

# Discover the Value of Digital Twins

Presented by Robb Neuenschwander, Mindset Consulting LLC

**MINDSET**





# Today's Agenda

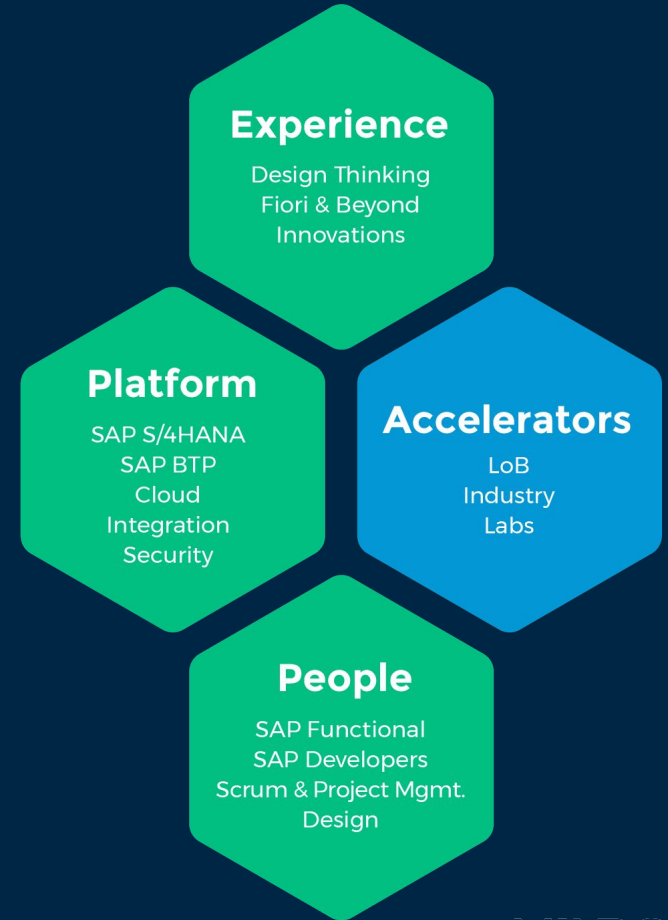
- About Mindset
- Frame of Reference
- What is a Digital Twin?
- Use Cases for Digital Twins
- Architecture of a Digital Twin
- SAP Components of a Digital Twin
- Future of Digital Twins



# About Us

Mindset is the technology partner of choice for leading global organizations that want to leverage exceptional user experience (UX) on the SAP platform.

# Reimagine the SAP Experience with Mindset



# Frame of Reference

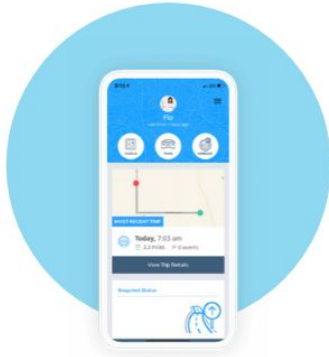
# Frame of Reference

<https://www.ispot.tv/ad/1IHu/progressive-auto-safe-driver-trophy>



# Frame of Reference

## How might Snapshot affect my rate?



With Snapshot, we measure a variety of factors related to your driving, including things such as the time of day you drive, sudden changes in speed (hard brakes and rapid accelerations), the amount you drive, and, for customers using the mobile app in some states, how you're using your mobile phone while driving.

Most Snapshot customers earn a discount based on their safe driving. However, riskier driving based on these factors indicate a greater likelihood of being in an accident and may result in a higher rate at renewal — depending on the state you live in and when you signed up for Snapshot.

See our [state details page](#) for more information.

# Frame of Reference

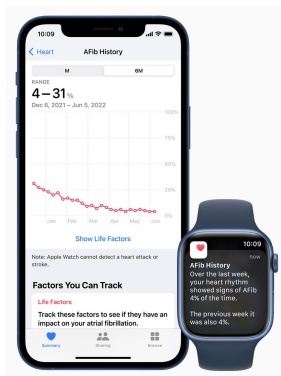
“Apple is democratizing healthcare, providing on-demand access to accurate sensors and software that can help consumers develop real healthcare literacy and inform how daily choices impact their health.”

