



DIGITAL TWINS

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OVERVIEW

- What is a Digital Twin?
- The Product Lifecycle
- Living Learning Model
- Example in Action
- Human-Digital Twins

WHAT IS A DIGITAL TWIN?

“In simple terms, a digital twin is the digital representation of a physical product in all its aspects.”

- Dr. Norbert Gaus of Siemens Corporate Technology

“Digital Twin is most commonly defined as a software representation of a physical asset, system or process designed to detect, prevent, predict and optimize through real time analytics to deliver business value.”

- Dr. Colin Parris (GE Digital’s Chief Technology Officer)



“ALL ITS ASPECTS”

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- Ex. Manufacturing
 - Mechanical
 - Embedded software
 - Flow mechanics
 - And in many, many other aspects
- Covers the entire product lifecycle

PRODUCT LIFECYCLE



3 BIG STEPS TO DESIGN A DIGITAL TWIN

1. What is the business value you want?
 - Availability, more production, reduced cost, etc.
2. Can I get the right data and domain knowledge?
 - Can we find the insights?
3. Making Models
 - AI models, physics models, etc.

THE DATA PROBLEM

- Sometimes you have Big Data
 - Google delivers 29.8 billion ad impressions a day
- Sometimes you need to make it
 - Physics and Simulations

PRODUCT LIFECYCLE



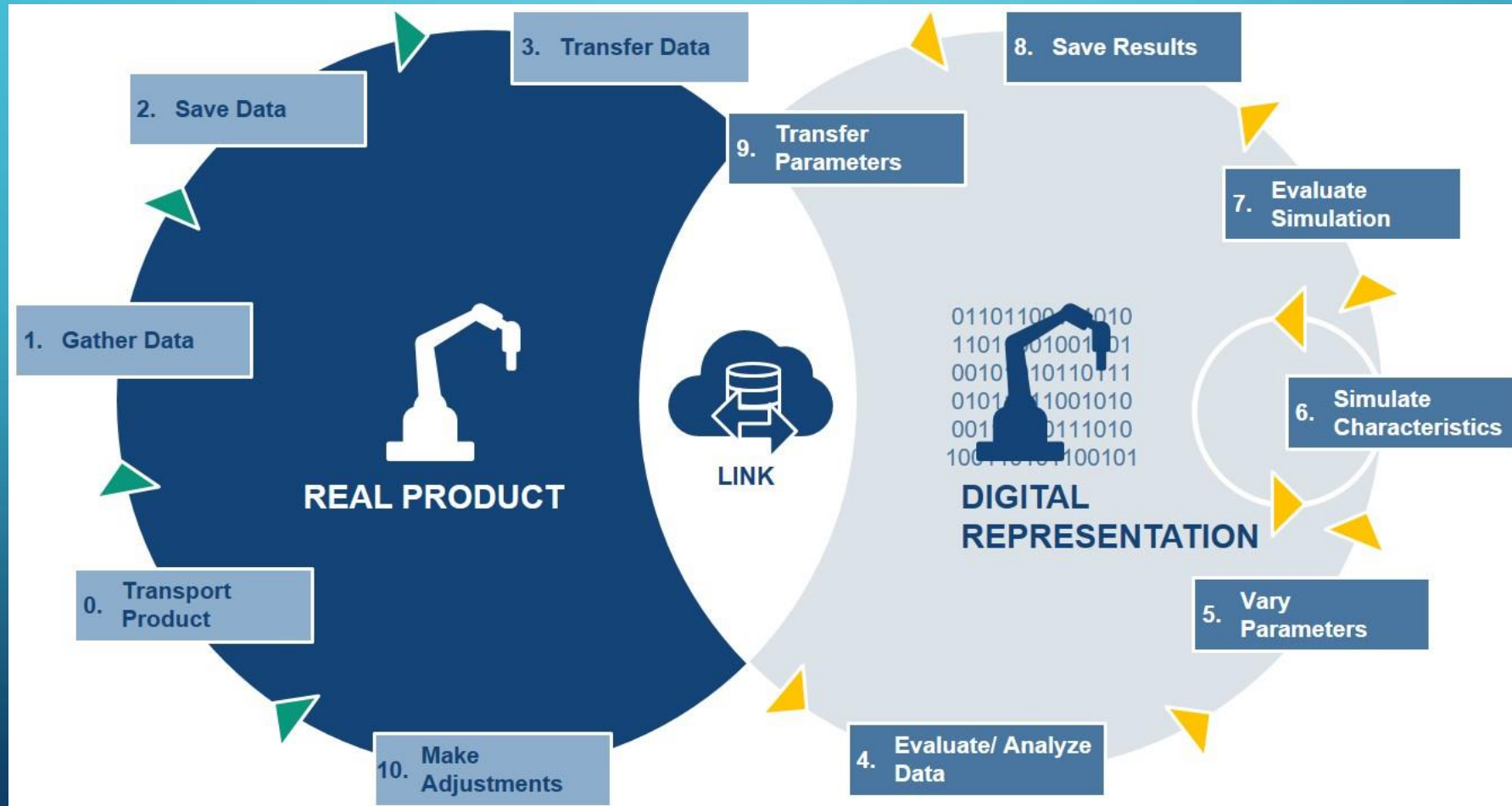
PRODUCT LIFECYCLE



PRODUCT LIFECYCLE



A LIVING-LEARNING MODEL



3 BENEFITS OF HAVING A LIFE IN PARALLEL

- Early warnings on a problem
- Continuous prediction
- Dynamic optimization

SEE ONE "IN-ACTION"







HUMAN-DIGITAL TWINS (THE GOOD AND THE SCARY)

HEALTH- MECHANICS



PERSONALIZATION THROUGH DIGITAL TWINS

- Amazon personalization
- Google's personalized ads
- The "YouTube algorithm"

TIME

SECURITY & PRIVACY

How Target Knew a High School Girl Was Pregnant Before Her Parents Did

By Keith Wagstaff | Feb. 17, 2012

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In Charles Duhigg's new piece for the *New York Times*, a father finds himself in the uncomfortable position of having to apologize to a Target employee. Earlier he had stormed into a store near Minneapolis and complained to the manager that his daughter was receiving coupons for cribs and baby clothes in the mail.

Turns out Target knew his daughter better than he did. She really was pregnant.



MORE: Google, Walmart Had Spies, NSA Report

THE BIG SCARE - DIGITAL TWIN MANIPULATION

- Who is your online twin?
- What if someone wanted to make you do/think something?
- Information is power

REFERENCES

- Parris, C. (2020, October 03). How to use a DIGITAL twin and AI to improve manufacturing. Retrieved February 24, 2021, from <https://www.cxotalk.com/video/how-use-digital-twin-ai-improve-manufacturing>
- Siemens. (2020, December 28). What is a DIGITAL TWIN? Retrieved February 24, 2021, from <https://www.cxotalk.com/episode/what-digital-twin-why-it-important>

OTHER INTERESTING VIDEOS

- <https://youtu.be/2dCz3oL2rTw>
- <https://youtu.be/LMmB5VK0nQo>
- <https://youtu.be/2XAXKNcsb1M>