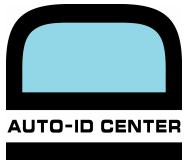


CAMBRIDGE AUTO-ID LAB

RETAIL DISCUSSION MEETING

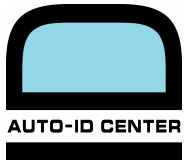
14 JANUARY 2004



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INTRODUCTION

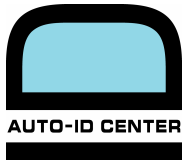
DUNCAN MCFARLANE
RESEARCH DIRECTOR
CAMBRIDGE AUTO ID LAB



RETAIL DISCUSSION MEETING

Welcome

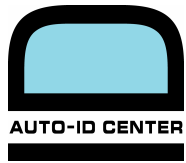
- Engineering Department / Institute for Manufacturing
- UC Involvement in the Auto ID Center
- Research Focus: Integration of Product Information into Supply Chain Decision Making Processes
 - Manufacturing
 - Retail
 - End of Life
 - (Reverse) Logistics



RETAIL DISCUSSION MEETING

Aims of the Meeting

1. Familiarisation with EPC Network and its developments
2. Develop an understanding of the impact of Auto-ID system on OOS/OSA



RETAIL DISCUSSION MEETING

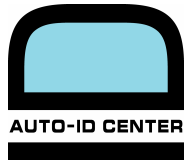
Research Project Focus

Understanding In-Store (Replenishment) Processes

Ways of improving OOS and OSA with better product information

- short term
- longer term

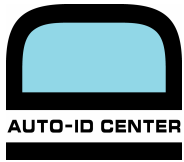
Appropriate application of Auto-ID Technology



RETAIL DISCUSSION MEETING

AGENDA

13:00 - 13:15 Intros / Welcome	Duncan McFarlane
13:15 - 13:45 Introduction to EPC Network	Steve Hodges
13:45 – 15:00 Discussion Session	C Y Wong / All
15:10 – 15:45 Lab Demonstration	James Brusey
15:45 – 16:00 Q&A	All



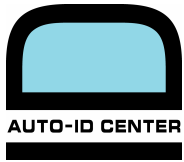
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DISCUSSION SESSION

C. Y. WONG

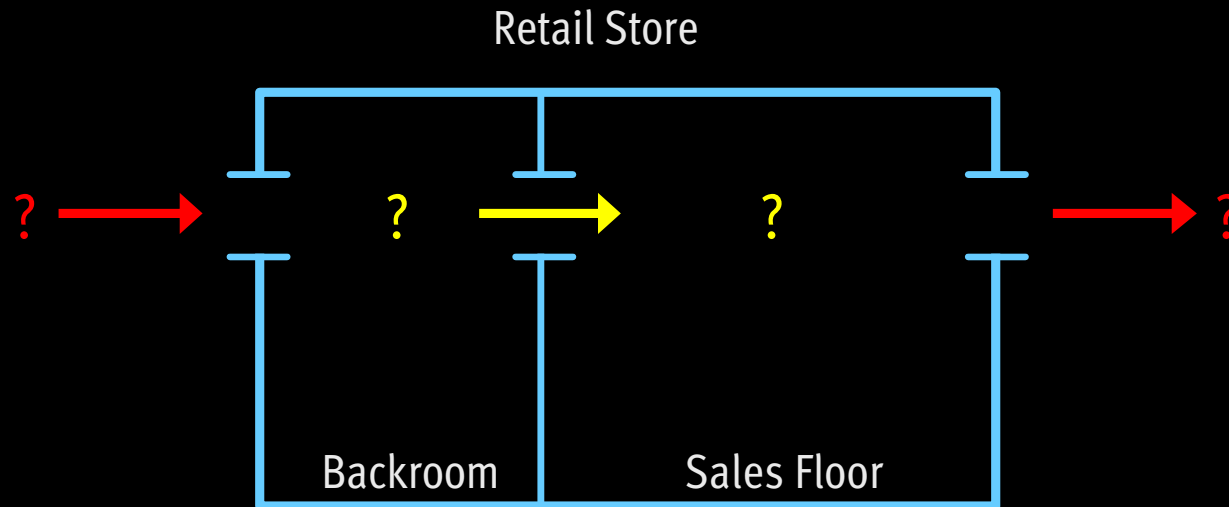
DOCTORAL RESEARCHER

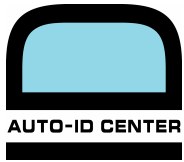
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BEFORE POINT-OF-SALE SYSTEM