Dr. Leslie A. Saxon  
Professor of Medicine, Clinical Scholar, Keck School of Medicine, USC



“Products that seek to provide deeper health insights, like the Apple Watch, have the potential to be significant in new clinical care models and shared decision making between people and their healthcare providers.”

Dr. Ivor Benjamin  
Immediate Past President of the American Heart Association

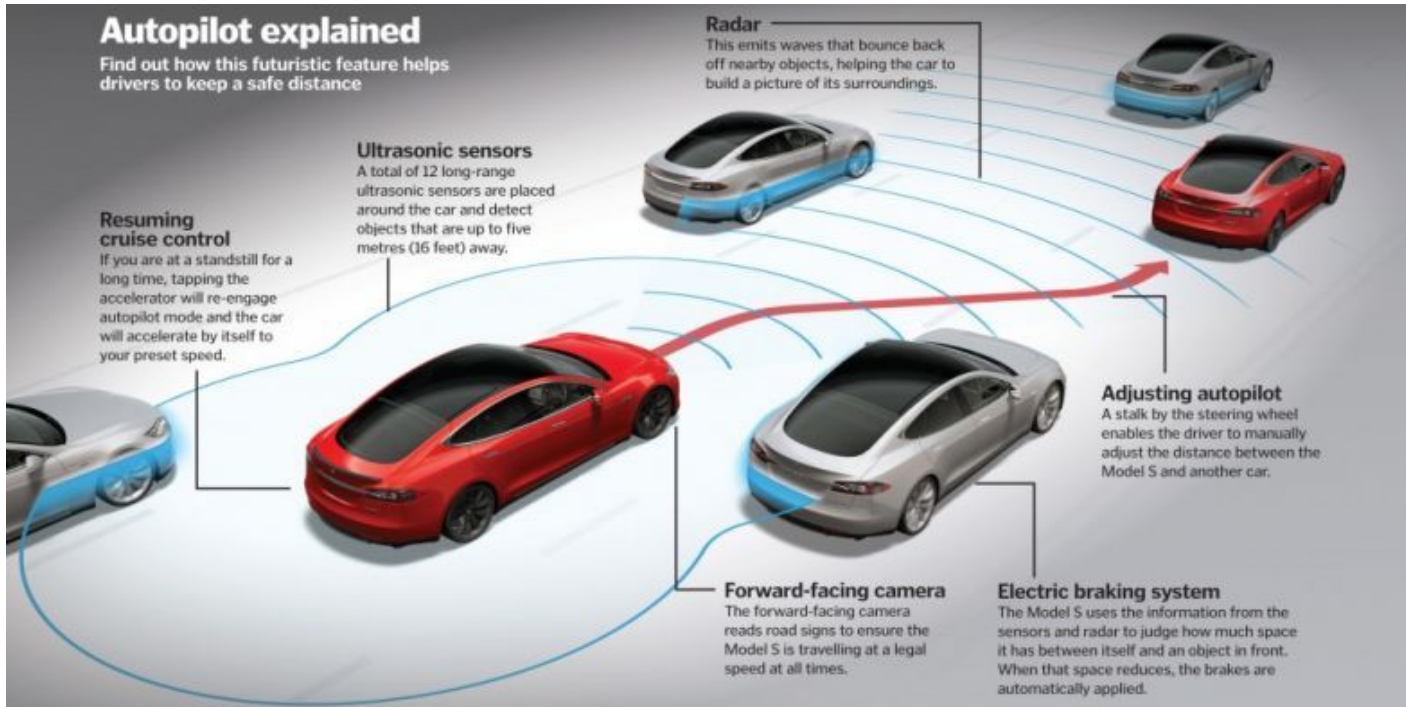


	High and Low Heart Rate Notifications	Irregular Rhythm Notification	ECG App	Low Cardio Fitness Notifications	Blood Oxygen Level	Fall Detection
Sensors	Optical heart sensor	Optical heart sensor	Electrical heart sensor	Optical heart sensor and location	Optical heart sensor	Accelerometer and gyroscope
Apple Watch Series 3	✓	✓	✗	✓	✗	✗
Apple Watch SE	✓	✓	✗	✓	✗	✓
Apple Watch Series 4 and 5	✓	✓	✓	✓	✗	✓
Apple Watch Series 6 or later	✓	✓	✓	✓	✓	✓
Apple Watch Ultra	✓	✓	✓	✓	✓	✓





