

Delivering parts availability & inventory performance in a global service business



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Cat Logistics: Part of Caterpillar's Heritage

- Producing and supporting high-value, capital equipment working in time-sensitive, critical environments around the world
 - Caterpillar manufactures more than 300 products to serve construction, mining, forestry and power generation applications
 - Manages over 5,000 major supplier relationships and 100+ manufacturing facilities
 - Distributes products in over 190 countries
 - Services over 620,000 part numbers
 - Provides 99.7% service within 48 hours
- Our ability to get the right part, in the right place, and at the right time separates us from the competition.. providing world class service for over 80 years
- World-class logistics increases customer loyalty and improves shareholder value



Cat Logistics: World Class Service

Today

Cat Logistics is one of the fastest growing divisions within Caterpillar.

▶ Service Parts & Aftermarket Product Support

▶ **Maintenance, Repair & Operations**

▶ Inbound to Manufacturing

▶ Transportation

Caterpillar Logistics has 80+ years of experience in Global Supply Chain Management.

Caterpillar has leveraged unequalled aftermarket support from Cat Logistics to achieve industry-leading buyer loyalty.

Global footprint

- ▶ 6 Continents
- ▶ 28 Countries
- ▶ 100+ Facilities
- ▶ 12,000 Employees
- ▶ 24 Languages
- ▶ Shipping to 190+ Countries
- ▶ 29M + Sq.Ft.
- ▶ 160M + Orders/Yr
- ▶ 16B lbs of Freight/Yr
- ▶ \$2.4B Transportation Purchased/Yr
- ▶ 18M SKUs Serviced/Yr



Region	Facilities	People
Americas	76	7,200
Europe, Africa, Middle East & CIS	42	3,900
Asia-Pacific	12	900



Today's discussion will focus on

- **The impact of an ever changing world upon your business**
- **Inventory management tools & process**
- **Ways for your operations to remain agile in the changing global market**
 - **developing and flexing your strategy in order to:**
 - **Improve Productivity**
 - ✓ Improve parts availability
 - **Improve Asset Utilization**
 - ✓ Reduce your inventory investment
 - ✓ Optimal Inventory policies to meet service objectives
 - **Improve Operating Margin**
 - ✓ Improve personnel productivity
 - ✓ Leverage technology and information to reduce labour costs
 - ✓ Reduced stores handling costs by Push/Pull deployment

How to manage inventory to achieve right part, right place, right time?

Why is managing spare parts inventory important?

Inventory is core for your operations...but not just in the parts...

Inventory drives each of the following:

- Stores size / real estate / buildings
- Stores Operations / people / process
- Stores layout / storage / mobile equipment
- Transportation
- Deployment across operations

Having the right parts, in the right place, at the right time will impact productivity and operational efficiency.

Contributes to establishing and maintaining a competitive advantage



The changing global market

In the modern economy and worldwide market place, what could change the status quo?...

Everything!

Economic crisis - “Great Recession”

Government policy

Earthquakes

Tsunami

Competition

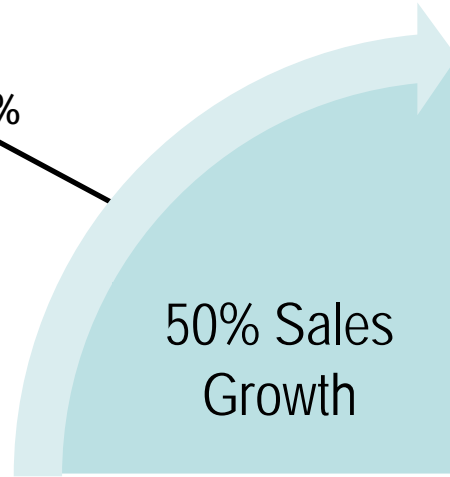
Changing supply base

Business Recovery, Growth & Expansion

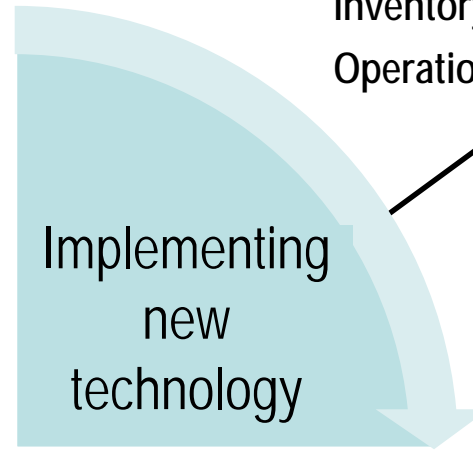


Cat Logistics – Flexible performance measures

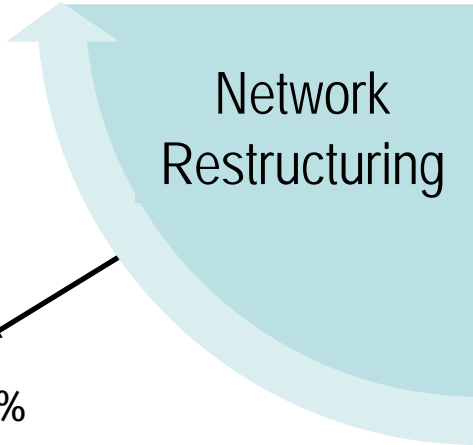
Fill rate = + 3%
Inventory = - 7.5%
Inventory turns = + 65%



Maintained fill rate above 95%
Inventory = - 3%
Operational/Customer savings = + 5%



