Process Modeling Essentials for Industry 4.0 - PM323173

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About the speakers

Rusty Belcher

Rusty Belcher is a manufacturing application expert working with IMAGINiT Technologies. Rusty provides implementation, training, and support services at every level for all Autodesk, Inc., manufacturing products. His specialty involves the integration of 3D design practices into manufacturing production environments. Over the past several years Rusty has worked directly with Autodesk to develop and author the current Factory Design Suite software training courseware, and he has also developed and recorded many of the tips and tutorial videos available on the Factory Design Suite software's YouTube channel.

David Reaume

David Reaume, Product Manager for Inventor Automation and Smart Factory, has more than three decades of successful experience in nearly every phase of design and manufacturing. His roles and titles within multiple corporations have spanned the breadth of the industry. Dave has served as Mold Designer, User Experience Designer, Product Owner, R&D Specialist, Solutions Architect, Application Engineer, Product Lifecycle Management Services Manager, Director of Software Development, and Engineering/Manufacturing Process Improvement Specialist. Dave also co-founded Logimetrix, the startup that developed iLogic technology and was acquired by Autodesk in 2008.

With his comprehensive knowledge of diverse technologies and systems, including design automation, tooling, software development, and technology platforms, Dave brings an acute problem-solving mentality to all his work along with an ever-present commitment to the end user, always fiercely advocating for the customer.

Process Modeling Essentials for Industry 4.0

Innovations with Process Modeling for Factory Design

This new era of technology is driving a lot of innovation in all aspects of design. All product manufacturers are embracing innovation and new technology in order to maintain or advance their current production cycles. But, incorporating new technology and innovative manufacturing practices requires a solid plan, not a wild guess. The path to innovation must start with a thorough analysis of your current process. It is not enough to say, ‘the process is inefficient,” or “new tech will solve our problems.” It is critical to properly outline and identify bottlenecks or over- and under-utilized equipment and practices. Once the process is properly defined, organizations can move beyond reaction-based decision making to predictive-based planning. In this class, we’ll demonstrate how the current Factory Design Utilities may be enhanced with ProModel Process Simulator.

Process Modeling Essentials for Industry 4.0

LEARNING OBJECTIVE 1

Learn how to compile existing process information through empirical evidence and existing sensor data.

LEARNING OBJECTIVE 2

Learn how to develop simulations of a process utilizing ProModel Process Simulator integrated with the Factory Utilities.

LEARNING OBJECTIVE 3

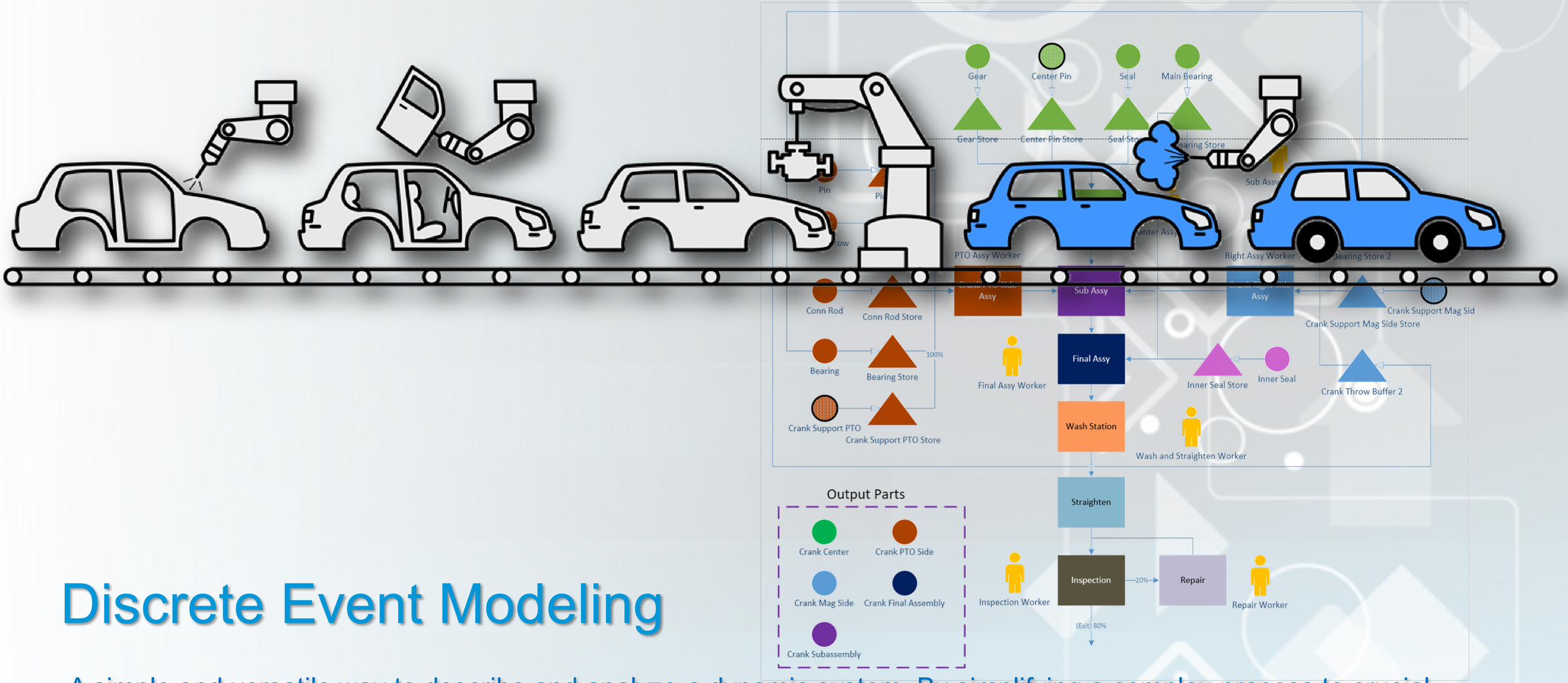
Learn about process bottlenecks and deficiencies while generating “what if” scenarios that offer optimization for the process.

