Reduce, Reuse, Recycle

Integrate your Reverse Logistics Network

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Agenda

- Framework & flows
- Disposition management
- Cost reduction
- Business control
- Reduction design
- Recycling strategies
- Reuse case study
- Environmental considerations
- Design for recycling
- Debrief & summary
- Questions
Reduce, Reuse, Recycle - Theme context

- Physical & data infrastructures are necessary to enact an effective reduction, reuse and recycling solution
- “Reverse Logistics” encompasses the essence of our context theme
  - Reduce: lower things like cost, cycle time, waste, etc.
  - Reuse: employ purposeful utility
  - Recycle: process; use again with minimal alteration
Framework

Results
- Inc. Cash
- Reduce conversion cycle
- Improve control

Enablers
- Visibility
- Performance mgt.
- Collaboration

Execution Processes
- Returns processing operations
- RMA mgt.
- Inventory mgt.
- De-mfg.
- Recycling
- Re-mfg.
- Parts harvesting
- Asset mgt.
- Transp. Mgt.
- Waste stream mgt.

Foundations
- Strategy
  - Information systems
- Data & information management
- People, organization & competence

Reduce, Reuse, Recycle

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Types of Returns

- Consumer Returns
- Warranty Returns
- Marketing Returns
- Asset Returns
- Environmental Returns
- Product Recalls
The “Nerve Center”

- Centralized Return Center
- Optimizes people, process & capital
- One touch, one system, one team
  - RMA management
  - Gatekeeping
  - Re-manufacturing/refurbishment
  - De-manufacturing
  - Parts harvesting
  - Waste stream management
  - Recycling
  - Fulfillment
  - Asset management
Adaptive Transportation

- Transportation of assets managed to minimize transportation costs
  - Retailer
  - OEM
  - End-user

- Real time adaptation to conditions to minimize cost and/or maximize revenue
  - Consolidation
  - Accelerate loads
  - Drop loads
  - Redirect loads

Transportation work streams
Disposition Management

- **Optimize → Disposition Decisions**
  - Quantity
  - Time
  - Restrictions
  - Demand

- **Alignment → Remarket to optimum channel**
  - On-line
  - B2B auction
  - Category salvage
  - Bulk salvage

- **Cash → Reconcile recovery values**
Disposition Management Decisions - **Quantity**

Quantity has two dimensions: amount of merchandise vs. breadth of SKUs to be liquidated.
Disposition Management
Decisions - **Time**

**Needs Assessment**
- Space Availability
  - Warehouse Requirements
  - Store Requirements
- Return on Investment
  - Maximize Revenue
  - Open up ‘Option-to-Buy’

- CHANNEL OPTIMIZATION -

**Speed**
- Online Fixed Price
- Online Auction
- B2B Exchange
- Store Resale Placement
- Category Salvage
- Bulk Salvage

**Cost Recovery**
- Low
- High

Time: Asset liquidation speed depends upon the volume moved through each channel: online vs. traditional.
Disposition Management Decisions - Restrictions

- **Marketplace**
  - Inside or outside the US
  - Online vs. Traditional
  - Brand placement
  - A mix

- **CHANNEL OPTIMIZATION**

Restrictions: Having multiple channels allows you to direct inventory where *you* want it to go.
Liquidation criteria and market conditions are used in routing inventory to the most appropriate channel.
Remarketing for Optimal Recovery

Step 1: Optimize

Step 2: Remarket to Channel

Step 3: Reconcile

Optimization Model

Cost Recovery

- Online Auction
- Online Fixed Price
- B2B Exchange
- Store Resale Placement
- Category Salvage
- Bulk Salvage

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Integrated Information Flows

- Product Take-Back Policy
- Inventory Control
- Logistics Scheduling
- Systems Recognition
- Recycling Selection
- Inventory Control
- Marketing
- Production Scheduling
- Layout
- Material Handling
- Marketing
- Inventory Control

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Integrated Information Flows

- RMA generation
- Real time disposition management
- Call center management
- Pipeline visibility and management
- Return stream & waste stream management
- Customer relationship management
- Transportation management from pick up through final disposition
- Repair, recondition, refurbishment
- Parts & finished goods fulfillment
- Remarketing
- Management reporting
Cost Reduction Strategies