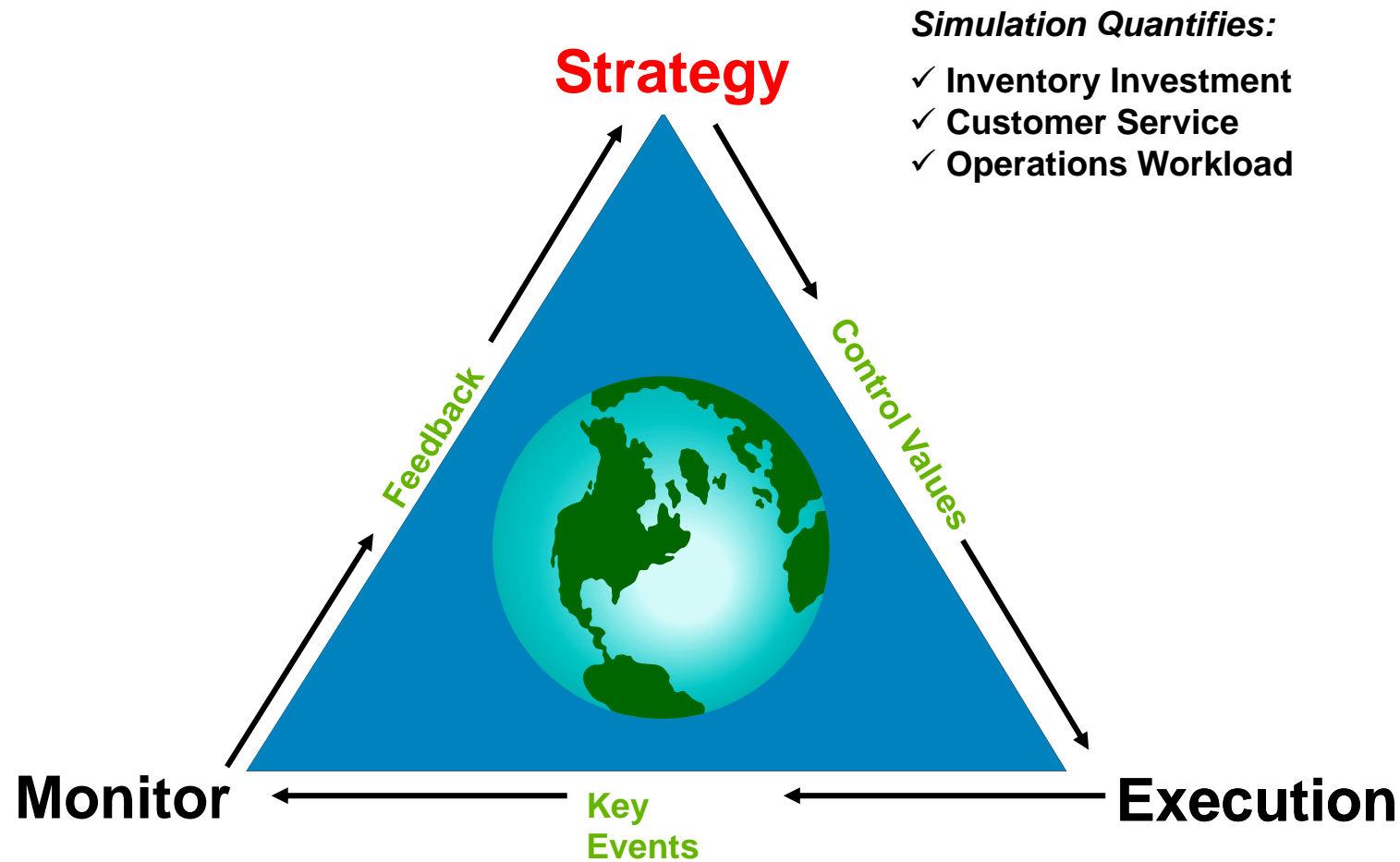
Inventory = - 42%
Inventory turns = + 49%
Facing fill rate = + 13%
System fill rate = + 3%



Maintained fill rate > 95%
Inventory = - 7%



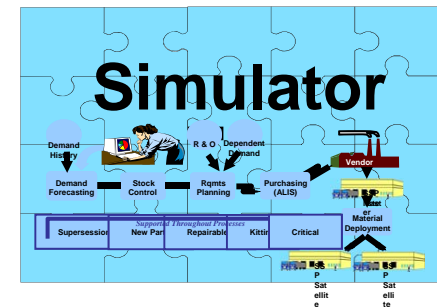
Inventory Management: Defining your strategy



Strategy: When do we simulate?...

when the operations environment or strategy change

Decisions Regarding Inventory Management Are Simulated ...



Supply

- Changing supply base
- Changes to lead time
- Material costs
- Transport costs
- Network restructure
- Parts categorisation

Demand

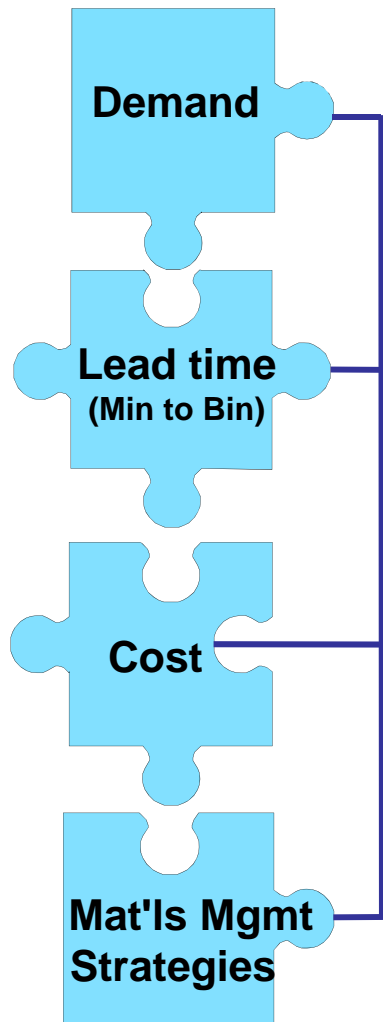
- Changing operations base
- Pricing changes
- Distribution costs
- Service targets
- Productivity targets
- Production goals

