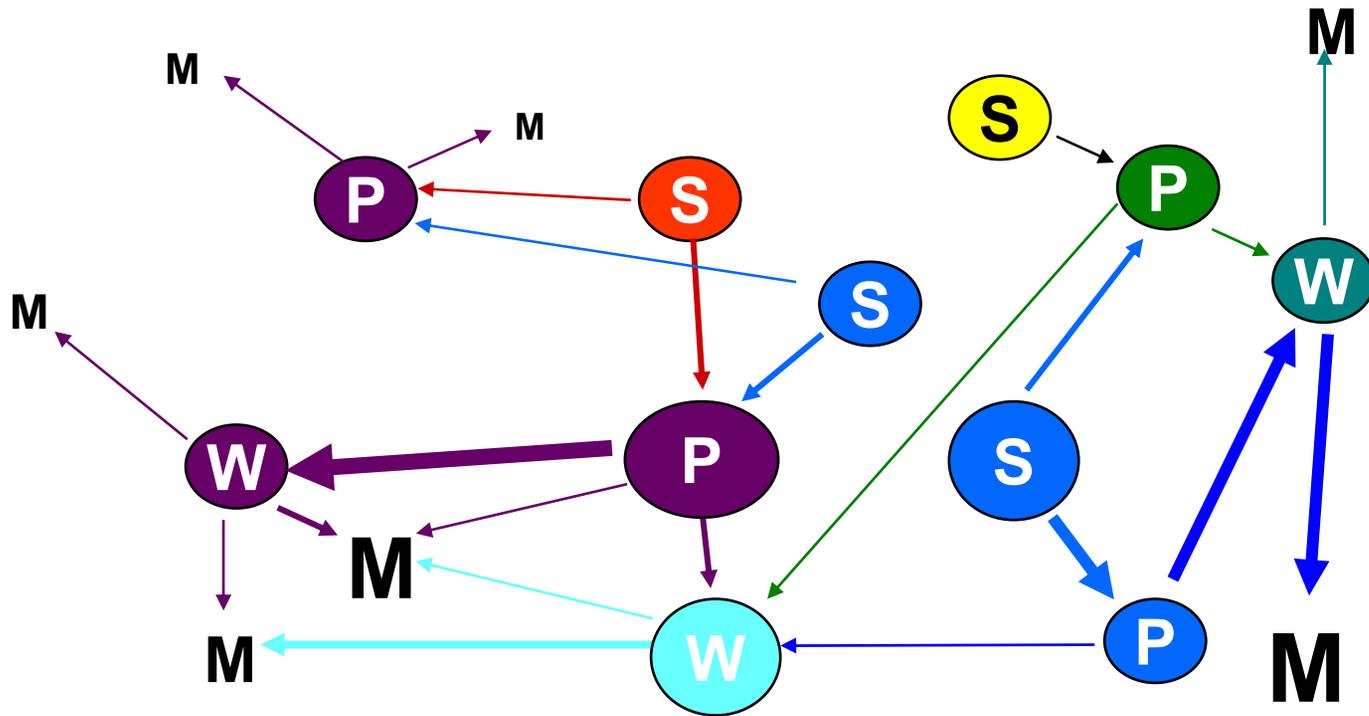


Section 4 > Network Modeling

Network Modeling

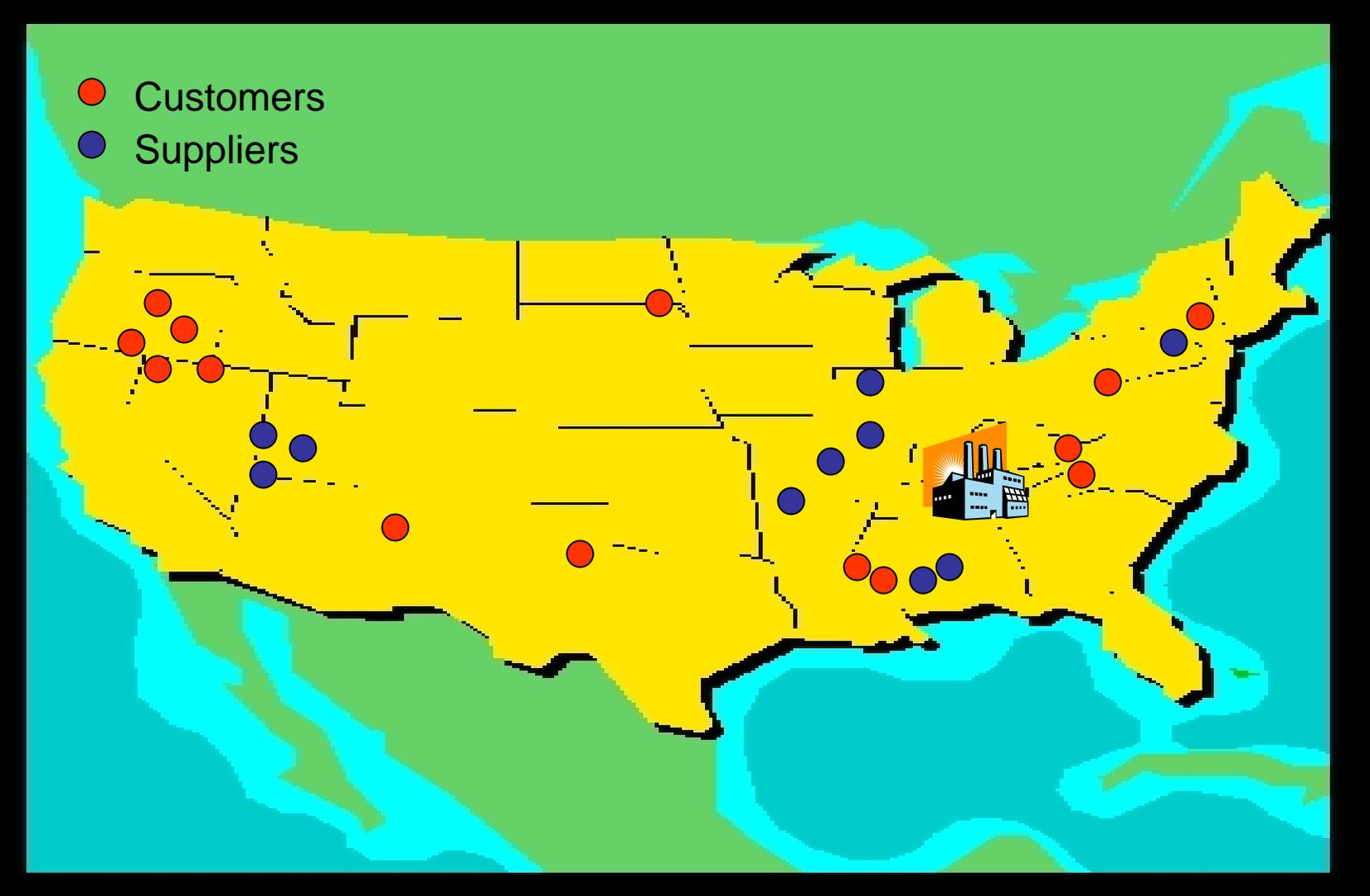
Nodes and Links in a Shipper's Network

(S = supplier, W = warehouse, P = plant, M = market)



What should we be thinking about ?

