



A Control Mechanism on Outbound Logistics

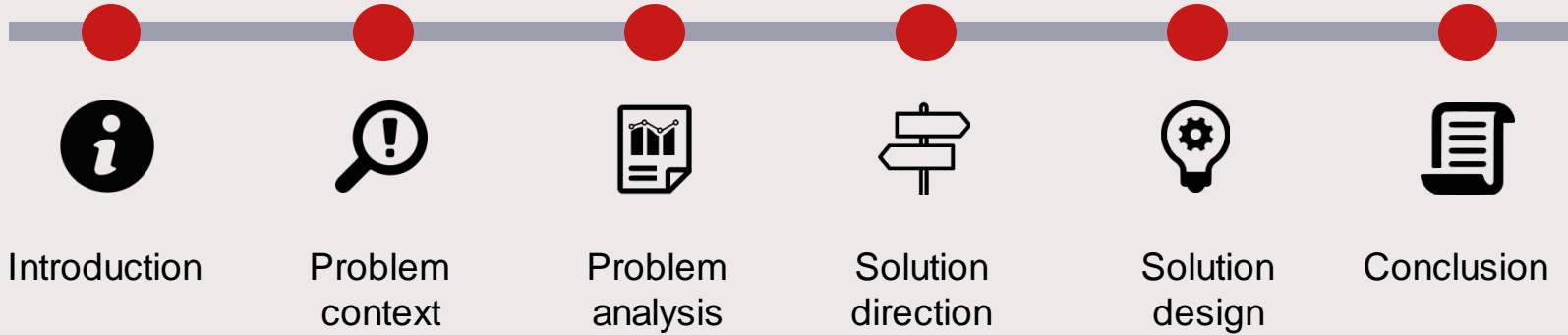
JUNE 28, 2019

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TU/e EINDHOVEN
UNIVERSITY OF
TECHNOLOGY

Agenda



Océ-Technologies B.V.

- Founded in 1877
- Digital imaging and industrial printing
- Factories in Venlo, Poing (Germany) and Penang (Malaysia)
- Acquired by Canon in 2010