***... Results of Strategies Known Prior to Implementation &
Control Values Link Simulation to Execution Environment!***

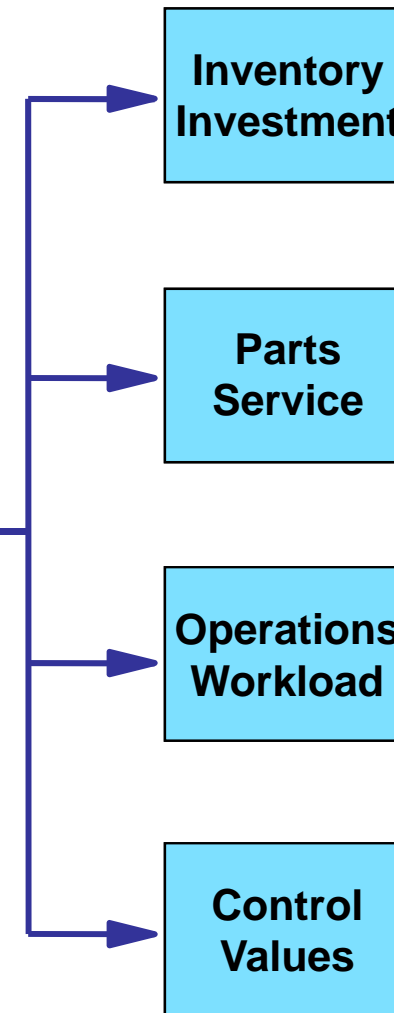


Strategy: Simulation is a Collaborative Process

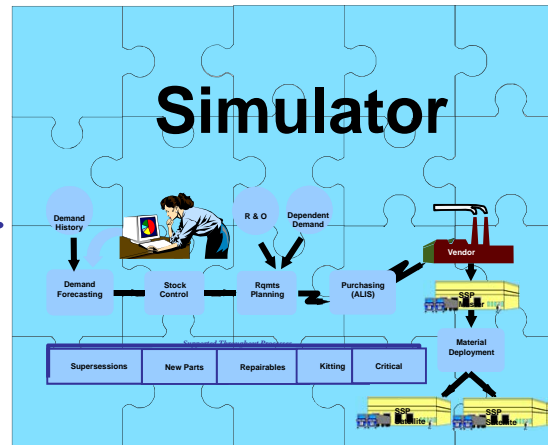
Information Gathering



Simulation Results/Benefits



Simulation Study

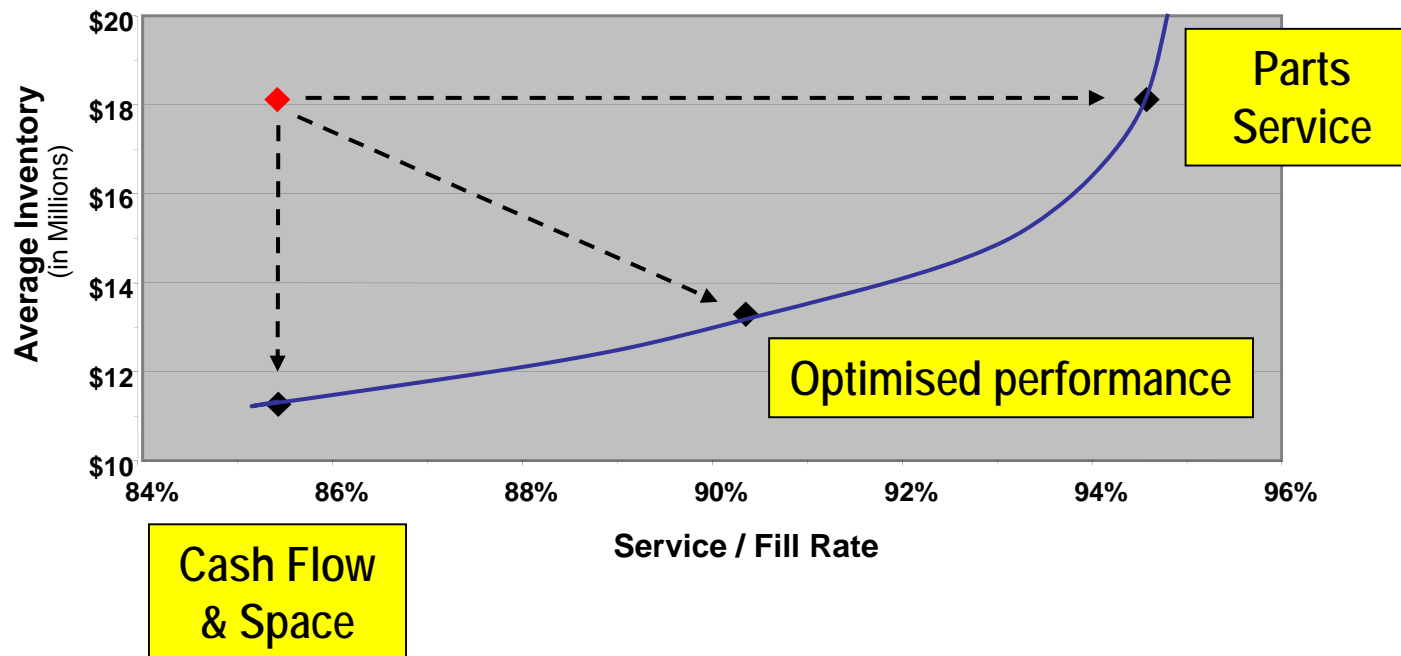


- ✓ Transaction-processing simulation, not a mathematical calculation
- ✓ Re-creates 12-month period to determine optimized fill rates and inventory positions.