Flow > Asset > Transportation



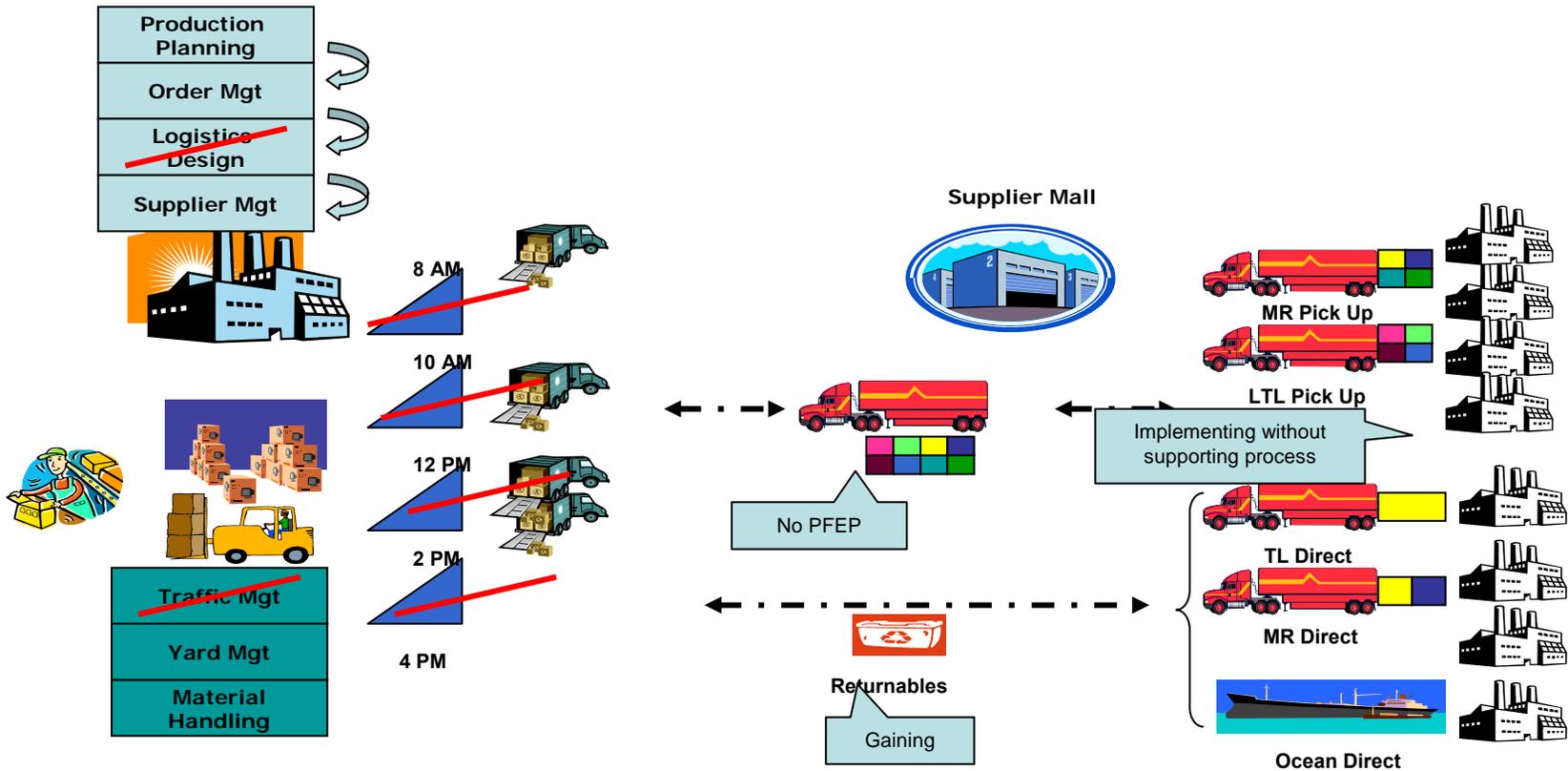
Expedited Group Discussion

Network Modeling

1. Where do we start ?

Logistics Waste

Inventory	Transportation	Time	Space	Knowledge, Admin, Pkg.
Excess Inventory Safety Stock Obsolete Inventory	Unit Cost Tone/Mile Expedites	Order to Supplier Ship Ship to Plant Receive Plant Receive to Consumption	# Stocking Locations Packaging Storage Systems	Process Complexity Variation Complexity Correction
Lean Best Practice PFEP 5S - Visual Control Pull -Leveled Flow	Lean Best Practice Network Ownership Network Integration Logistics Design	Lean Best Practice Value Stream Map Sleep Time Reduction Process Improvement	Lean Best Practice Reduced Stocking Points Returnable Containers Flow Racks	Lean Best Practice Quality at Source Error Proofing Standardization

