Certified in Planning and Inventory Management

Push or Pull Replenishment

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Push or Pull Replenishment

1. Push vs. Pull Inventory Philosophies

Push systems rely on forecasts to push inventory into the supply chain, while pull systems use actual demand signals to trigger replenishment. CPIM candidates must understand how each approach impacts inventory levels, lead times, capacity utilization, and customer service. Push minimizes stockouts in stable environments but risks excess inventory. Pull minimizes waste and enhances responsiveness in volatile environments but requires reliable flow and short lead times. Choosing the right philosophy aligns operating strategy with demand patterns.

2. Forecast-Driven (Push) Replenishment

Push replenishment uses planning systems such as MRP to generate supply orders based on forecasted demand, lead times, and bill-of-materials structure. CPIM learners must understand how forecast accuracy, safety stock, and planning parameters affect performance. Push systems are effective when demand is stable, product variety is high, or long lead times make pull impractical. But forecast errors may create bullwhip effects, causing excess inventory or shortages. Push replenishment is widely used in capacity-constrained or engineer-to-order environments.

3. Demand-Driven (Pull) Replenishment

Pull replenishment relies on consumption signals from customers or downstream operations. Examples include Kanban, two-bin systems, and rate-based replenishment. CPIM candidates must understand how pull enables lean operations, reduces inventory, and increases flexibility. Pull

systems require stable processes, short lead times, and reliable suppliers. Pull reduces waste by producing only what is needed, when it is needed. It is best suited for repetitive, high-volume manufacturing and fast-moving inventory items.

4. Hybrid Push-Pull Systems

Many supply chains integrate both push and pull elements. For example, upstream factories may use push planning, while downstream distribution centers use pull replenishment. CPIM candidates must understand decoupling points, where the strategy switches from forecast-driven to demand-driven. Hybrid systems optimize efficiency and responsiveness, reduce variability, and support mass customization. Understanding where to place push-pull boundaries is essential for balancing cost and service.

5. Customer Order Decoupling Point (CODP)

CODP designates the point in the supply chain where customer orders trigger production or fulfillment. Upstream processes operate under push principles, while downstream processes operate under pull. CPIM learners must understand how CODP affects lead times, inventory levels, customization, and cost structure. Strategic positioning of the decoupling point is crucial for achieving desired service levels while managing product variety and supply uncertainty.

6. Material Requirements Planning (MRP)

MRP is a classic push system that uses forecasts, BOM structure, and lead times to determine planned orders.

CPIM candidates must understand dependent and independent demand, time-phasing, and lot-sizing. MRP ensures material availability but can lead to nervousness, inventory swings, and long queues if parameters are inaccurate. MRP is best suited for complex assemblies with long lead times and stable demand.

7. Reorder Point (ROP) Systems

ROP triggers replenishment based on actual stock consumption, making it a pull mechanism. When inventory drops to a calculated threshold, replenishment orders are released. CPIM learners must understand how demand variability, lead times, and safety stock influence ROP settings. ROP is simple and effective for independent demand items with medium to high consumption rates. It reduces stockouts while keeping inventory lean.

8. Kanban and Visual Pull Systems

Kanban is a core pull tool in lean manufacturing. It uses cards, bins, or electronic signals to authorize replenishment based on actual consumption. CPIM candidates must understand Kanban sizing, flow control, and how WIP limits improve throughput. Kanban enhances visibility, reduces overproduction, and supports continuous improvement. It is best suited for repetitive production with stable cycle times.

9. Two-Bin and Min-Max Systems

Two-bin systems use one bin for consumption and another for reserve stock. When the first bin empties, replenishment is triggered. CPIM candidates must understand how two-bin and min-max systems simplify pull control in environments where demand is steady and

replenishment is frequent. These methods are easy to implement, low-cost, and commonly used for maintenance, repair, and operating (MRO) items.

