Perishable Supply Chains

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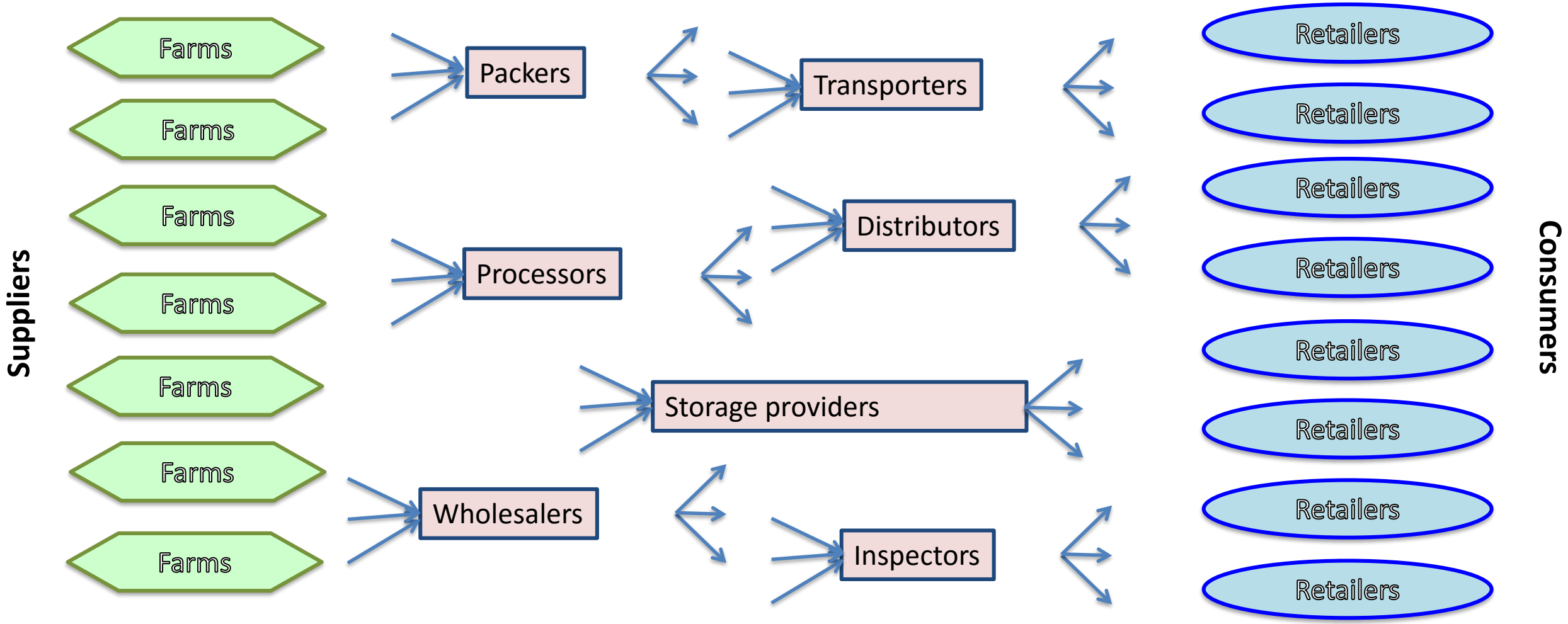
ScanTech

Food Supply Chains (Produce)

Product is handled/transferred multiple times



Distinguishing Food Chain Characteristics

- Products
  - Perishable
  - Large variety
  - Product specific handling requirements
  - 60% imports
- Technology
  - Lots of sophisticated technology
  - Limited technology use
- Regulations
  - U.S. regulations historically not enforced but will in the future
  - "high impact" legislation
- Enterprises
  - Very large number of enterprises
  - Large differences in sophistication
  - Limited integration
  - Combination push/pull

Integrated Food Chain (IFC) Research Center

Cold chain management of perishable goods

Food Safety (Compliance)

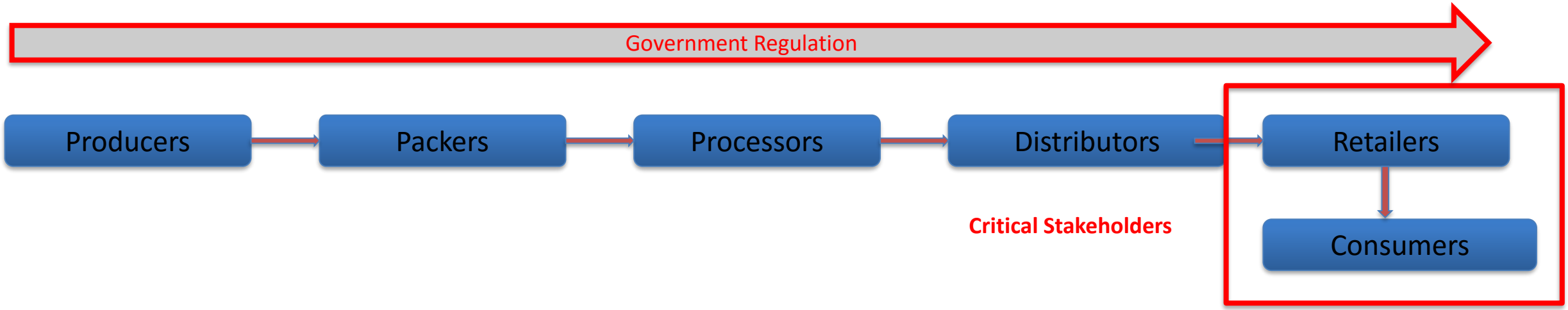
Product Quality
(Monitor & control)

Performance (Analytics)

Cold Chain Management Professional

- Planning & Management
- Integration
- Assessment and Audit

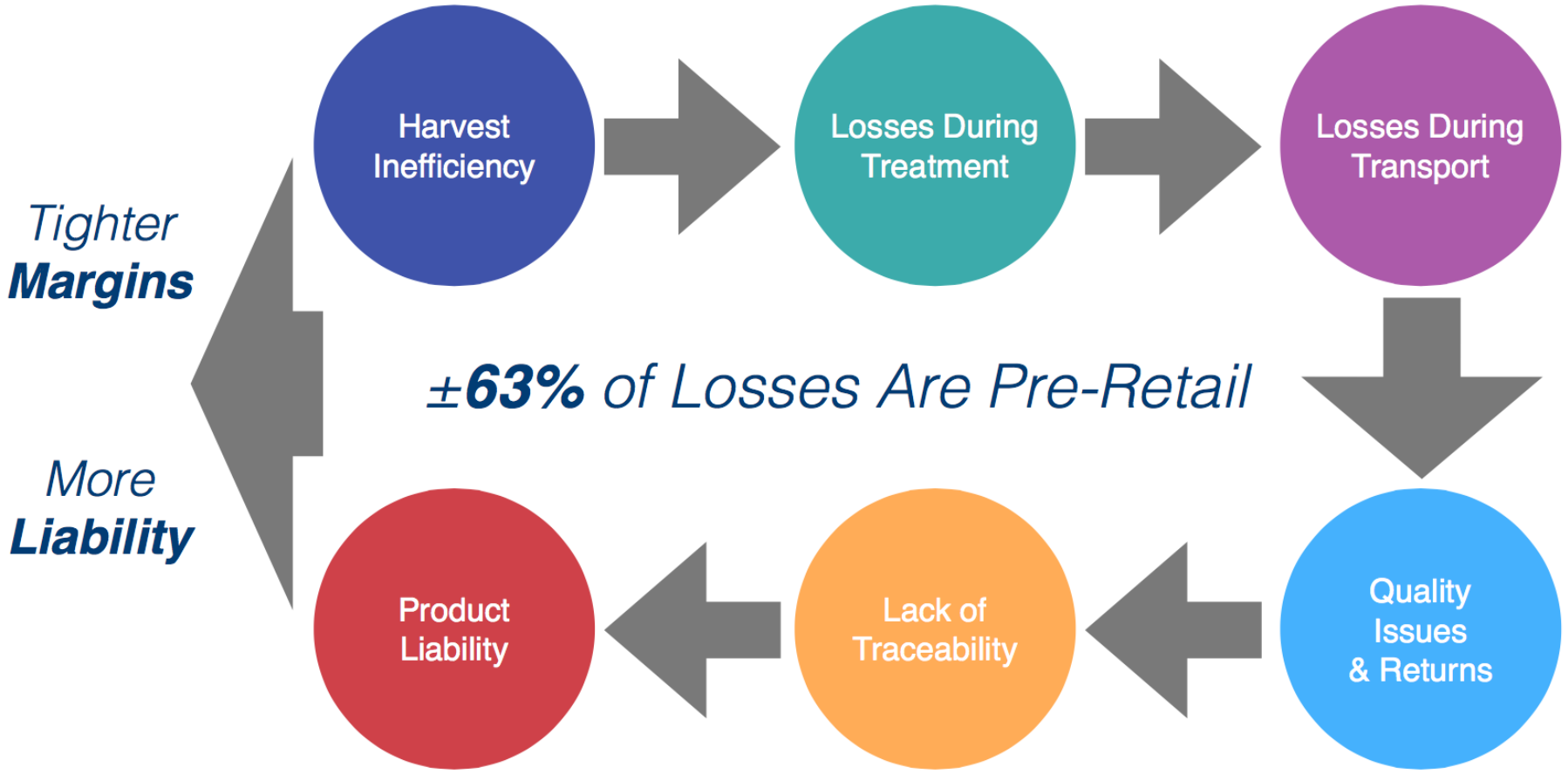
Focus Today – Move From SC "Management" to "Integration"