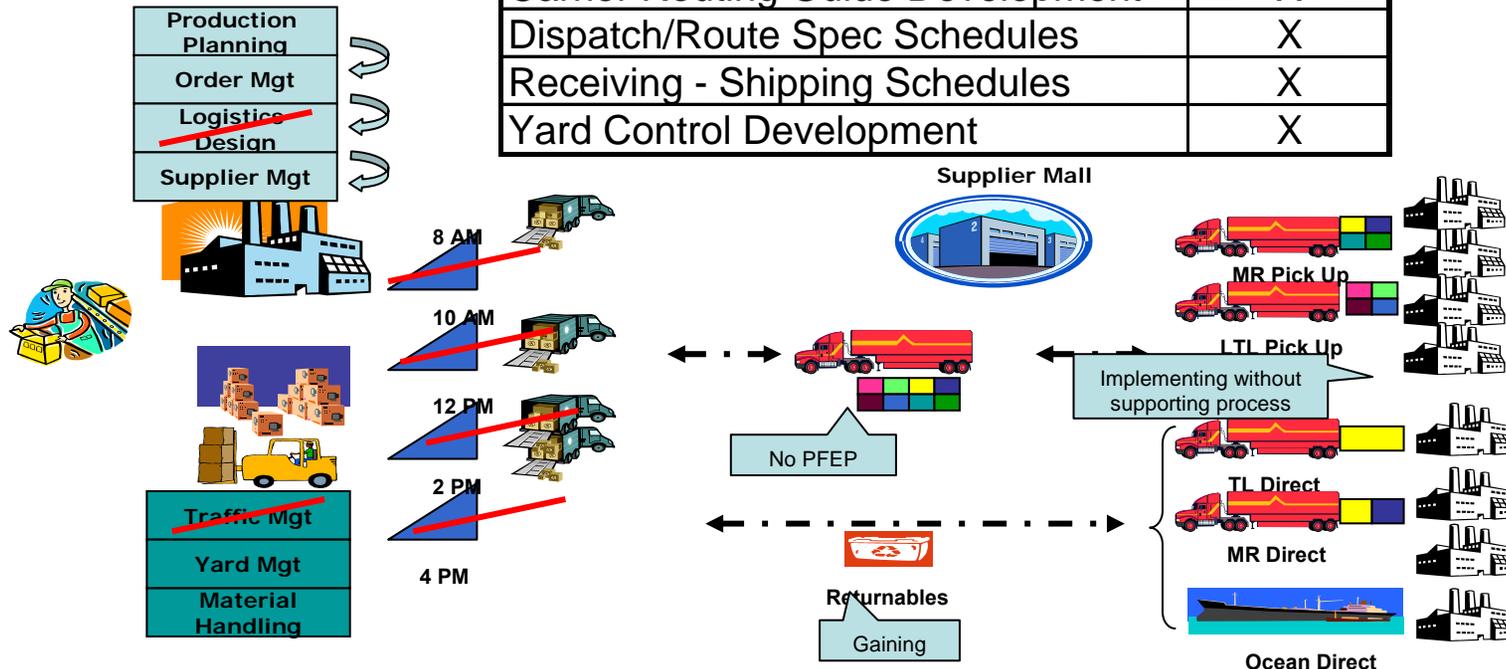


Capability > Visibility > Understandability

Understanding the Logistics Network	
Channel Partners What role do channel partners play?	Moments of Truth What are the critical touch points with channel partners?
Continuous Improvement How do we know we are improving?	Measurement How do we know if we are succeeding or not?
Understanding the logistics network starts with understanding all the stakeholders and determining what role they play.	

Flow > Asset > Inventory > Network Modeling

Logistics Network Design	Checklist
Logistics Design Infrastructure	X
Packaging File Data Collection	X
Volume File Data Collection	X
Supplier - Customer Data Collection	X
Network Mapping	X
Lean Network Design	X
Just In Time Network Modeling	X
Leveled Flow Schedules	X
Resource Requirements	X
Carrier Routing Guide Development	X
Dispatch/Route Spec Schedules	X
Receiving - Shipping Schedules	X
Yard Control Development	X



Production Planning
Order Mgt
~~Logistics Design~~
Supplier Mgt

~~Traffic Mgt~~
Yard Mgt
Material Handling

Supplier Mall

8 AM
10 AM
12 PM
2 PM
4 PM

No PFEP

Returns
Gaining

Implementing without supporting process

MR Pick Up
LTL Pick Up
TL Direct
MR Direct

Ocean Direct

Flow > Asset > Fixed Resources

Logistics Fixed Resources - Prioritization of Waste Elimination

Priority for Elimination

- Priority # 1: Warehouses and Space
- Priority # 2: Transportation Equipment
- Priority # 3: Material Handling Equipment
- Priority # 4: Racking - Storage Equipment

Fix Resources- Interrogation Questions

1. What is this resource costing us?
2. Why do we need this resource?
3. How could we operate if we were forced to do without this resource?

When dealing with fixed resources we must first identify the resource and seriously question the need and value of the resource. Although, we may not eliminate the resource immediately, brainstorming how we would operate without the resource is a very worthwhile exercise.

All Roads Lead to the PFEP

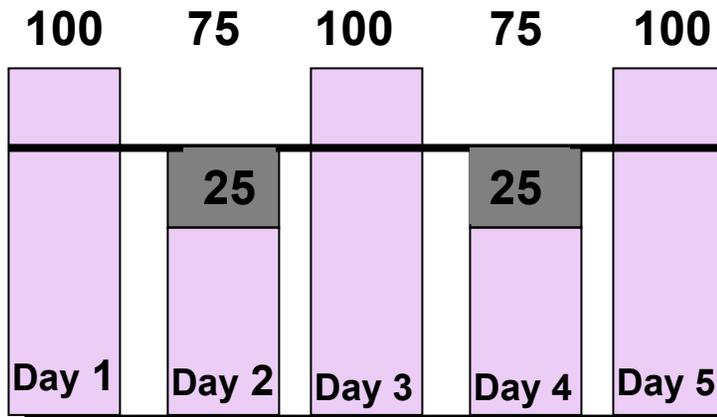
Part Description							Supplier Information							Container Information							Trans.			Conv.											
Part #	Part Description	Common Part Name	Daily Volume	Minimum Order Quantity	Fixed Order Quantity (if exists)	Standard Cost per Part	Planner	Order Type	Order Frequency(week)	Supplier Name	Supplier Location	Supplier Address	Shipping Contact	Shipping Telephone	Shipping Hours	Container Type	Length (IN)	Width (IN)	Depth (IN)	Weight Per Part (LBS)	Full Container Weight (LBS)	Parts per Container	Containers per Layer	Layers per Pallet	Shrink Rap	Stackable	Haz Mat	Delivery Frequency	Inbound Route	Inbound Mode	Direct / Cross Dock	Internal Stores Address	Flow Rack	Internal Route #	Internal Route Mode

PFEP (Plan For Every Part) – Packaging File

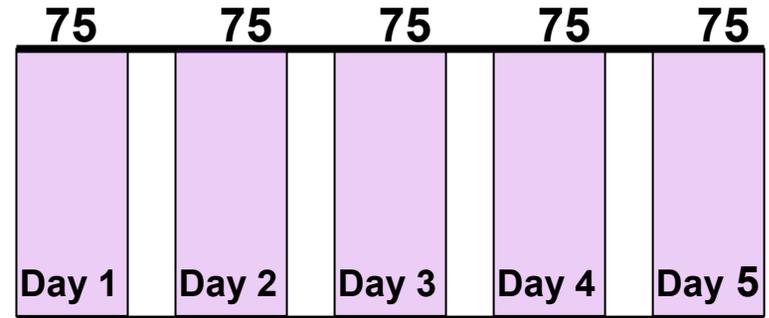
1. How can we get this built?
2. How can we ensure it stays accurate?