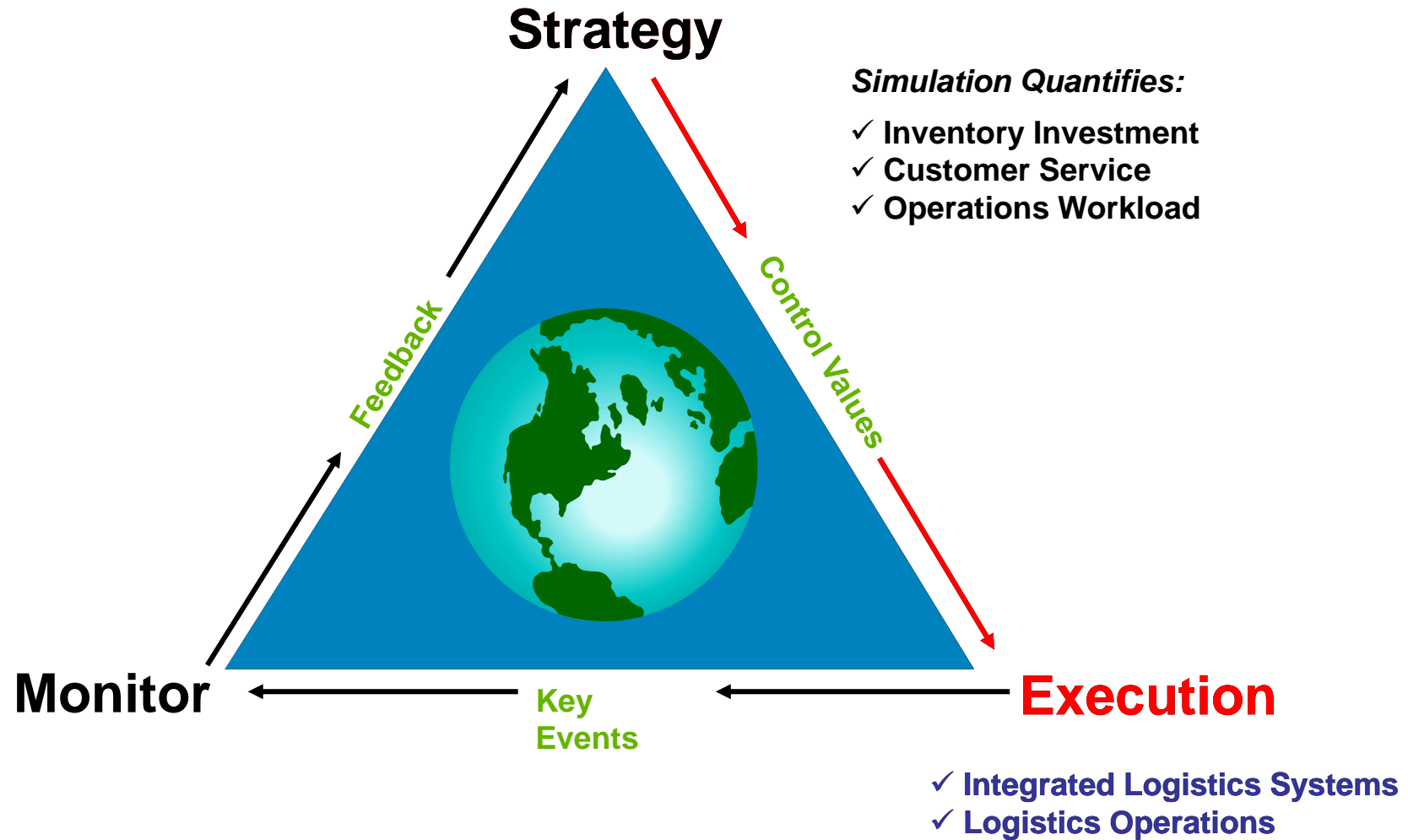
Strategy: Simulation Results Demonstration