- Detachment of physical movements from software inventory system
- From the perspective of near-real-time software inventory system



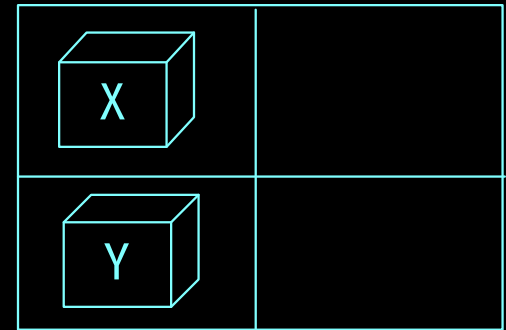


BEFORE POINT-OF-SALE SYSTEM

Backroom



Shelf



Identify

Count

Track

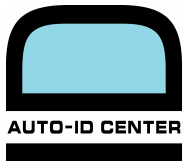
Decide

Move

Verify

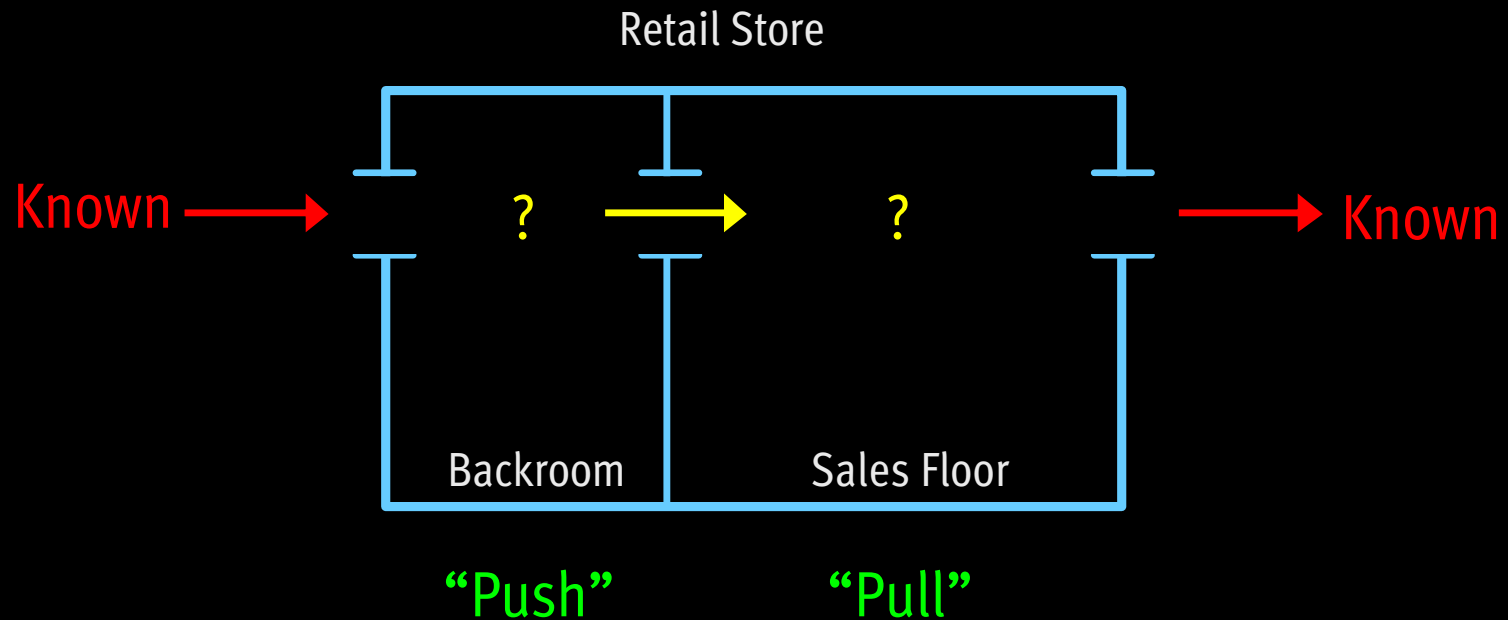


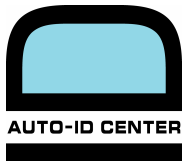
Staff



WITH POINT-OF-SALE SYSTEM

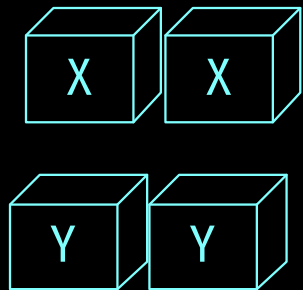
- First step towards exploiting software inventory system
- From the perspective of near-real-time software inventory system