LEARNING OBJECTIVE 4

Learn how to use a process simulation to make predictive plans for process innovation and technology enhancements.

Industry 4.0

The phrase “Industry 4.0” represents the fourth revolution that has occurred in manufacturing. From the first industrial revolution (mechanization through water and steam power) to the mass production and assembly lines using electricity in the second, the fourth industrial revolution will take what was started in the third with the adoption of computers and automation and enhance it with smart and autonomous systems fueled by data and machine learning. Now that the manufacturing world is so connected, it has never been more essential to understand your current and future process workflows.



Discrete Event Modeling

A simple and versatile way to describe and analyze a dynamic system. By simplifying a complex process to crucial occurrences, the effort to develop a simulation model is greatly diminished. The computational overhead of the simulation is also drastically reduced, only requiring calculations for the truly critical process events. This allows designers to easily run multiple simulations, providing a more thorough picture of the system under various scenarios.

Discrete vs. Discreet

dis·crete

/diˈskrēt/

adjective

individually separate and distinct.
"speech sounds are produced as a continuous sound signal rather than discrete units"

Similar: separate | distinct | individual | detached | unattached

dis·creet

/diˈskrēt/

adjective

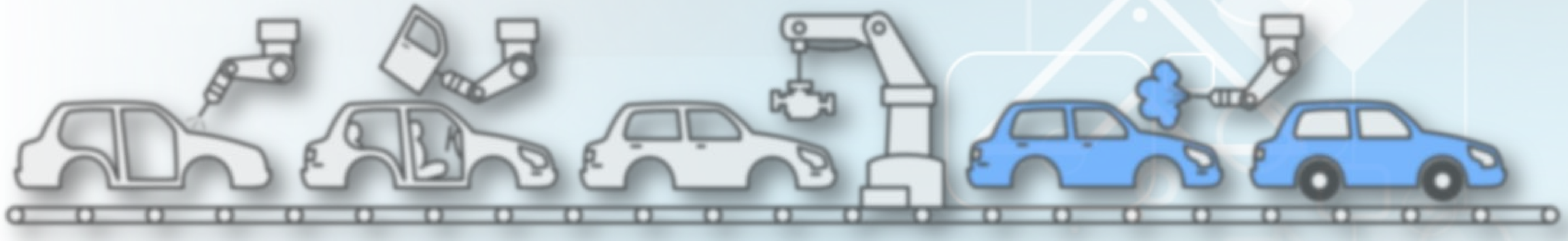
adjective: **discreet**; comparative adjective: **discreeter**; superlative adjective: **discreetest**

careful and circumspect in one's speech or actions, especially in order to avoid causing offense or to gain an advantage.
"we made some discreet inquiries"