Simulation Establishes Optimal Service vs. Inventory Exchange Curve

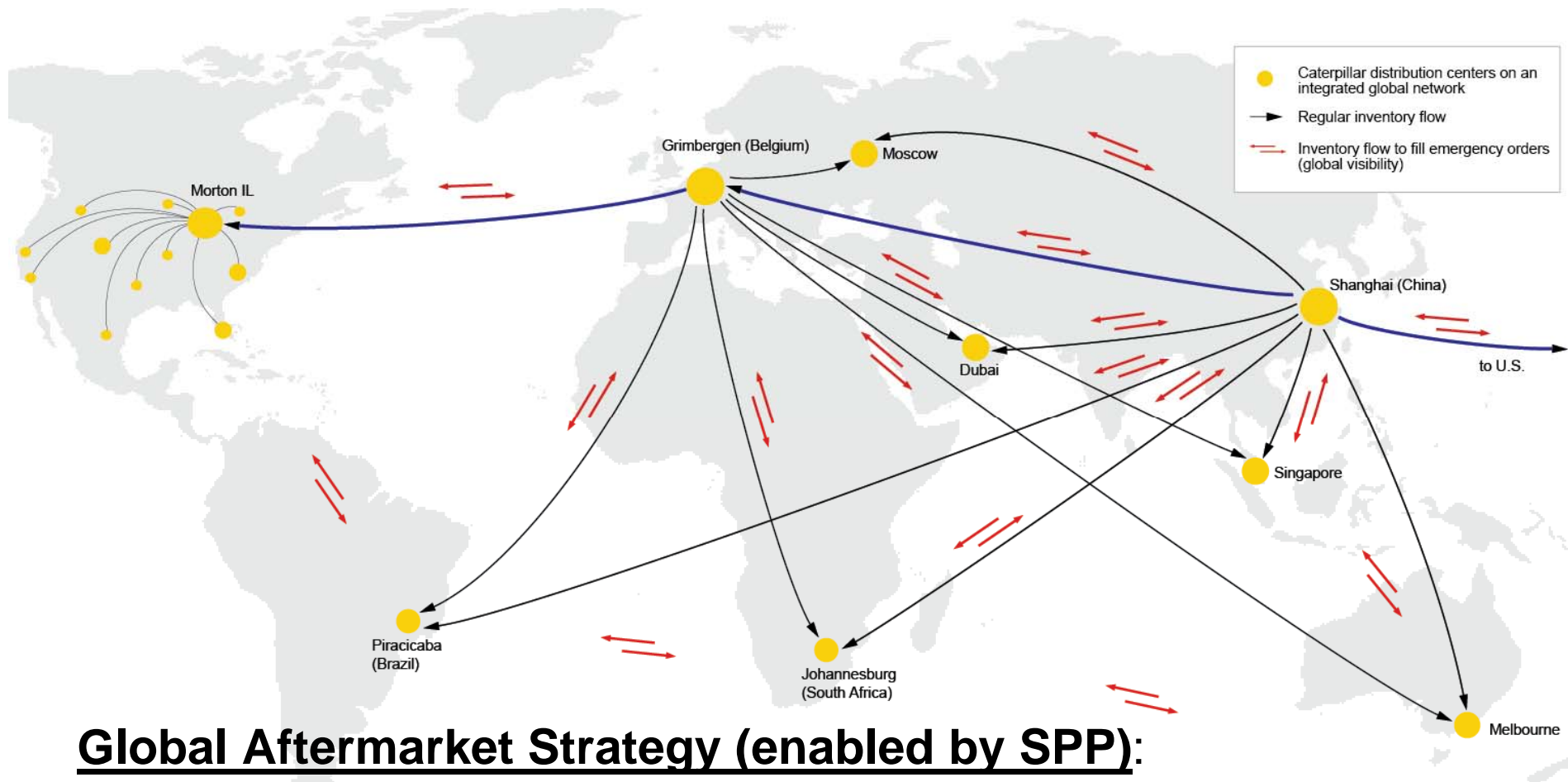
Simulation Scenario	***** Statistics *****			***** Simulation Results *****		
	Stocked Items	Demand Lines	Demand COGS	Service / Fill Rate	Average Inventory	Est. Turns
#1 - Baseline	26,708	114,197	\$ 66.924	85.4%	\$ 18.181	3.69
#2 - Optimize Inventory	20,931	114,197	\$ 66.924	85.4%	\$ 11.187	5.98
#3 - Optimize Service	20,931	114,197	\$ 66.924	94.6%	\$ 18.195	3.67
#4 - Mid-point	20,931	114,197	\$ 66.924	90.3%	\$ 13.430	4.99



