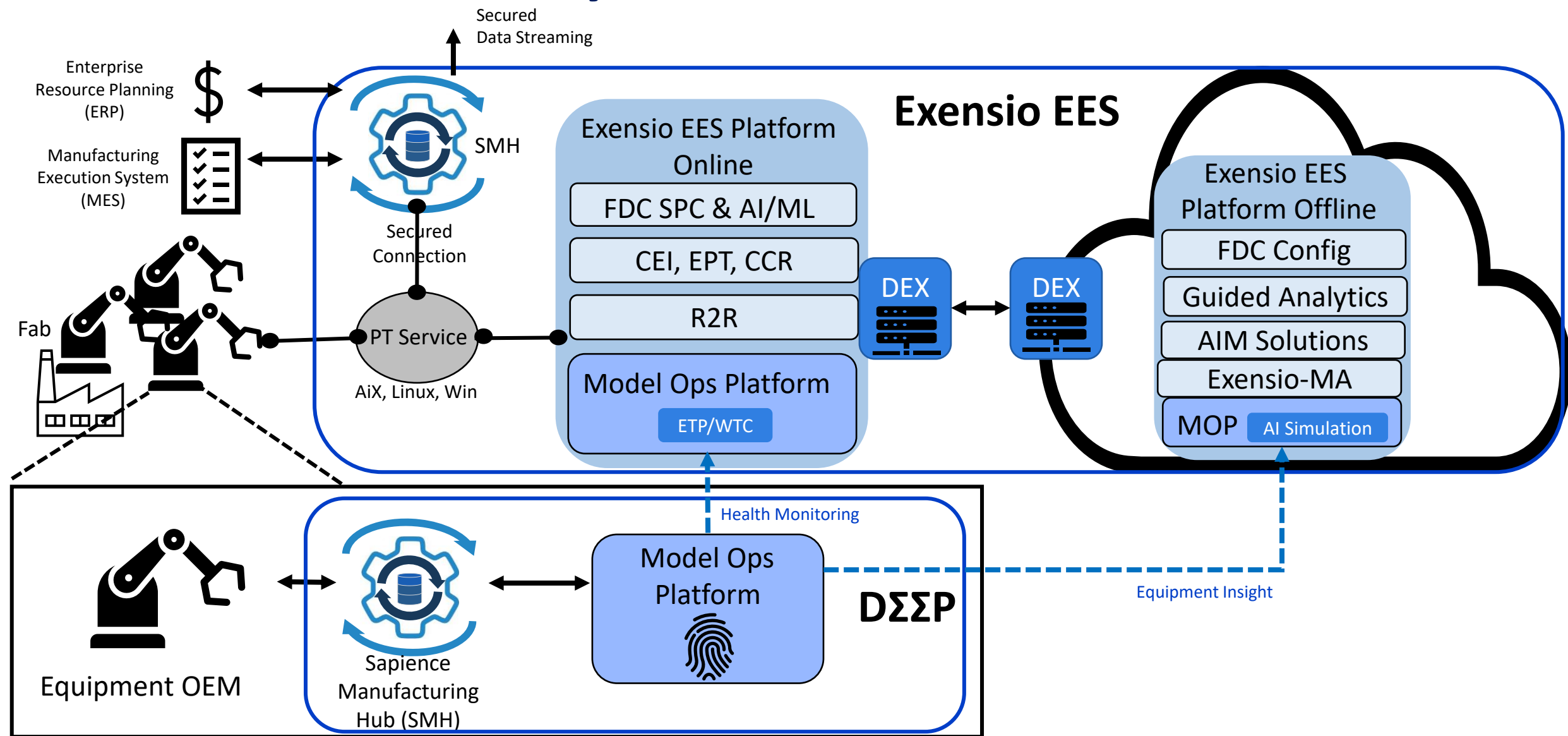
# Quantifying Business Value



#	Benefit Type	Value Driver	Potential Improvement	Value Realization
1	Financial	Reduce cost of building MES/ERP interfaces (Build vs. Buy)	30% - 50%	One Time
2	Financial	Reduce cost of maintaining MES/ERP interfaces	70% – 80%	Annual Recurring
3	Financial	Accelerate value realization from faster deployment of MES/ERP interfaces	60% - 80%	One Time/ Time to Value
4	Financial	Improve profitability with accurate operational cost insight and analysis	1% - 2%	Annual Recurring
5	Financial	Improve product costing efficiency	20% - 40%	Annual Recurring
6	Financial	Improve batch traceability/lot genealogy management efficiency	20% - 40%	Annual Recurring
7	Financial	Improve product throughput	1% - 2%*	Annual Recurring
8	Strategic	Yield loss impact - understand yield loss impact to revenue	0.5% - 1%*	Non-quantified
9	Strategic	Improve on-time delivery	3% - 5%	Non-quantified

\* Reduced benefit potential due to limited scope

# PDF End-to-End Analytics Platform



# Summary of Key Benefits



## Big Data Analytics

Built for Industry 4.0 with scalability and performance to support any size customer data



## Machine Learning

A production-proven “force multiplier” of your existing engineering team: >3x ROI



## End-to-End Data

Serves the entire manufacturing value chain – from the equipment to the fab to the final system



## Differentiated Data

Systems that deliver months of foresight into critical mfg issues

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