Similar: careful | circumspect | cautious | wary | chary | guarded

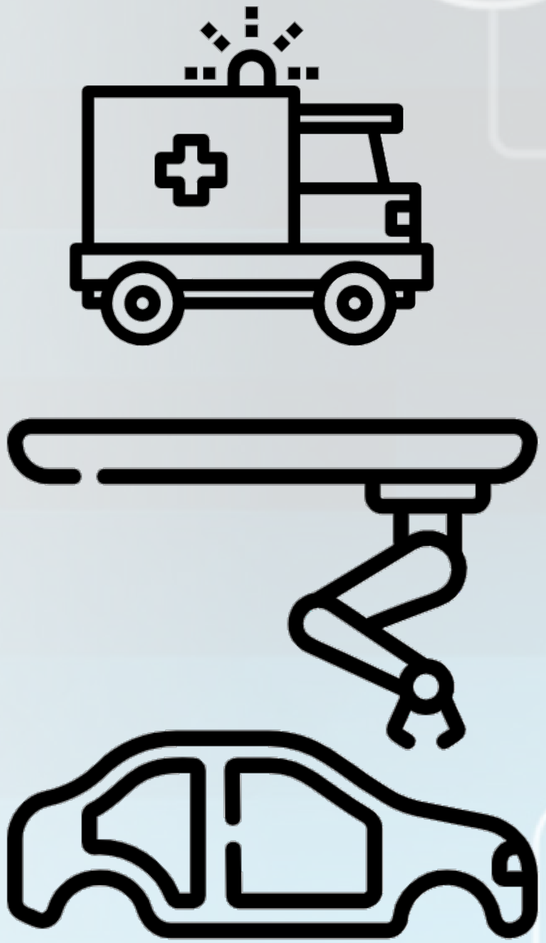
- intentionally unobtrusive.
  "a discreet cough"

  Similar: unobtrusive | inconspicuous | subtle | low-key | understated



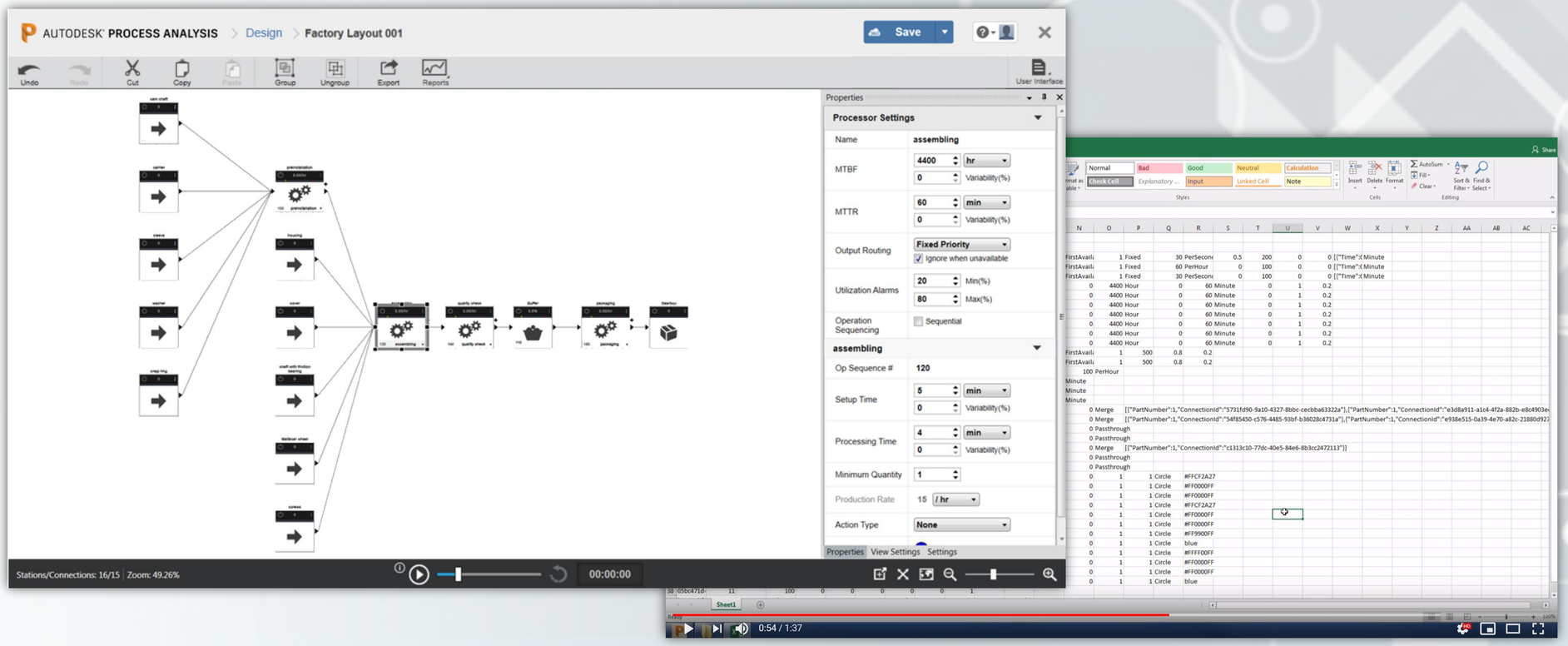
Examples of Discrete Event - Process Simulation

