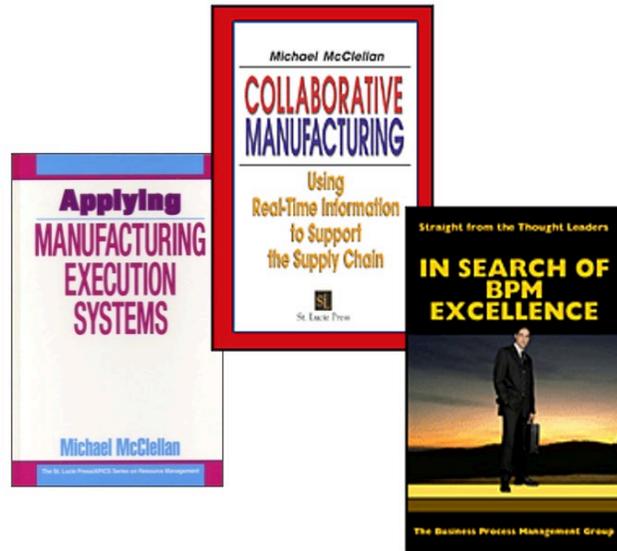


Orchestrating Production Data and Realizing the Digital Thread

MBE SUMMIT

Chicago 2024

Michael McClellan MM@cosyninc.com



Michael McClellan

- President of three manufacturing companies
- 25 years as a manufacturing information system advisor & author
- An originator of MES applications -1984
- Board of Directors for Manufacturing Enterprise Solutions Association (MESA International)

CSI

- Collaboration Synergies Incorporated (CSI) is a 25-year-old independent manufacturing plant floor information advisory company located in Vancouver, Washington.
- Our mission is to provide guidance and support in identifying opportunities and implementing applications to improve manufacturing operations and to meet Digital Thread objectives.

www.productiondigitalthread.com



The **National Institute of Standards and Technology (NIST)** defines the **digital thread** as the effective communication of product designs, manufacturing information, and quality considerations throughout the entire product lifecycle. ChatGPT

Definition: A digital thread is an **extensible, configurable, multi-directional integration** of authoritative technical data, software, and information throughout a product's or system's life cycle, enabling the capture of decision-making information and knowledge.

4 Digital Thread realities as I see them...

Digital Thread is an enterprise information-management discipline

Stitching applications together (integration) is difficult, expensive, and risky.

The business cares about product over plant assets and applications

There are novel, proven solutions available for less cost and risk



Let's revisit the basics



Is there any similarity in making a Boeing 747 and making Oreo Cookies?

- **YES!** Each has a defined set of process steps with a beginning and an end.



Common in any manufacturing environment

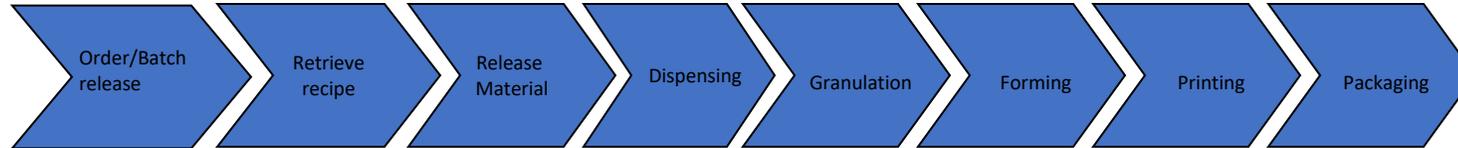
All manufacturing is accomplished through physical operations/steps –cutting, drilling, heating, mixing, etc.

Material conversion steps are accomplished at physical workstations through predetermined operations.

Operations at workstations can generate and/or require electronic data support artifacts such as assembly drawings, CNC programs, machine/PLC settings, test data, photos, inventory management, etc., and may connect with data sources across the extended enterprise including supply/value chain partners.



Consider the Manufacturing Process for aspirin



The manufacturing engineer is focused on the manufacturing conversion steps and the information required to support each step.

Production Process Management™

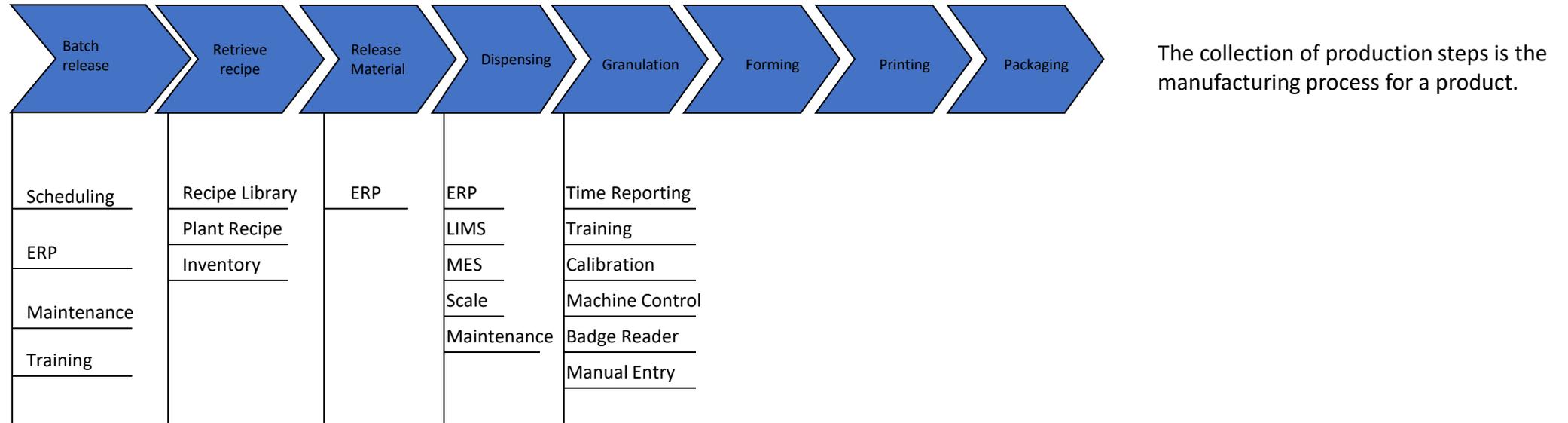
Production Process Management™ provides the ability to design and execute a human readable **Bill of Process Information (BOPI)** process model that orchestrates and executes the information flow to and from workstations and any extended enterprise resource including PLM, ERP, value chain data, MES, SPC, scheduling, etc.

The executable production process model is the forward and backward record of the data orchestration events and artifact management specific to each workstation and operation on the product. The production process model is in human readable form.

Execution of the process creates the **digital thread**---the permanent record of each data event.



The digital thread is built as the execution of a product/plant specific process model is executed and managed across the production steps.



This includes retrieving the **Bill of Process Information (BOPI)** production step data artifacts from a library, plant, or other value chain resources to support the workstation information requirement while simultaneously collecting the workstation data to build the Digital Thread. Each instance of a Production Process is archived for traceability, analytics, fail-safe restart, and future reference.

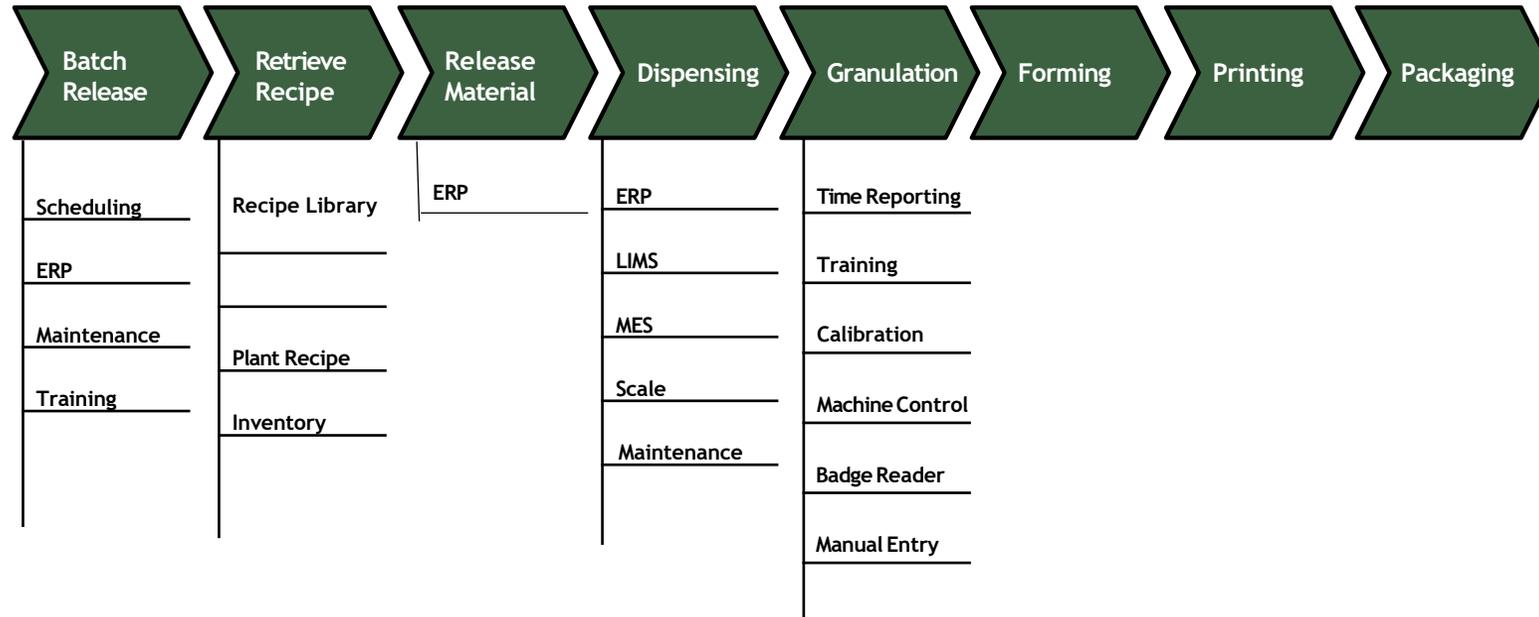
Production Process Definition and Workflow Model

Plant/workstation/operation

Electronic or manual info

Anomalies-corrections-exceptions-artifacts

Data is product serial # or batch specific



The workflow includes retrieving the current **Bill of Process Information (BOPI)** production step data artifacts from a library, plant, or value chain resource to support the workstation information requirement and simultaneously, collecting the data to build the Digital Thread. Each instance of a Production Process is archived for absolute traceability, analytics, failsafe restart, and future reference.



QUESTIONS

Next Steps

Conversation with your team.

Review of your existing strategy, facilities, and objectives at your location.

Define and develop a proof of concept with your team.

www.productiondigitalthread.com

Call me or email

Michael McClellan

1 503 880 6345

Portland, Oregon

mm@cosyninc.com

Thank you.

Questions and discussion?