High Velocity, Low Variability Supply Networks

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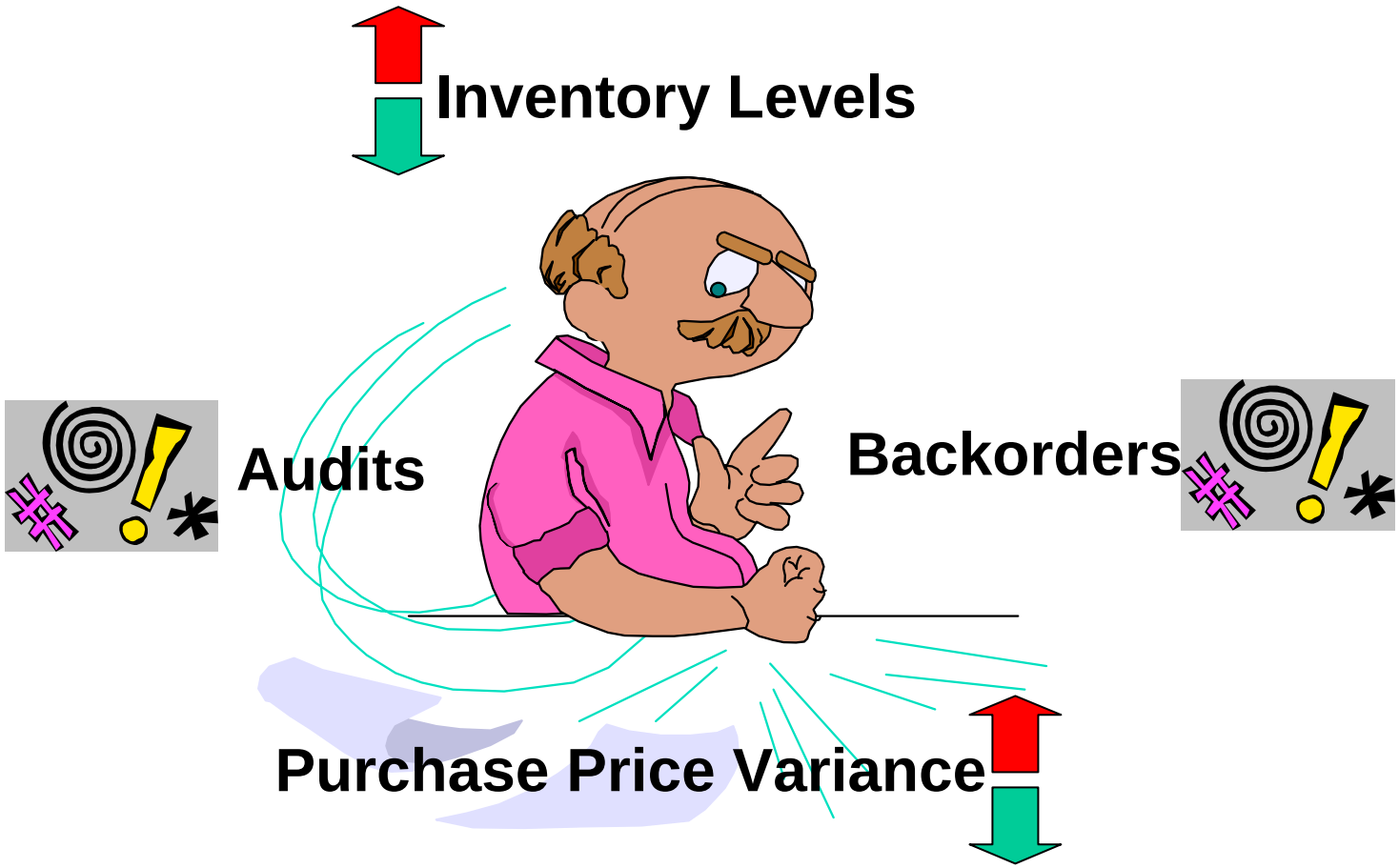
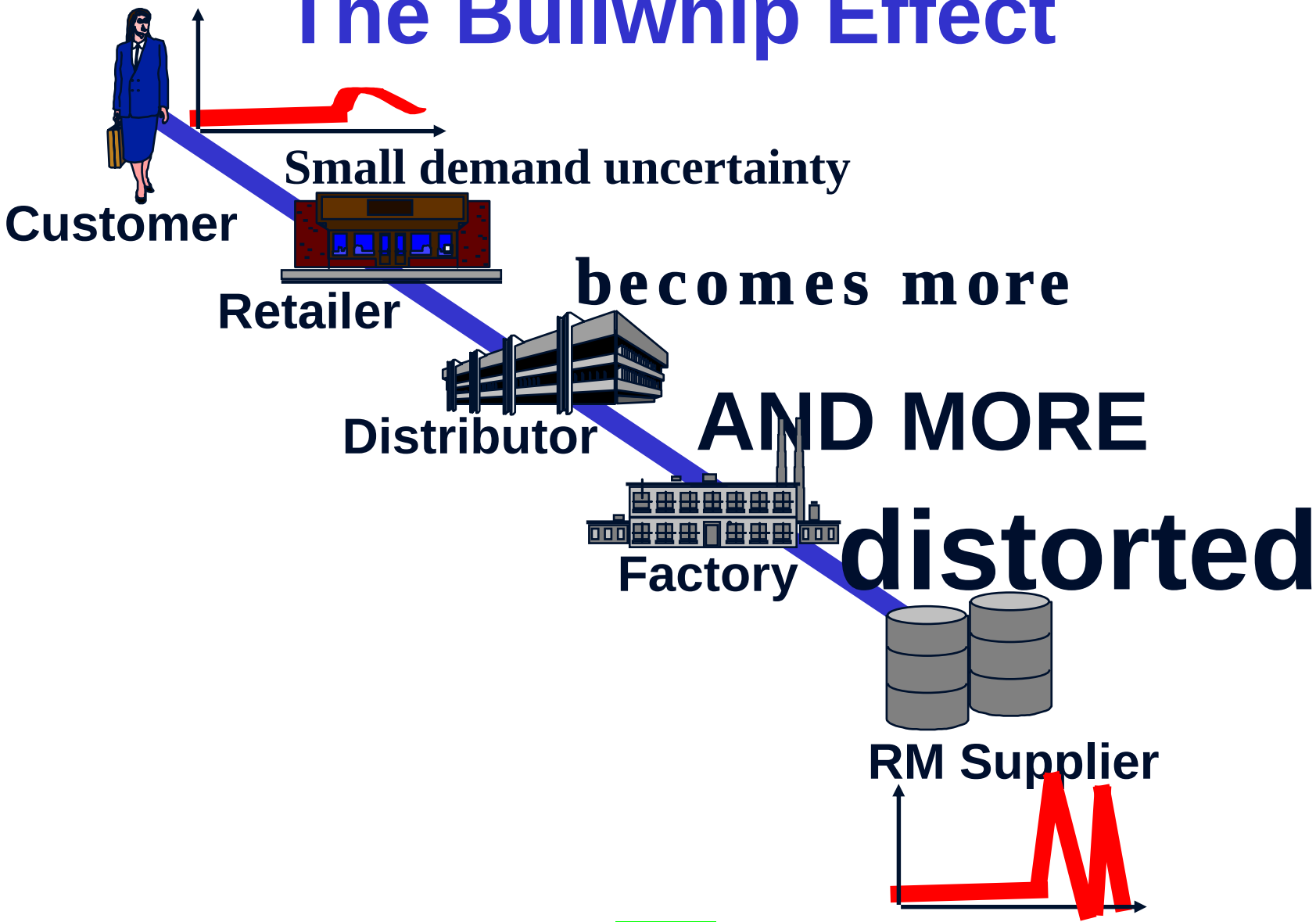
Symptom:
The Supply Manager Can Never Win



Intro

Symptom:
The Bullwhip Effect



Intro

Symptom:
The Supply Chain Squeeze

	Growing Throughput	Declining Throughput
Cash Flow	Customer-makes increasingly larger payments --SQUEEZE— Middle Node-needs to borrow for incremental investment in inventory and capacity Supplier-okay	Customer-holding back payment to conserve cash Middle Node-short of cash with cash tied up in inventory and excess capacity --SQUEEZE-- Supplier-very short on cash
Physical Flow	Customer-wants immediate delivery Middle Node-can't get lower level materials fast enough, may be capacity constrained --SQUEEZE— Supplier-out of stock	Customer-falling demand for product or delivery pushed out --SQUEEZE-- Middle Node-excess inventory and capacity at all levels Supplier-excess stock

Intro

Session Outline

- Silo View: The Supply Manager's Old Job
- What Is A Supply Network?
- Trading Partners vs Nominal Trading Partners
- The Velocity and Variability Principles
- Network View: The Supply Manager's New Job

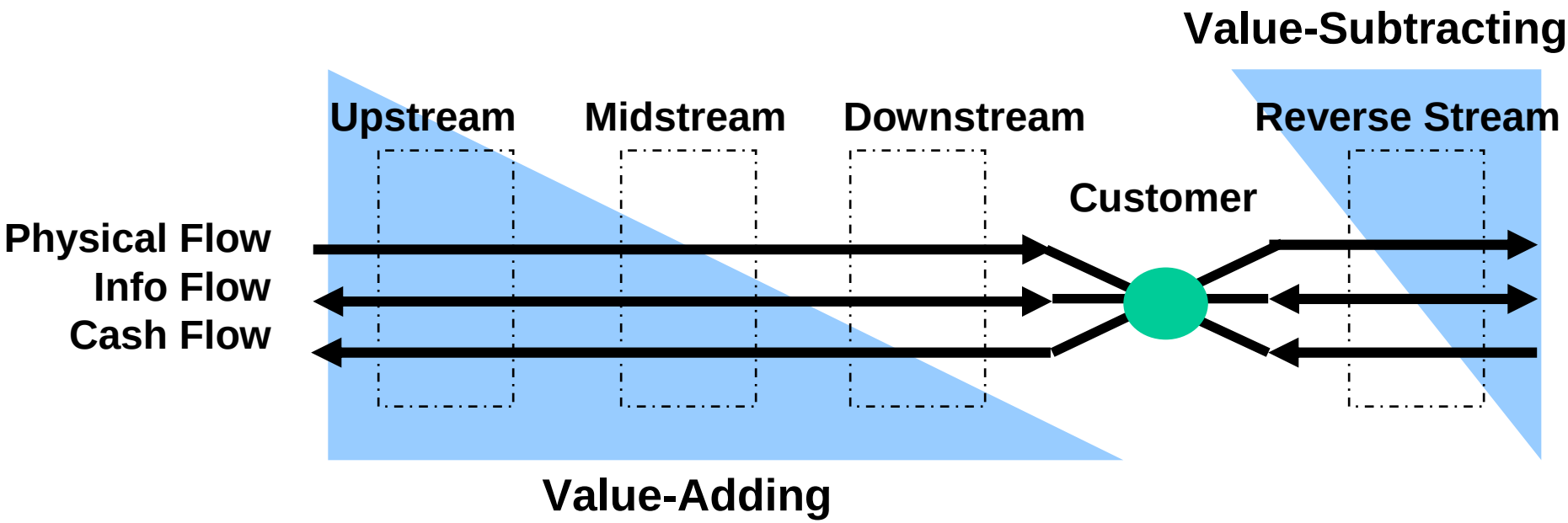
Intro

A SUPPLY CHAIN is
the global network
used to deliver products and services
from raw materials to end customers
through engineered flows of
information, physical distribution, and cash.