- Consumers want safe and high quality food that has a reasonable time to consume
- Retailers want continuous availability, high quality and minimum losses
- Regulators want to know who is responsible if safety issues arise
- Retailers and regulators want more assurance that safety will not be compromised
- Everyone wants more "value" from information compliance

Current Issues

Problems Facing Growers, Producers, & Distributors



Highlights of the Food Safety Modernization Act

- New enforcement power for FDA
- New requirements for FDA
- New processor/retailer expectations
- New testing requirements
- Traceability requirements
- Importer requirements
- New accreditation requirements
- Fees for service

FMSA: Effects on Transport

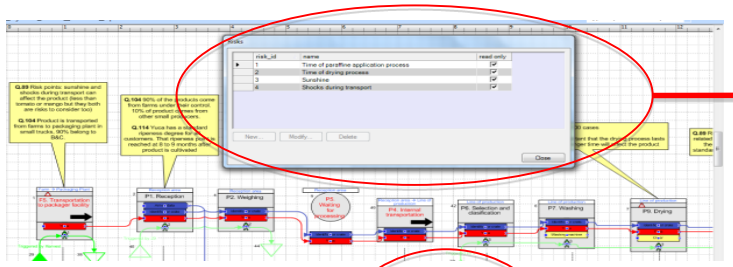
- Transportation now included in the regulation for traceability
- FDA can stop transport of product entering a market
- New data requirements and records
- Time limit on providing trace back
- Exposure for out of spec product
- Liability for cross contamination of transport
- Preventive of Mixed loads?

Supply Chain Integration

- Definition – enterprises within the supply chain cooperate to achieve certain desirable results

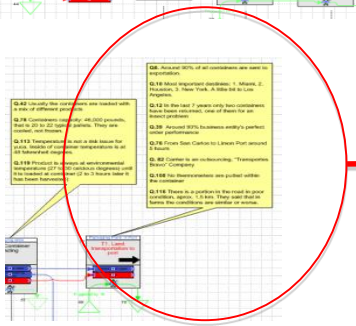
- Realizing integration value
  - Minimizing cost of food safety compliance
  - Increasing “quality sell time”
  - Increasing supply chain efficiency

Value from Integrating the Supply Chain



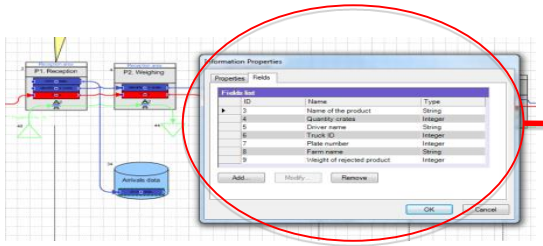
Control points and actual quality

- ✓*Time of paraffine application process*
- ✓*Time of drying process*
- ✓*Sunshine*
- ✓*Shocks during transportation*



Logistics performance (times and costs)

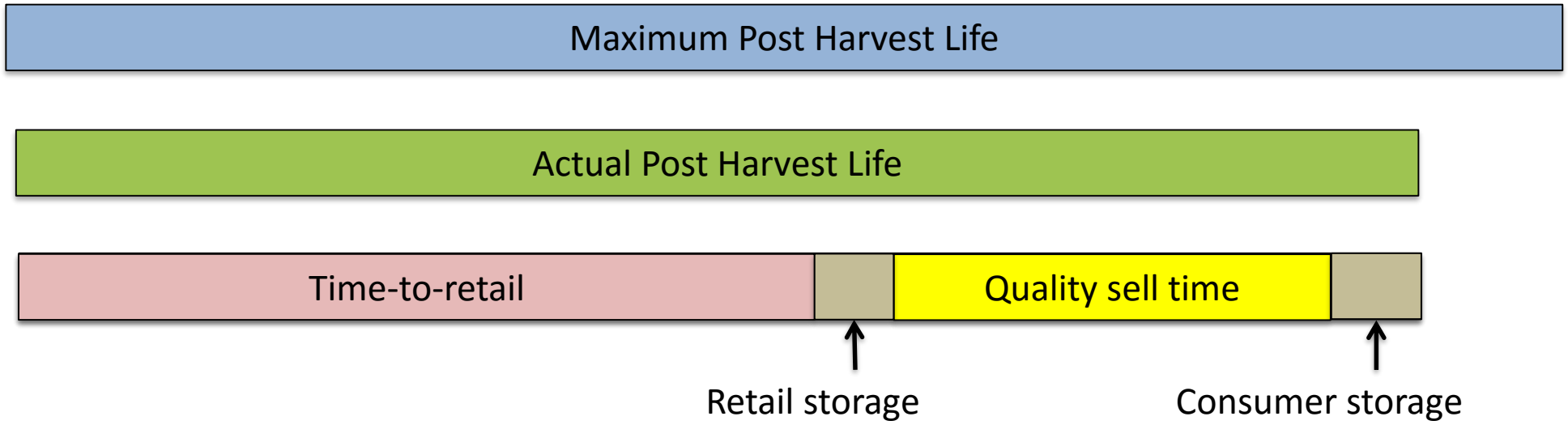
- ✓*90% of all containers are sent to exportation*
- ✓*90% business perfect order performance*
- ✓*(4,5,6 hours. Triang. Distrib.) from pack. facility to export port*



Gaps in traceability

- ✓*No code bar technology used at all*
- ✓*Lot number is date and grower identification basically*
- ✓*Paper and isolate records about: Qty. driver, Plate number, date and weight*

Increasing Quality Sell Time

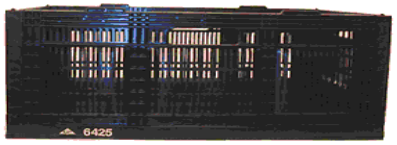


- **Increasing quality sell time**
  - **Increase actual post harvest life**
  - **Decrease time-to-retail**
  - **Decrease retail storage time**

Increase Actual Post Harvest Life

- Improved temperature environment
  - Communicate product requirements throughout the chain
  - Educate transporters
  - Determine best compromise for mixed loads
  - Monitor temperature through the chain
  - Determine economic value for improved monitoring
- Improved packaging
  - Communicate desired packaging
  - Educate packers
  - Facilitate mixed pallet
  - Determine economic value for packaging improvements
- Collaborate regarding cost versus value of improvements

RPCs



Decrease Time to Retail

- Measure time in each activity of the supply chain
  - Required data captured to comply with safety requirements
  - Data must be shared
- Assess time performance of each activity
- Practice continuous improvement
- Design agile supply chains
  - Time to retail changes with seasons
  - Adapt the chain as sourcing moves

Decrease Retail Storage Time

- Decrease variability in time-to-retail
- Accurately predict remaining shelf life
- Accurately predict time to replenish
- Optimize inventory

Increasing Food Supply Chain Efficiency

- Cost Drivers
  - Transportation
  - Storage
  - Shrinkage
  - Inventory
  - Lost sales

- Improving Efficiency
  - Network design
  - Energy management
  - Monitoring and control
  - Predictive modeling
  - Inventory management
  - Transportation Planning

How do we achieve integration?

- Focus on economic value
- Recognize that food safety regulations are inevitable
  - Require significant data capture
  - Very expensive if everybody works independently
  - More value if the data is shared
  - Analytics is required to achieve real value
- Collaborate to monitor and control through the chain
  - Lots of technology
  - Economic value of new technology not yet established
  - Need for supply chain process standardization
- Measure and improve performance
  - Time spent in supply chain activities
  - Inventory optimization at each stage
  - Predictive modeling
  - Food chain design
  - Transportation planning

Recognized Benefits of Cold Chain Integrity

Stage	Description
Initial	Typical cold chain management processes are undocumented and driven by ad hoc and reactive management mostly driven by events. This is usually an unstable environment.
Repeatable	Temperature monitoring using GPS is characteristic that some processes are repeatable, possibly with consistent results. Process discipline is unlikely to be rigorous, but where it exists it may help to ensure that existing processes are maintained.
Defined	Monitoring temperatures using prescribed limits and thresholds is characteristic of processes that are defined and documented with standardized processes established with some degree of improvement over time. These standard processes are in place and used to establish consistency of process performance across the cold chain
Managed	A temperature performance index provides proactive controls where dispatchers and supervisors can effectively control the delivery process. Of note, management can adjust and adapt the process to better manage driver behavior and delivery methods without deviations from set specifications. This can allow a summer and winter approach to operations.
Optimized	A temperature performance and service index is a characteristic of processes that focus on continual process improvement through both incremental and innovative technological changes/improvements.