Lean Logistics Concept 1 of 3 - Lot Size

Plant Daily Requirements = x75



Order Lot Size = 50



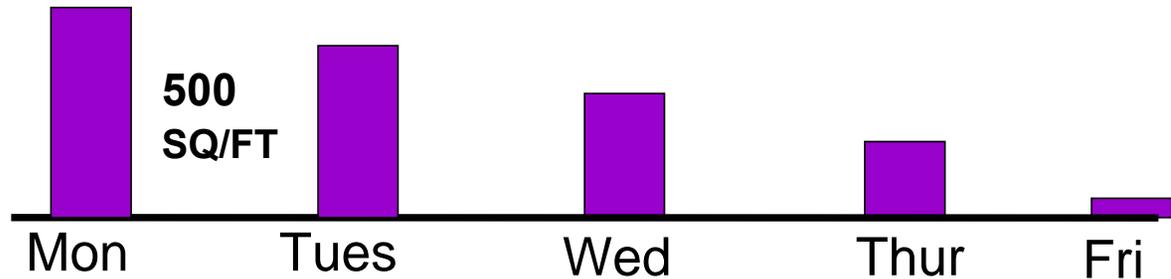
Order Lot Size = 25

What Happens Here ? What are the Implementation Challenges ?

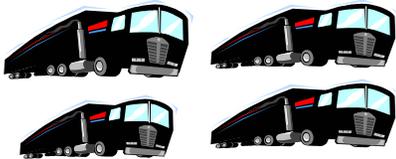
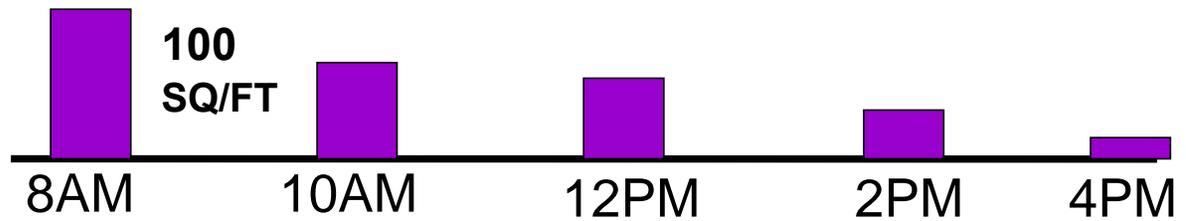
Lean Logistics Concept 2 of 3 - Frequency



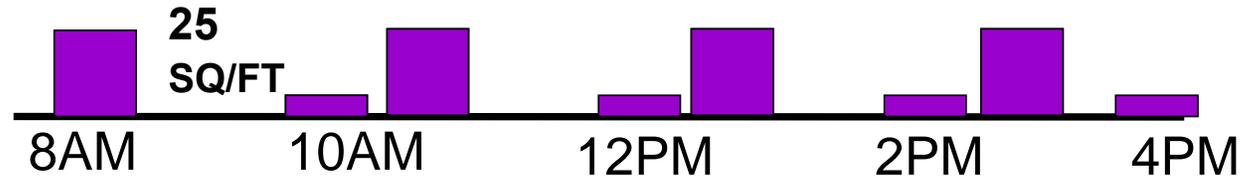
1 /week



1 /day

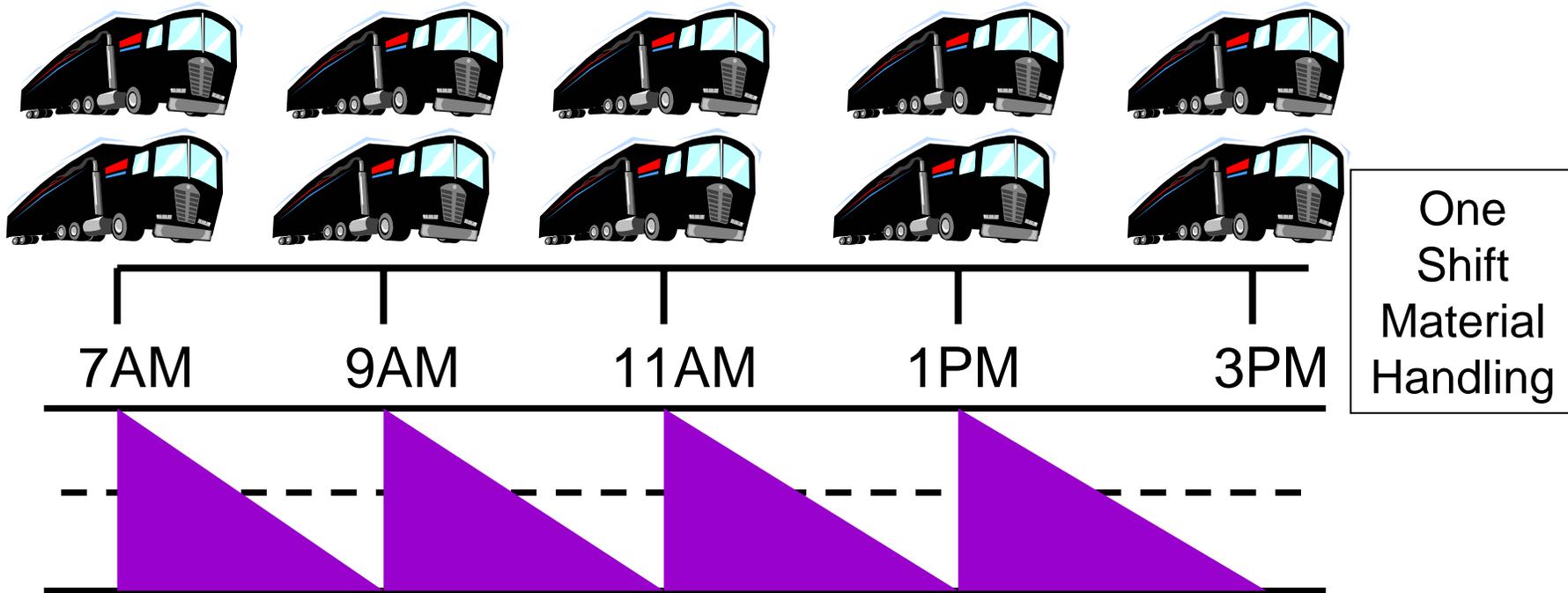


4 /day



What is the Effect on Inventory? What is the obvious challenge?