Inventory Management: Executing your strategy



Execution: Flexible Global Inventory Flow



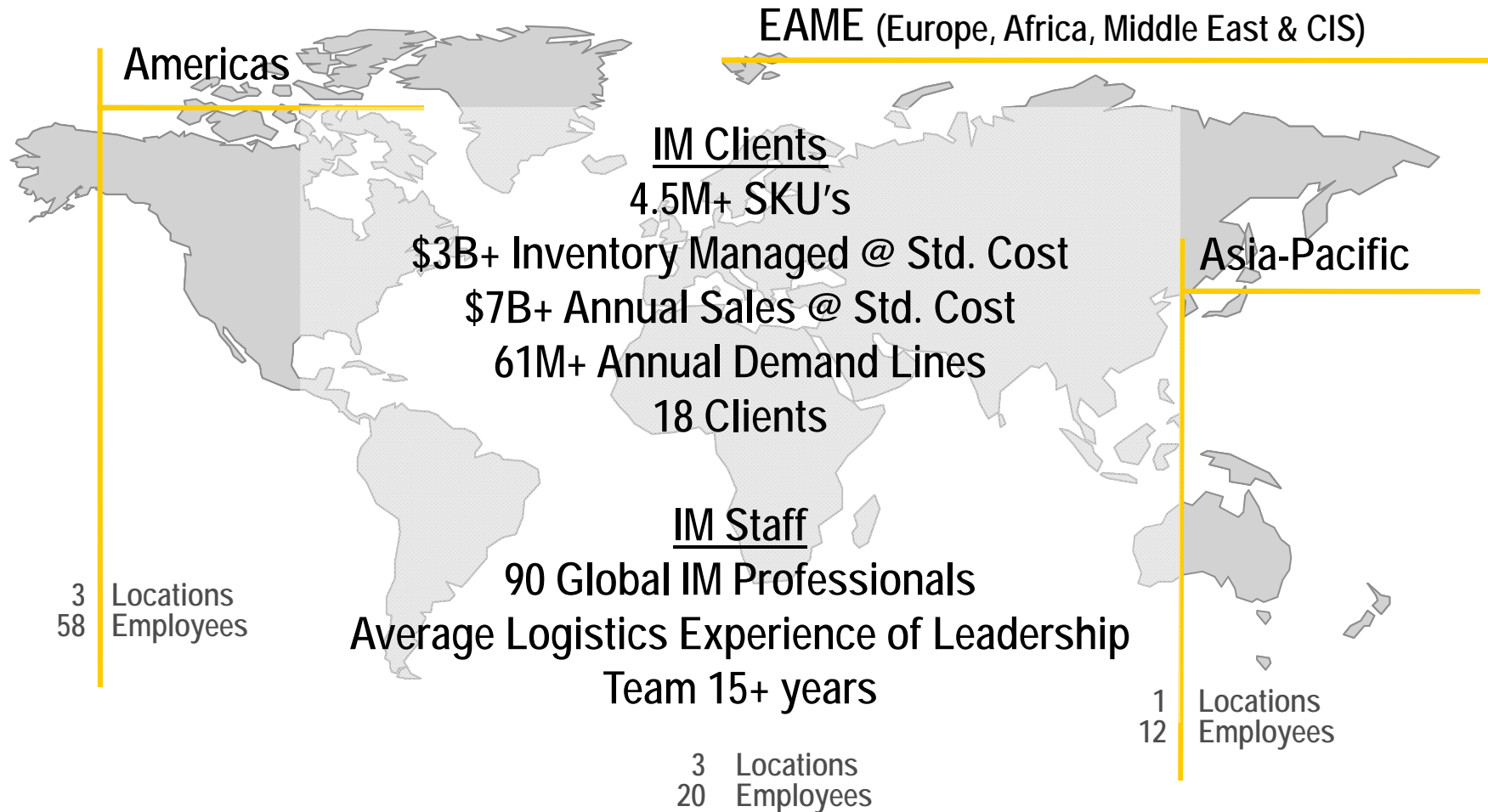
Global Aftermarket Strategy (enabled by SPP):

Global Sourcing
 Global Available To Promise
 Global Network Visibility

Multi-echelon
 Multi-entry Point
 Push Deployment



Execution: Global Inventory Management (IM)



Execution: A Collaborative Process

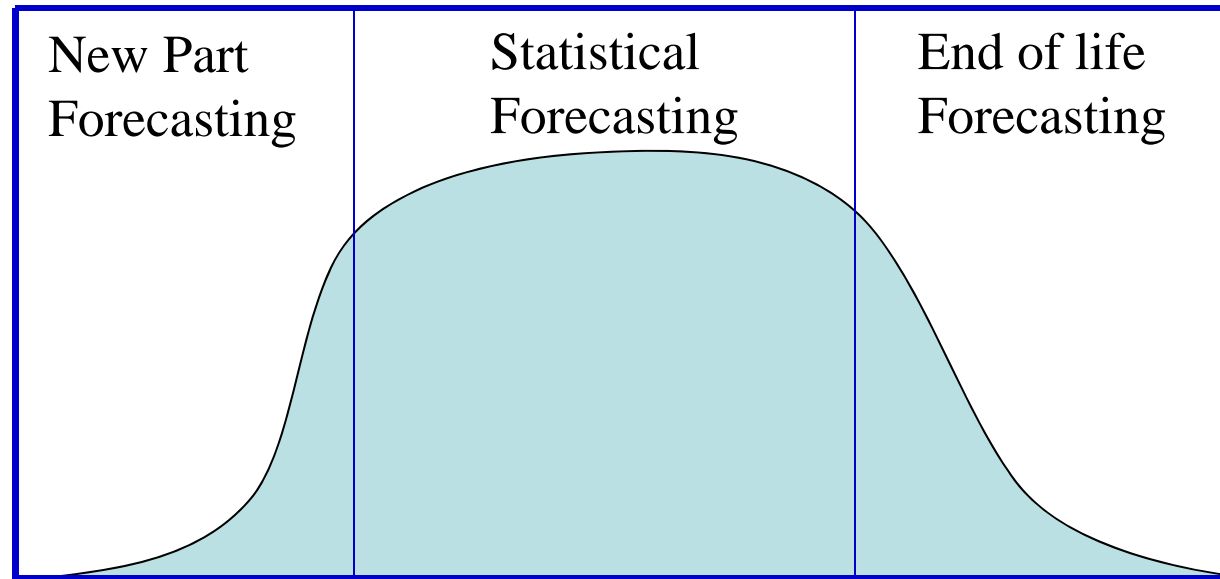
Function	Cat Logistics	Collaboration	Client
Customer management:	I		A R
Sales order entry			A R
Sales order allocation	I		A R
Management of Supersessions		X	
Forecasting and inventory planning	A R		I
New product forecasting		X	
Suggested schedules for replenishment	A R		I
Purchase Order Approval	C		A R
Purchase order communication to suppliers			A R
PO follow-up, expediting, de-expediting	C		A R
Vendor management	C		A R
Standard and ad hoc reporting	A R		C
Inventory ownership			A R
Perform data audits and resolve discrepancies		X	
Determine disposition of excess/obsolete inventory		X	
Sponsor and prioritize continuous improvement projects		X	