Transforming International Food Chains

- Expand information flow
  - Related to food quality and status
  - Among the entities along the chain
- Building systems that predict the trajectory of quality and status of product moving along the chain
- Building new decision support tools
  - to manage variability
  - coordinate the supply chains
  - speed product flow
  - redirect downstream product allocation
  - maximize “quality-sell-time”

New Models Emerging

95% of total cassava exports enter through these 6 ports:

The remaining 5% came from these other ports (descending order):

- ❑San Francisco, CA
- ❑San Diego, CA
- ❑Savannah, GA
- ❑Seattle, WA
- ❑Norfolk, VA
- ❑Baltimore, MD
- ❑Honolulu, HI
- ❑Nogales, AZ
- ❑Ogdensburg, NY
- ❑Tampa, FL
- ❑U.S. Virgin Islands

Infrastructure for Integration

- Scheduled temperature control intermodal models
- New food safety technology models – facilities, automation, and integrated services designed for cold chain management
- Integrated border management policies and practices
- Use of process and technology management for better for better visibility and control
- Collaborative commerce for synchronized supply chains



ScanTech

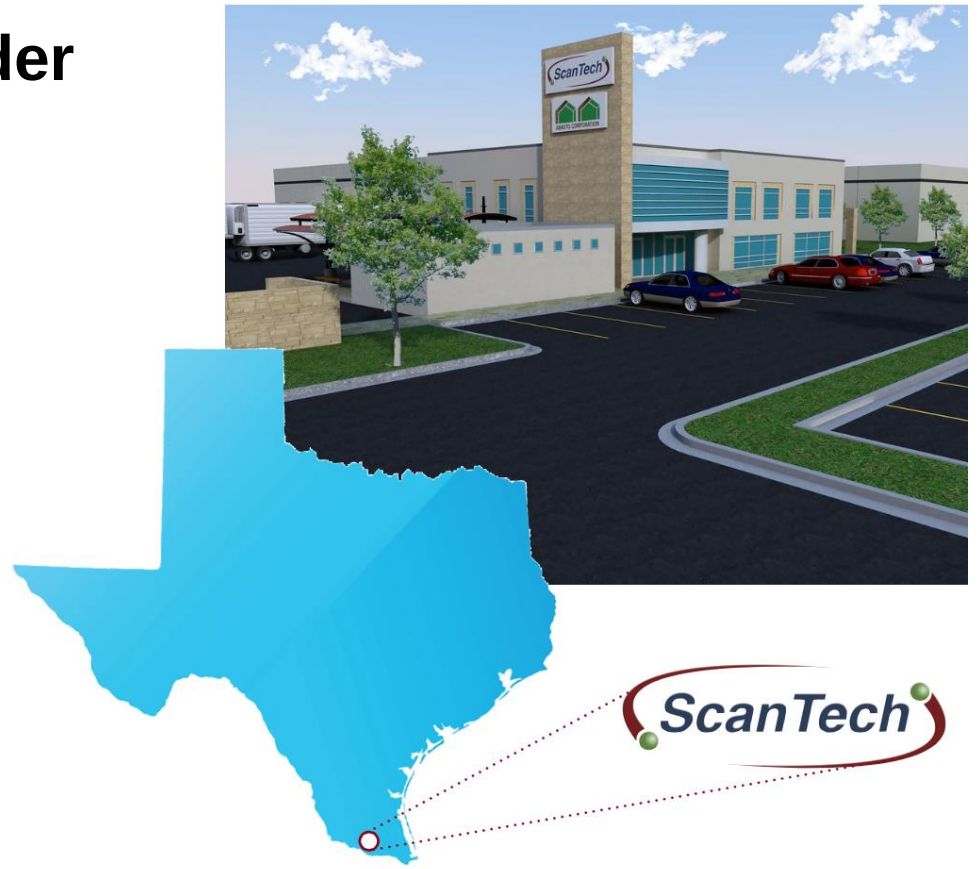
ScanTech is in the process of building a next-generation food treatment facility at the US border

On 22 August 2012, the USDA amended its phytosanitary treatment regulations to provide generic criteria for new irradiation facilities, allowing them to be located anywhere in the southern United States subject to federal approval

PROJECT HIGHLIGHTS

- **Proprietary high-speed conveyor systems (designed to minimize processing time) and precision-control ECP™ systems allow the facility to treat a variety of produce with maximum efficiency and efficacy**

- **Conforms to USDA phytosanitary treatment requirements and will be ISO 14470 (Food Irradiation) certified/ compliant**



Strategic Planning

- Growth Strategy
- Candidate Qualification and Diligence
- Distribution Assessment & Strategy
- Competitive Intelligence and SWOT
- Market Assessment
- Customer Requirements
- Investment/Budget Feasibility

Operations

- Operational Design
- Sourcing & Procurement
- STS 10/40
- Production/Service Control
- SOPs
- Safety and Regulatory Requirements
- 3PL Integration

Supply Chain Information Technology

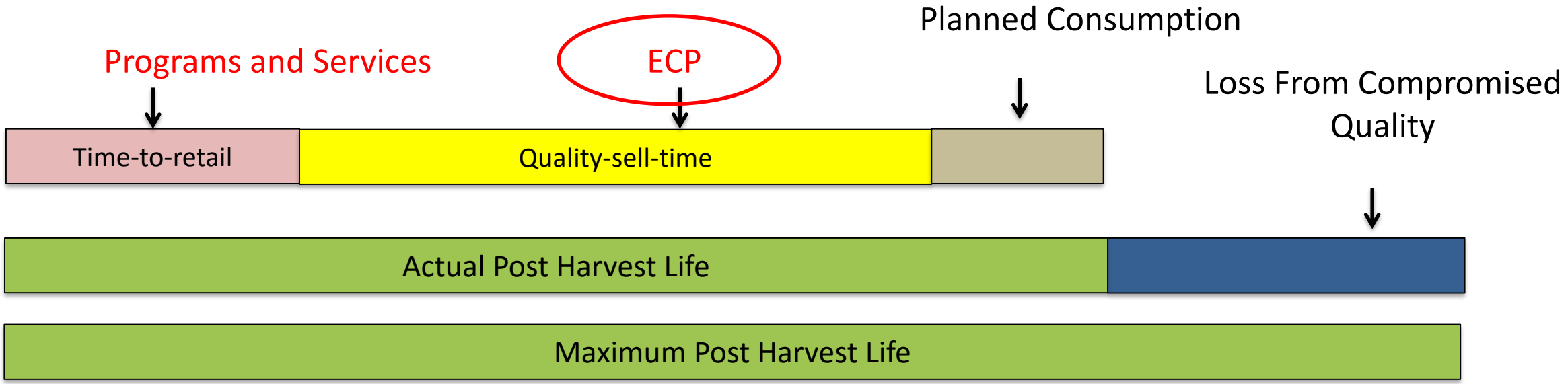
- Planning and Assessment
- Software Selection
- Solution Implementation
  - Enterprise Resource Planning
  - Customer Relationship Management
  - Yard Management (includes CBP - RFID Systems Design and Implementation
  - Dock Scheduling
  - Order Management
  - Location Management
  - Warehouse Control System
  - Conveyor Control System
  - Supply Chain Intelligence: Oder Visibility; Transportation Visibility; Replenishment planning; Analytics

Material Handling Integration

- Turnkey Material Handling Systems
- Systems Design
- Material Handling Controls (WCS)
- Installation Project Management
- Maintenance

ECP/STS 1040 Controls

ScanTech's Focus on Quality-Sell-Time

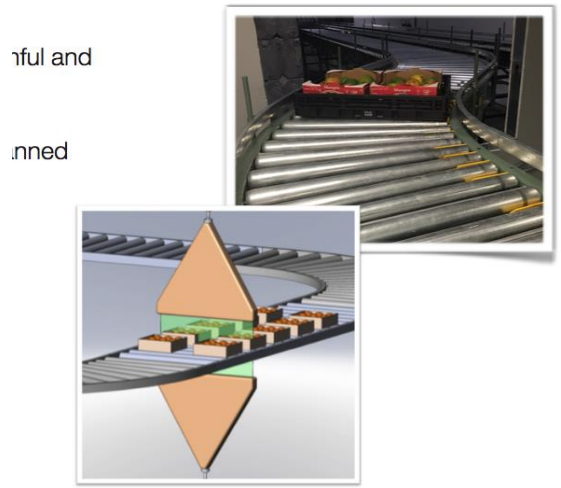


Increasing quality sell time

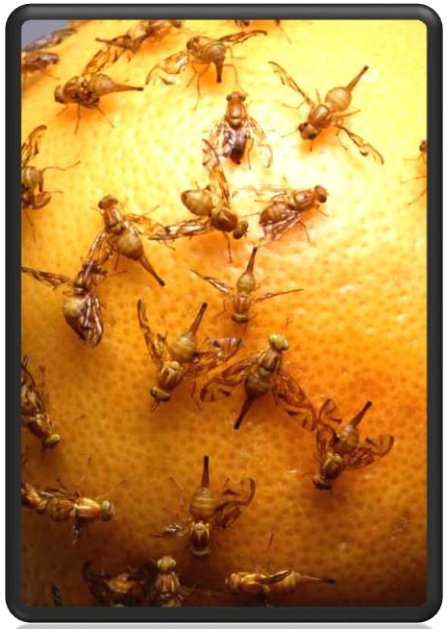
- Increase post harvest life through ECP

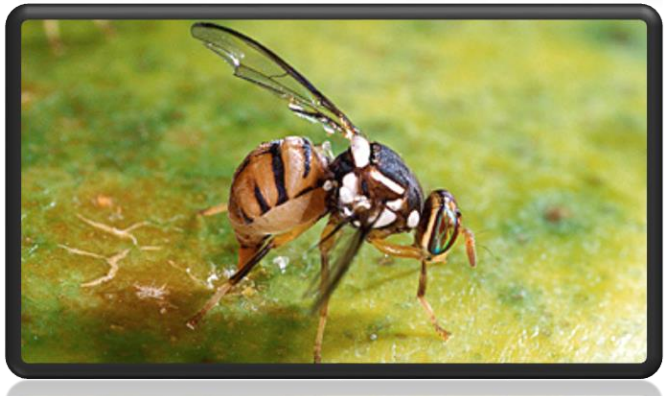
What is Electronic Cold-Pasteurization (ECP™)?