# Frame of Reference

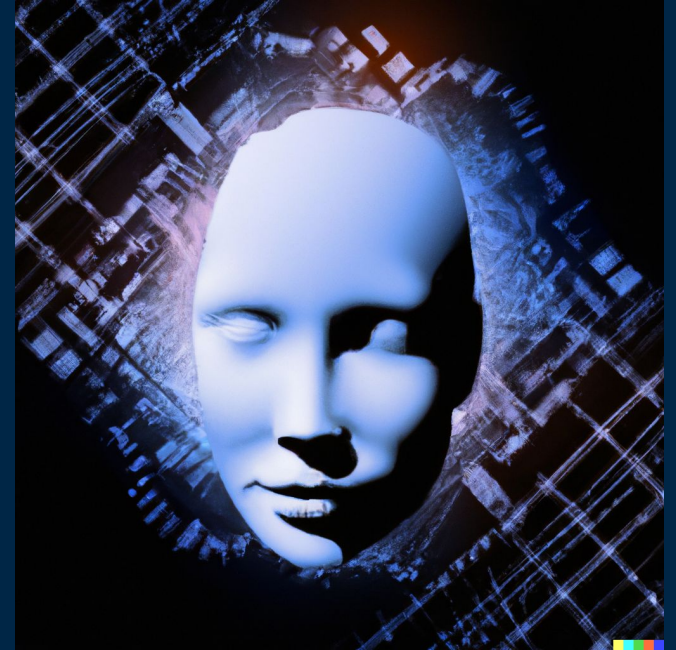


# What is a Digital Twin?

# What is a Digital Twin?

Think of a Digital Twin as a digital instantiation of a real-life object.

- Customers
- Employees
- Products
- Equipment / Assets
- Facilities / Locations



# What is a Digital Twin?

Digital Twins have data associated with them to represent their existence:

- Base properties
- History of usage and interactions
- Related entities (other twins)
- Predicted behavior, performance, etc



# What is a Digital Twin?

Digital Twins can have operations associated with them to provide business value:

- Predicted behavior, performance, etc
- Event-based reactions
- Sales or service recommendations
- Association to groups or like populations



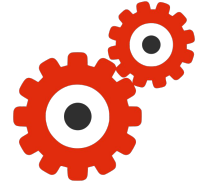
# Use Cases for Digital Twins

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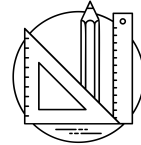
Predictive maintenance