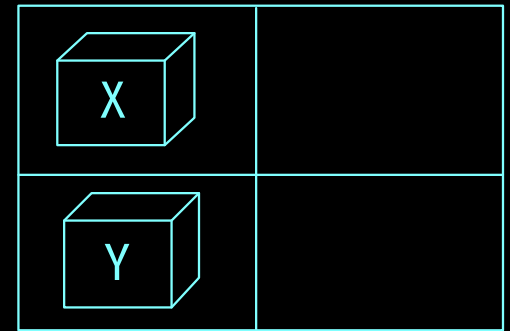


WITH POINT-OF-SALE SYSTEM

Backroom



Shelf



Identify

Count

Count

Track

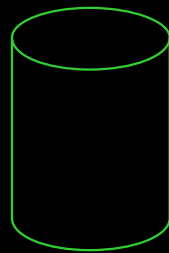
Track

Decide

Decide

Move

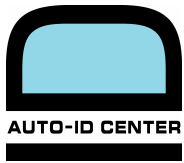
Verify



POS

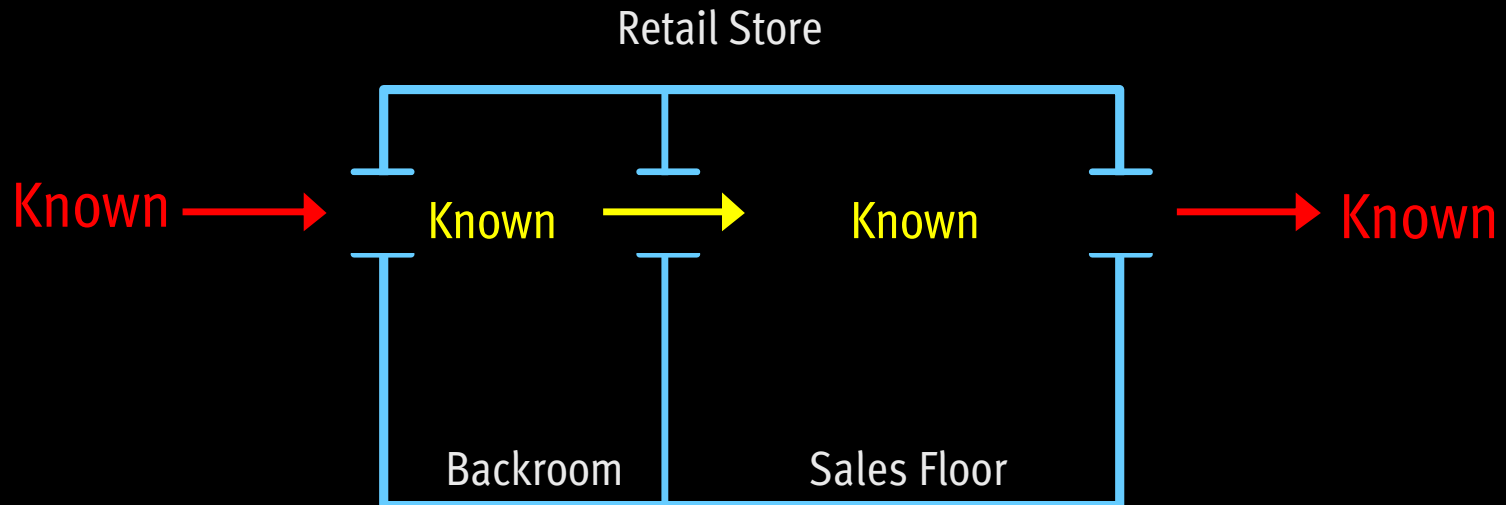


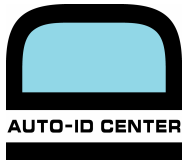
Staff



WITH RFID TAGS ON ITEMS

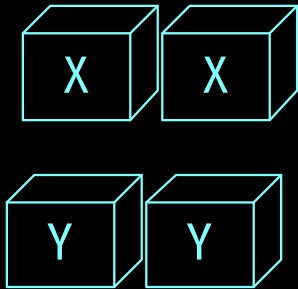
- Merging physical movements and software inventory system
- From the perspective of near-real-time software inventory system