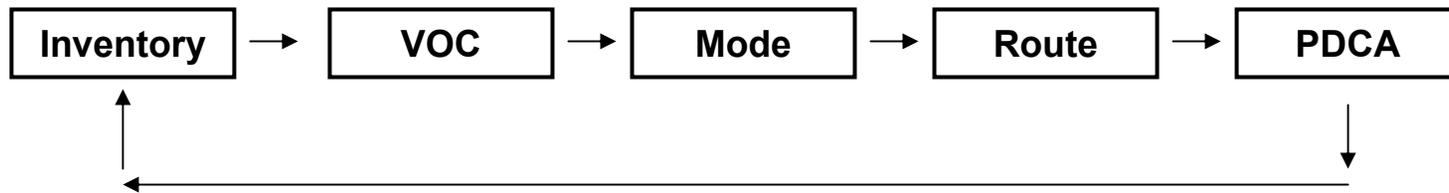
Lean Logistics Concept 3 of 3 – Level Flow



Where can we use this concept tomorrow ?

Transportation Strategies

1. What is our objective with Transportation ?
2. What are the decisions to be made ?
3. How can we reach our lean goals ?

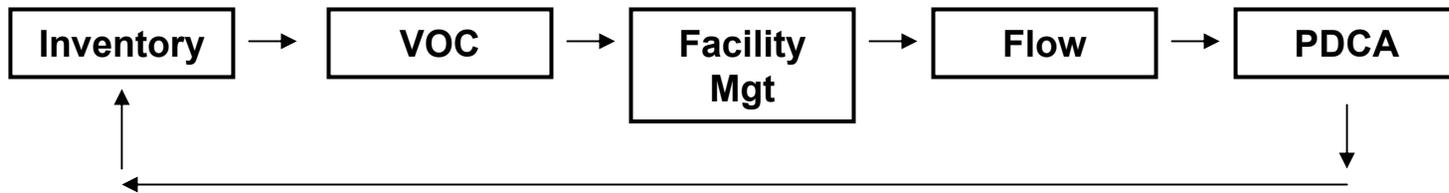


Remember: There is no magic pill to transportation challenges.
What are your goals ?

Question: What is a milk run ?

Warehousing Strategies

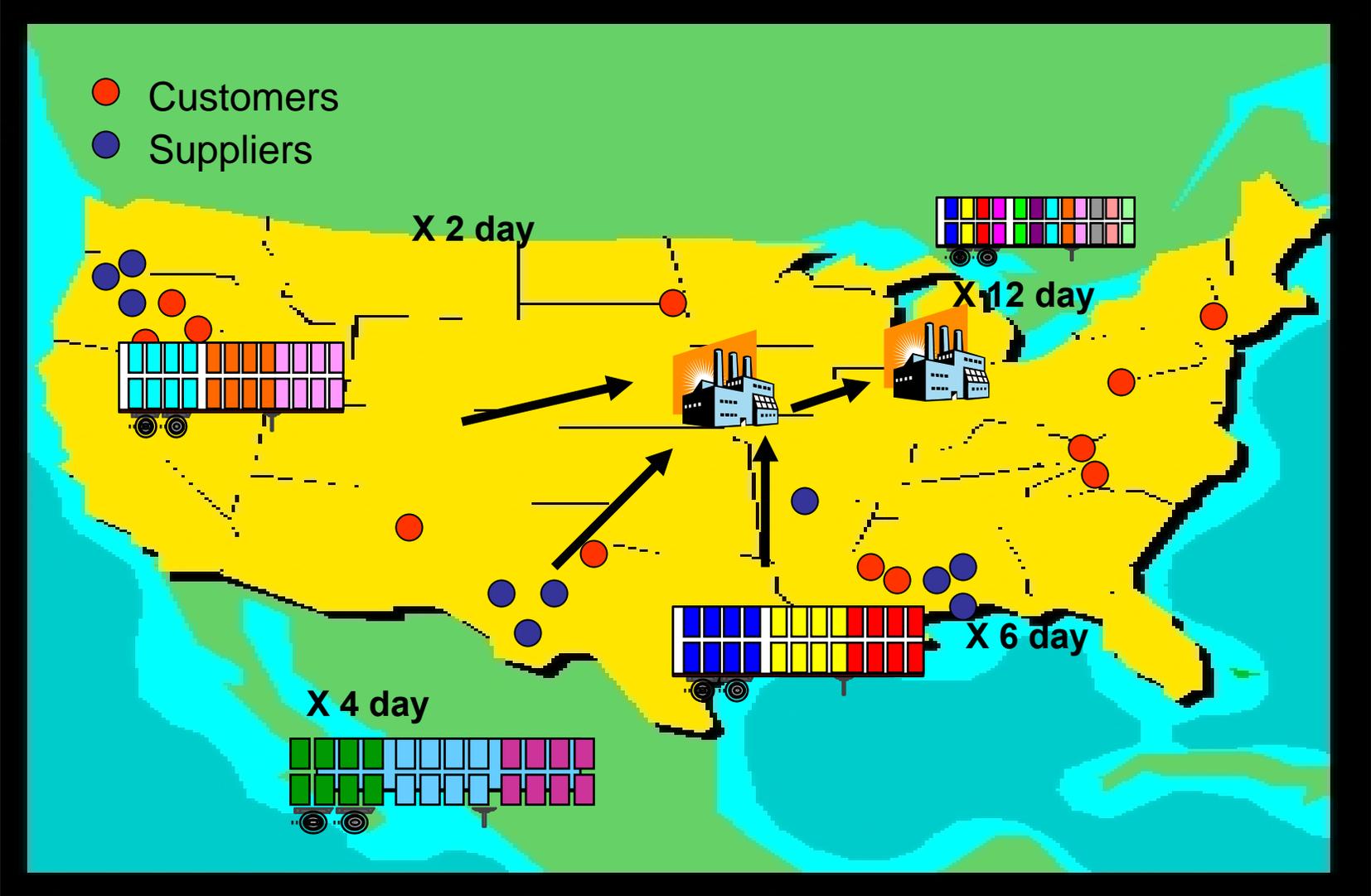
1. Why do we have warehouses ?
2. What are the decisions to be made ?
3. How can we reach our lean goals ?