Performance optimization



Supply chain optimization



Product Design / Prototyping

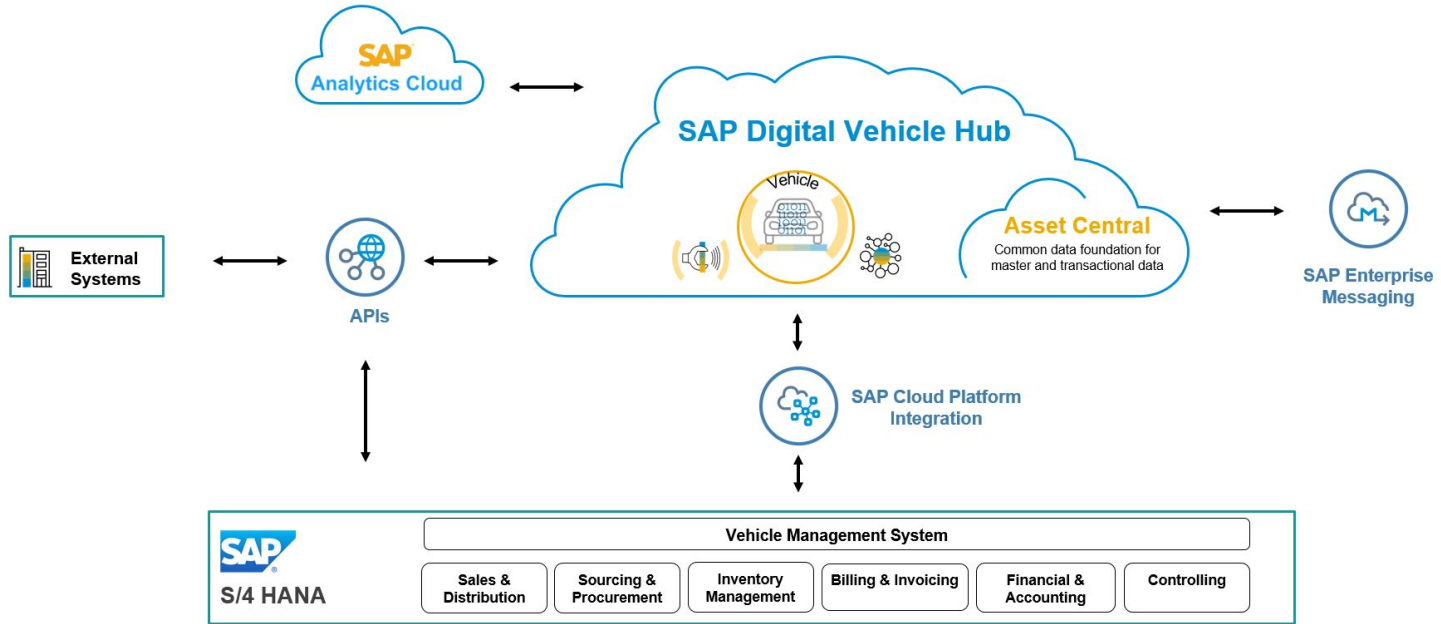
Employee performance optimization



Smart house / city planning



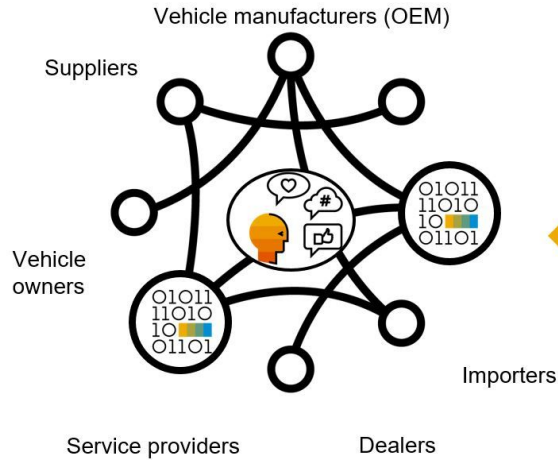
# Use Case - Digital Vehicle Twin



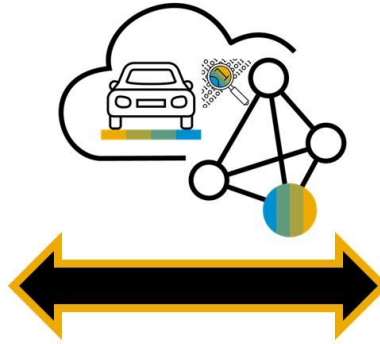
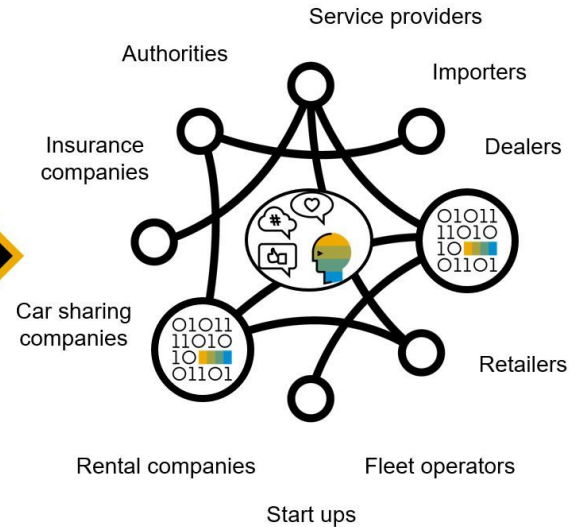


# Use Case - Digital Vehicle Twin

Interested in making revenue from data sharing

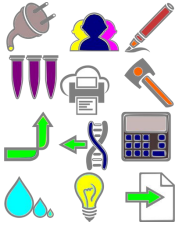


Interested in accessing vehicle data for their businesses



# Architecture of a Digital Twin

# Architecture of a Digital Twin



Physical assets

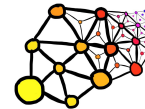
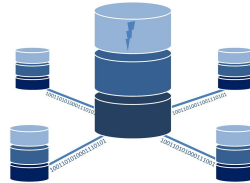


Sensors

Artificial Intelligence /  
Machine Learning



Datastores (Big Data,  
NoSQL, SQL, etc)



Data Integration  
(Streaming,  
Real-time, Batch)