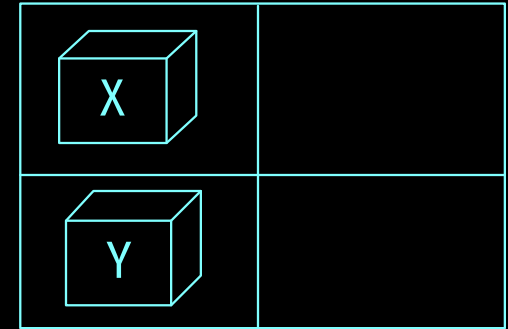


WITH RFID TAGS ON ITEMS

Backroom



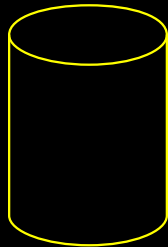
Shelf



Identify

Count

Track



Decide

Decide

Verify

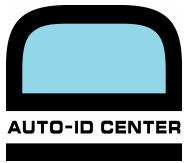
Verify

Move

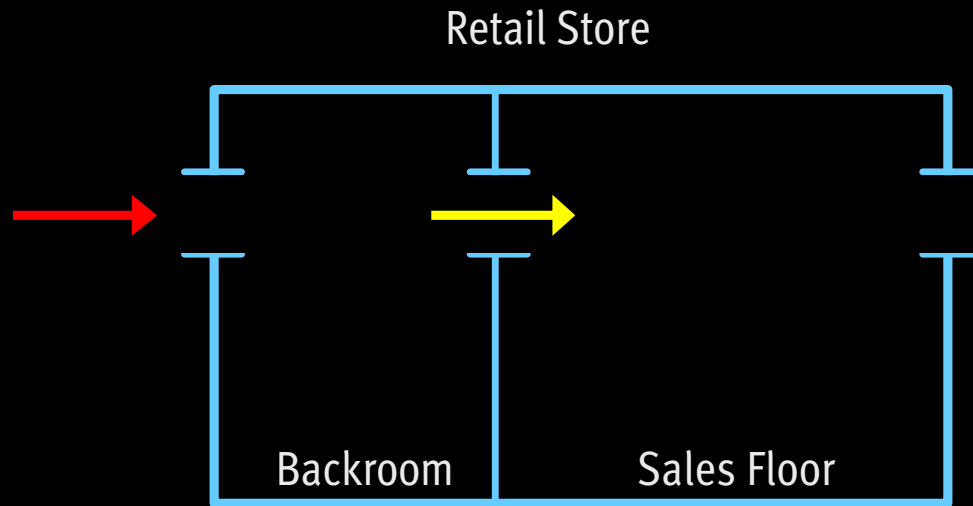


Staff

RFID enhanced
Retail Inventory System



STORE REPLENISHMENT VS SHELF REPLENISHMENT

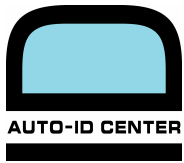


→ Store replenishment

Out-of-stock

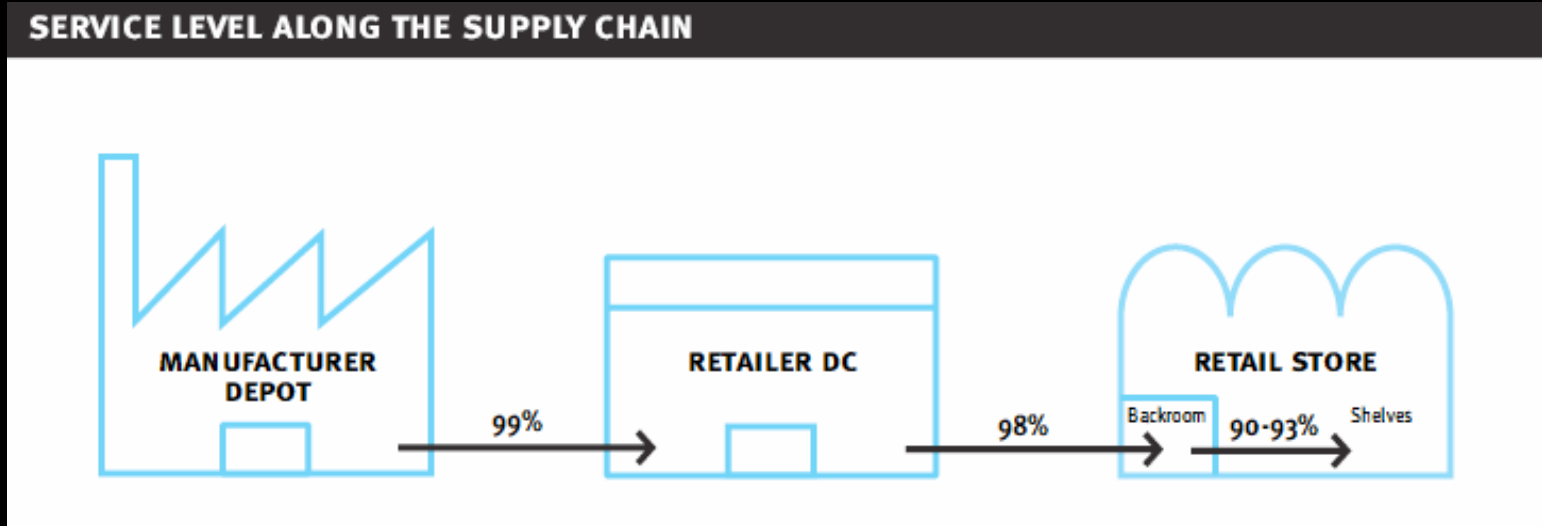
→ Shelf replenishment

Off-Sales



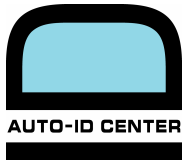
SOME STATISTICS

- “25% percent of 8.3% global out-of-stocks are caused by poor shelf management” – GMA, Food Marketing Institute and CIES (2002)



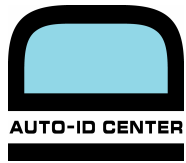
ECR Europe (2003)

- “Almost 33% of off-sales items could be found in the backroom”
– Accenture



PUZZLE OF THE DAY

- How do we improve in-store processes to reduce OOS and to increase OSA?
- Could we ever eliminate OOS?



RETAIL SHELF REPLENISHMENT

What:

To analyze the impact of accurate and timely item level information on current shelf replenishment policies

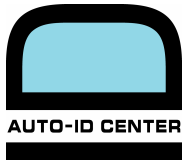
Why:

- Reduce shelf space allocation
- Improve on-shelf-availability
- Reduce out-of-stock

How:

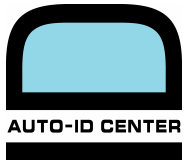
- Examine current retail shelf replenishment processes
- Identify information useful for improving the process
- Develop a simulation and inventory control models
- Compare new models with different replenishment policies





ICE BREAKERS

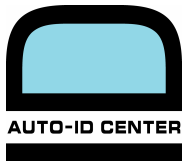
- What is your ideal store?
- What is the ideal store layout?



OSA AND OOS

How do you predict and manage on-shelf-availability and out-of-stocks?