- Accountable (A) – “Buck Stops Here”
- Responsible (R) – “Doer”
- Consult (C) – Two way communication
- Inform (I) – FYI One-way communication

Clients have full control over customer relationships, supplier relationships, and purchase orders

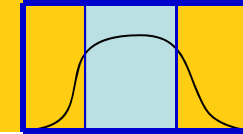


Execution: Lifecycle of a Part

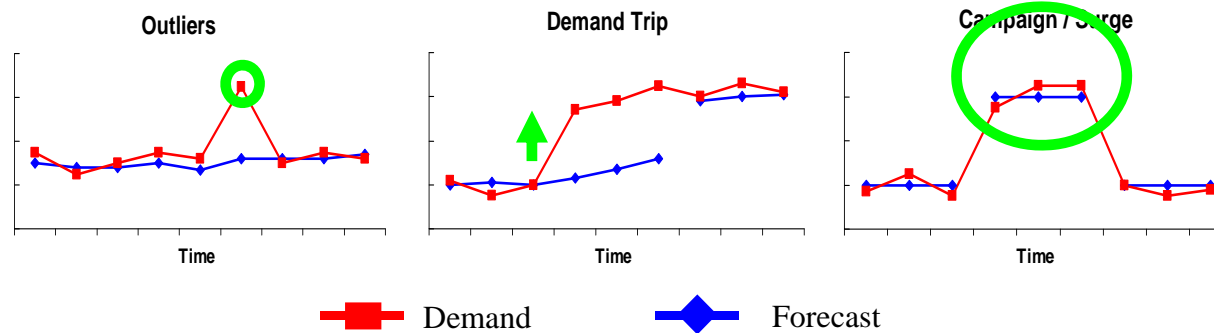


- New Part Forecasting – Acceleration of curve
 - ✓ Collect statistics from similar parts
 - ✓ Identify New Parts
 - ✓ Set parameters
- Statistical Forecast – Responsive to demand changes
 - ✓ Automatic forecast model selection
 - ✓ Fine tuning of parameters
 - ✓ Trip logic to react to demand shifts
- End of Life forecasting – Minimising potential obsolescence
 - ✓ Managing supersession & declining demand

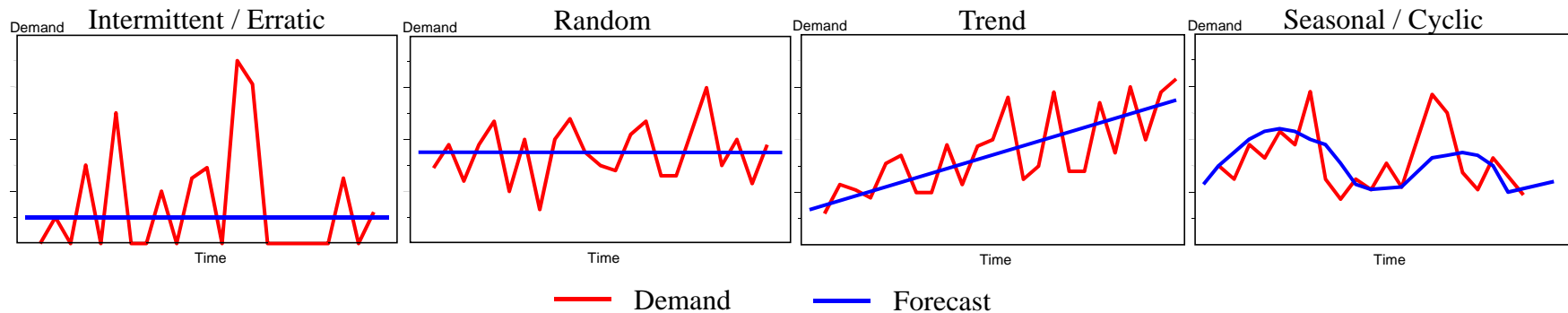
Execution: Flexible Forecasting



Managing varying demand types:



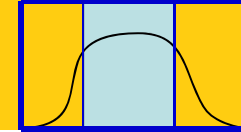
System defined forecast models at SKU level:



Responsiveness of the system can be manually adjusted during periods of change to be more aggressive/conservative