Pervasive  
security



Visualization

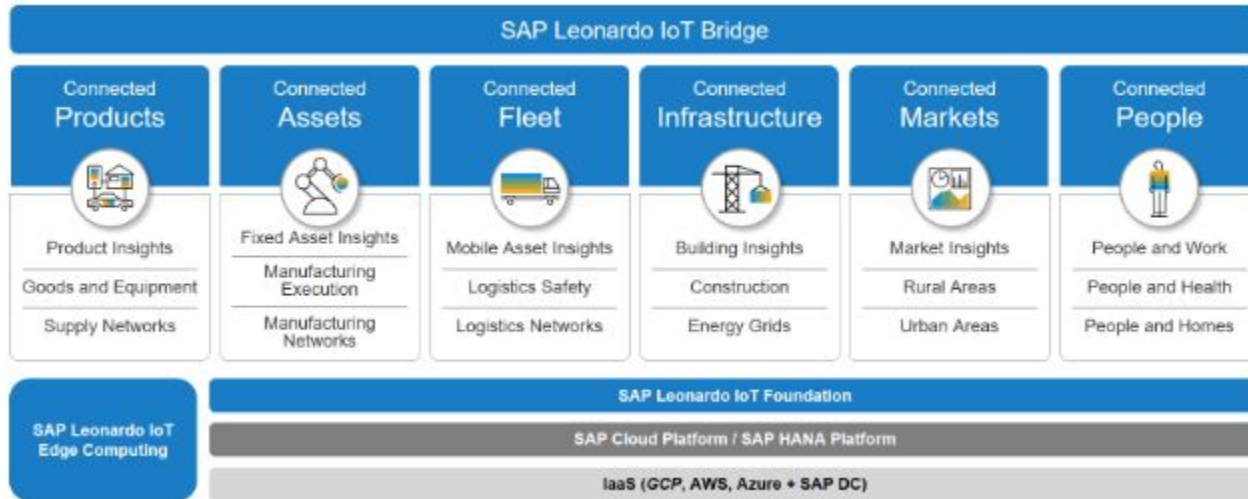
API's



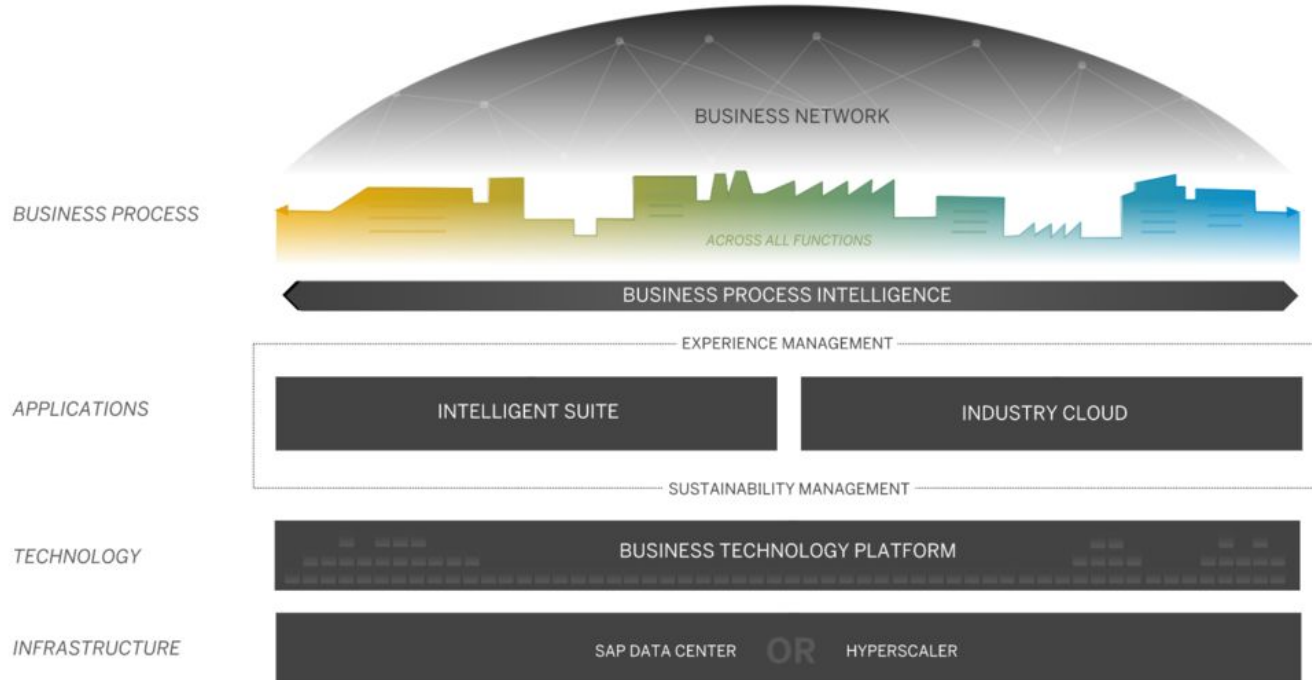
