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DRP Process, Logic, and Ordering Policies

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DRP Process, Logic, and Ordering Policies

1. Foundations of Distribution Requirements Planning (DRP)

DRP is a time-phased planning methodology used to determine inventory replenishment needs across distribution networks. It translates demand forecasts, customer orders, and replenishment logic into planned orders at each stocking location. Understanding DRP's core structure is essential: it operates like MRP but in a finished-goods distribution environment. DRP connects downstream demand with upstream supply, ensuring the right products are available at the right locations. Key components include projected on-hand inventory, gross requirements, scheduled receipts, planned order releases, and lead times. Mastery of DRP fundamentals enables accurate replenishment planning, network coordination, and improved service levels.

2. Time-Phased Planning Logic

DRP uses a time-phased planning grid where demand and supply elements are placed into discrete time buckets (days, weeks). Understanding how requirements propagate through these buckets is essential for interpreting DRP outputs. Time phasing manages seasonality, variability, and lead-time offsets. It ensures that planned order releases align with lead times so replenishment arrives exactly when needed. Mastery includes reading DRP tables, understanding the timing of gross requirements, and interpreting how inventory balances evolve across periods. Time-phased logic allows planners to see future imbalances before they occur and take proactive measures.

3. Gross Requirements and Demand Sources

Gross requirements represent the total demand for a product at a distribution center. They come from forecasted demand, customer orders, safety stock replenishment, promotional demand, and interfacility transfers. Understanding how each demand source contributes to gross requirements ensures accurate planning. A planner must evaluate forecast accuracy, customer order behavior, and seasonality to avoid under- or over-estimating needs. Knowing how DRP aggregates these elements helps interpret why certain replenishment decisions were generated. This concept is critical because errors in gross requirements directly lead to stockouts, excess inventory, or ordering instability.

4. Projected On-Hand Inventory (POH)

Projected on-hand inventory is a forward-looking calculation that shows expected inventory at the end of each time bucket after accounting for demand and supply. It is the backbone of DRP and drives replenishment decisions. Understanding how POH is calculated—beginning inventory plus scheduled receipts minus gross requirements—is key to interpreting future stock positions. Planners must know how safety stock levels influence projected on-hand balances and trigger replenishment signals. Mastery of POH logic enables early detection of shortages and ensures calculated replenishment reflects realistic inventory expectations.

5. Scheduled Receipts and Open Orders

Scheduled receipts are firm supply orders already placed but not yet received. They play a critical role in DRP because

they offset future demand. Understanding how scheduled receipts flow through the DRP grid allows planners to avoid double-ordering or overlooking incoming supply. Open orders must be monitored for cancellations, delays, or quantity changes. DRP assumes scheduled receipts will arrive on time, so planners must integrate real-world updates such as supplier delays or transportation disruptions. Strong grasp of this concept ensures supply accuracy and prevents both overstock and stock depletion.

6. Planned Order Receipts

Planned order receipts represent the recommended replenishment quantities calculated by the DRP system. They are scheduled to arrive at the right time to cover demand and maintain safety stock levels. Understanding when and why DRP generates these planned receipts is essential for reviewing system outputs. Planned order receipts depend on lead times, lot-size rules, and projected inventory shortfalls. They are not firm orders but suggestions that become actual orders after review and approval. Mastery of this concept helps planners validate DRP recommendations and maintain alignment with operational constraints and policies.

7. Planned Order Releases

Planned order releases are the time-phased instructions indicating when a replenishment order must be issued to meet future requirements. They offset lead time so materials arrive precisely when needed. Understanding the distinction between planned receipts and releases is essential because releases drive operational execution. DRP systems generate these releases based on lead time,

lot-sizing, and inventory balance. Planners must know how to interpret release timing, validate its feasibility, and adjust based on real-world constraints. Correct handling of planned order releases ensures timely replenishment and network stability.

8. Lead-Time Management in DRP

Lead time includes order processing time, transportation time, receiving time, and internal handling time. Because DRP is time-phased, accurate lead times are essential for correct replenishment timing. Misstated lead times can cause stockouts or overstock conditions. Planners must understand cumulative lead time across multi-echelon networks and how lead-time variability influences safety stock requirements. DRP assumes fixed lead times, so planners must adjust manually when disruptions occur. A strong understanding of lead-time logic ensures planned orders are released at the correct time for uninterrupted supply.

9. Safety Stock Policies in DRP

Safety stock protects against uncertainty in demand and lead time. In DRP, safety stock levels directly affect projected on-hand inventory and trigger replenishment orders. Planners must understand multiple safety stock methods—statistical, service-level-based, time-based, or fixed-quantity. Safety stock must be consistently reviewed based on demand variability, forecast accuracy, and service-level targets. Excessive safety stock increases carrying costs, while inadequate levels risk stockouts. A strong grasp of safety stock logic ensures optimized inventory levels, steady customer service performance, and stable DRP outputs.