- **ECP™ is a non-nuclear source of irradiation via Electron Beam, which was first introduced in the 1940s**
- **During ECP™ treatment, an accelerated beam of electrons is shaped magnetically to be scanned across food in its standard retail packaging on a high-speed conveyor belt**
- **Treated food passes through the electron beam for milliseconds with no chemicals, additives, or other residue and no measurable increase in temperature**
- **When ECP's™ ionizing radiation strikes bugs, bacteria and other microbes, its high energy, breaks chemical bonds in molecules that are vital for cell growth and integrity. As a result, pest, bacteria and pathogens either die immediately or can no longer multiply to cause illness or spoilage**

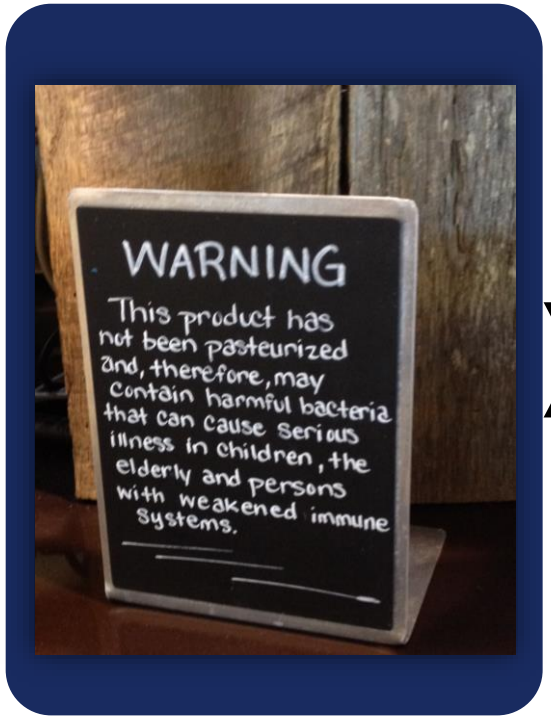


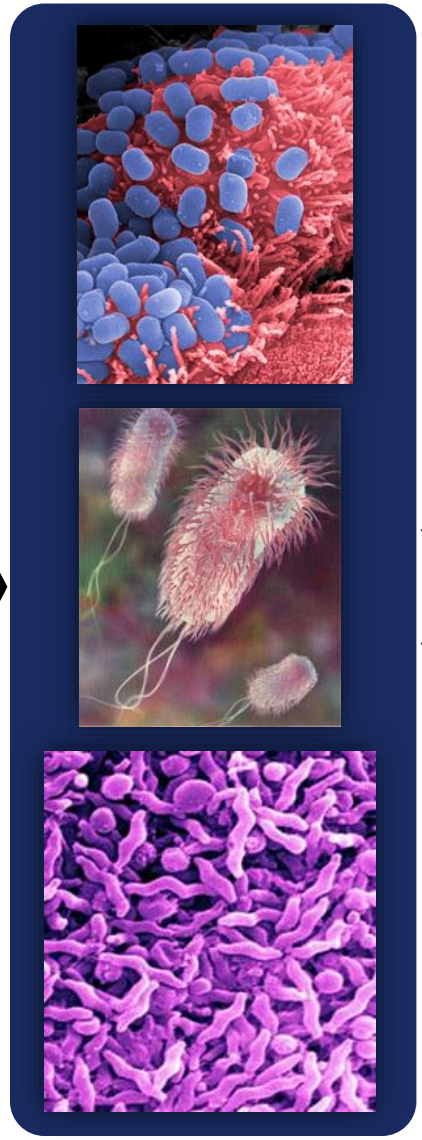
Phytosanitary Treatment

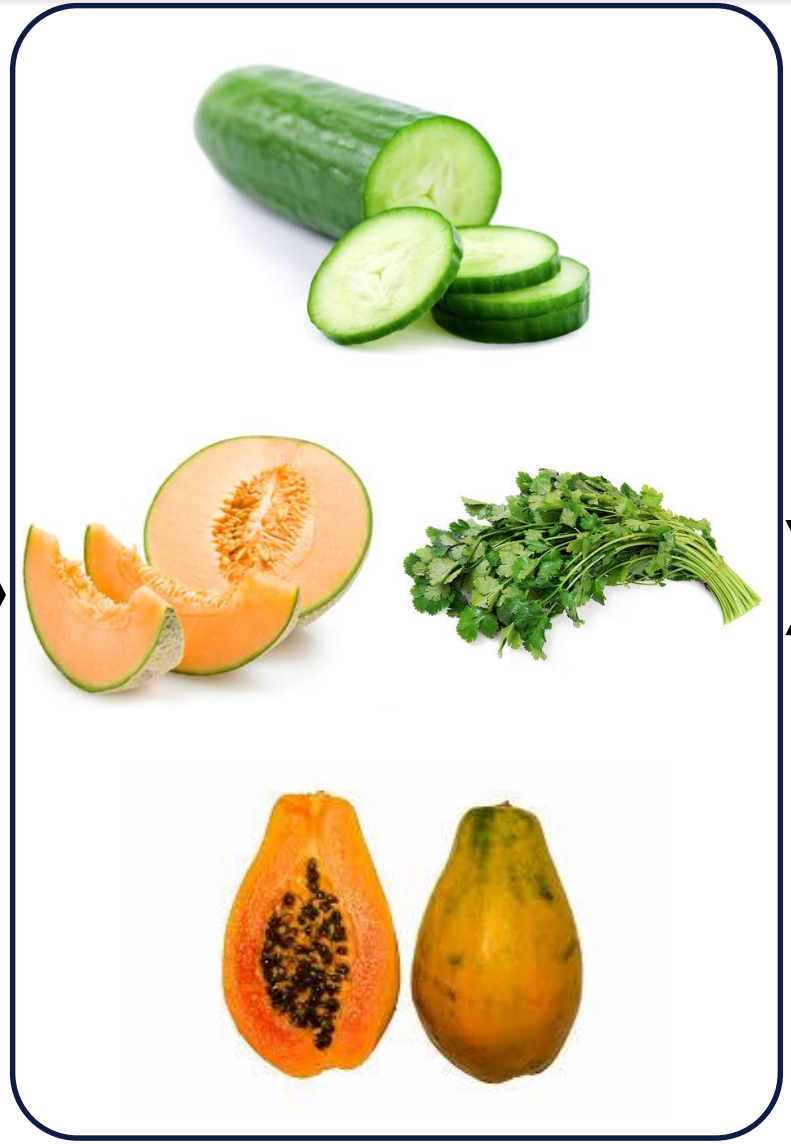




Pathogen Reduction







Shelf-Life Extension

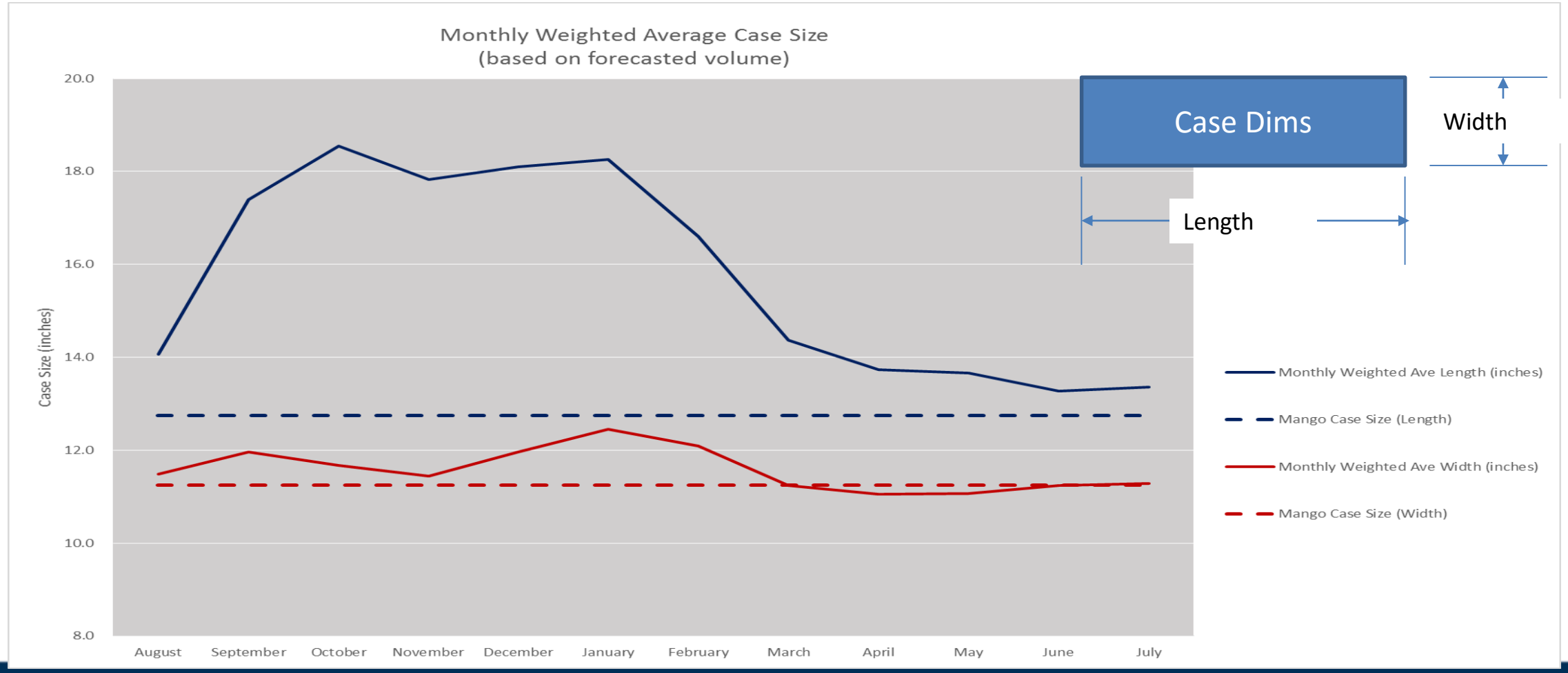
- Produce spoilage severely impact the food chain costing millions of dollars