APICS Dictionary, 10th Edition,

State **Explain** **Apply**

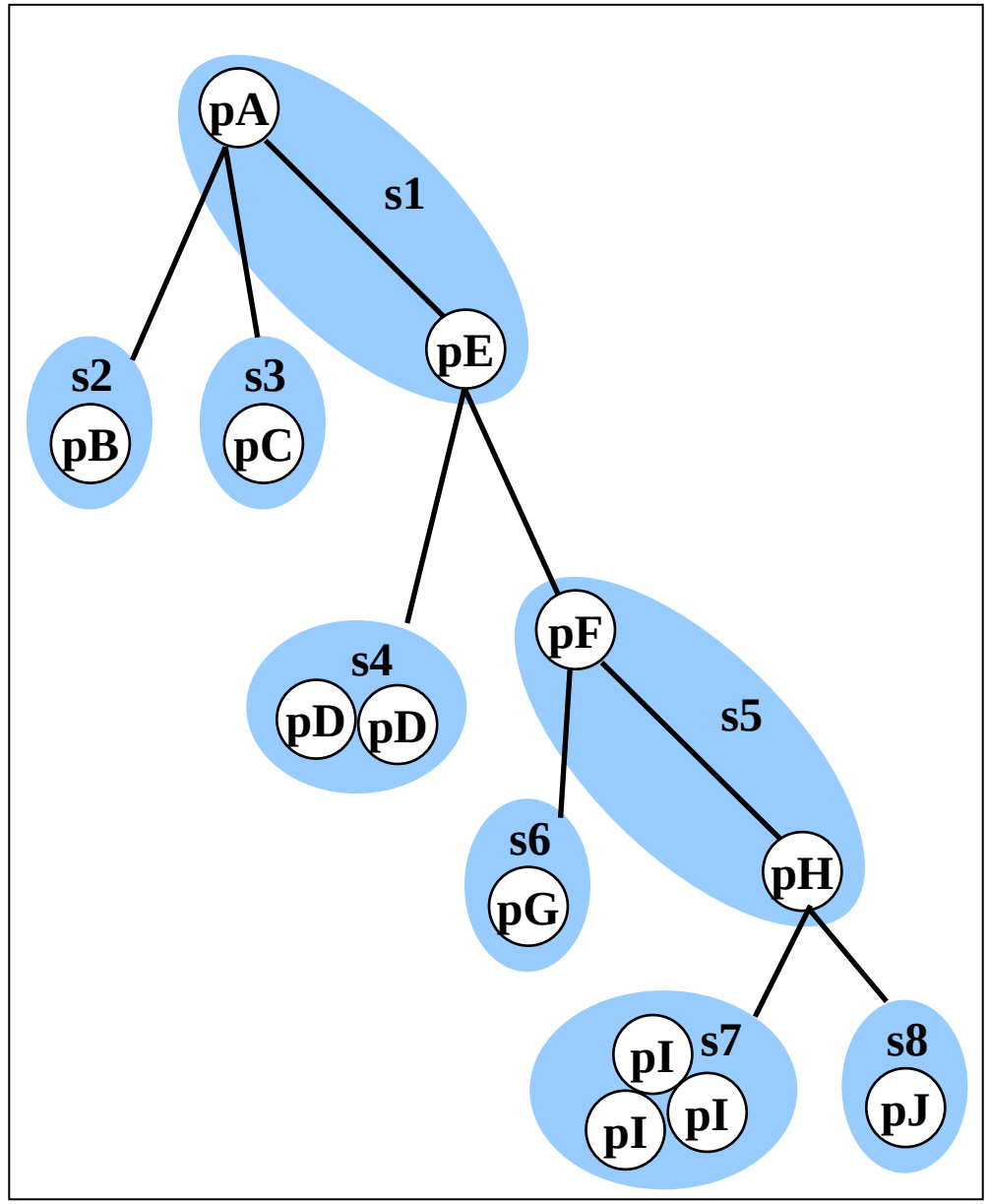
Focus On Supply Networks



Bill Of Materials

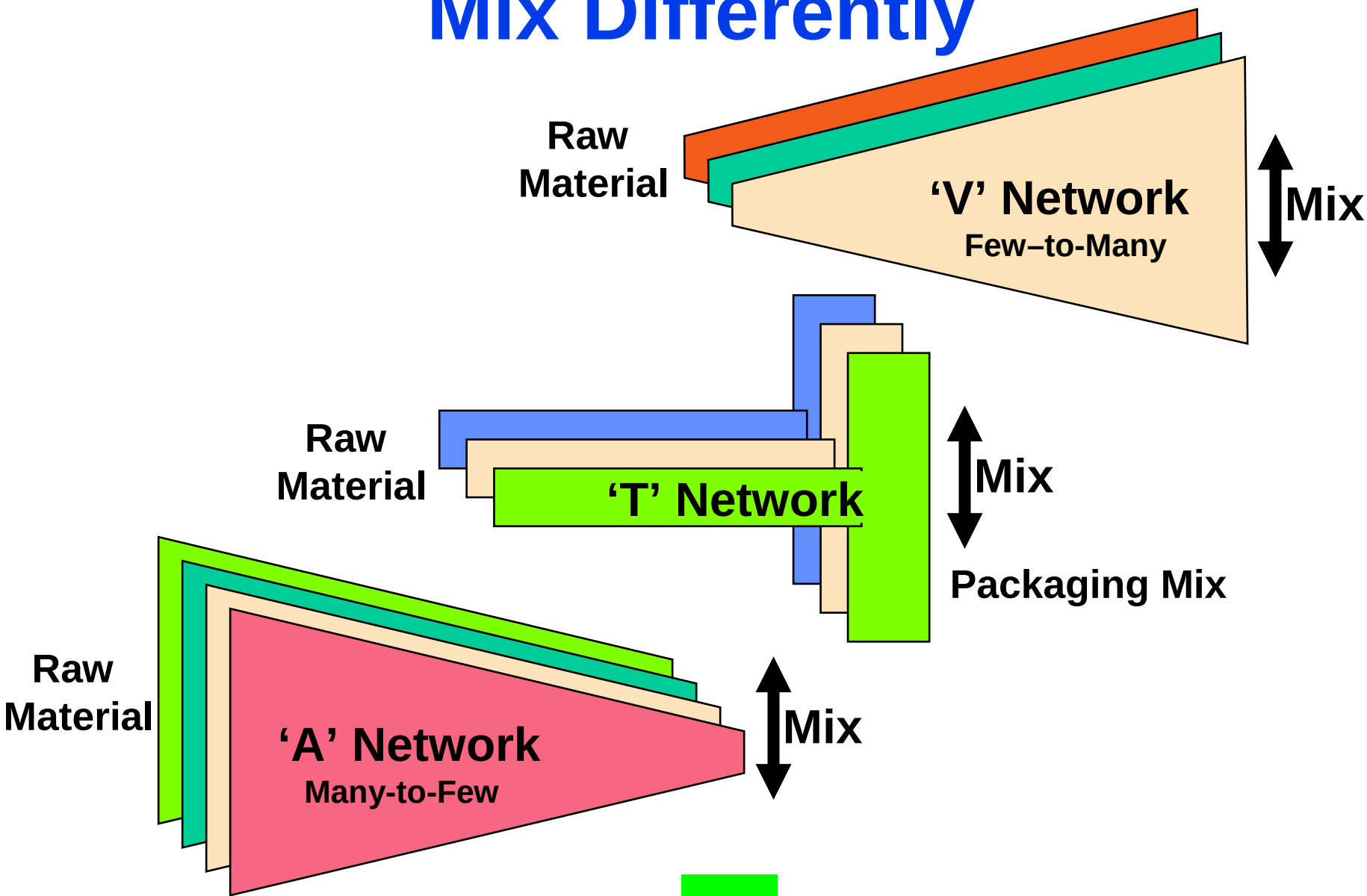
The Item Master
- Part Number
- Description
- Approved Supplier(s)
- Manufacturer's Part Number
- Cost
- Unit of Measure

The Product Structure
- Levels
- Parent-Child Relation
- Quantity Per
- Options/ Substitutes
- Effectivity



State **Explain** Apply

A, T, V Networks Produce Mix Differently



State **Explain** Apply

BOM vs Network Relationships

Network Length

- Network length is determined by the number of echelons.
- Echelon(s) are added down stream for distribution.
- #BOM Levels >= value-adding midstream echelons.
- Echelon(s) are added upstream for raw materials.

