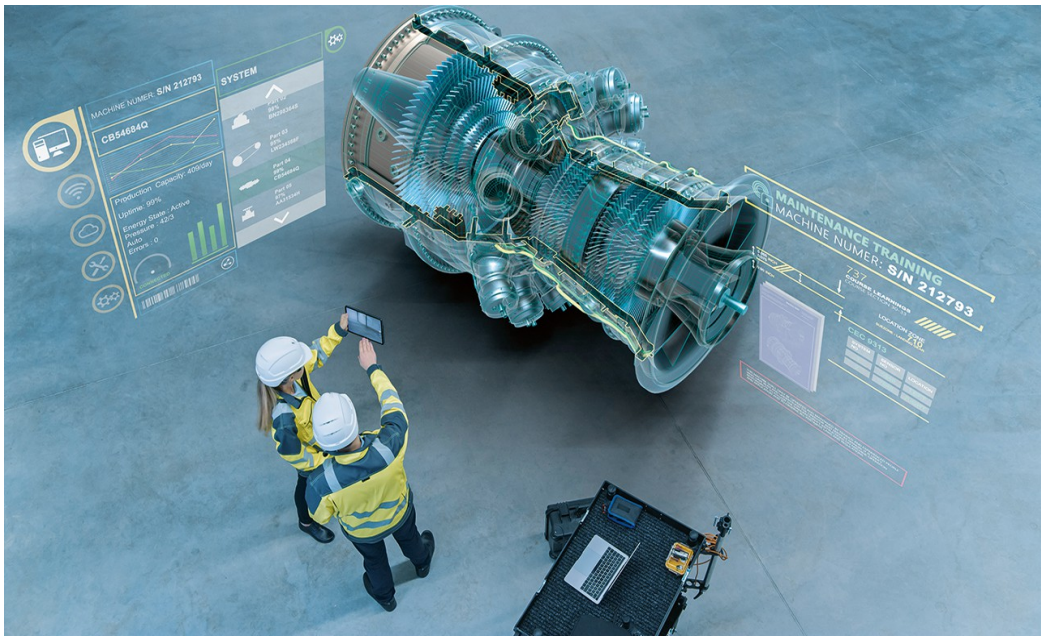
Introduction to Simulation / Digital Twin -
Realizing Industrial Revolution 4.0 Technology

Abstract



Source: https://new.abb.com/news/detail/80770/the-digital-twin-from-hype-to-reality

Based on Gartner definition, (source: https://www.gartner.com/en/information-technology/glossary/digital-twin) a **digital twin** is a digital representation of a real-world entity or system. The implementation of a digital twin is an encapsulated software object or model that mirrors a unique physical object, process, organization, person or other abstraction. Data from multiple digital twins can be aggregated for a composite view across a number of real-world entities, such as a power plant or a city, and their related processes. The earlier concept was originated from Michael Grieves and then of the University of Michigan in 2002. The first practical definition of digital twin originated from NASA in an attempt to improve physical model simulation of spacecraft in 2010.

Based on TWI-Golbal definition, (source: https://www.twi-global.com/technical-knowledge/faqs/faq-what-is-simulation) a **simulation** imitates the operation of real world processes or systems with the use of models. The model represents the key behaviors and characteristics of the selected process or system while the simulation represents how the model evolves under different conditions over time. Simulations are usually computer-based, using a software-generated model to provide support for the decisions of managers and engineers as well as for training purposes. Simulation techniques aid understanding and experimentation, as the models are both visual and interactive.

Simulation can help us to understand what may happen in the real world whereas **Digital Twin** allows us to compare and predict what may happen alongside what is actually happening. If companies know how to apply these technologies effectively to their business models/processes as well as the products/services, they will have an edge over the competitors in business functions like design/development, operation/asset management/maintenance, fault alert/prediction, etc. and hence achieving higher business profitability plus customer delight.

This class is a fundamental technology awareness training which participants will learn about the Simulation / Digital Twin technologies and its application through Internet of Things (IoT) platform. This training will be your first step to realize Industrial Revolution 4.0 (IR4) transformation through its pillar technology named Simulation / Digital Twin.

Learning Objectives

1. To learn Simulation / Digital Twin Definition/Concepts
2. To understand Simulation / Digital Twin Benefits for Business
3. To learn Simulation / Digital Twin Applications/Success Stories (emphasis on Manufacturing Industry)
4. To experience Simulation / Digital Twin In Action through Internet of Things (IoT) Platform

Target Audience

For anyone who has an interest in learning Simulation / Digital Twin fundamental. This training is designed for working adults who have minimum or zero knowledge/experience in engineering or computer science fields.

Prerequisite

Ideally, the participants should have worked in any industry for a few years.