- Customer confidence is lost when food isn't properly treated
- Combination of ECP™ with intact cold-chain management increases shelf-life and quality
- Meanwhile, retailers and distributors lose tons of safe food to spoilage each year, costing them billions

Operations

- Process flow and methods optimization
- Facility strategic, tactical, and detail planning
- Facility implementation management
- Facilities layout and configuration
- Material handling systems design
- Logistics service provider strategy, selection and implementation
- Cross docking process flow
- Order and Location Management
- Value-added services design
- Operational excellence
- SOPs/ Facility Management
- Management Reporting

Monthly Weighted Average Box Sizes

- Based on the Product Seasonality Data – monthly weighted average of box sizes (L x W)
- Length ranges from 19 to 13”



Product Mix … convert to cases/month

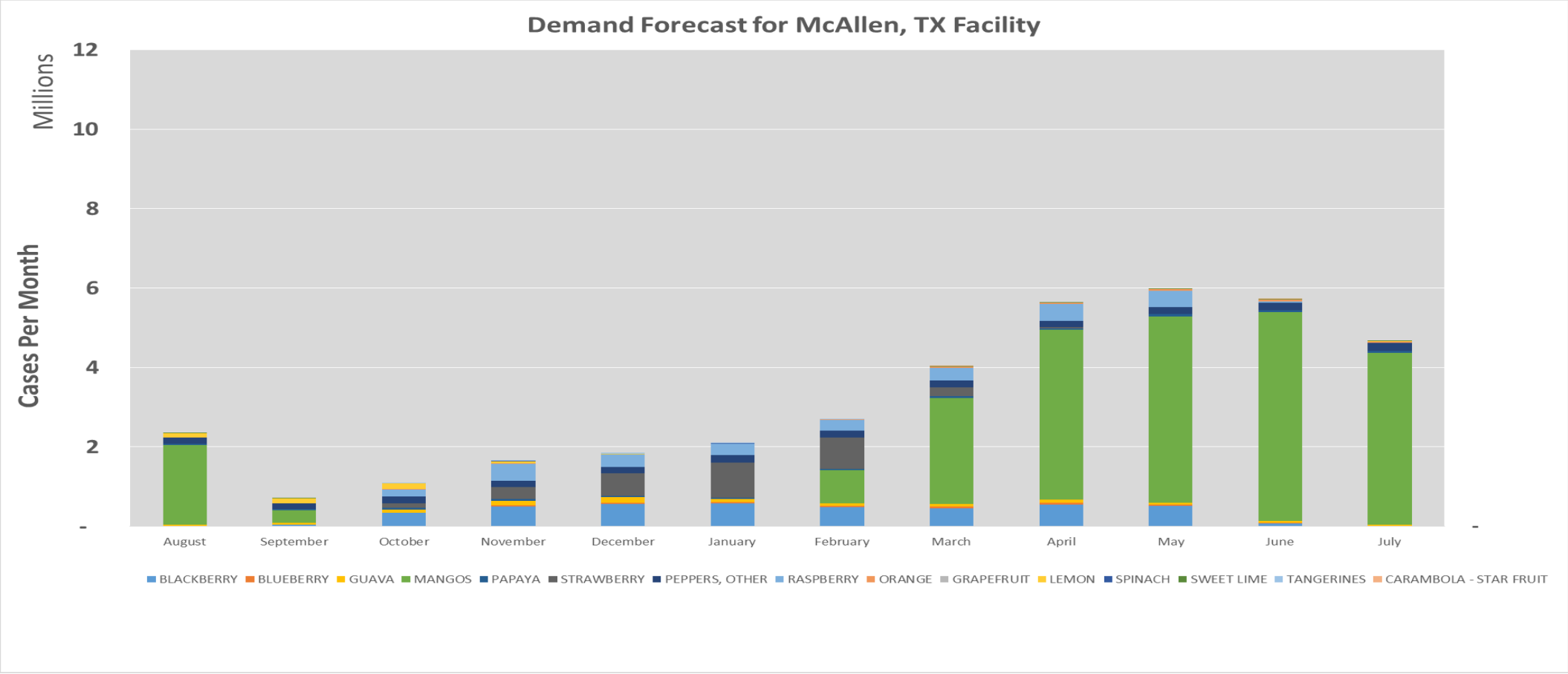
- Based on the seasonality data … Results in the product mix
- Mangos (63%), Blackberry(11%), Strawberry (8%), …