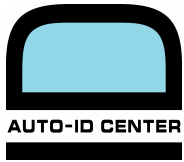
- Why are there OOS?
- What is an acceptable OSA?
- How accurately could we predict what is on shelf based on POS data?
- Could we accurately predict hourly demand?
- Could we predict OOS occurrence and OSA?
- What product types encounter highest OOS?



SHELF REPLENISHMENT

What are the most effective shelf replenishment policies?

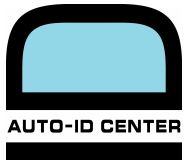
- How do we determine what is on the shelf?
- How frequent do we determine what is on the shelf?
- How do we determine the best time to replenish from backroom to shelf?
- Should we replenish from the backroom as soon as one product is taken off the shelf?
- What stops us from replenishing straight away from the backroom whenever the shelf is empty?



SHELF

What is the most optimal shelf space allocation?

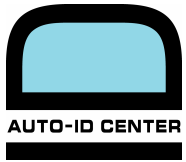
- How much days worth of inventory are there on the shelf?
- How much is the ideal average inventory on shelf?
- How do we determine the optimum size of shelf?
- How do you decide how much to put on shelf?
- Why do we need sales area? Why not Argos model?
- Why couldn't we just allocate one item per product type on shelf?
- Does everything has to be physically orderly?



BACKROOM

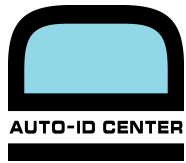
Why do we need backroom in retail stores?

- Could we do without a backroom?
- How much inventory do we hold in the backroom?
- What is the ideal backroom layout?
- What is the optimum size of the backroom?
- If cost of property is high, should we shrink backroom or increase backroom size?



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LAB DEMONSTRATION



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QUESTIONS AND ANSWERS