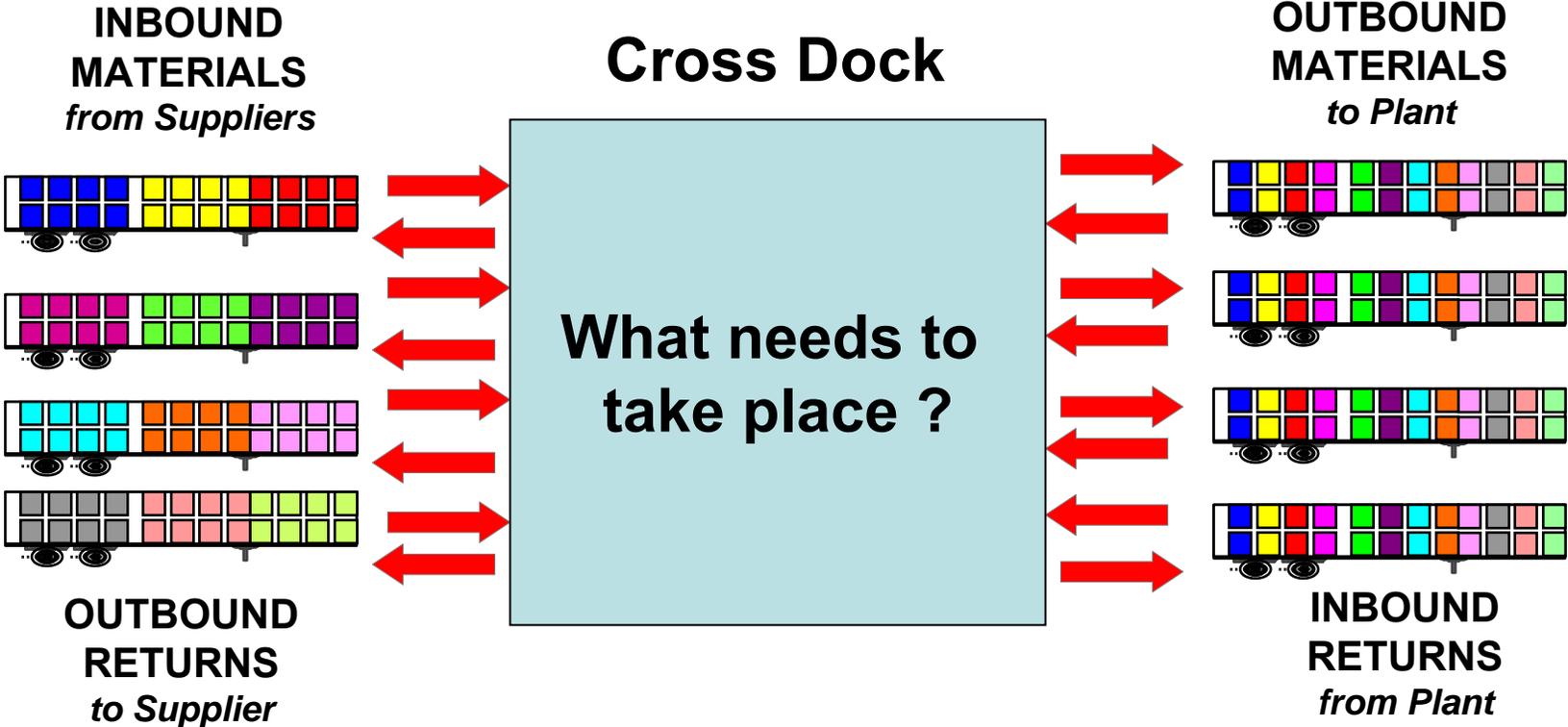
Remember: There is no magic pill to warehousing challenges.
What are your goals ?

Question: What is a cross dock ?

Flow > Asset > Transportation



Flow > Asset > Cross Dock



Work Out

Logistics Network Modeling

1. How can we stratify inventory?
2. What inventory characteristics are we looking for to implement lean first?
3. When would milk runs make sense?
4. When would cross docking make sense?

Section 5 > The Lean 6 σ Logistics Strategy

Key Strategic Drivers

Stability



Capability > Predictability > Organization

The Organized Workplace						
Box A What Number is Missing ?						
2	5	12	23	1	15	25
3	9	18	24	8	7	22
4	13	17	14	6	10	20
21	11			16		

Adapted From Achieving Basic Stability - LEI

Capability > Predictability > Organization

The Organized Workplace

Box B What Number is Missing ?

1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16		18	19	20	21
22	23	24	25			

Adapted From Achieving Basic Stability - LEI

Capability > Predictability > Complexity

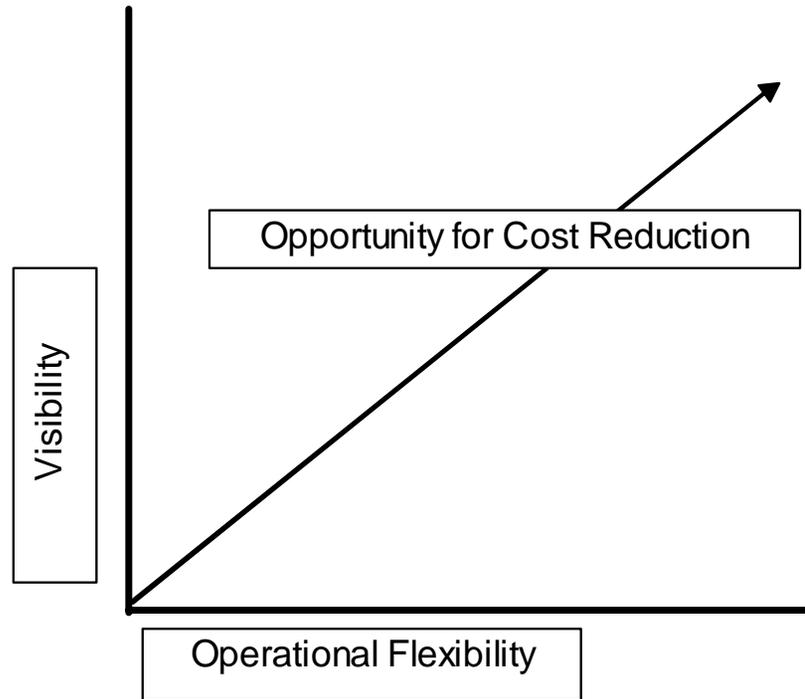
Complexity and Cumulative Probabilities

The more steps, or complexity in any process, the more opportunities for defects. Consider if the "perfect order" components were all running at 99% performance levels. What would be the yield performance of the entire process to the customer ?