Estimated Boxes Captured Through STS Facility

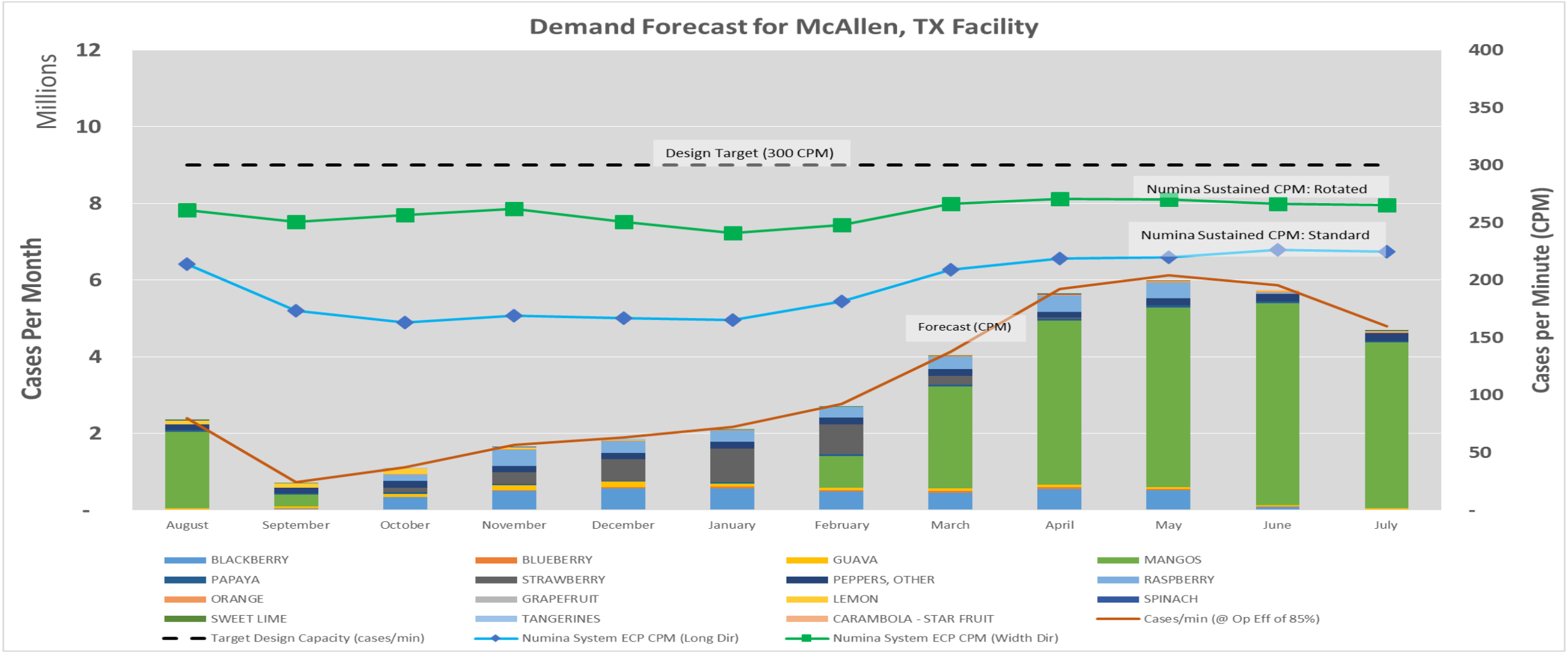
	August	September	October	November	December	January	February	March	April	May	June	July	Totals (Boxes/year)	% of total mix (% boxes)
BLACKBERRY	1,200	34,400	334,600	501,200	561,000	573,600	477,800	448,000	552,600	510,200	74,400	1,600	**4,070,600**	10.6%
BLUEBERRY	840	5,670	12,390	23,310	29,820	43,890	44,520	48,930	47,670	34,650	15,120	5,040	**311,850**	0.8%
GUAVA	38,864	52,528	74,704	122,528	145,600	66,864	61,040	63,840	68,096	54,096	45,696	40,432	**834,288**	2.2%
MANGOS	1,998,570	309,960	6,090	2,730	2,730	6,720	827,400	2,669,730	4,277,490	4,688,670	5,261,970	4,321,170	**24,373,230**	63.3%
PAPAYA	43,505	37,400	36,575	36,575	29,315	30,415	38,995	43,670	45,375	51,865	45,045	44,605	**483,340**	1.3%
STRAWBERRY	-	-	120,312	296,352	567,000	879,984	784,188	223,560	28,620	6,588	-	-	**2,906,604**	7.5%
PEPPERS, OTHER	146,448	137,268	168,156	169,884	155,412	186,084	171,828	180,792	149,364	177,336	190,404	201,312	**2,034,288**	5.3%
RASPBERRY	-	7,000	177,000	422,400	313,600	288,400	276,200	316,800	424,800	406,200	31,800	2,400	**2,666,600**	6.9%
ORANGE	3,240	324	11,070	10,746	4,266	6,696	7,560	18,954	30,186	42,444	45,252	31,374	**212,112**	0.6%
GRAPEFRUIT	-	540	-	216	162	-	270	162	-	-	-	-	**1,350**	0.0%
LEMON	107,784	116,316	143,478	57,618	14,364	2,376	486	378	3,672	8,964	6,804	25,650	**487,890**	1.3%
SPINACH	342	342	1,482	2,679	4,617	4,617	3,876	4,674	3,534	1,824	798	1,368	**30,153**	0.1%
SWEET LIME	600	1,000	3,500	2,200	5,300	8,400	4,100	11,500	3,600	1,000	1,400	400	**43,000**	0.1%
TANGERINES	-	-	440	11,275	22,935	15,400	8,415	4,400	-	-	825	-	**63,690**	0.2%
CARAMBOLA - STAR FRUIT	-	-	-	-	-	-	-	840	-	-	840	-	**1,680**	0.0%

Monthly Product Mix Processed at ScanTech

- Based on seasonality data provided … cases/month
- Forecast of the processing mix at the TX Facility



Sustained System Throughputs vs Forecast

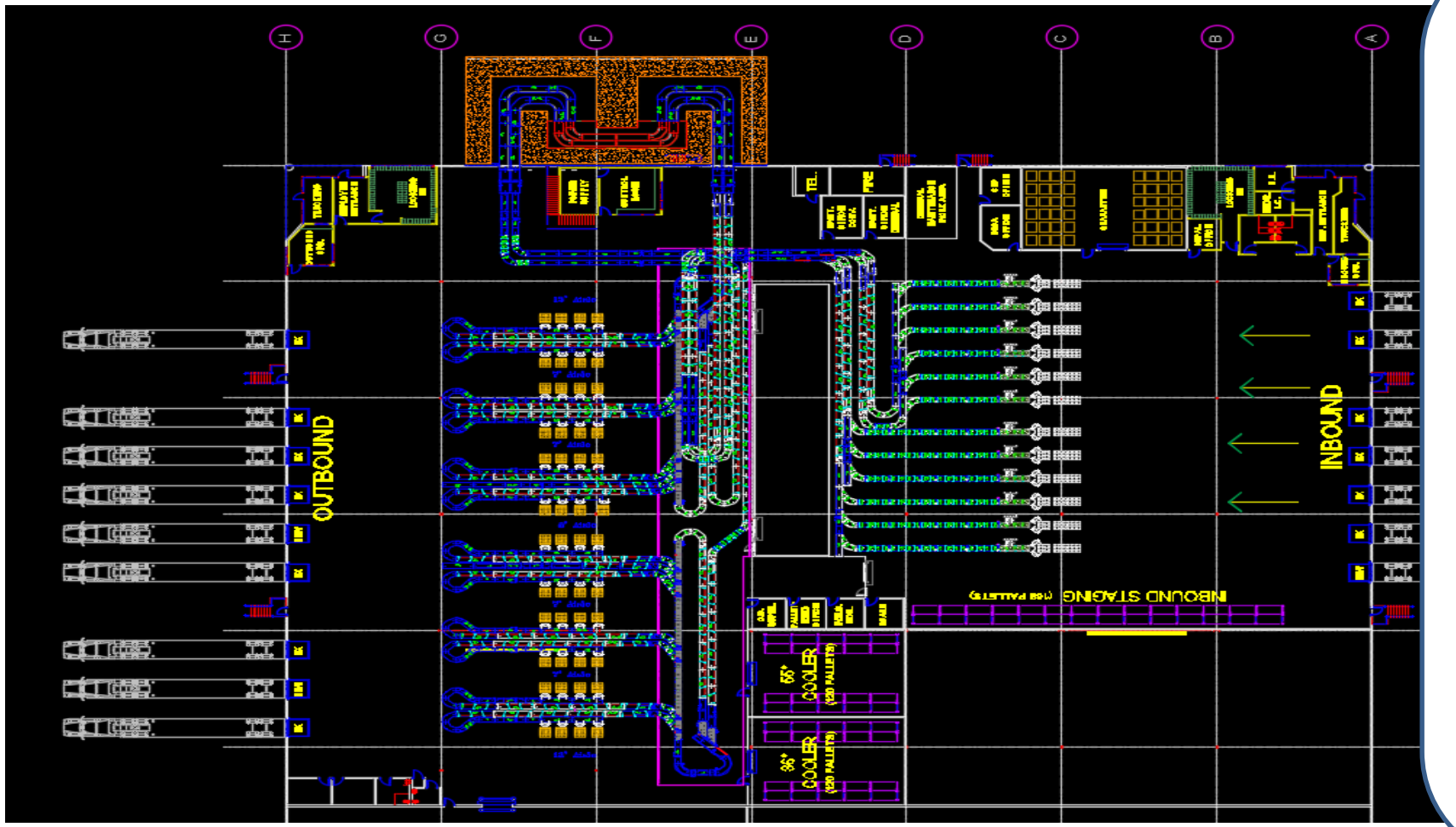


Preliminary System Design Metrics System throughput rate projects were modeled using MOST techniques to set a baseline for system performance. The following table outlines the carton induction process and anticipated throughput rate.

			GET			PLACE			Controlled Move										
			Action Distance	Body Motion	Gain Control	Action Distance	Body Motion	Placement	Move Controlled	Process Time	Alignment								
Step	Secs	Task	A	B	G	A	B	P	M	X	I	SUM	Multiplier	TMUs					
1	20.0	Process time -pull full pallet into station								556									
		Frequency	100%	100%	100%	100%	100%	100%	100%	100%	100%								
		Task Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	556.0	0.0	**556.0**	1	**556.0**	20.0	secs	3.4%		
3	367.2	Place tray on conveyor	3		1	3		3											
		Frequency	10200%	10200%	10200%	10200%	10200%	10200%	10200%	10200%	10200%								
		Task Total	306.0	0.0	102.0	306.0	0.0	306.0	0.0	0.0	0.0	**1020.0**	10	**10,200.0**	367.2	secs	61.6%		6.12
4	204.2	Process Time Avg wait for empty slot								55.6									
		Frequency	10200%	10200%	10200%	10200%	10200%	10200%	10200%	10200%	10200%								
		Task Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5671.2	0.0	**5671.2**	1	**5,671.2**	204.2	secs	34.2%		3.40
6	5.0	Process Time - push empty pallet out								139									
		Frequency	100%	100%	100%	100%	100%	100%	100%	100%	100%								
		Task Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	139.0	0.0	**139.0**	1	**139.0**	5.0	secs	0.8%		
													TOTAL	**16,566.2**	596.4	secs		9.94	mins
													TMU per Palle	**16,566.2**	596.4	secs			
													Pallets/Hr	**6.0**					
													PF&D	**15%**					
													Pallets/Hr w/	**5.2**					