# SAP Components

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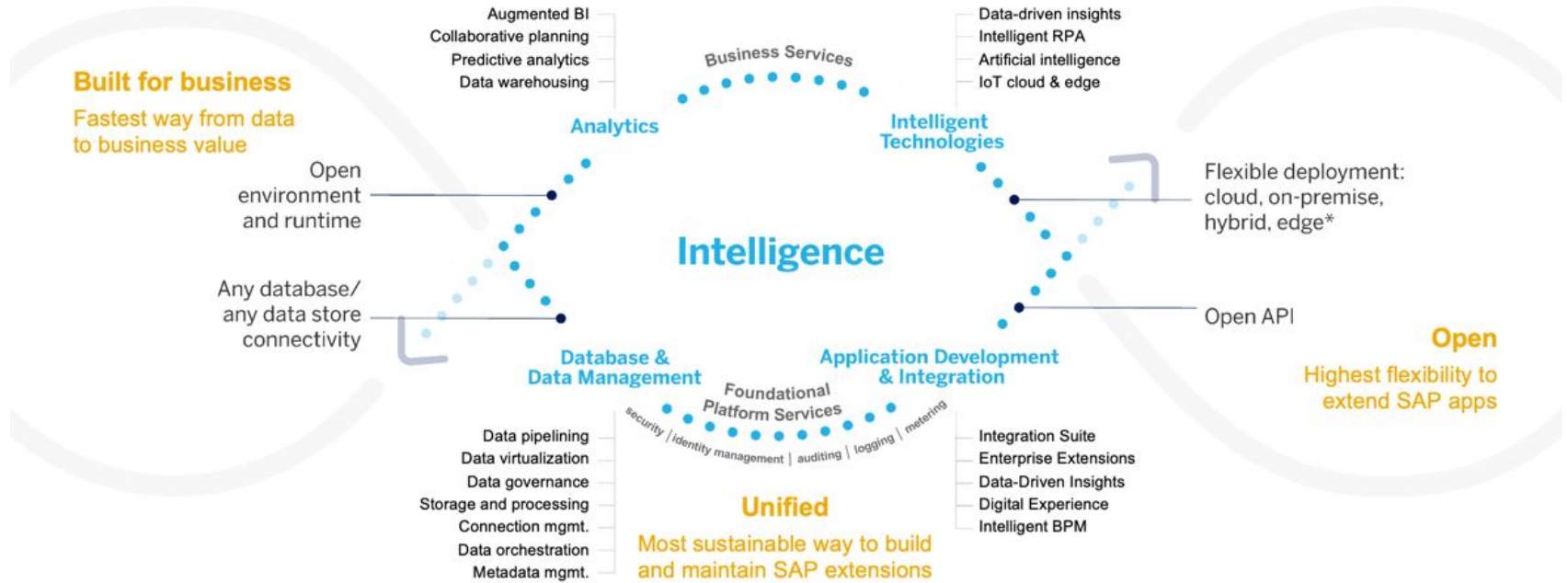
2017