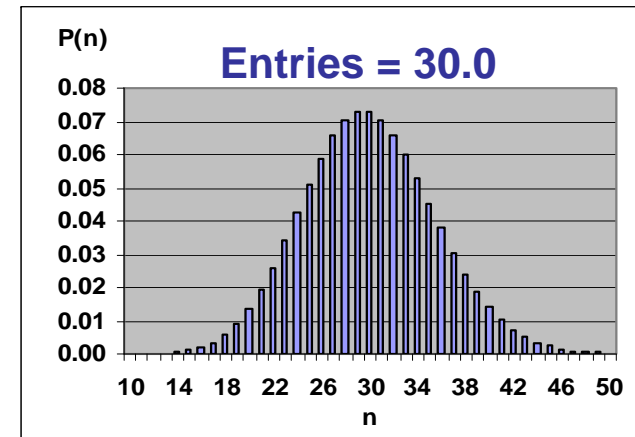
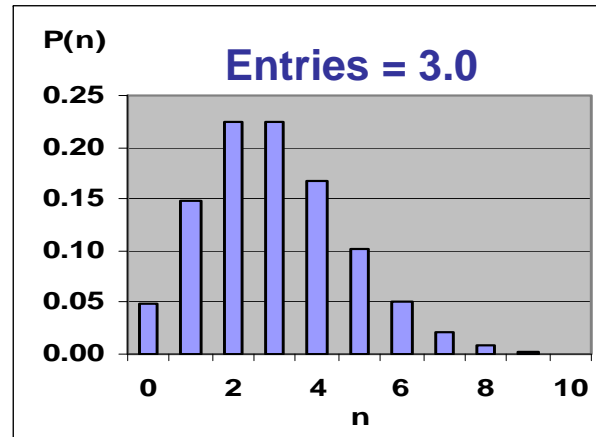
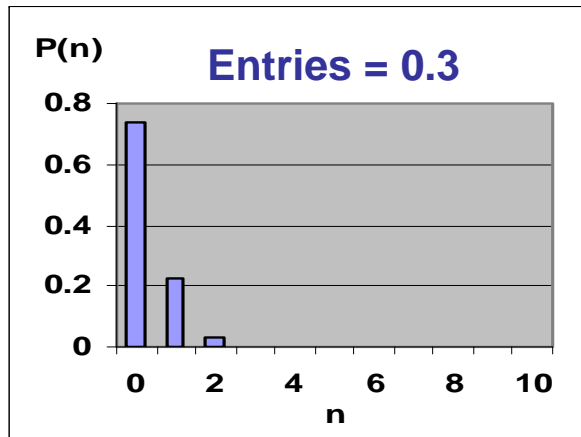


Execution: Forecasting Technology



How do you measure availability? - In pieces?

How do you forecast demand? - In pieces?



Cat Logistics forecasts using Entries (customer order lines)

- **Forecasts managed at SKU level**
- **60%-70% of parts are slow moving**
- **Appropriate probability distribution method applied**
 - ✓ Forecasting techniques combine Poisson with entry-based approach
 - ✓ Poisson proven to be an excellent predictor of customer order lines
 - ✓ **Extremely efficient for slow moving parts**

Execution: Why forecast using Entries?

Using demand transactions to forecast & plan inventory provides the foundation to optimising inventory & service

	<u>PART 1A1</u>	<u>PART 2B2</u>
<i>Monthly Demand</i>	100 pieces	100 pieces
<i>Cost</i>	\$20	\$20
<i>Lead Time</i>	60 days	60 days
<i>Criticality (Service)</i>	Same	Same

Which part should have greater safety stock? - Same?

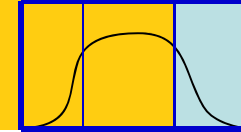
Customer Order Lines 2 @ 50 pieces 20 @ 5 pieces

Part 2B2 impacts more customers

How does this effect your strategy?

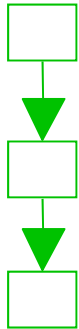
What store size do you need?

What are your real operations service targets?



➤ Supersession (part substitution)

One to One

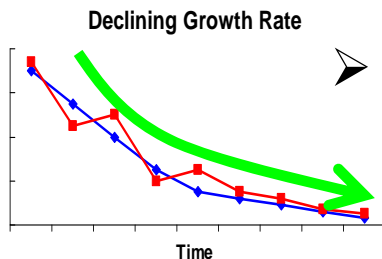


- ✓ Sales order allocation
- ✓ Forecasting
 - » Demand history captured on actual item ordered and bottom of chain
 - » React daily to supersession changes (forecast)
- ✓ Replenishments (DRP/Purchasing and Deployments)
 - » Statistics rolled from existing part to bottom of the chain part

➤ SKU level

➤ Chain breaks automatically handled

- ✓ Forecast indicators reset appropriately
- ✓ Demand history and forecast statistics updated



➤ Declining demand

- ✓ Forecast tracks demand changes
- ✓ Responsiveness to change can be varied

System flexibility enables forecast accuracy, optimised inventory and **minimises obsolescence**

Inventory Management: Monitoring the business environment



Monitor: Supply Chain Performance Management

- *Trend Analysis and Performance Reporting*

- Various Service Profiles

- Network
- Warehouse
- Customer
- Region / Country

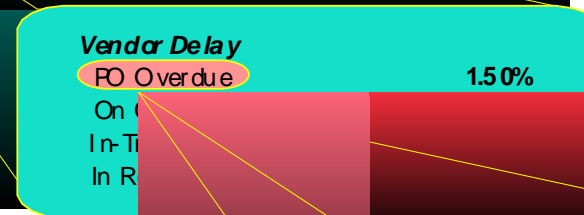
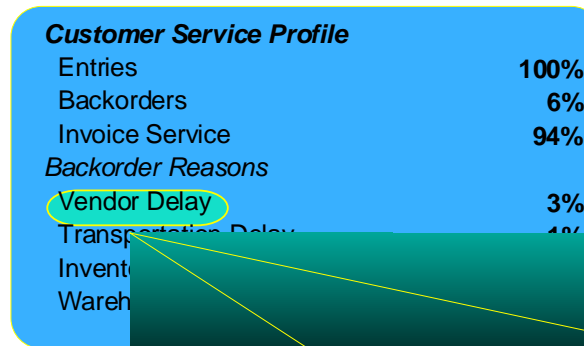
- Multi-Level Inquiries

- Drill-down Capability

- Continuous Improvement

- Performance by:

- Vendor
- Product class
- Product cost
- Product velocity
- Etc.



PO Overdue

Item	B/O Date	Bin	Vendor
A	1/1/99	C9	207
A	1/2/99	C9	207
C	1/6/99	F5	207
G	1/1/99	G3	205

Remaining agile and flexible in the global economy



Questions?