Actual time to unload a pallet is conservatively calculated at 6.12 minutes (61.6% of 9.94 minutes total process time)

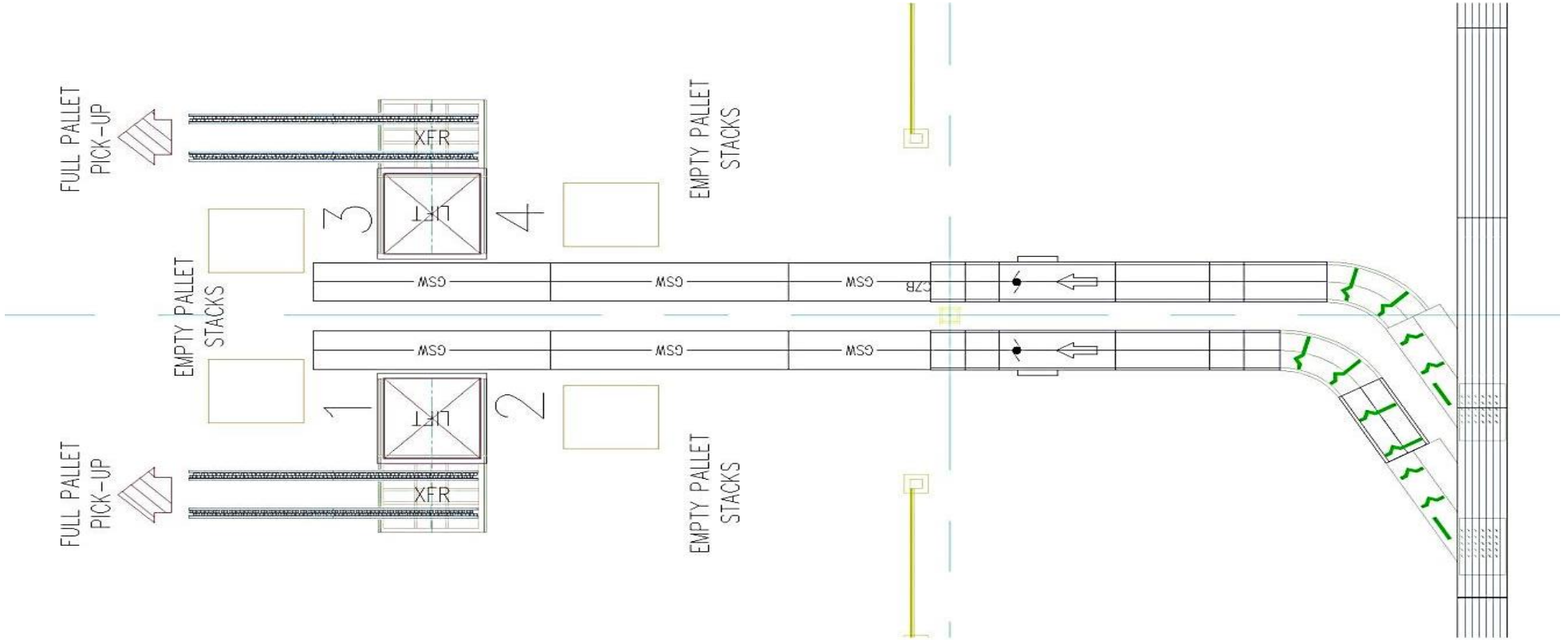
Overview of Numina Group design



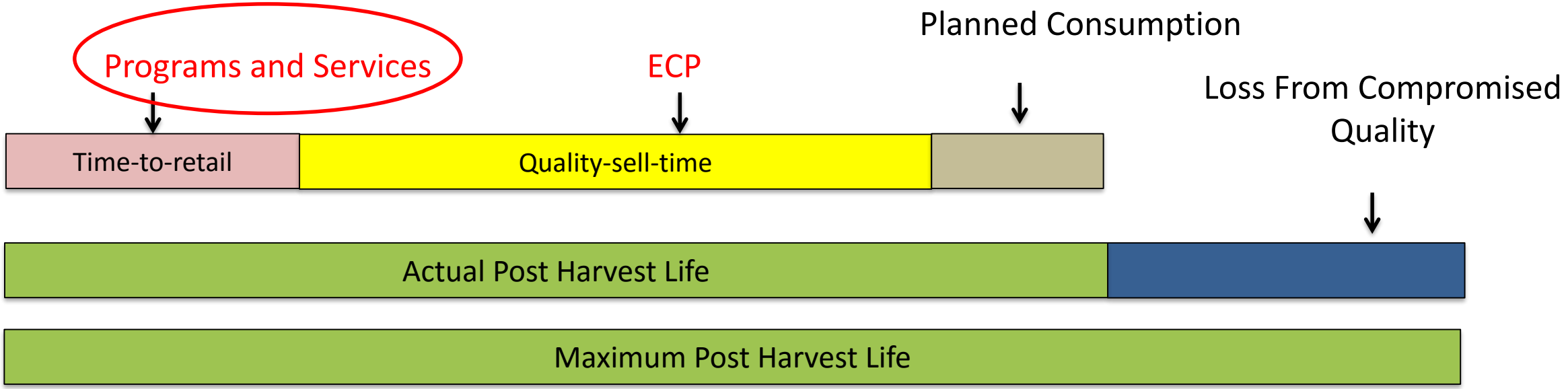
System description:

- Induction:
  - 12 induction lanes w/ Print and Apply
  - Induction: 3 x 1 merge feeding into 2 x1 merges (2) feeding into the 2 main ECP lanes
  - Pallet flow (gravity) for induction pallets delivery to induction operators
- Outbound:
  - Raised platform to allow for floor access of pallet staging, MT pallet staging and aisle access way
  - 2 Sorters w/ 6 pallet build lanes per sorter
  - 1 exception lane per sorter (not shown but included in pricing)
  - Gravity pallet build conveyors → no back pressure case to pallet build
- General:
  - High speed merging for all merge
  - Vision acquisition for image capture of cases entering and exiting ECP cell

STS – McAllen Processing Facility



ScanTech's Focus on Quality-Sell-Time



Increasing quality sell time

- Increase post harvest life through ECP
- Decrease time-to-retail though DSD
- Optimize time-in-store with better replenishment planning

ScanTech's Operating Advantage

- Assure safety and quality from farm to consumer
- Synchronized transportation
  - From farm to border
  - From border to facility
  - From treatment to DC, storage, or direct to store
- Accurately predict or significantly reduce variability in remaining shelf life to control shrink
- Demand management and replenishment programs enable Lean Distribution
- Cold chain integration services

Scan Tech's Operating Platform

Scan Tech's platform enables collaborative commerce as well as supply chain integration and synchronization

