SCOR Model Planning and Scheduling

One analytical model not possible

- One analytical model will allow global optimization but …
- One model impractical because of granularity and technology:
  - Decisions are made at different time frames – strategic, tactical and operational
  - Decisions are made at different data granularities – aggregate and detailed
  - Impractical to use one modeling/solver technology for all problems
- Decomposition is thus necessary
- Introduces a problem of maintaining global optimization with multiple hybrid analytical models as well as aggregation/dis-aggregation rules

Outline

- SCOR model planning and scheduling
- One SCOR model ≠ One analytical model
- Decomposition dimensions
- The Microsoft Dynamics AX hierarchical planning and scheduling framework
- The Microsoft Dynamics AX planning and scheduling models/solvers
  - Today
  - Investing
    - Models and Solvers
    - Alternative scheduling strategies
Dynamics AX hierarchical framework

Function and throughput decomposition

Dynamics AX Models/Solvers - Today

- Demand planning
  - Sales History Model
  - Microsoft Time Series Algorithm Solver
  - Aggregate products

- Supply planning
  - Throughput Model
  - Internal LP Solver
  - Aggregate products and components and bottleneck resources

- Multi-Site and Single-Site Master Planning and Scheduling
  - BOM and Routing Model
  - BOM explosion and operations sequencing solver
  - Detailed products and components and all resources

Multi-dimensional decomposition
**Dynamics AX Models/Solvers - Investing**

- Supply planning
  - Flow prediction modeling
  - Queueing theory
  - Operational Analysis
  - Stochastic programming

- Multi-Site and Single-Site Master Planning and Scheduling
  - Process models
  - Queueing theory
  - Operational Analysis
  - Math/Constraint/Stochastic Programming
  - Alternative scheduling strategies
    - Lean
    - Theory of Constraints
    - CONWIP

**Theory of Constraints**

Characteristics:
- Less data
- High quality data
- Profit based
- Drum, buffer, rope
- Pull & push work
- Includes financials
- Quality at bottleneck

Mix optimized for maximum profit \( \text{profit} = T - OE \)

Inventory is an expense

Set price on market demand not cost + profit

Pace based on constraint throughput. CPI goal – move constraint to market

**MRP II Scheduling**

Characteristics:
- Lots of data
- High quality data
- Order based
- Batch & Queue
- Push work
- Quality not built-in

Mix based on order priority

Pace based on schedule & efficiency performance metric. Goal is to maximize efficiency.