10. Demand-Driven Material Requirements Planning (DDMRP)

DDMRP integrates both push and pull concepts, using buffers strategically positioned to absorb variability. CPIM candidates must understand how decoupling buffers stabilize flow, reduce lead-time variability, and improve demand responsiveness. DDMRP replaces forecast-driven execution with demand-driven replenishment while using planning tools to position inventory strategically. It is ideal for volatile markets or long lead-time supply chains.

11. Buffering and Decoupling Inventory

Buffers protect operations from supply and demand variability. CPIM candidates must understand buffer types—safety stock, cycle stock, decoupling stock—and how they support push or pull systems. In pull systems, buffers ensure smooth flow without overproduction. In push systems, buffers protect against forecast error. Proper buffer positioning improves stability and flow.

12. Takt Time and Flow-Based Replenishment

Takt time defines the rate at which products must be produced to meet customer demand. Pull systems rely on takt-based synchronization to maintain steady flow and avoid overproduction. CPIM candidates should understand how takt time influences line design, staffing, WIP, and replenishment frequency. Flow-based replenishment works best when cycle times and demand rates are stable.

13. Lead-Time Reduction

Long lead times force organizations to rely on push replenishment. Short lead times enable pull systems, reduce inventory, improve responsiveness, and lower total cost. CPIM candidates must understand the relationship between lead time, variability, and replenishment strategy. Techniques such as SMED, supplier integration, and process automation support lead-time reduction and enhance pull feasibility.

14. Variability and Its Impact on Replenishment

Demand and supply variability directly influence whether push, pull, or hybrid strategies are optimal. CPIM learners must understand how forecasting errors, supplier inconsistency, transportation delays, and process instability affect replenishment decisions. Reducing variability increases predictability and improves pull system performance. Managing variability through standardization and continuous improvement supports reliable flow.

15. Bullwhip Effect

Push systems often amplify demand variability, causing large swings in production and inventory. CPIM candidates must understand how forecasting errors, long lead times, batch ordering, and poor communication contribute to bullwhip effects. Pull systems reduce bullwhip by using real demand signals and frequent replenishment. Understanding bullwhip helps organizations design stable supply chains.

16. Lot Sizing and Order Quantities

Lot-sizing methods (EOQ, lot-for-lot, fixed order quantity) determine how much inventory to replenish. CPIM learners

must understand how lot sizing influences replenishment frequency, inventory carrying cost, and flow stability. Smaller lot sizes favor pull systems, while larger lot sizes are often associated with push. Choosing the right lot-sizing approach balances cost and responsiveness.

17. Capacity Constraints in Replenishment

Capacity availability influences whether push or pull is more effective. Push systems can overload capacity if planned orders exceed practical limits. Pull systems help stabilize capacity by aligning production with actual demand. CPIM candidates should understand how finite capacity scheduling, bottleneck management, and workload leveling support replenishment decisions. Proper capacity planning reduces waste and improves flow.

18. Supplier Integration in Replenishment

Pull replenishment requires suppliers capable of frequent, flexible, and reliable deliveries. CPIM learners must understand how supplier lead time, batch size, quality, and transport reliability affect replenishment strategy. Supplier-managed inventory (VMI) and collaborative planning (CPFR) support pull by reducing variability and improving visibility. Strong supplier integration enhances supply chain responsiveness.

19. Performance Metrics for Push and Pull

Different replenishment strategies require distinct performance metrics. Push systems emphasize forecast accuracy, schedule adherence, and planned utilization. Pull systems focus on flow rate, cycle time, replenishment lead

time, and WIP. CPIM candidates must understand how KPIs align with replenishment strategy to support continuous improvement and operational excellence.

20. Choosing the Right Replenishment Strategy
Selecting push, pull, or hybrid replenishment requires analyzing demand pattern, lead time, product type, cost structure, and supply chain capability. CPIM candidates must understand the trade-offs among cost efficiency, service levels, responsiveness, and inventory investment. A well-designed replenishment strategy aligns with organizational goals and ensures optimal flow, stability, and customer satisfaction.

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