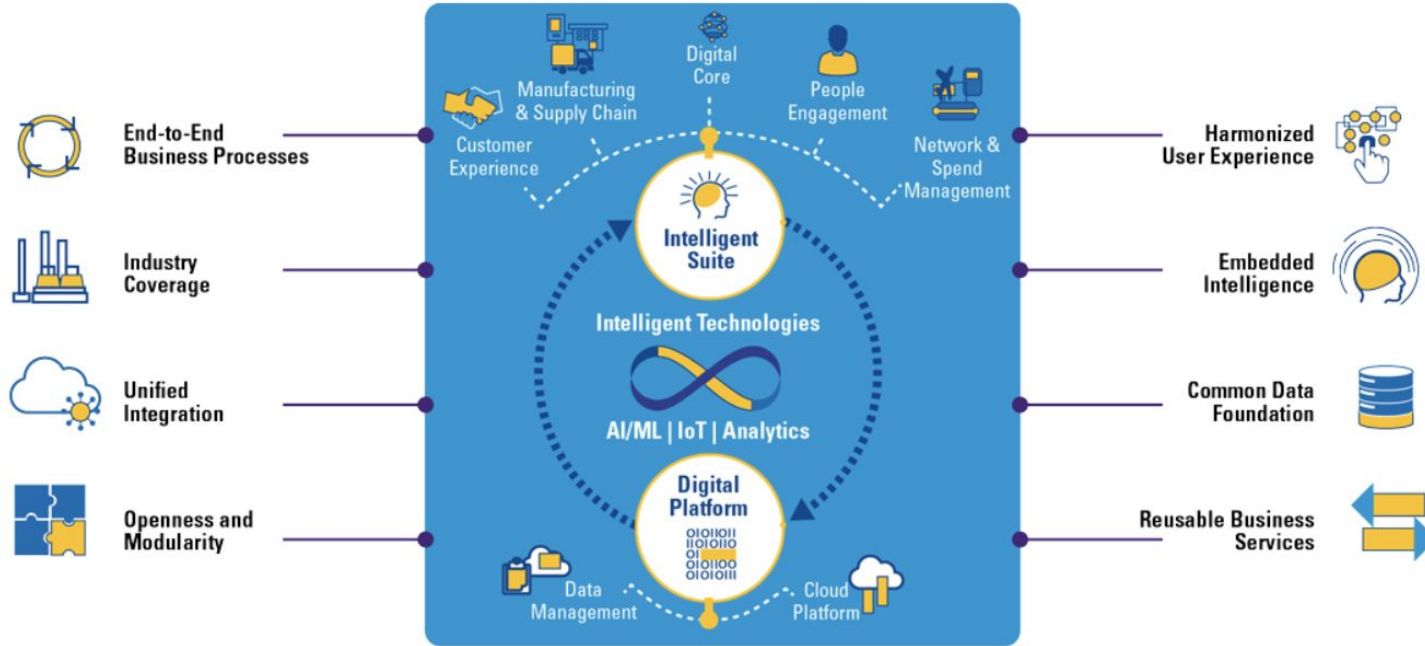
# SAP Components



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# SAP Components





# Future of Digital Twins

# Future of Digital Twins



what is the projected adoption of digital twins in the next 5 years



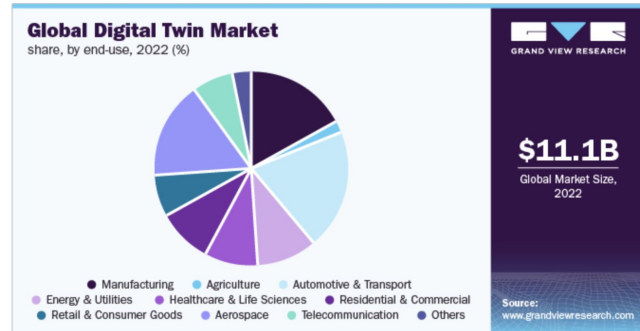
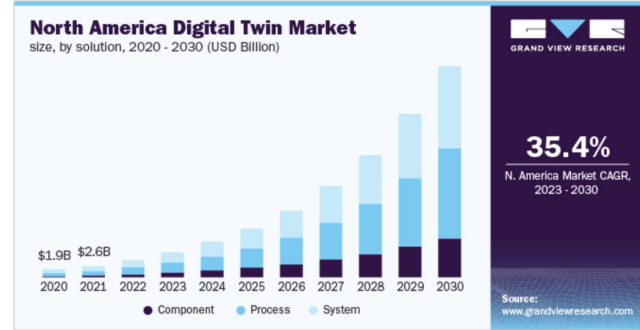
The adoption of digital twins is projected to grow significantly in the next five years. According to a report by MarketsandMarkets, the global digital twin market size is expected to grow from USD 3.1 billion in 2020 to USD 48.2 billion by 2026, at a CAGR of 58.9% during the forecast period.



This growth can be attributed to several factors, including the increasing demand for predictive maintenance and the growing adoption of the Internet of Things (IoT) and advanced analytics. The COVID-19 pandemic has also accelerated the adoption of digital twins, as businesses are looking for ways to optimize their operations and reduce costs.

The manufacturing industry is expected to be one of the largest adopters of digital twins, followed by the healthcare, automotive, and aerospace industries. In addition, the use of digital twins is expected to expand to other industries, such as construction, energy and utilities, and agriculture.

Overall, the adoption of digital twins is expected to continue to grow in the next five years, as more businesses realize the benefits of this technology and as the technology itself becomes more advanced and accessible.



“

"Digital twins are a game-changer for manufacturing, allowing businesses to optimize their operations and reduce costs."

- Forbes

“

"The future is now with digital twins. We are already seeing how they can revolutionize the way we design, build, and operate physical systems, and this is just the beginning."

- Stephane Marouani, Senior Vice President, Digital Manufacturing, PTC



# Thank you!