Training Setup/Methodology

This is an instructor led training to understand/learn about Simulation / Digital Twin technologies and its application through IoT platform. Simple exercise is designed to strengthen participants' learning experience.

Duration

1 Day 9:00am – 5:00pm

Content

1. Day1 AM– Simulation / Digital Twin Fundamental
   a) Definition
   b) Concepts
   c) Benefits
   d) Applications/Success Stories ((emphasis on Manufacturing Industry)
   e) Etc.
2. Day1 PM – IoT Platform Demonstration
   a) IoT Fundamental
   b) IoT Platform Quick Introduction
   c) Simulation / Digital Twin Implementation Exercise

Trainer Biodata

Choo Fook Seng graduated from National University of Singapore (NUS) in 1990 with bachelor's degree of Electrical & Electronic Engineering. Later in 1996, he obtained Master of Science in Communication Software Management from University of Essex UK.

Fook Seng (born 1965) had over 20 years of proven track record in managing and delivering multi-million-dollar mobile phone (Motorola) and IA silicon/platform (Intel) software engineering projects. He demonstrated persuasive and influential skills in working together with various key stakeholders to deliver engineering projects on time and with quality. He is analytical, result oriented and customer oriented in resolving project/team problems. Fook Seng is proficient in driving organization continuous improvement initiatives by applying best practices of SEI CMM, ISO9001 and Agile SCRUM/LEAN to the organization design/development life cycle. The best accomplishment was achieving SEI CMM Level 4 certification for Motorola Singapore Design Center software team in 2001.

Fook Seng has a strong passion in employee training/coaching and has developed numerous courses to-date in the area of **Software Engineering Best Practices, Agile/Lean Project Management, Digital Transformation, Internet of Things with Arduino/RPi, Design Thinking, Maker Movement, 4th Industrial Transformation, Trust Leadership, AI Introduction**, etc. During 2014-2009, he had contributed significantly to Intel Training/Development for Intel Malaysia employees:

1. Delivered 2 Intel University (IU) Training classes of **"Trust Matters"** for 30 Penang HR Payroll employees Sep'13 & 2 IU **"LEAN"** trainings for 12 Penang Embedded Engineering employees H1'13 plus many more informal **"LEAN"** training/coaching.
2. Invited to share Best Known Method (BKM) at 1st/2nd **"Bright Spot" manager sessions** for >100 Malaysia Design Center (MDC) managers starting Nov'13.
3. Completed 7 **Lean/Value Stream Mapping** (VSM) training/workshop sessions for Penang Embedded Software Engineering Teams 2012. Delivered 2 **"Myself as Trust Builder"** trainings (Apr/Sep'11) benefiting 46 Intel Malaysian employees. Picked up **T-Coaching** certification and delivered 2 new Manager coaching sessions H2'11.

In addition, Fook Seng had championed **People Development programs** 2006-2008 for Intel Board Design Center Malaysia (BDCM) team which benefiting 200+ employees by implementing Manager Feedback Tool workout, Mentorship Pilot Run, Innovation culture building & numerous soft skill/technical trainings.

CERTIFICATIONS

- ❑ WIDE/IPv6 Forum Certified Network Engineer Level1/2 (2016)
- ❑ iNTACS Automotive SPICE/ISO 15504 Provisional Assessor Certification (since 2015)
- ❑ Malaysia HRDF Trainer Certification (since 2014)
- ❑ ScrumAlliance.org Certified Scrum Master (since 2013)
- ❑ ScrumAlliance.org Certified Product Owner (since 2012)
- ❑ Intel/SSG Trainer of LEAN Overview (2012)
- ❑ Intel/SSG Trainer of LEAN Value Stream Mapping (VSM) (2012)
- ❑ Intel Trainer of Trust Matters (2012)
- ❑ Intel Certified 6 Sigma Green Belter (Jul 2012)
- ❑ Intel Certified Transition-Coach (2011)
- ❑ Intel Trainer of Building Trust (2008-2011) – Ken Blanchard Licensed Training
- ❑ Intel Certified Trainer of Outsourcing 101 (2007)
- ❑ Intel Certified Trainer of Code of Conduct (2007)
- ❑ Intel Trainer of Software Metric Overview (2004)
- ❑ Intel Trainer of CMMv1.2 Introduction (2004)
- ❑ Motorola Certified 6 Sigma Green Belter (Feb 2003)
- ❑ Motorola University's Certified Trainer for SEI Capability Maturity Model (CMM) Course (Mar 2002)
- ❑ Motorola Qualified SEI CMM Assessor (1999)
- ❑ Motorola Qualified Project Manager (1999)

Detail biodata is also available online via QR scan below: