Simulating and Scheduling the Job Shop

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The Process Improvement Company

Announcement

- Joint Development

  The Ohio State University

  and

  CreateASoft, Inc.

PFAST <<< >>> Simcad Pro

Integration

Properties of a Job Shop

- High Mix – Custom orders
  - One of a kind.
  - Customized specifications.
- Skilled resources
- Relatively Low Volume.
- Variable Demand.
- High machine utilizations.
- A constant struggle to meet delivery schedules.

Why Schedule?

- Better utilization of equipment/resources.
- Predictable lead time
  - When can I deliver?
- Improve efficiency/reduce change over
  - Part grouping
- Manufacturing cost reduction
- Improved workforce moral

We are lean, do we need to schedule ?

- What's in the shop ?
  - A pull system ?
  - A 5S system ?
  - Single piece/kanban pull, ….
- Job shop lean is different than Toyota lean
- A leaner environment provides
  - Cost reduction
  - Lower WIP
- Does that translate to a better schedule ?

Schedule Requirement

- What is required to create a schedule?
  - Current state of the shop
  - Resource and equipment status
  - Future orders
    - Due dates
    - Quantity
- Shop Layout
- Outside services, raw material availability
- Historical equipment performance (MTBF/MTBR)

What to expect?

- A scheduler should generate
  - Sequence of orders in the shop
  - State of the shop at different time intervals
  - Gantt chart with respective delivery dates
  - Expected Process activity
  - Expected resource load

Types of schedule

- Static scheduling
  - Based on historical data of the equipment
  - Does not include resource efficiency
  - Based on averages or distributions.
  - Not very reliable.
  - In use in most shops.
  - Does not use current equipment loading/WIP as part of the schedule
  - Dependent on Resource data entry

Active Scheduling

- Active Scheduling includes:
  - Work orders to be processed
  - Active WIP, what's happening in the shop
  - Current Downtimes
  - Run daily or weekly
  - Extensive, time consuming operation

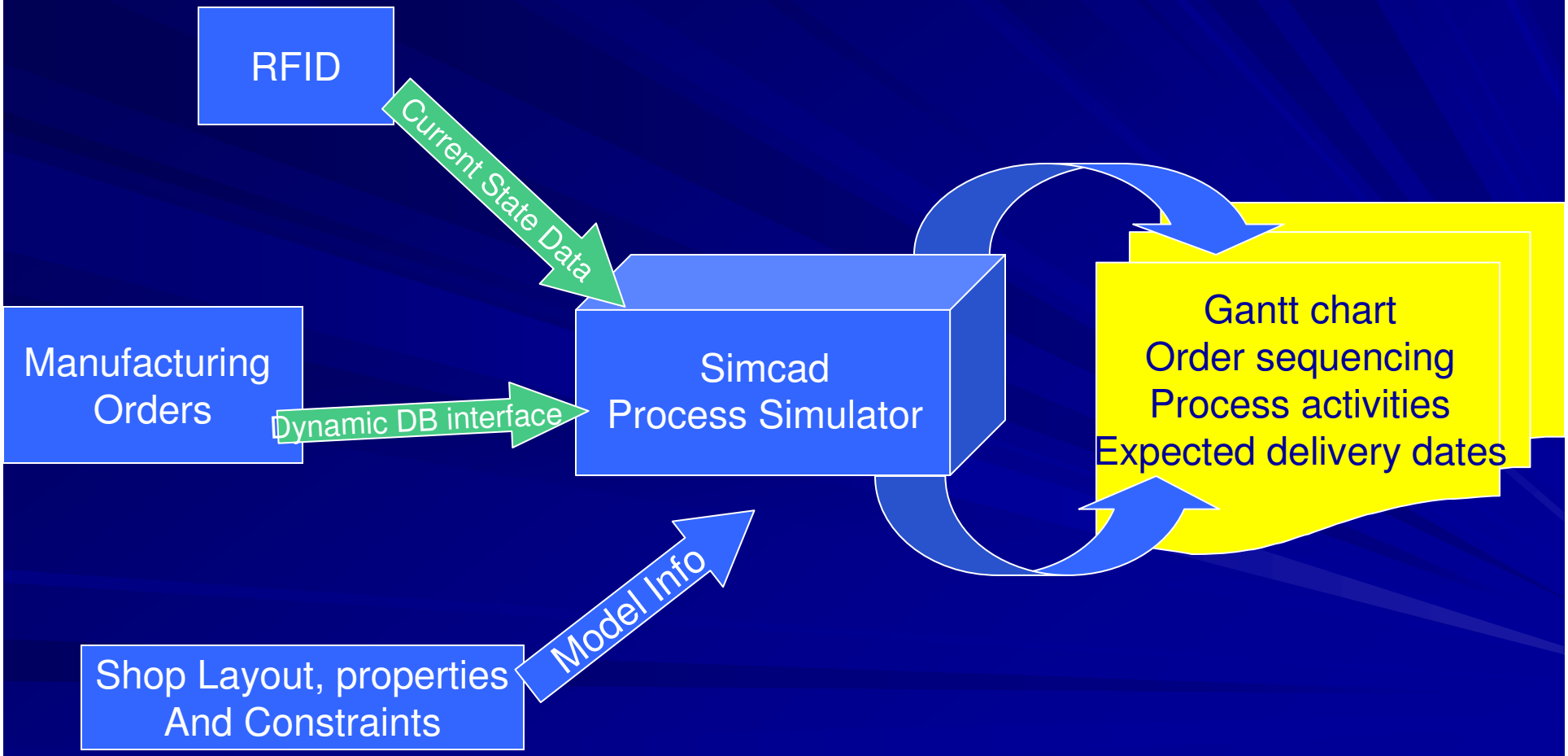
Dynamic Scheduling

- Constant view of the shop
  - Live monitoring of activities
  - Automatic pull of data
  - Automatic look ahead for potential problems and machine downtime
  - Dynamic reroute of parts if machine is down
  - Constant update of forecasted delivery date.
  - Most accurate, minimum user interaction

Achieving dynamic scheduling

- Requires an environment that can forecast the future based on current data
  - Simulation….
  - With dynamic connectivity to existing systems
    - For orders, current status, WIP levels, locations…
- Must get accurate representation of the shop data with minimum reliance on personnel
  - Active RFID / Wi-Fi based tags with minimum overhead.

Implementing Dynamic Scheduling



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Example/Implementation

Simulating and Scheduling the Job Shop

- Example
- Q&A

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