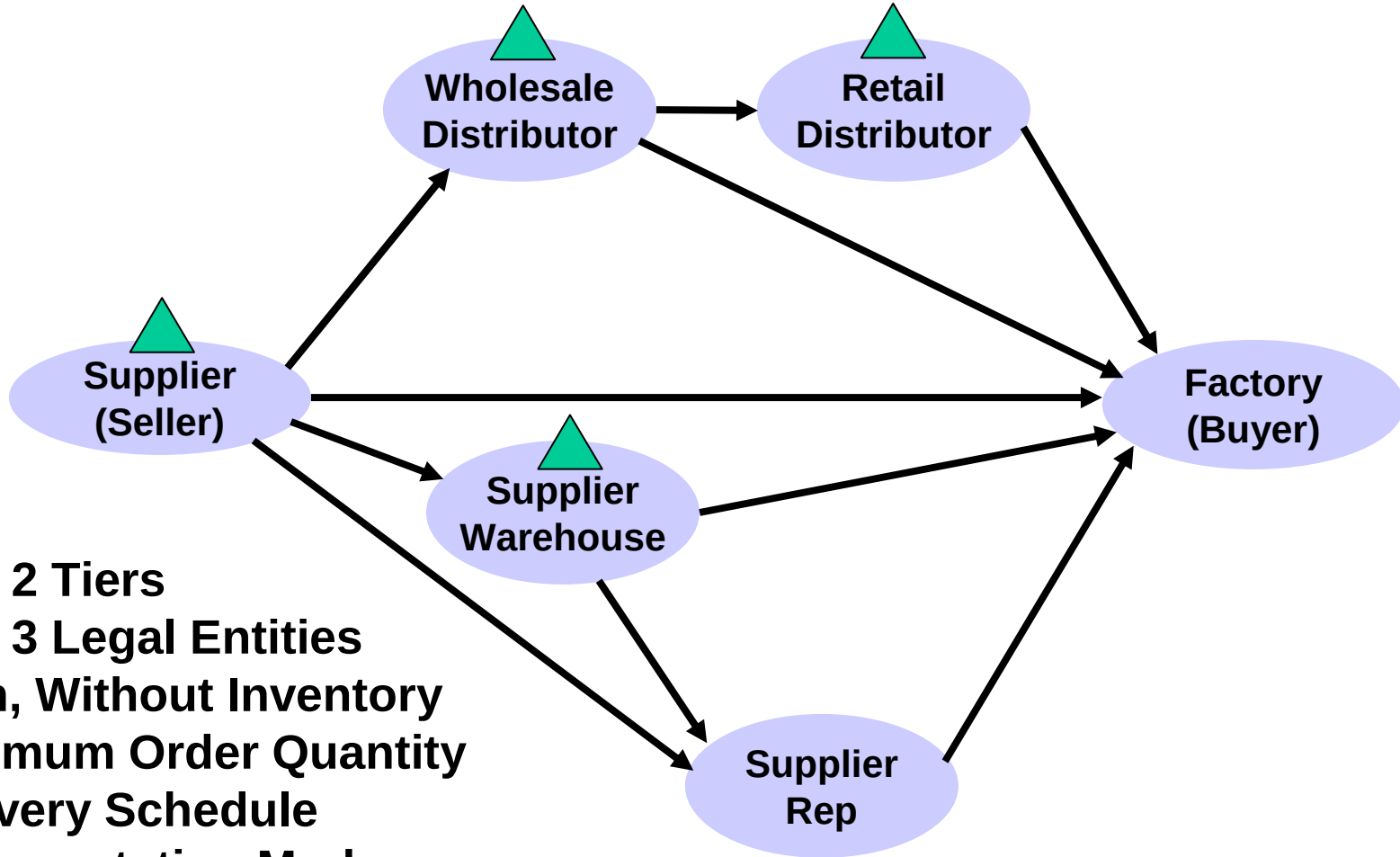
Network Width

- Network width is driven by the number of BOM suppliers.
- Network width is driven by the number of customers.

Selling & Buying In Supply Networks

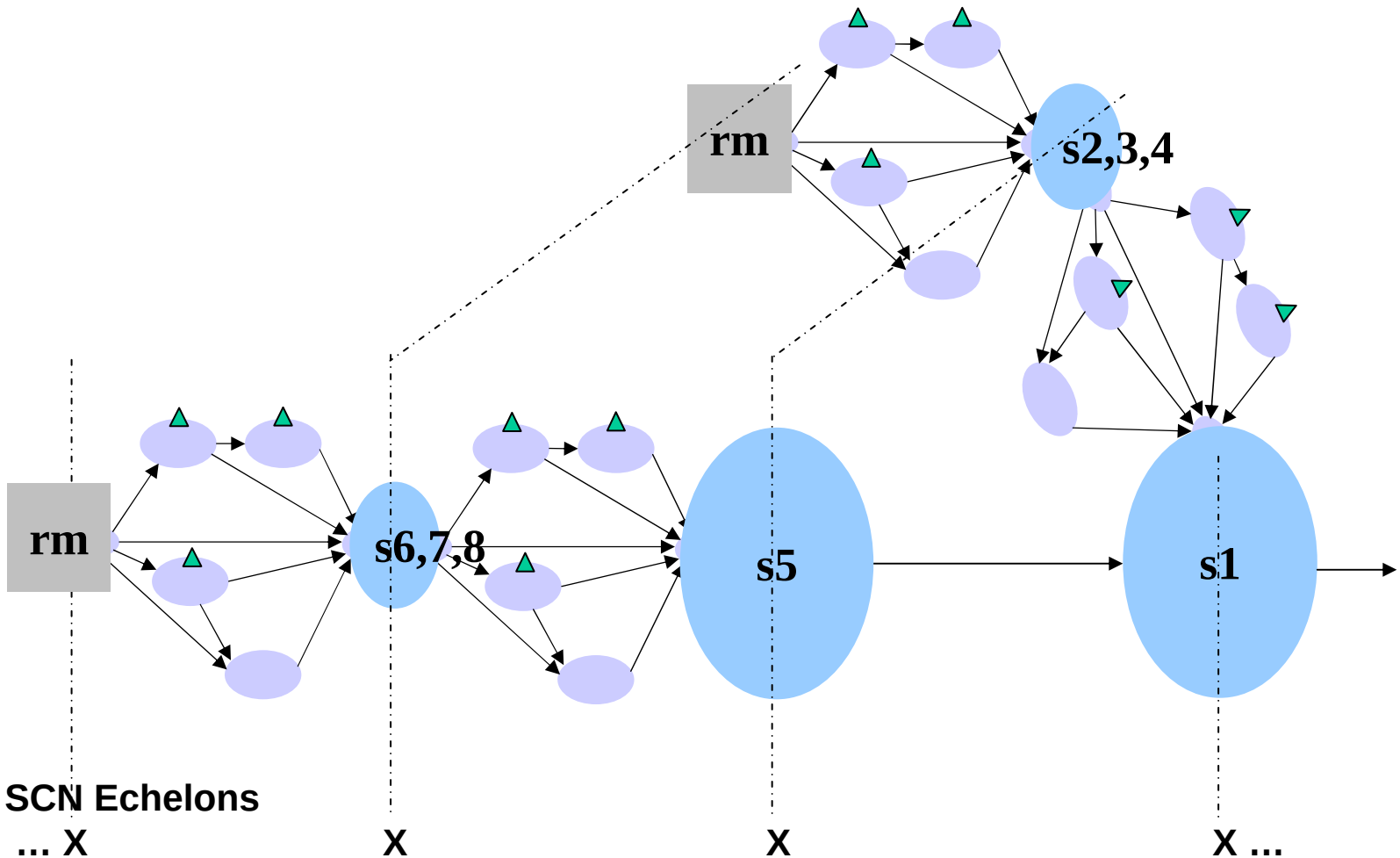
- Making potential buyers AWARE of the supply offering
- DIFFERENTIATE the supply with the promise of services
- Helping the buyer make a favorable presale COMPARISON
- Getting the buyer's decision maker to DECIDE to buy
- Capturing the ORDER before s/he changes their mind
- DELIVERING the supply to the buyer
- Collecting on the CASH PAYMENT
- Providing post sale REASSURANCE to the buyer
- Delivering SERVICES to the buyer

Many Supply Distribution Channels



0, 1, 2 Tiers
1, 2, 3 Legal Entities
With, Without Inventory
Minimum Order Quantity
Delivery Schedule
Transportation Mode
Price & Discount

Putting BOM's + Channels Together



State Explain Apply

New Product Introduction Touch Points

- The Bill Of Materials is volatile during development
- The value-adding portion of the supply chain network may be fundamentally different, i.e. V vs A vs T
- The supply chain network must connect with the supply from incremental suppliers
- The supply chain network must connect with the demand from incremental customers
- The new business may be fundamentally different, i.e. Build-To-Order vs Build-To-Stock

A TRADING PARTNER is
an organization outside the firm that plays an integral role within the supply chain community and whose business fortune depends on the end-to-end success of the supply chain community.

There will be NOMINAL TRADING PARTNERS that are of critical importance to the supply chain community, but whose business fortunes are independent of the end-to-end success of the supply chain community.

APICS Dictionary, 10th Edition,

State Explain Apply

Who Are the Trading Partners?

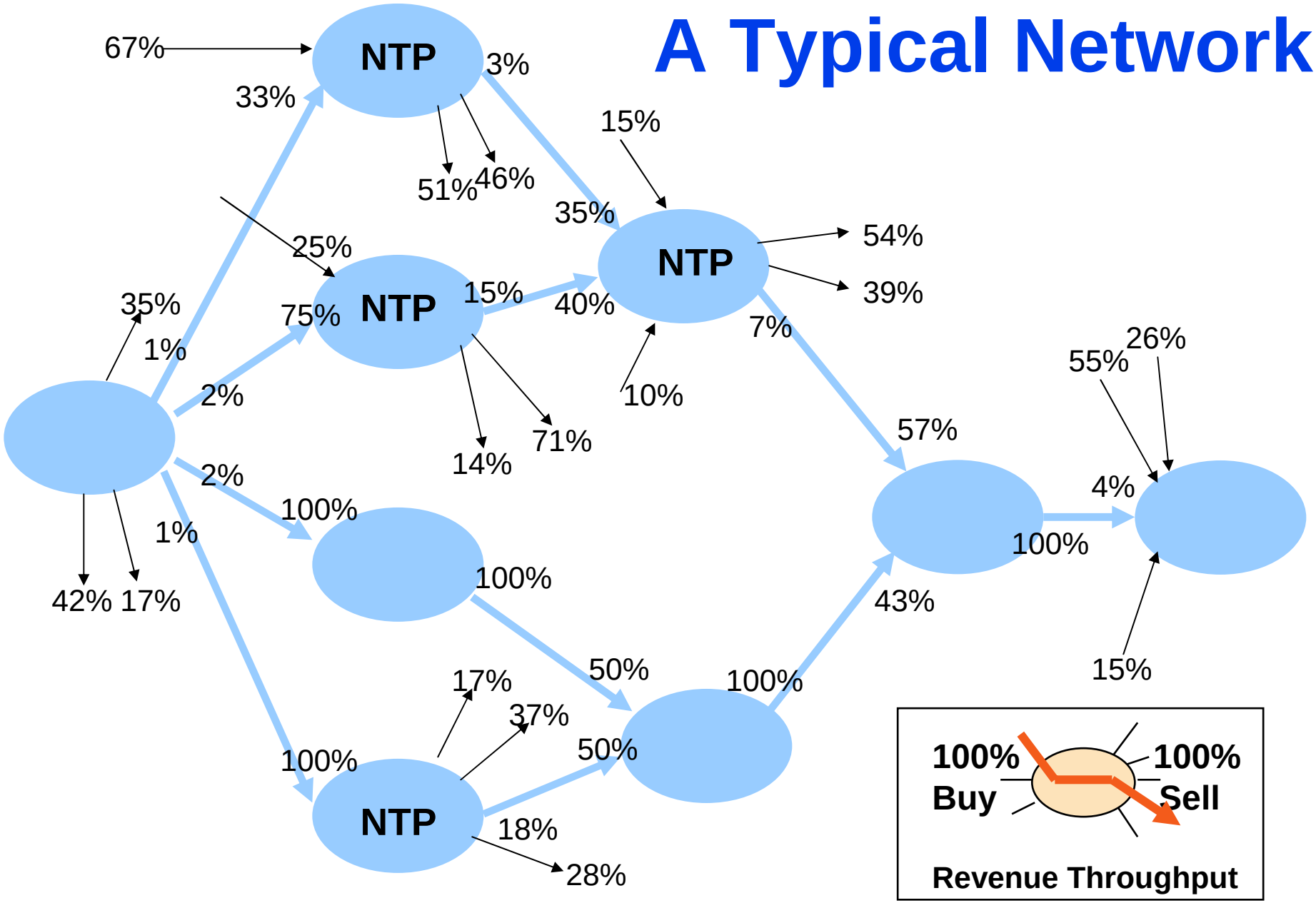
- **Upstream – Connects with a strategic raw material or technology**