- Reduce processing cost
  - Increase utilization of capacity
  - Use of disposition optimization tools

- Reduce Client management costs
  - Single point of contact
  - Consistent processes across all product lines

- Reduce transportation costs
  - Use of full service return center
  - Adaptive transportation processes
  - Decision optimization tools
Business Controls Strategies

- Attempt to make all costs variable
  - Use of shared facilities
  - Transition of lease ownership

- Reduce organization complexity
  - Through single point of contact for returns stream management

- Reduce process complexity
  - Through use of consistent, well-documented processes for all product lines and returns
Reduction-Design for Recycling (DFR)

- Joint research effort with TTU
- First year yielded processes and tools to support DFR
- Processes and tools applied Dell products as test case
- New NSF grant received to address entire reverse logistics process
DFR System Function

System

- Product Disassembly
- Product Recycling
- Material Assessment
- Environmental Impact Assessment
- Product Evaluation
- Product & Material Information Management
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Product Disassembly Tree

Model - Deskpro 386s

Stage 0
Computer Assembly

Stage 1
M 1 Cover Assembly
C 7 Motor.

Stage 2
C 6 Square Cover
C 8 Square Cover

Stage 3
C 10 Fan
C 18 Screw

Stage 4
C 3 Main Cover

Stage 5
M 2 Main Body

Model - Prolinea 4/33s

Stage 0
Computer Assembly

Stage 1
M 1 Cover Assembly
C 1 Front Cover

Stage 2
C 2 Main Cover
C 18 Aluminum

Stage 3
C 19 Plastic

Stage 4
C 8 Power Box

Stage 5
M 2 1 Cover Assembly
C 9 Rear Cover
M 2 2 Disk Drive
C 12 Disk Case

C 13 Power Board
M 2 1 1 Board Assembly
C 16 Hard Drive

C 31 Disk Cover
C 11 Mother Board
C 22 Disk Drive

C 4 Main Case
Product Recycling

- Generate recycling plan
- Provide alternative recycling method
- Classify product bins and scraps bins
- Classify component bins and material bins
- Select recycling processes and recyclers
Recycling Plan Alternatives

- Reuse
- Remanufacture
- High grade recycling
- Low grade recycling
- Chemical decomposition recycling
- Incineration recycling
- Disposal to landfill
Recycling Plan (Output)

- Recycling method
- Sorted components
- Recoverable materials
- Recycler information
- Cost and profit
- Recoverability score
Material assessment may check the following entities:

- Number of different materials
- Number of recoverable materials
- Weight of recoverable materials
- Number of hazardous materials
- Weight of hazardous materials
- Product recoverable material rate
- Material compatibility score
Environmental Impact Assessment

Environmental impact assessment provides the following functions:

- Calculates eco-indicator score of product
- Report on material eco-indicators score
- Report on hazardous materials’ information
- EPA regulations for hazardous materials
Product Evaluation

Criteria evaluated based on the system function:

1. Disassemble ability (Index)
2. Recycle ability (Index)
3. Material compatibility (Index)
4. Environmental impact (Eco-score)
Revenue Enhancement Strategies

- Maximize remarketing revenue
  - Expanded channels
  - Channel optimization
  - Strong channel management

- Reduce remarketing price erosion
  - Shortened process time
  - “Selling the Pipeline”
Business Results

Vision
- Integrated system environment
- Strong, diverse remarketing ability to “sell the pipeline”
- Repeatable, scalable, solution
- Consistent process for entire life cycle
- Comprehensive return stream management
- Adaptive transportation processes
- Automated disposition optimization
- Reduce waste stream through DFR

Reduction Impacts
- Processing costs
- Processing time
- Management costs
- Price erosion
- Fixed costs
- Reduced inventory
- Maximized remarket price

Business Results
- Increased cash
- Reduced cash conversion cycle
- Improved business controls
Key Takeaways: Reduce, Reuse, and Recycle

1. Determine your reverse logistics goal and strategy
2. Develop a network infrastructure
3. Reduce touches; employ repeatable processes
4. Integrate processes – physically & systems
5. Engage flexible, robust liquidation channels
6. Understand product recycling alternatives and effect a responsible strategy

The Yield:

- Increased cash
- Reduced cash conversion cycle
- Improved business controls