- Emergency Room Triage
- Computer Network Traffic
- Bank Teller Services
- Supermarket Checkout
- **Manufacturing Workflow**
- Airline Arrivals / Departures
- Passenger Boarding on Aircraft
- Military Planning and Deployment



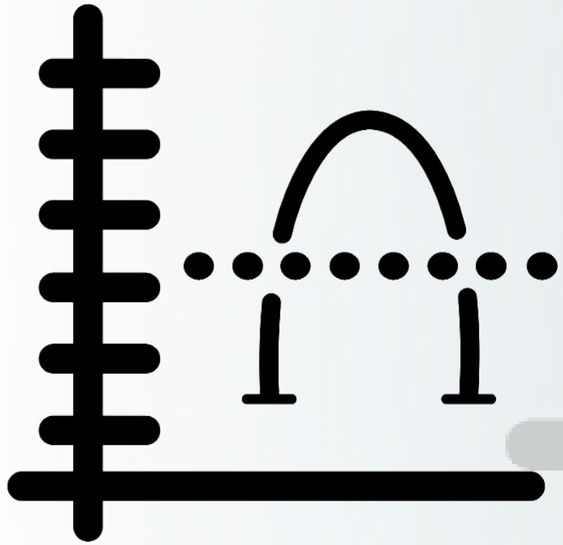
Process Simulator – Autodesk Edition

Process Simulator is a process analysis and improvement tool based on Microsoft Visio and ProModel technology that simulates and optimizes any Visio flow chart. It can be used to bring diagrams to life and analyze how a facility will actually operate. Process Simulator animates and simulates the processes showing activity flow and reports predictive analytics on all key performance indicators.



Autodesk Process Analysis

Autodesk Process Analysis is a web application used to model, study, and optimize a wide variety of manufacturing processes. By visualizing the process, you can optimize performance and identify potential bottlenecks before they occur on the factory floor. You can also more effectively assess manufacturing decisions, equipment settings, capacity, work in process and inventory reductions, and improve line balancing.