- **Midstream – Transforms materials and delivers value-added products in the most customized, highest performance, or lowest cost way. A, V, or T configurations.**
  A – many raw materials to a few end products (BTS)
  V – few raw materials to many end products (BTO)
  T – few subassemblies to many end products (ATO)

- **Downstream – Connects with a strategic market segment**

- **Reverse Stream – Repairs, remanufactures, or recycles in the most customized, highest performance, or lowest cost way**

A Typical Network



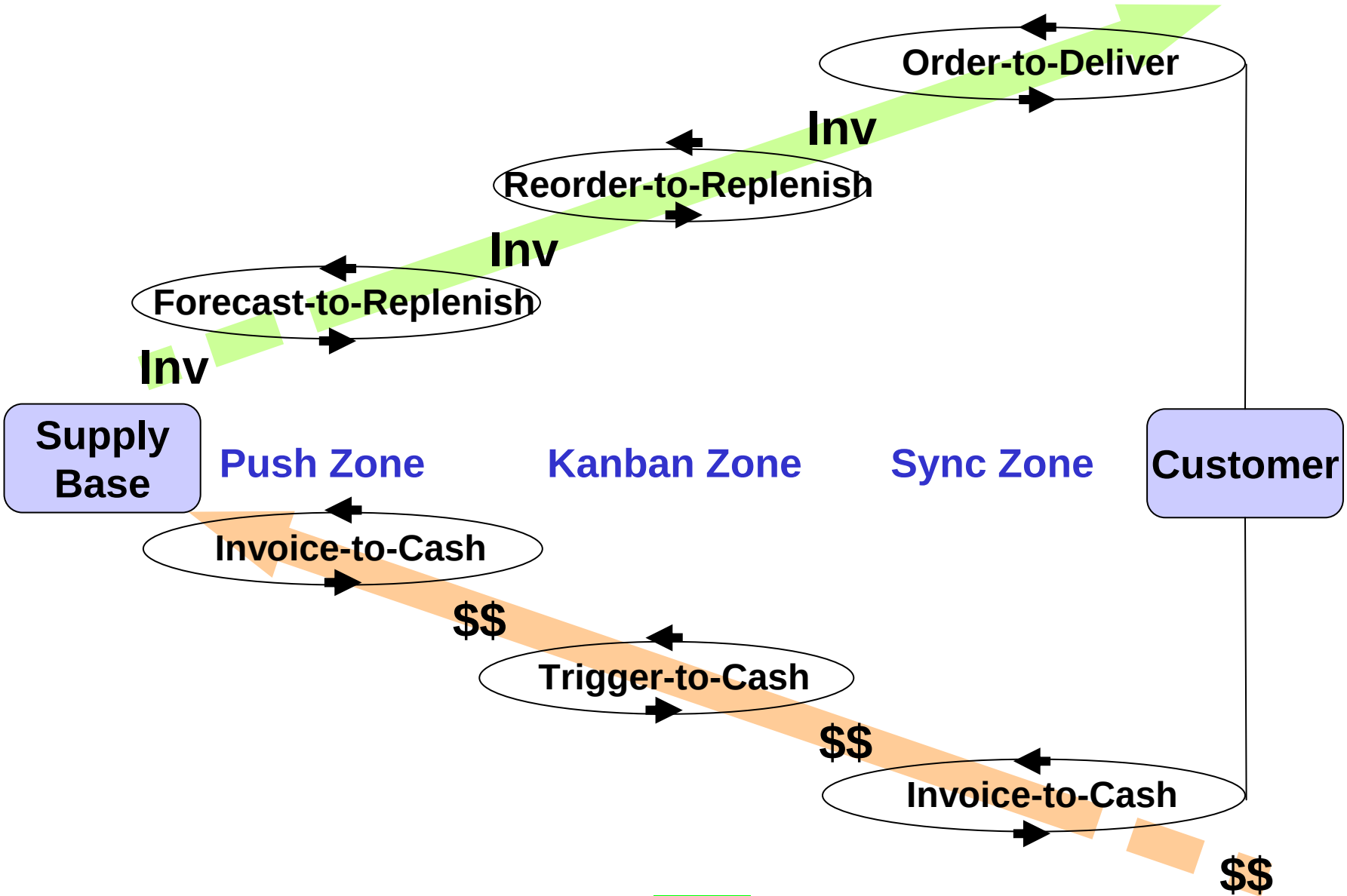
State **Explain** Apply

Who Are Nominal Trading Partners?

- Suppliers who source lower cost, lower volume, lower level materials
- Fabricators, assemblers, and integrators working for many customers
- Logistics service providers including carriers, freight forwarders, customs brokers, customs bonded warehouses, 3PL's, etc.
- Information service providers including Internet Service Providers, software application vendors, wireless services, etc.
- Financial service providers including credit card services, letter of credit services, clearing houses, etc
- Distributors who carry products from many different manufacturers

NTP's Are Easy To Substitute

Info<->Physical & Info<->Cash Loops



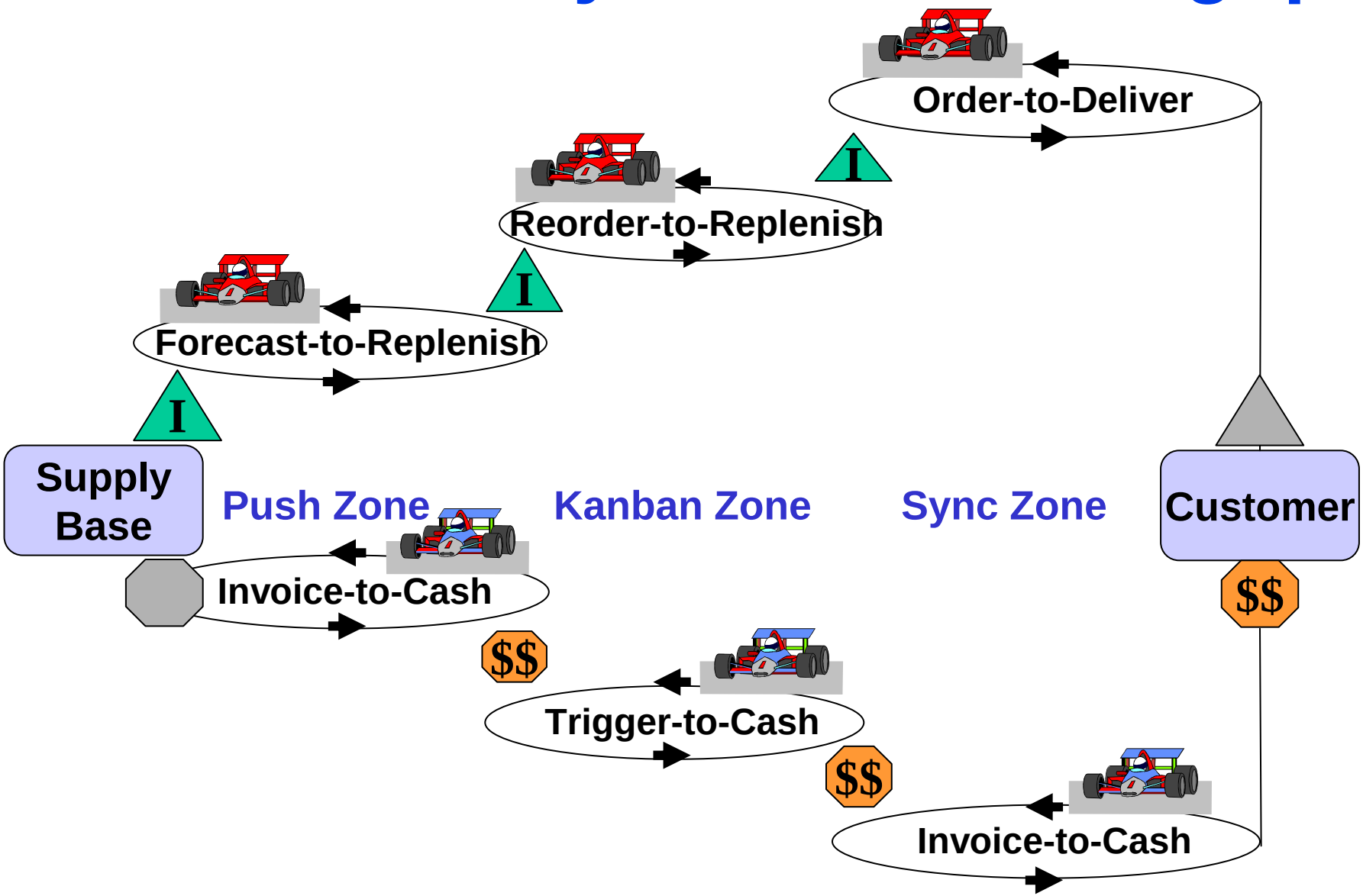
State Explain Apply

SCM Principle:
Build A Competitive Infrastructure

This principle is about maximizing "velocity" through supply chain network design.

State **Explain** **Apply**

Network Velocity Causes Throughput



State **Explain** Apply

Order-To-Cash Equals
Order-To-Shipment Plus Shipment-To-Cash

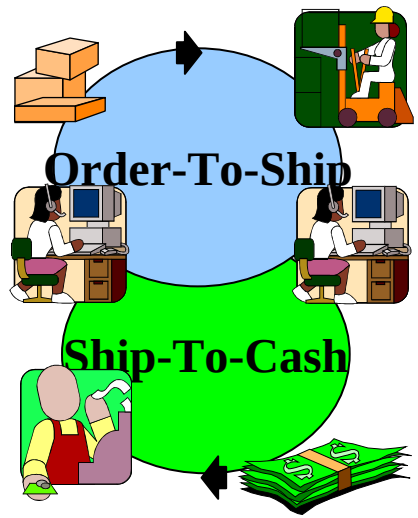
Order-To-Cash =

Order-To-Ship

- Capture Order +
- Order Processing +
- Production Completion +
- Pack For Shipment +
- Trigger Shipment +

Ship-To-Cash

- Trigger Payment +
- Accounts Payable Cycle +
- Payment Processing +
- Cash Transmission