Perfect Order	Performance
Right Part	99%
Right Place	99%
Right Time	99%
Right Quantity	99%
Right Quality	99%
Right Cost	99%
Overall Logistics Performance	= 94%

Capability > Stability > Flexibility

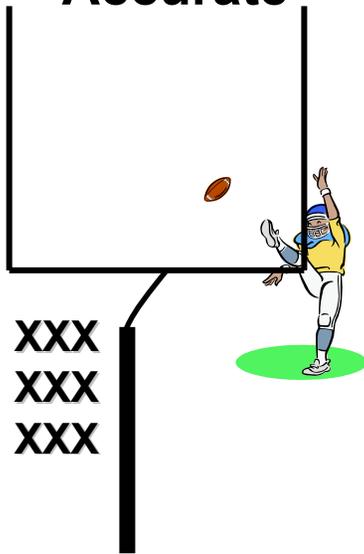
Flexibility + Visibility = Waste Reduction



Visibility and operational flexibility are a powerful combination. We need to see the opportunities and then we need to do something about them !

Capability > Stability > Control

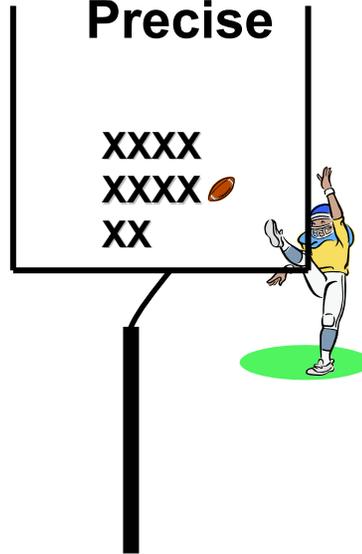
Precise not
Accurate



XXX
XXX
XXX

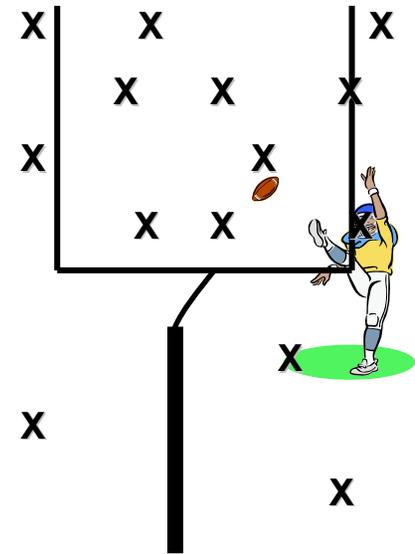
Center
Process

Accurate and
Precise



XXXX
XXXX
XX

Not Accurate or
Precise



X X X
X X X
X X X
X X X
X X X
X X X

Reduce
Spread

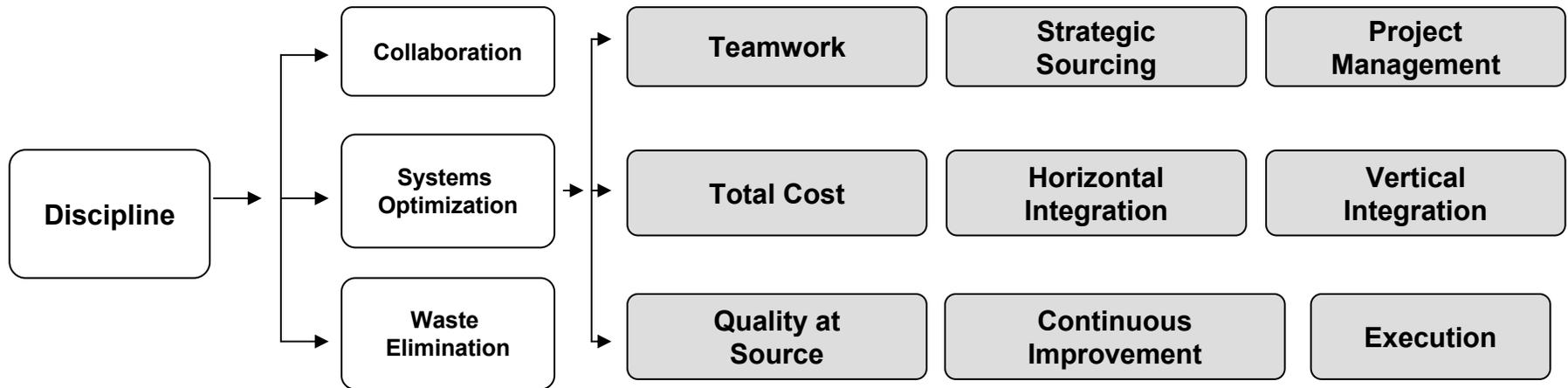
Capability > Stability > Control

Questions for Out of Control Processes

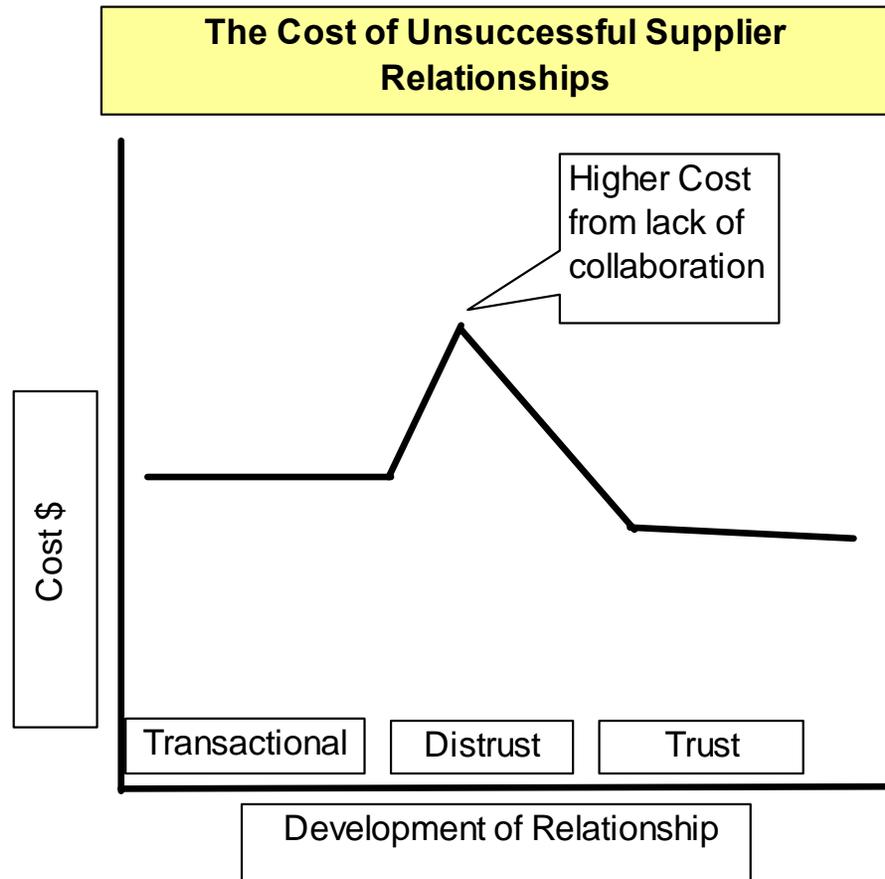
Processes will not go out of control randomly. Some event has happened that resulted in the process going out of control. If a process seems to be out of control, ask yourself:

1. Have we changed the way we measure this process ?
2. Has there been an environmental change (weather, supplier location) ?
3. Have we changed the people that manage this process ?
4. Has there been a change in the procedures of the process ?
5. Have we changed suppliers to the process ?