Spreadsheet Averages vs. Reality Simulation

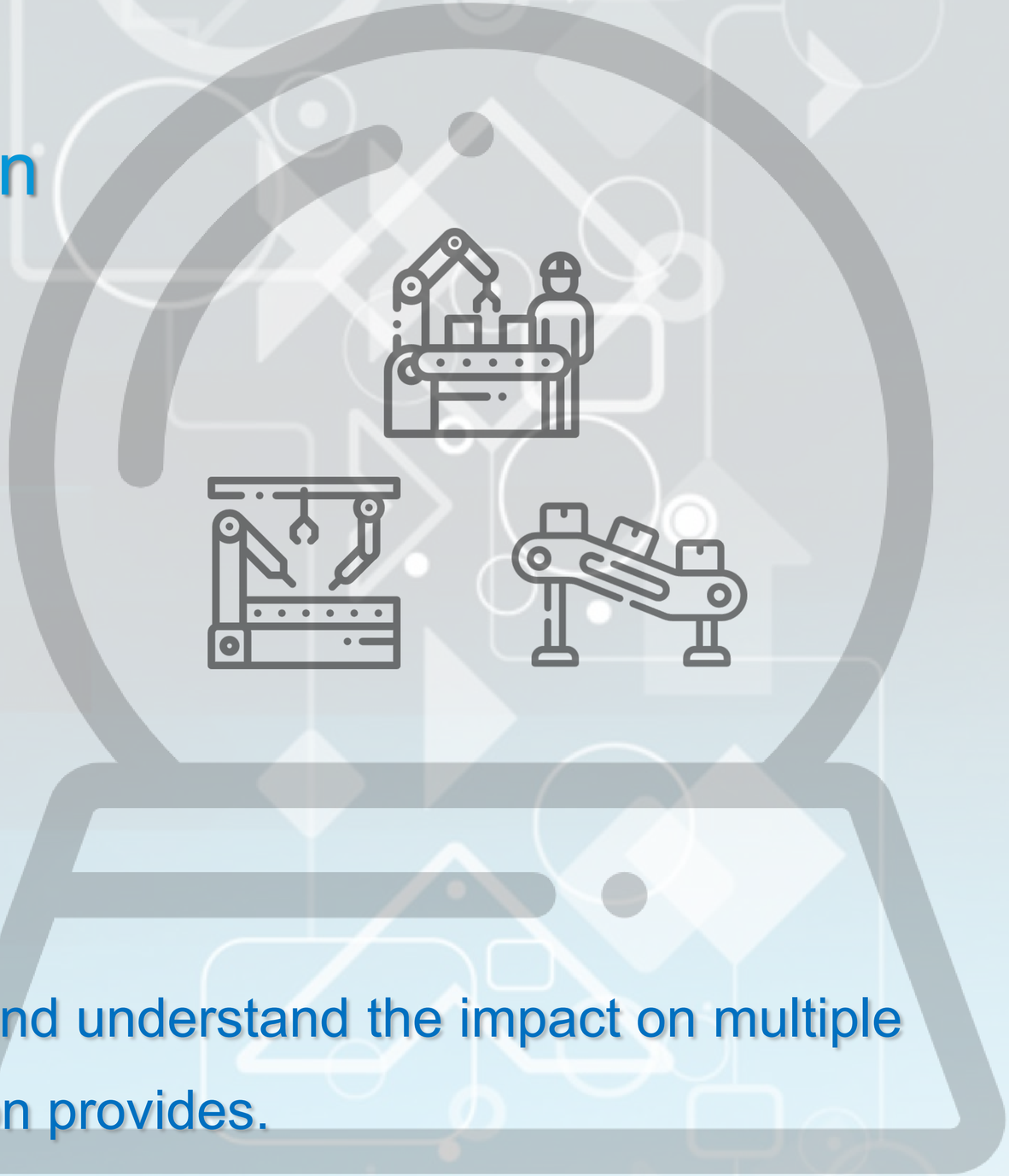
Use of averages for cycle times, resource availability, and arrival patterns for performance analysis quickly leads to a significant cumulative inaccuracy known as the “error of averages.” Simulation allows the user to capture the specific variability of multiple interdependent processes and provides results which are orders of magnitude more accurate than deterministic analysis.

Process Simulation Must Account For…

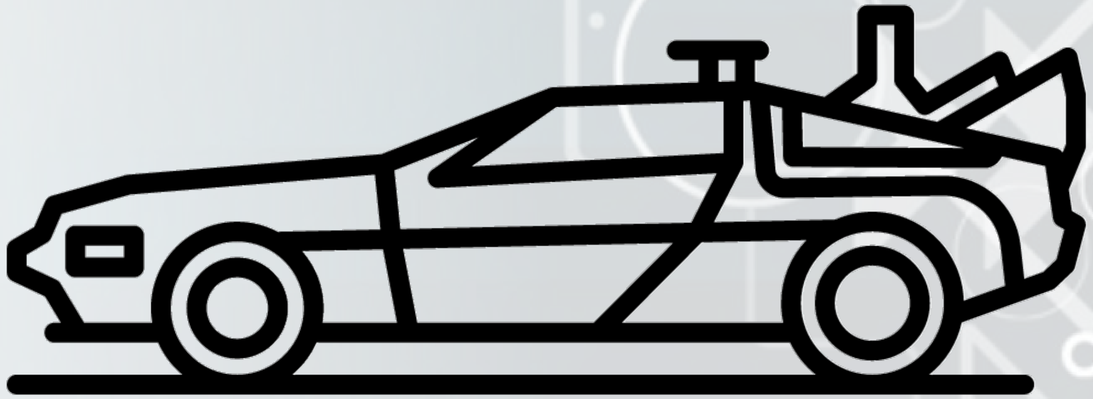
- Randomness / Probability Distributions
- Interdependence
- Time Variables / Various Distributions Based on Time
- Service Down Time Events
- Resource Allocation
- Logical Argument Capability
- Workforce Schedule
- Replication Exercise Variables

Benefits of Process Simulation

- Gain a True Understanding of a Dynamic System
- Truly Predictive Analytics
- Discover System Latency
- Resolve Resource Utilization
- Uncover Bottlenecks / Deadlocks
- Maximizing Productivity
- Increase Revenue
- Minimizing Defects
- Minimizing Cost
- Virtual Sandbox for Digital Twin Scenarios



- The power to “**look into the future**” and understand the impact on multiple key metrics is what Process Simulation provides.



Your future hasn't been written yet.
No one's has. Your future is whatever
you make it. So make it a good one.

- Dr Emmitt "Doc" Brown

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