Sort Cycle Times by Timeframe

Identify Opportunities to Improve Velocity

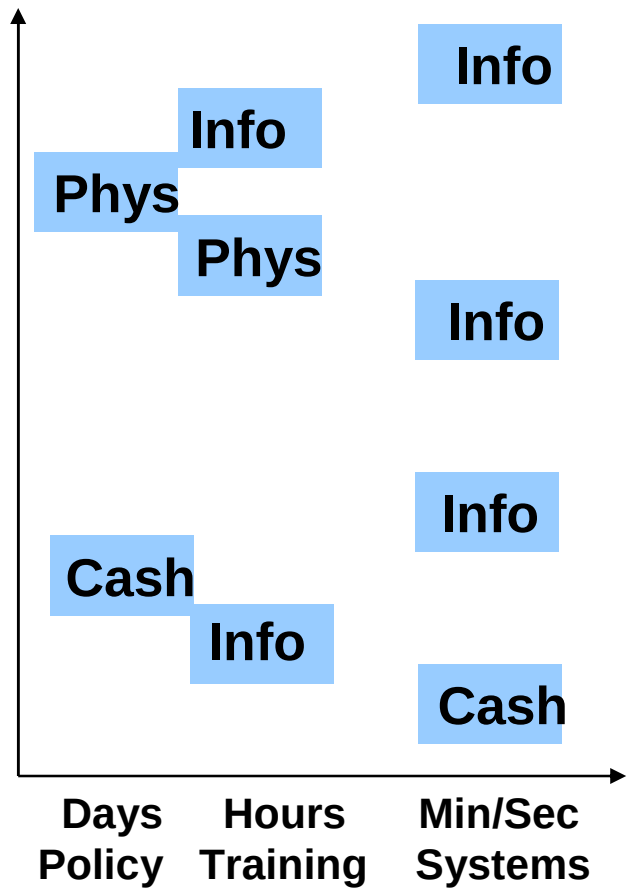
Order-To-Cash =

Value to Customer

- Capture Order +
- Order Processing +
- Production Completion +
- Pack For Shipment +
- Trigger Shipment +

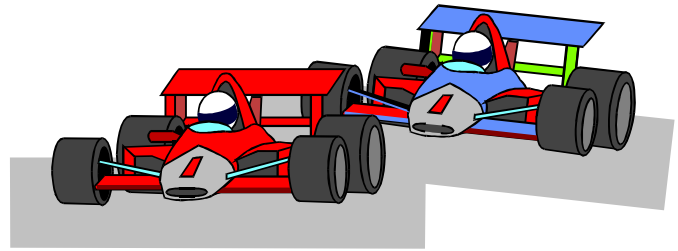
Value to Shareholder

- Trigger Payment +
- Accounts Payable Cycle +
- Payment Processing +
- Cash Transmission



The Velocity Principle

The network design of
[supply + value-adding + demand] nodes.



Network View New SM Job	Single Company View Old SM Job	Gap Implications
• Defined information-to-physical process loop • Defined information-to-cash process loop • Decision response times worldwide • Inventory and cash management policies	• Batch purchase order and invoice cycles • Limited authorization approval availability • Cross-training as time permits • Process built around good audit controls	• Keep information, inventory, and cash in constant motion. • Identify and eliminate friction points that slow velocity due to a lack of training or inappropriate policies.

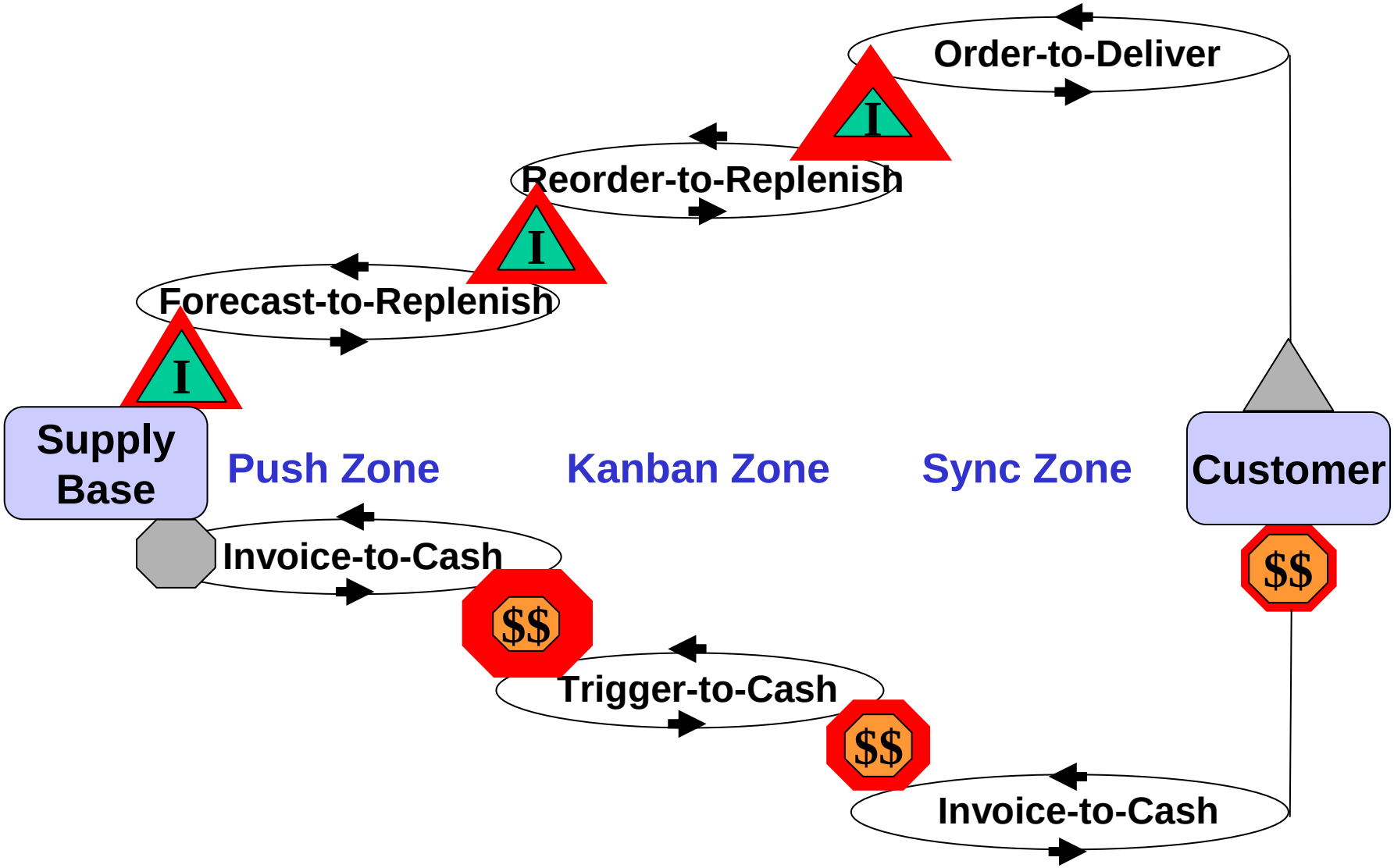
SM = Supply Manager

SCM Principle: Leverage Worldwide Logistics

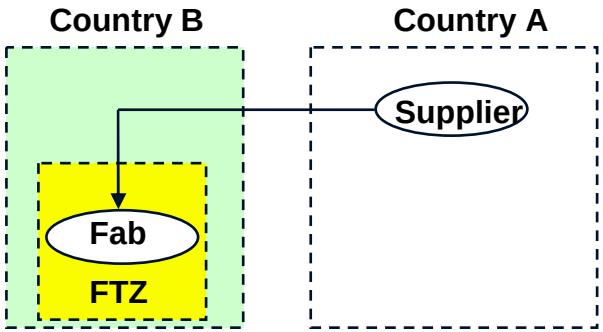
This principle is about minimizing logistics "variability"while maximizing product customization "variability" through supply chain network design.