10. Lot-Sizing Rules for DRP

Lot-sizing translates requirements into economically and operationally feasible order quantities. Common policies include lot-for-lot (L4L), minimum order quantity, EOQ, periodic order quantity (POQ), and fixed-order quantity. Understanding how each method affects DRP outputs is essential for balancing cost, responsiveness, and inventory levels. Lot-sizing choices influence order frequency, transportation efficiency, and warehouse workload. Incorrect lot-sizing can lead to volatile or excessive ordering. Mastery ensures replenishment aligns with cost structures, operational capacities, and service goals.

11. DRP Explosion Through Multi-Echelon Networks

DRP explosion refers to cascading replenishment requirements upstream through a distribution network, similar to MRP explosion logic. As planned order releases occur at regional distribution centers, they become gross requirements at central warehouses or manufacturing plants. Understanding this hierarchical dependency allows planners to coordinate planning across all levels. Misalignment in one node affects upstream and downstream performance. Mastery helps ensure coordinated supply chain planning, reduced bullwhip effects, and improved visibility across the network.

12. Managing Replenishment Frequency

Replenishment frequency affects transportation costs, order variability, safety stock requirements, and overall responsiveness. High-frequency replenishments reduce inventory but increase transport costs, while low-frequency replenishments increase inventory and reduce

responsiveness. DRP helps determine the ideal frequency by analyzing inventory projections, demand patterns, and lot-size rules. Planners must understand the trade-offs between cost and service. Mastering replenishment frequency management ensures consistent product availability while controlling logistics expenditure.

13. Distribution Network Structure and DRP

Understanding network design—nodes, linkages, lead-time paths, and stocking policies—is crucial for effective DRP. Every node behaves as both a demand point and a supply point within the larger network. Planners must understand the flow of demand signals, replenishment logic, and capacity constraints between nodes. Network structure affects lead times, replenishment timing, safety stock levels, and demand propagation. Mastery ensures optimal planning across multi-echelon distribution systems.

14. DRP Data Accuracy Requirements

DRP relies heavily on accurate data—inventory balances, open orders, demand forecasts, lead times, and lot sizes. Even small errors can compound across time buckets, causing significant over/under-supply. Planners must understand the importance of maintaining data integrity and performing regular audits. This includes cycle counting, system updates, and cross-checking operational data. Mastery of data accuracy ensures DRP outputs are reliable and reduces firefighting caused by incorrect planning signals.

15. Exception Management and Planning Alerts

DRP systems generate alerts for issues such as negative

projected inventory, late orders, capacity constraints, and abnormal demand spikes. Planners must understand how to interpret and prioritize these exceptions. Effective exception management focuses attention on high-impact issues so planners can intervene before operational disruptions occur. Mastery of this concept enables proactive decision-making, enhances service reliability, and ensures stable supply planning.

16. Order Policy Trade-Offs

Order policies determine how replenishment decisions are executed, including lot-sizing, minimum order quantities, frequency rules, and transport optimization constraints. Each policy impacts cost, responsiveness, inventory levels, and service performance. Planners must understand the economic and operational trade-offs of different order policies. Mastery enables them to select the best policy for each product or location and adjust dynamically based on network conditions or strategic priorities.

17. DRP vs. MRP: Key Differences and Integration

While both DRP and MRP use time-phased logic, DRP is focused on finished-goods distribution, while MRP focuses on component-level production. Understanding their differences—and how they integrate—is crucial for end-to-end planning. DRP outputs drive MRP inputs in many supply chains. A strong grasp of these interactions enables better coordination between distribution and production planning, improving service levels and reducing bullwhip effects.

18. Handling Variability in DRP

Demand variability, lead-time fluctuations, supplier delays,

and transportation disruptions all influence DRP outputs. Planners must learn how DRP responds to variability and how safety stock, forecast updates, and inventory buffers mitigate risk. Understanding variability is critical for building robust DRP systems that avoid frequent plan changes. Mastery helps create stable replenishment plans, minimize disruptions, and maintain service levels under uncertainty.

19. Using DRP Outputs for Tactical and Strategic Decisions

DRP is not only a replenishment tool but also a strategic planning asset. DRP outputs help identify capacity constraints, transportation bottlenecks, long-term inventory needs, and investment requirements. Planners must understand how to interpret DRP results for decision-making beyond day-to-day replenishment. Mastery enables alignment between operational execution and long-term network strategy.

20. Performance Measurement and Continuous Improvement

KPIs such as forecast accuracy, fill rate, inventory turnover, order frequency stability, and service-level performance are critical for evaluating DRP effectiveness. Planners must understand how to measure DRP performance and identify opportunities for improvement. Continuous improvement ensures DRP models remain accurate, responsive, and aligned with business objectives. Mastery of performance measurement provides long-term planning excellence and sustainable supply chain performance.

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