Develop Competitive Strategies and Priorities

Align strategies around the Scan Tech/HEB business model and services

- Food Safety - ECP
- Compliance – Traceability
- Quality – Inspection/Grading

Align Supply to Demand

Reengineer networks and processes for efficiency or responsiveness

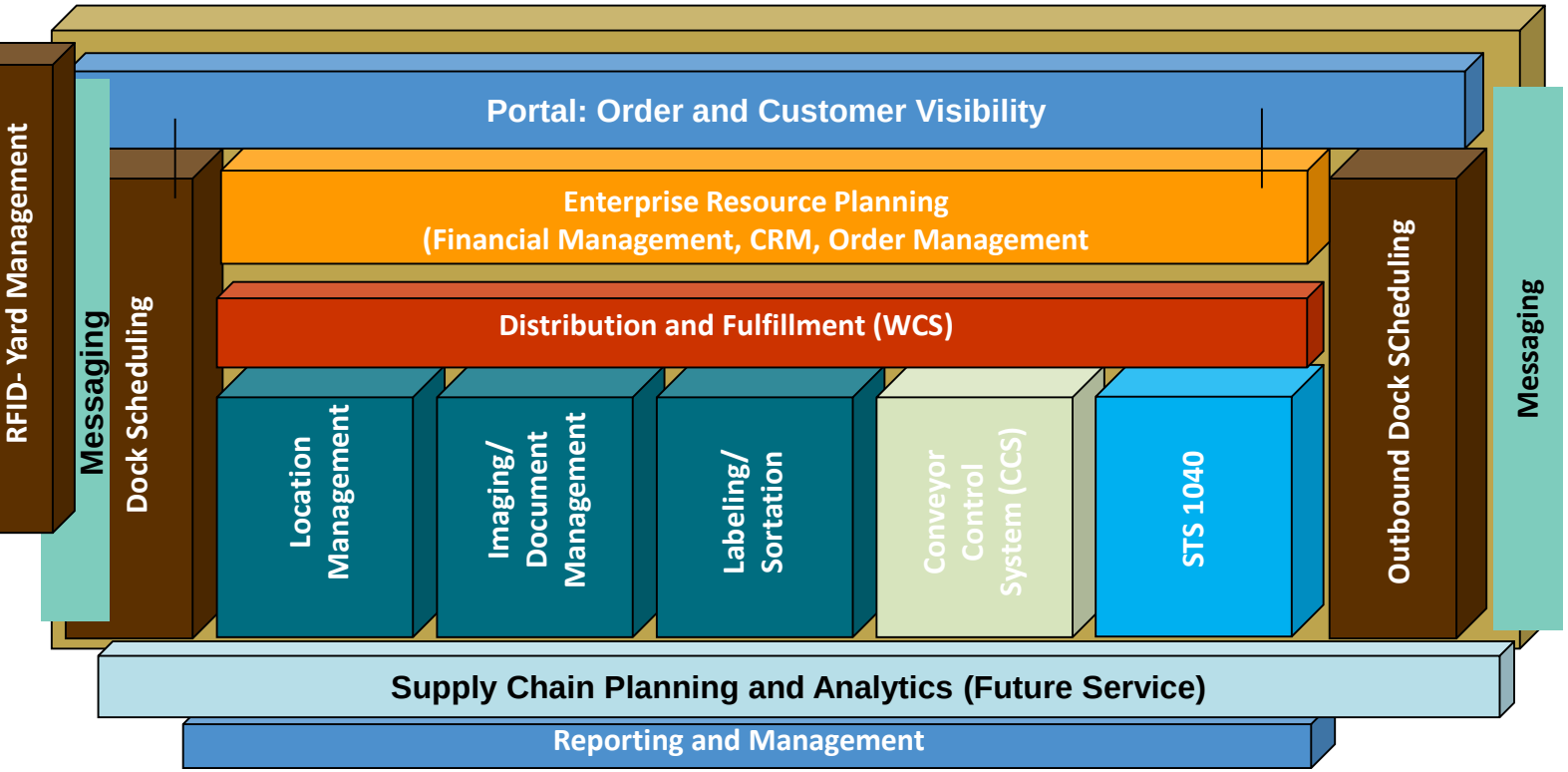
- CBP and USDA efficiencies
- Efficient Transportation
- Control Shrink
- Replenishment Planning
- Lean Fulfillment
- Cross Dock/DSD
- Logistics Programs
- Storage

Integrate Processes, Infrastructure & Information

Synchronize processes for better visibility and control

- Order Management
- Shipment Visibility
- Document Management
- Labeling and Identification
- Analytics

Logistics Information Management Framework

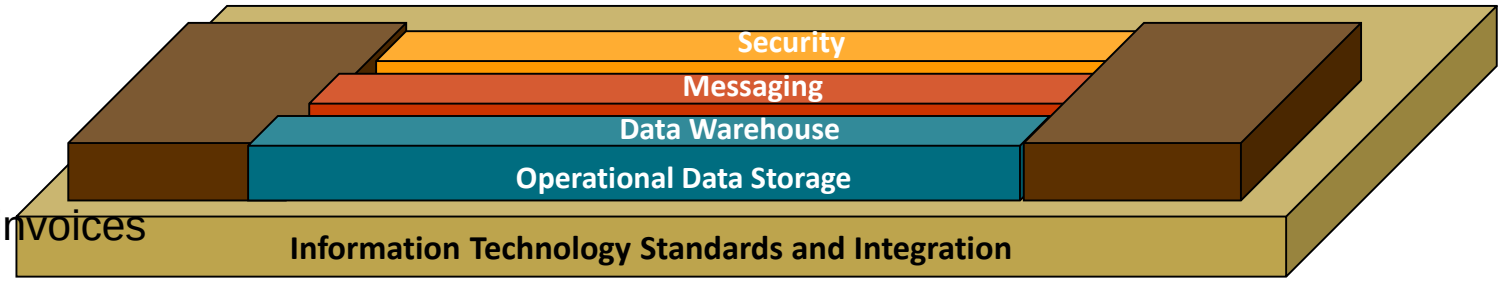


Planning, management and execution all under an integrated set of cohesive applications providing the following:

-Central source for operational visibility and management

-Closed-loop planning and execution

-Integration with key trading partners for coordination of factors not directly under internal control



Application standards and integration framework:

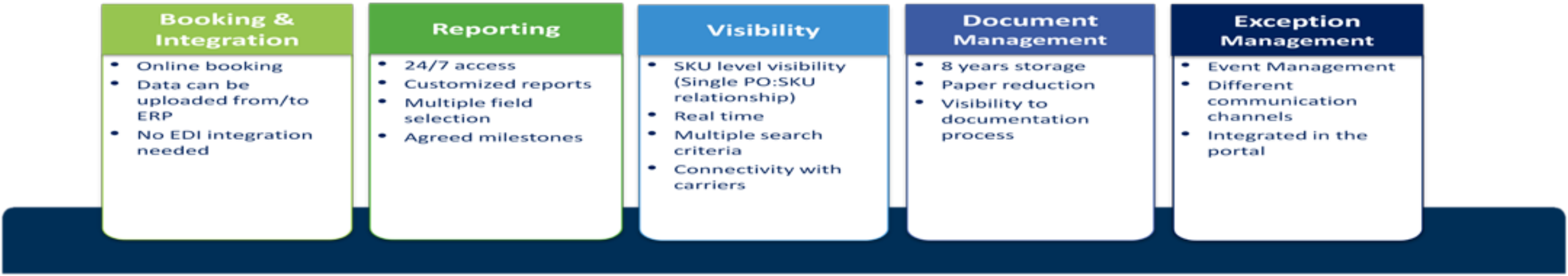
-Database management

-Electronic data exchange for POs, ASNs and invoices

-Web service and integration capabilities

Execution and Visibility

- Messages
  - PO upload
  - Receipt message
  - ASN confirmation
  - 315 departure
  - 315 arrival
  - Pick order?
  - POD message
- Event management
  - own and partner applications
  - Direct link to carriers
- Connectivity from origin, in-transit, destination
- Supporting individual EDI maps, all standard formats (e.g. xml, EDIFACT) and all protocols (e.g. AS2, VAN)



Enterprise Resource Planning

- ERP systems track business resources—cash, raw materials, production capacity—and the status of business commitments: orders, purchase orders, and payroll.
- Accounting/Finance
- Human Resources
- CRM
- Purchasing/Procurement
- Professional Services Management (Grants/Project accounting)

- Automates core business operations such as lead-to-cash, order-to-fulfillment, and procure-to-pay processes
- Enhances customer service by providing one source for billing and relationship and service tracking.

Customer Relationship Management

- Contact management - complete view of your customers, including activity history, key contacts, customer communications, and internal account discussions; Social media integration
- Opportunity management - details on sales opportunities — stage, products, competition, quotes, and more, Stay connected to the people and information
- Marketing/Sales campaign management
- Sales collaboration
- Sales performance management
- Lead management
- Marketing automation
- Sales data
- Partner and channel management

Order Management

- Identify customer, service (s), quantity, and price
- Accept orders from multiple sources (EDI, Email, Web)
- Visibility, automation, service integration, reporting
- Multichannel, mobile, B2B, web service

Distribution Execution

- Imaging
- Document management
- Scanning and Labeling, Print and Apply
- Track and Trace
- Visual scan and CCS integration
- Location management - ??WMS

Yard Management (level required??)

- System maintains yard layout and equipment locations within the yard
- Yard check-in /check-out processing, put away, and work priority scheduling
- Faster receipt flow and visibility/tracking in the yard
- Control the physical equipment inventory for all transportation modes including: type of trailer, dimensions and attributes, state of the container (e.g. empty, loaded, etc.) and load or shipment cross reference
- Yard driver notification via on-board computer communications systems and satellite trailer and tracking
- CBP protocols
- RFID gate contols

Dock Scheduling

- System schedules time slots for all doors and staging areas; Maintains rolling master dock schedule for all appointments, if use WMS then two-way interface
- Account for inbound & outbound capacities
- Maintain door availability; Designate doors as receiving, shipping, both, or reserved
- Message – Based on appointment request & confirmation procedure (A specific load for a specific door for a specific time period)
- Schedule and manage the loading and unloading based on need
- (priority) for goods and/or for lift capacity
- Container stuffing / Trailer loading (Live or Dropped)
- Shipment’s actual dispatch processing
- Shipment’s actual dispatch & receipt processing (Live or Dropped)
- System creates reporting mechanisms

Transportation (Level of requirement TBD)

- Transportation scheduling
- Carrier relationship management (freight bids, leveraging capabilities, performance improvement)
- Domestic and international transportation network
- Leveraging technology (TMS, implementation and effectiveness)
- Leveraging 3rd party services (selection, implementation and performance)
- Private and dedicated fleet operations
- Inbound/outbound freight optimization
- Domestic and international routing guides
- Due diligence support for transportation operations
- Cost reduction and service improvement

Potential Dispatch (HEB integration)

- Process and procedures combined with driver assignment
- Intelligent assignments provided automatically from the system based on driver
- Transportation manager approves selection
- Specified exact pick up time
- Owner Operators–message can only specify window of time for pickup
- Bills of Lading are printed on-demand and for drivers as load departs
- Ability to reassign loads based on driver availability
- Delivery instructions, including directions are printed and provided to the driver