State **Explain** **Apply**

Network Variability Causes Waste

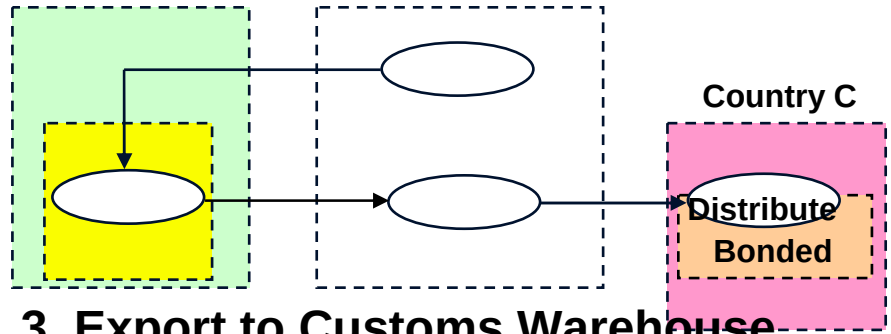


Identify Import/ Export Boundaries



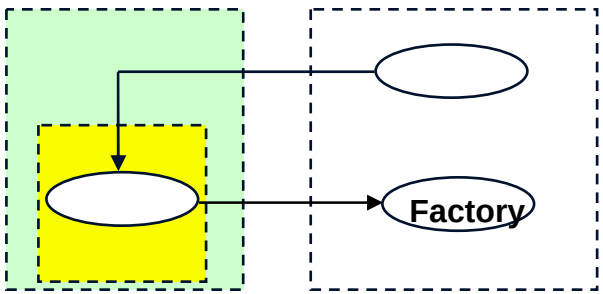
1. Import to Free Trade Zone

- Freight and Packaging Costs
- Country Of origin



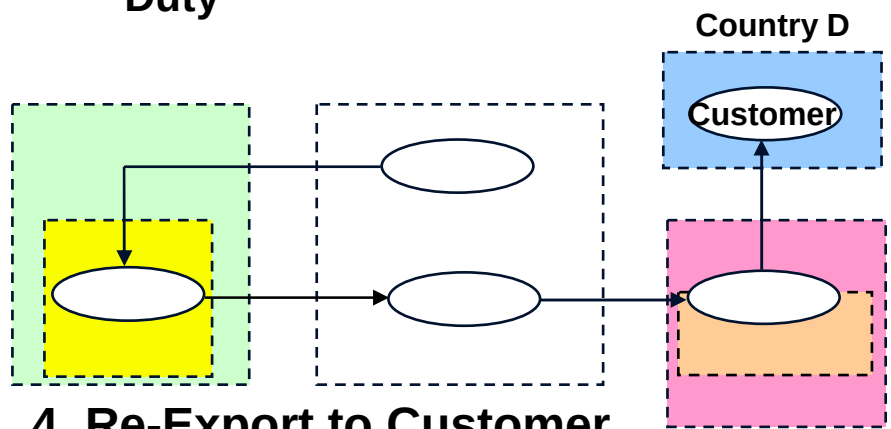
3. Export to Customs Warehouse

- Freight and Packaging Costs
- Country Of Destination
- Duty



2. Re-Import for Value-Add

- Freight and Packaging Costs
- Country Of Origin
- Duty and Duty Assist



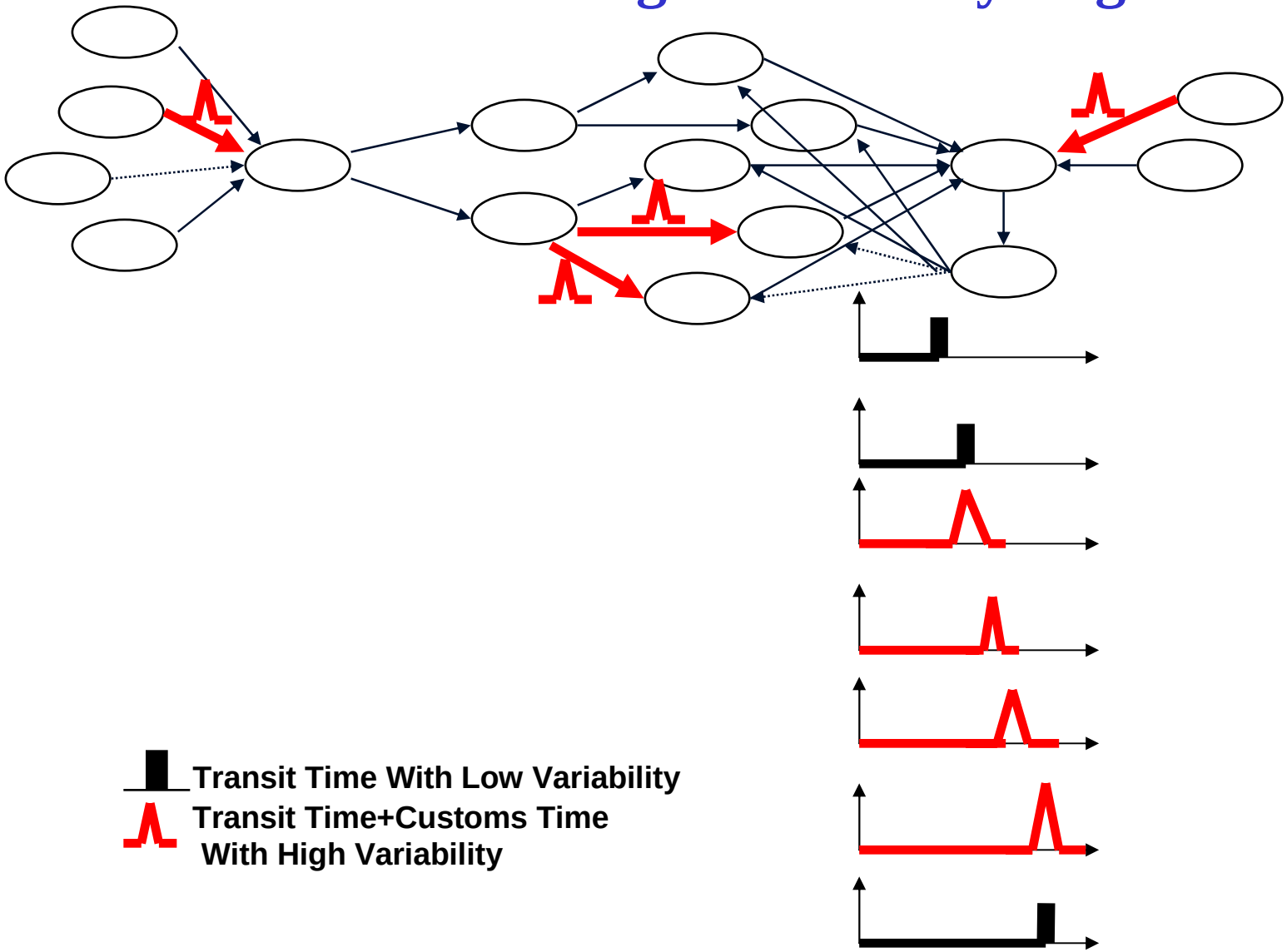
4. Re-Export to Customer

- Freight and Packaging Costs
- Country Of Destination
- Duty and Duty Drawback

State **Explain** Apply

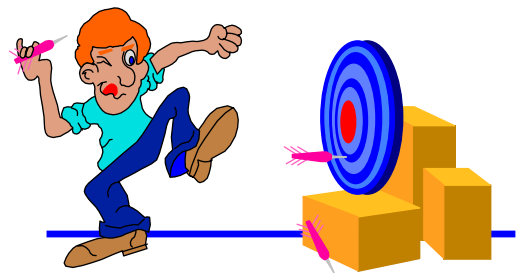
Rank Order Network Measurements

Eliminate High Variability Logistics



State **Explain** Apply

The Variability Principle



The network design of logistics interconnections.

Network View New SM Job	Single Company View Old SM Job	Gap Implications
• Consider the type of network relationship (TP or NTP, direct or indirect, domestic or imported) and the use of preferred logistics	• Shopping for price and availability means the supply network connection is dynamic • New e-auction buying creates a "chaotic" network connection	• Variability in upstream procurement decisions amplify downstream inventory requirements • Downstream variability in payment policy amplifies upstream cash requirements

SM = Supply Manager

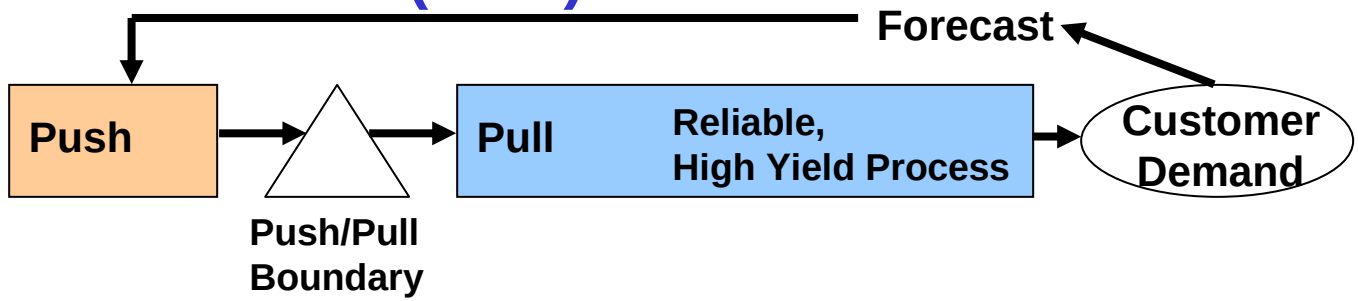
SCM Principle:
Synchronize Supply With Demand

This principle is about the end-to-end "vocalization" of demand in supply chain network operations.

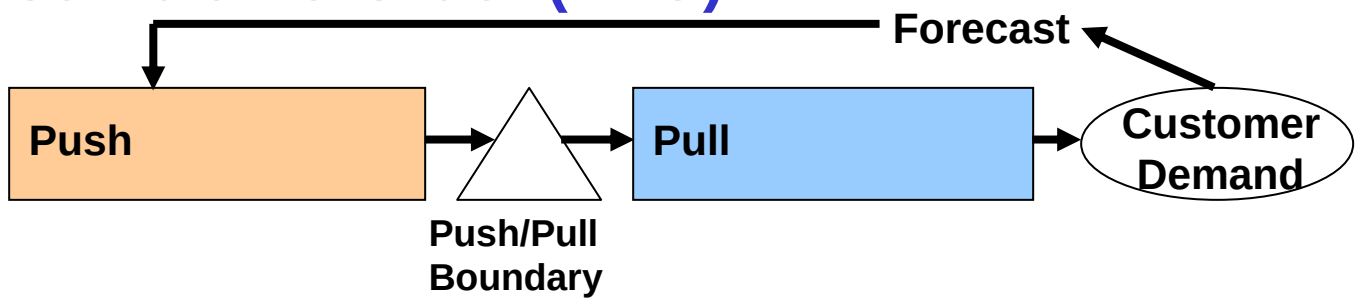
State **Explain** **Apply**

Meeting Customer Demand

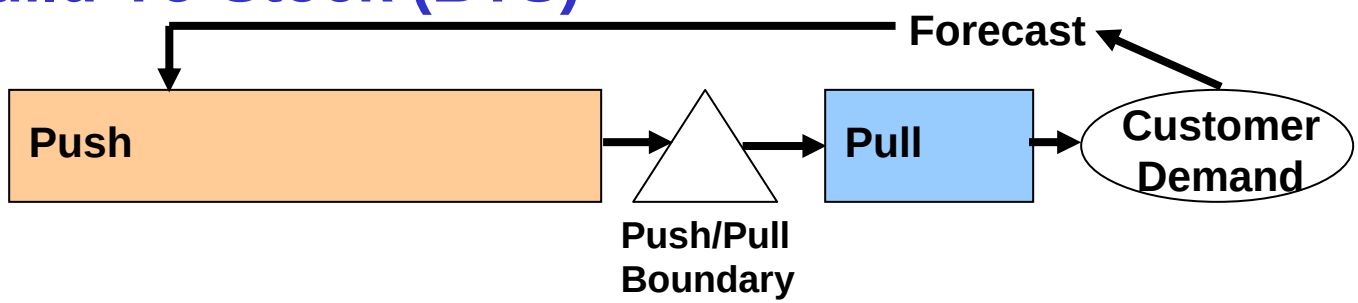
V: Build-To-Order (BTO)



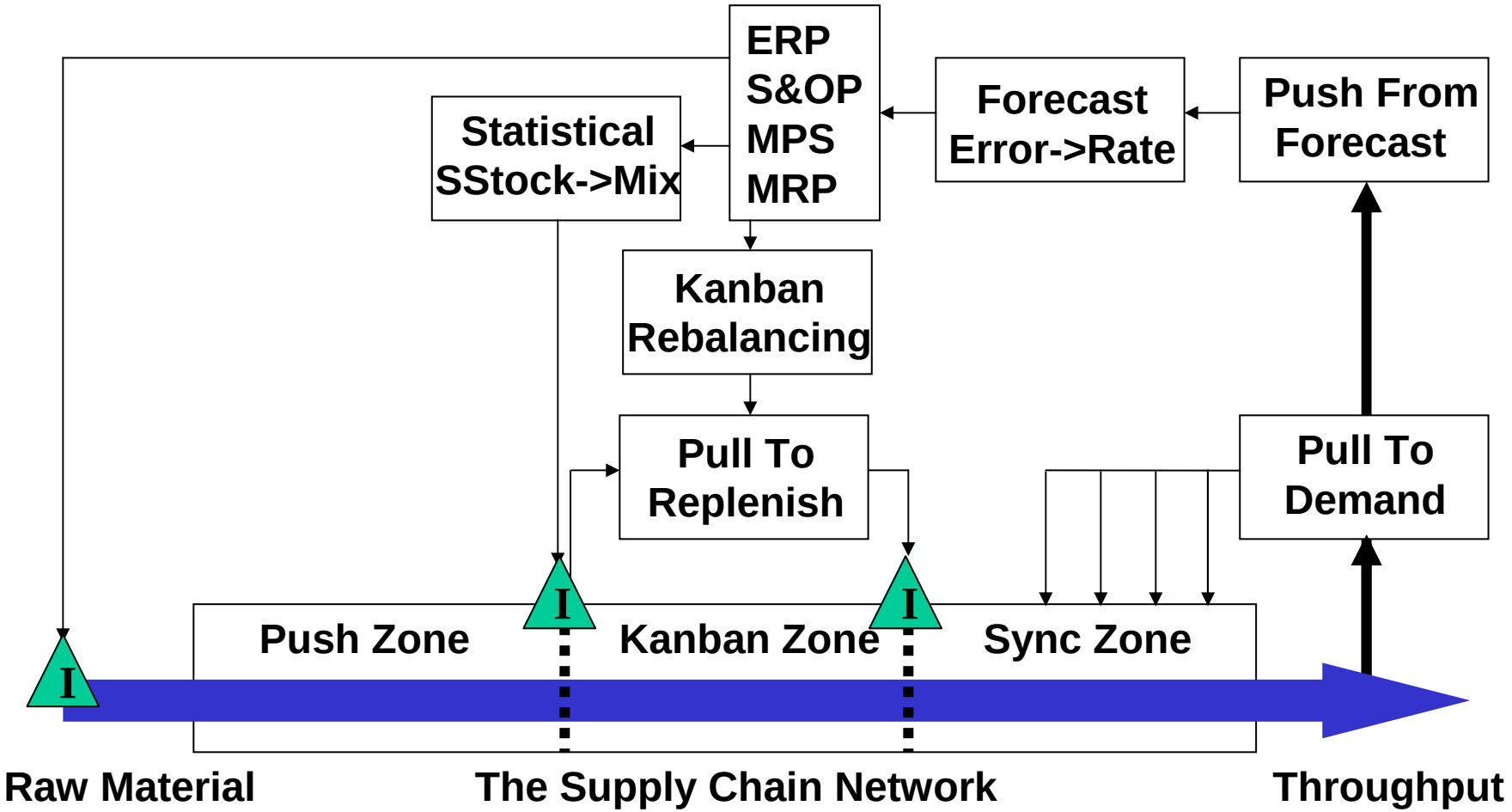
T: Assemble-To-Order (ATO)