Discipline



Discipline > Collaboration > Strategic Sourcing



This shows us that we are better off remaining in transactional relationships if we are not ready to develop relationships properly. This is especially true with third party logistics.

Discipline > Waste Elimination > Quality at the Source

Error vs. Customer Defect

Error

Definition: A mistake made that could result in a defect to product or process.

Example: Wrong customer address on shipping documents

Probability of errors happening: 100%

Defect

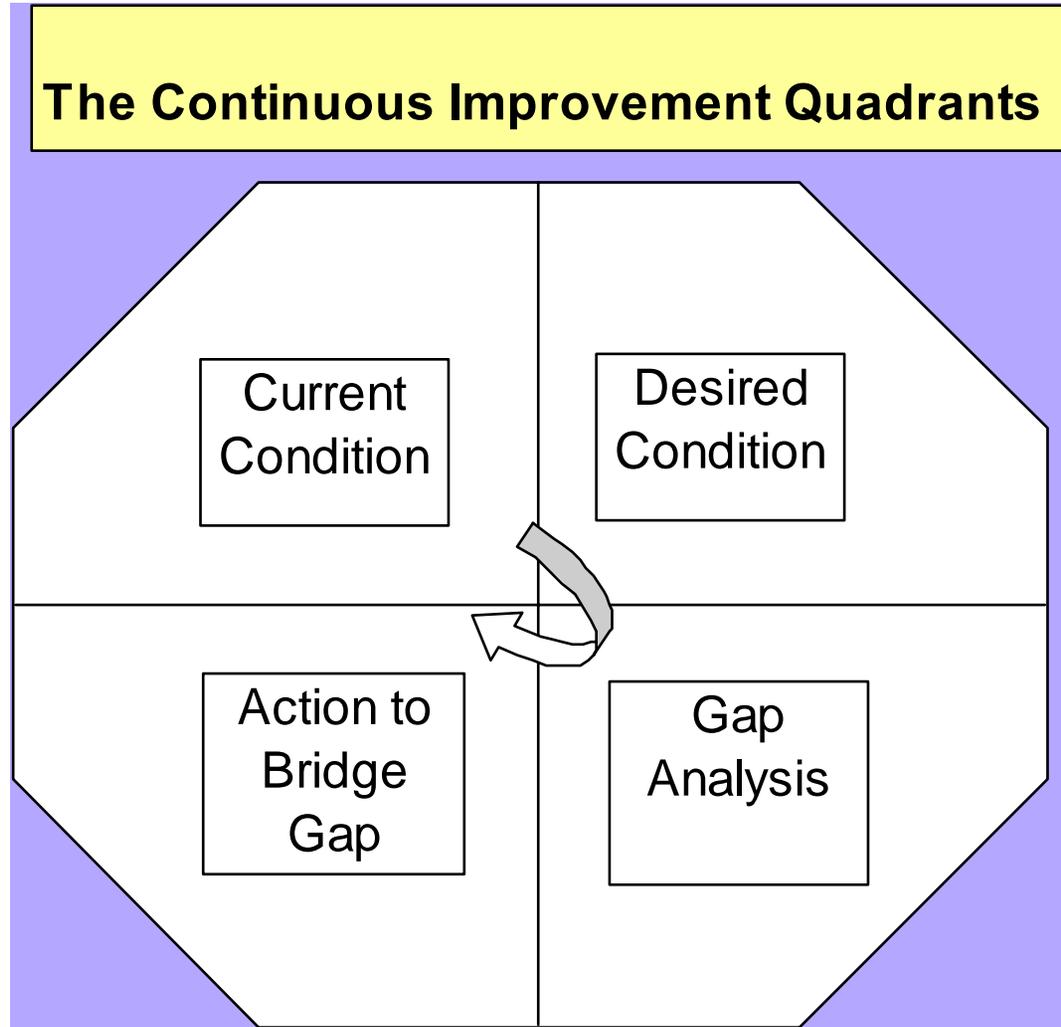
Definition: A defect in process or procedure as defined by the customer (internal or external)

Example: Shipment delivering to wrong customer address

Probability of opportunity for defects occurring : 100%

An error is very different from a defect. Errors will most certainly happen, however they do not need to turn into customer defects.

Discipline > Waste Elimination > Continuous Improvement



Work Out – Strategy Development

Lean 6 σ Logistics Strategy Development

1. Voice of the customer
2. What is your supply chain vision?
3. Choose 2 key logistics points that are clearly challenges.
4. What is the current condition?
5. What steps will you take to bridge the operational gap?

Lean 6σ Logistics > Maturity Level

The Doom Loop	The Next Step	Maturity
<p align="center"><i>Characteristics</i></p> <p>Accept Unleveled Demand Accept Complexity in Ordering Accept Supplier Non - Conformance No Logistics Network Design Complexity of Processes High Inventory Levels Lack of Logistics Knowledge</p>	<p align="center"><i>Characteristics</i></p> <p>Understand Unleveled Demand Create Logistics Visibility of Orders Measure Supplier Performance Focused Logistics Design Management of Complexity Focused PFEP Supplier-Internal Training</p>	<p align="center"><i>Characteristics</i></p> <p>Level Demand Common Ordering System Supplier Partnerships (OPS) Integrated Logistics Design Elimination of Complexity Total PFEP Learning Organization</p>
<p align="center"><i>Strategies</i></p> <p>Buy Technology Change Suppliers Re-work Transportation Network Focus on Hard Dollar Savings</p>	<p align="center"><i>Strategies</i></p> <p>Fully Understand Current Condition Isolate Lean Part Candidates Roll Out Measurable Pilot Program Train and Develop Select Groups</p>	<p align="center"><i>Strategies</i></p> <p>Hoshin Planning Leveled Demand Pull Replenishment Fully Trained Personnel</p>

Key Discussion Points

1. Logistics is a service = people and process.
2. Total Logistics Cost is a dynamic system, which makes measurement of real savings extremely difficult.
3. Inventory drives all logistics costs and processes. It must be our primary focus.

Logistics Bridge Model