A: Build-To-Stock (BTS)



The Planning Interface



The Vocalize Principle

Capacity and inventory management for network operations.

Network View New SM Job	Single Company View Old SM Job	Gap Implications
• Identify the network constraint->may be in a different company • Inventory placement optimized across the network • Demand broadcast to all the trading partners	• Buying on price and availability considering minimum order quantity, price breaks, transport costs, and life-time buys	• Operating differently in the pull vs push zone • Executing to actual demand, planning for mix, forecasting for rate • Eliminate the bullwhip

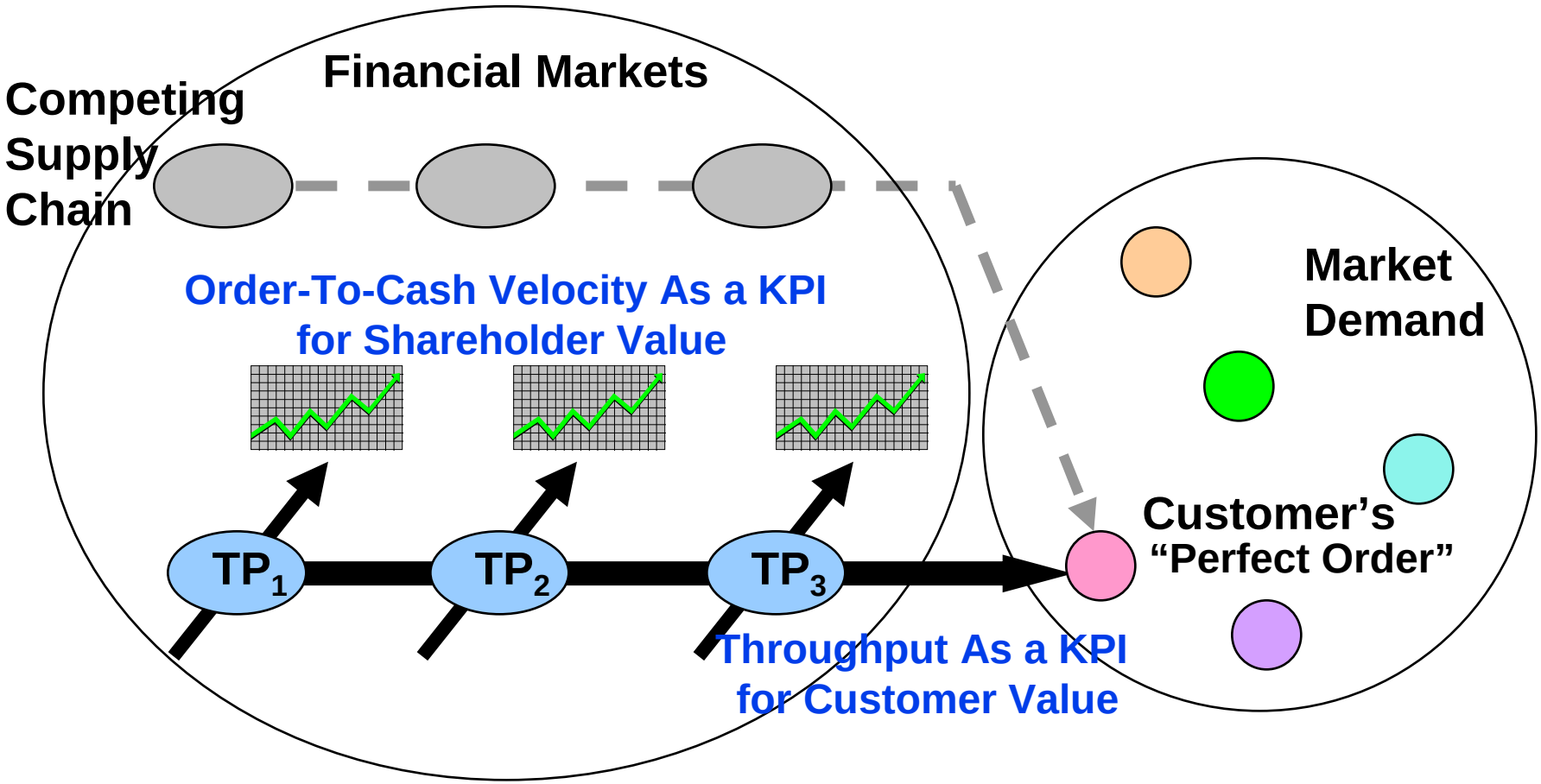
SM = Supply Manager

SCM Principle:
Measure Performance Globally

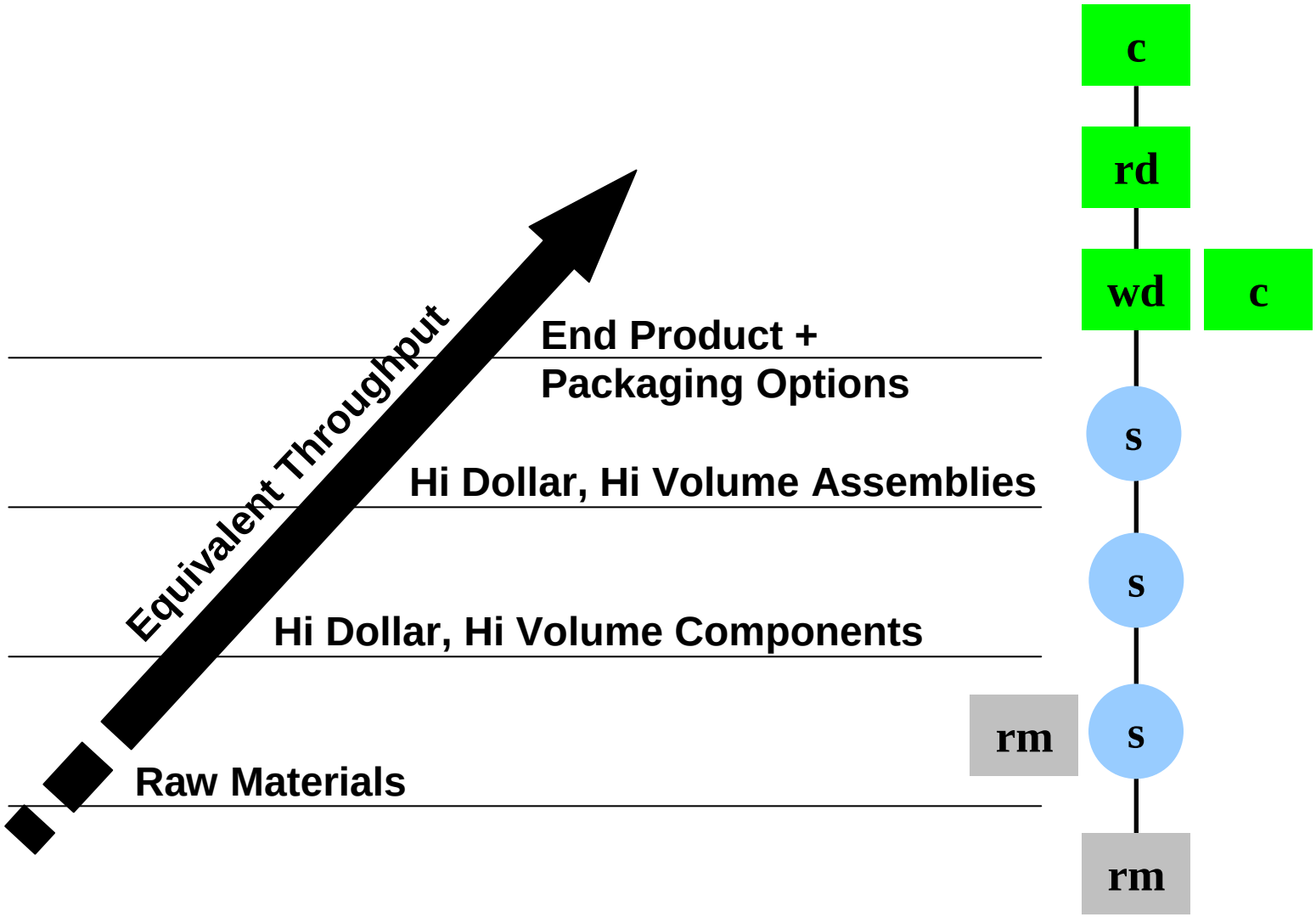
This principle is about the end-to-end "visibility"of throughput and inventory in supply chain network operations.

State **Explain** **Apply**

The Competitive Situation



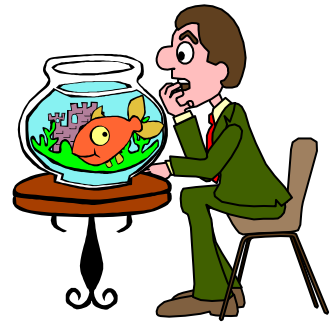
Equivalent Throughput



State **Explain** Apply

The Visualize Principle

End-to-end performance measures for network operations.



Network View New SM Job	Single Company View Old SM Job	Gap Implications
• Integrated into end-to-end measures of Equivalent Throughput, Total Inventory, and Order-To-Cash Velocity	• Silo measures of Purchase Price Variance, Inventory Dollars, and Number of Backorders	• Learn the equivalency of items supplied to end products and measure relative to network flows

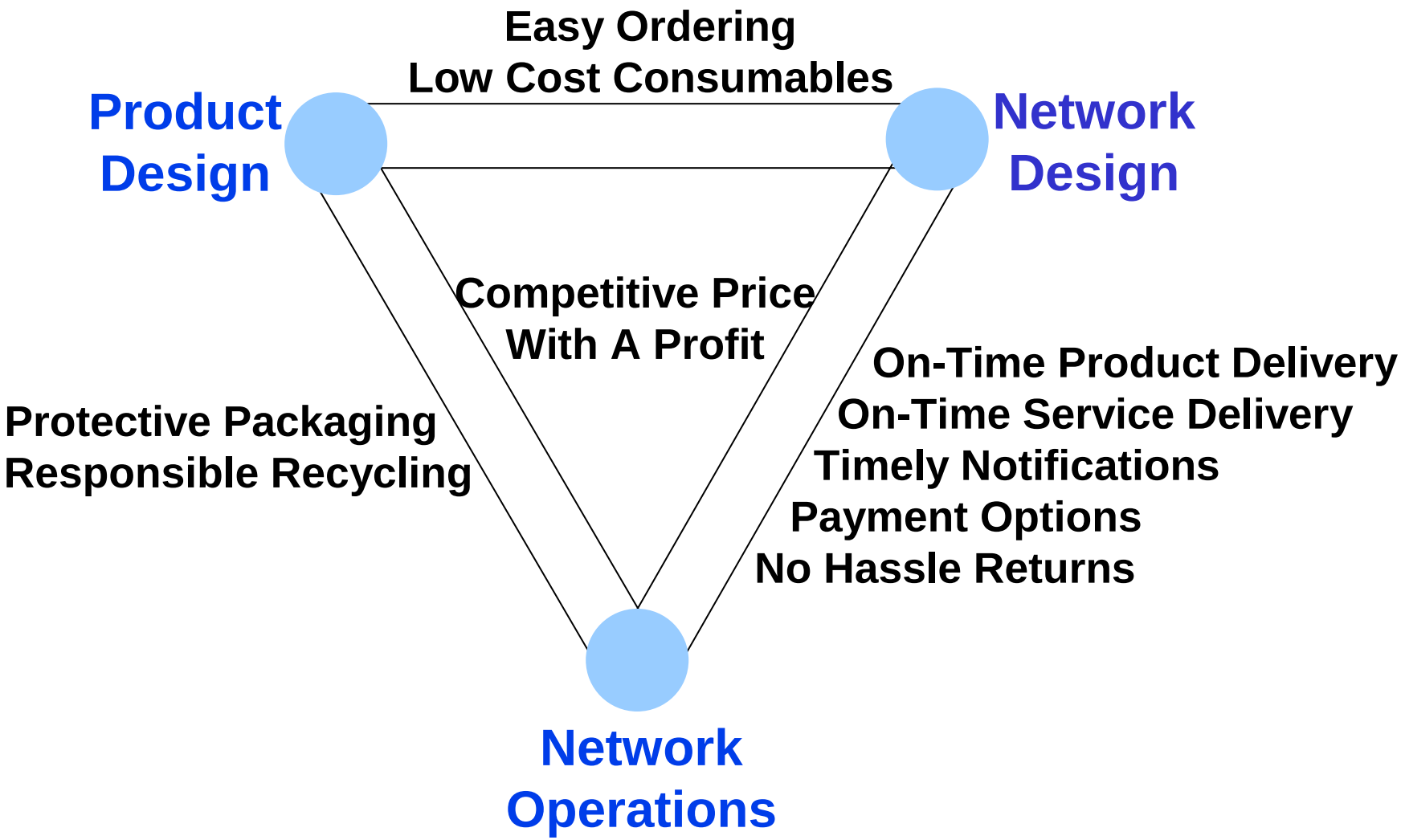
SM = Supply Manager

SCM Principle:
Create Net Value Through SCM

This principle is the “value” proposition resulting from a competitive supply chain network design and operation.

State **Explain** **Apply**

A “Perfect Order” Is The Proxy For Supply Chain Network Quality



State **Explain** Apply

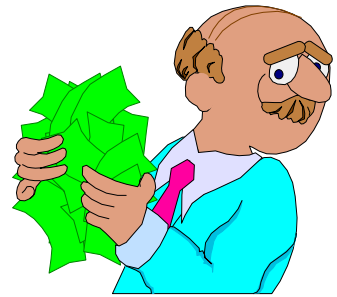
Improve ROIC…
…Improve Shareholder Value

$$ROIC = \frac{[\text{Profit After Tax}] \times [100\%]}{[\text{Inventory} + \text{Receivables} - \text{Payables}]}$$

- **Increase After Tax Profit**
  - **Increased Revenue From Products & Services**
  - **Lower Landed Cost**
  - **Lower Effective Income Tax**
- **Increase Capital Turnover**
  - **Increased Throughput**
  - **Lower Network Inventory Investment**
  - **Higher Velocity Cash-to-Cash Cycles**
- **Without Sacrificing Quality to the Customer**

The Value Principle

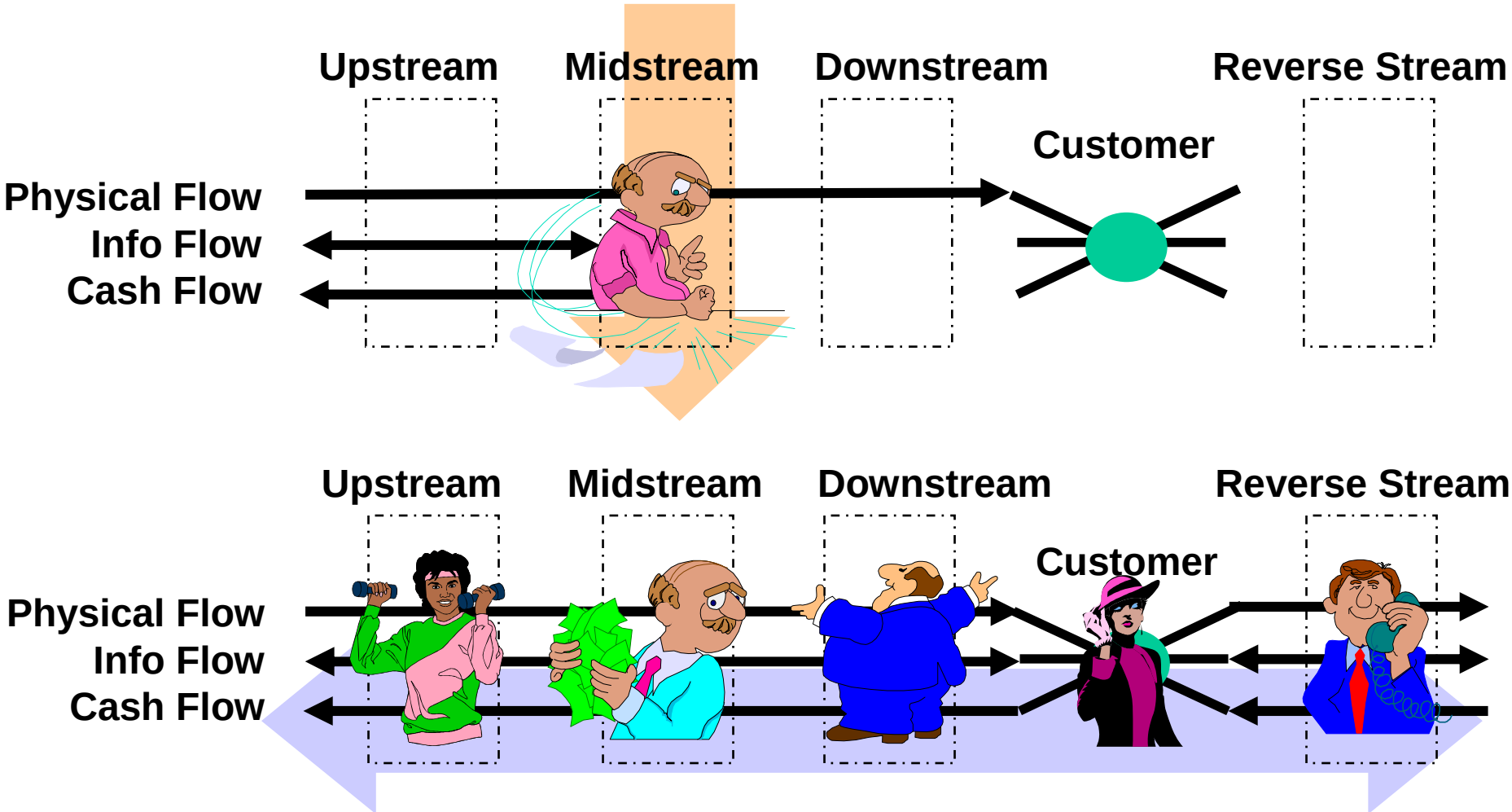
Value to the customer with value to the shareholder.



Network View New SM Job	Single Company View Old SM Job	Gap Implications
• Manage the supply impact on end-to-end throughput, a positive cash flow, profitability, and the inventory asset	• Company profit • Company growth	• Focus on the perfect order for the end customer and ROIC for shareholder value

SM = Supply Manager

From a Silo View To a Network View

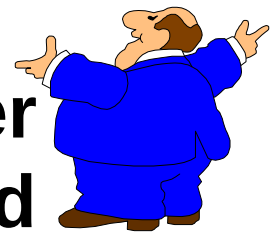


Summary

A Lack of Trust Is THE Single Largest Barrier

No matter how sophisticated the network's supply management…

The Buyer has got to trust that the Seller has the means to deliver the goods, and



The Seller has got to trust that the Buyer has the means to deliver the cash.

…It's that simple!

Summary

By Way of Introduction…

William T. Walker, CFPIM, CIRM

Bill Walker is a Supply Chain Architect for Agilent Technologies. He has worked both sides of the interface between supply chain management and new product development for over 33 years within Hewlett-Packard's Test & Measurement group, now the EPSG group of Agilent Technologies. Bill is accomplished in developing and optimizing international supply chains, has first hand experience leading worldwide product line transfers, was instrumental in developing design for supply chain guidelines, and has personally designed successful new products. He is a Logistics Forum "Top 20 Logistics Executive for 2000" award winner, a member of the Logistics Forum Advisory Board, and a member of the ASCET Editorial Advisory Board. Mr. Walker co-developed the Principles of Supply Chain Management (CD-ROM #01640) taught by APICS, and co-authored the book, *Supply Chain Management: Principles & Techniques for the Practitioner (#07015)*; his definition for "supply chain" is the official definition in the *APICS Dictionary, 10th Edition*. His articles on defining supply chain management, numerous proceedings, and presentations on advanced supply chain management topics have an international following. Bill is a past President of the APICS Educational & Research Foundation, where he collaborated on setting education strategy; and a past APICS Vice President of Education-Specific Industry Groups, where he held oversight on education developed for the Aerospace & Defense, Process, Repetitive, ReManufacturing, Small Manufacturing, and Textile/ Apparel SIG's. He is APICS certified at the Fellow level, and holds BSEE and MSIE degrees from Lehigh University.