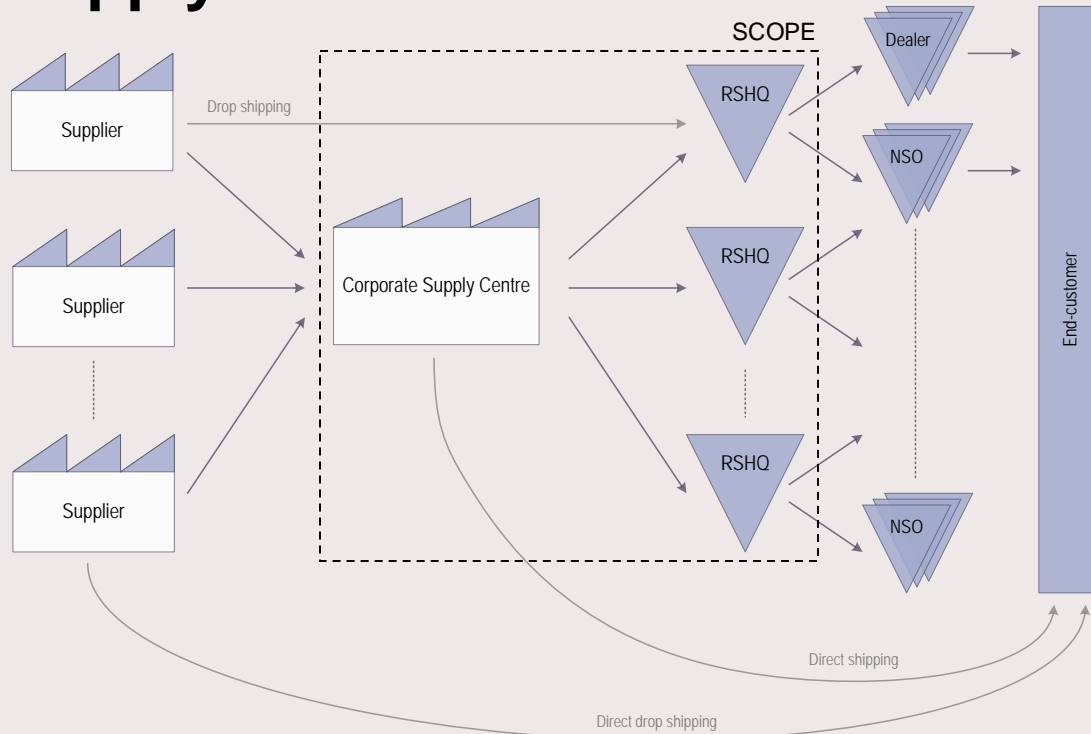
A CANON COMPANY

Products

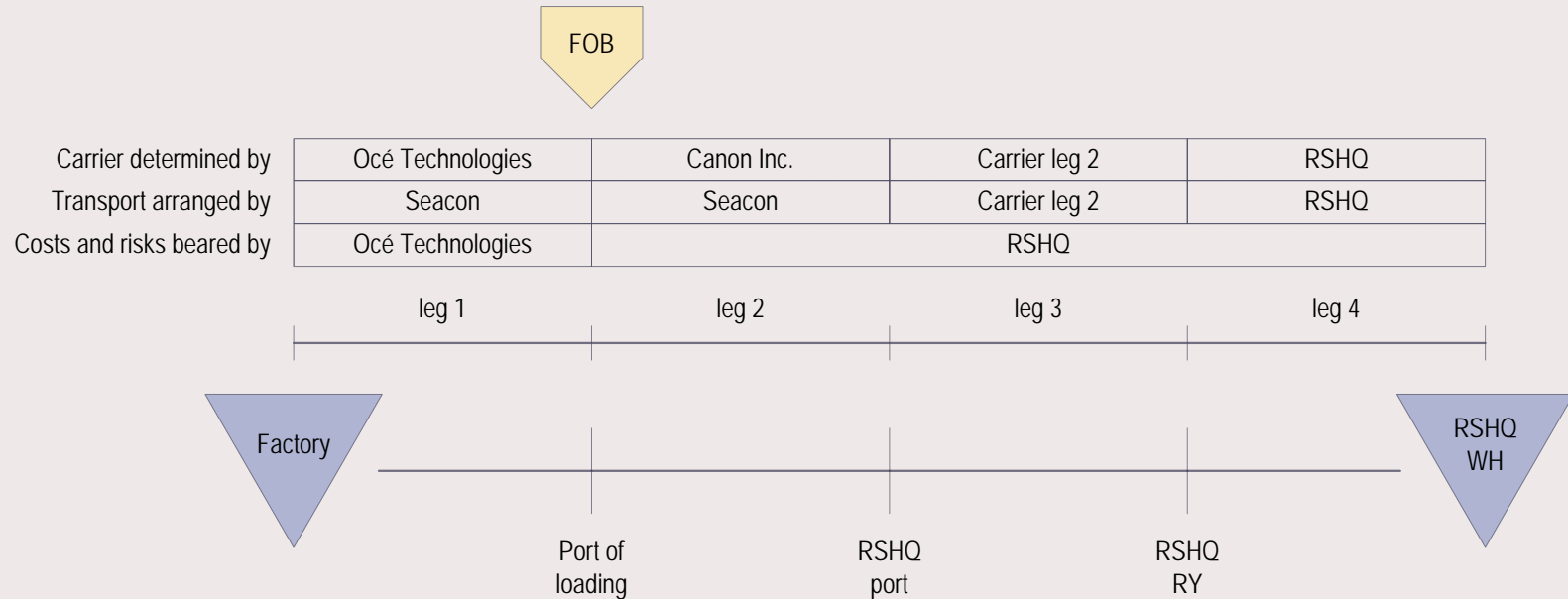
- Printing systems
 - Large format
 - Cut sheet (VarioPrint i-series)
 - Continuous feed printing
- Service parts
- Ink and toners
- Media



Supply chain



Regular replenishment orders of sea shipments



Challenges



Lack of ability to see a (unified) view of shipments with relevant details and statuses



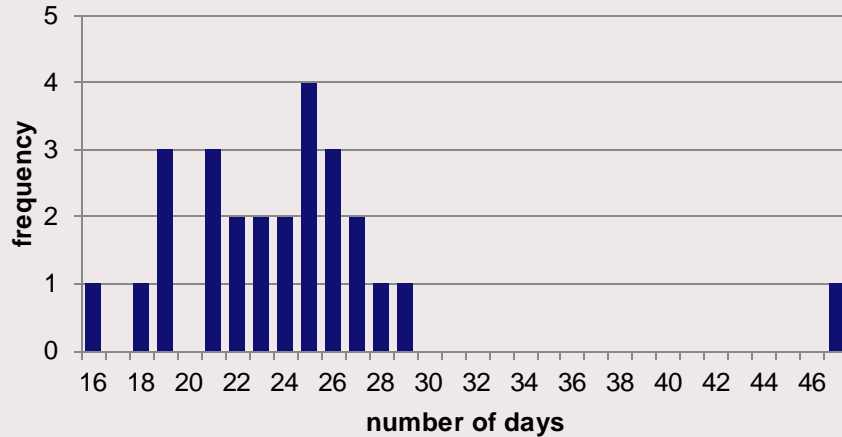
Inability to react to and communicate unplanned events and disruptions



Occurrence of long and fluctuating lead times

Lead times of sea shipments from Venlo to CUSA

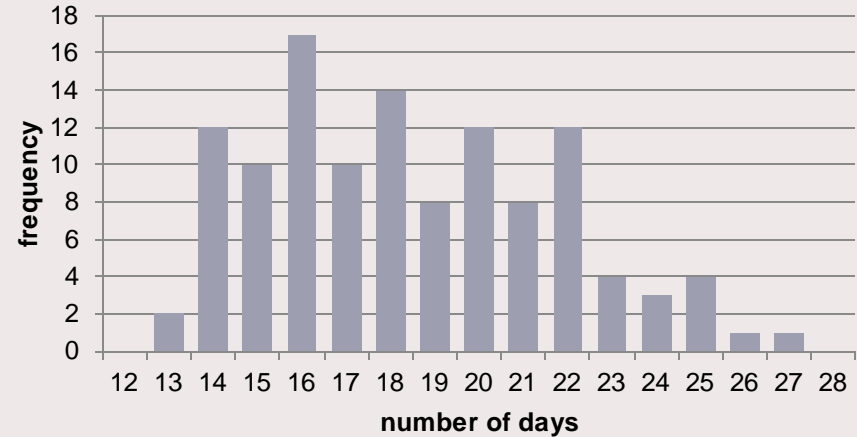
Rotterdam → Chicago
Q3 2018



$\mu = 23.8$ days

$\sigma = 5.8$ days

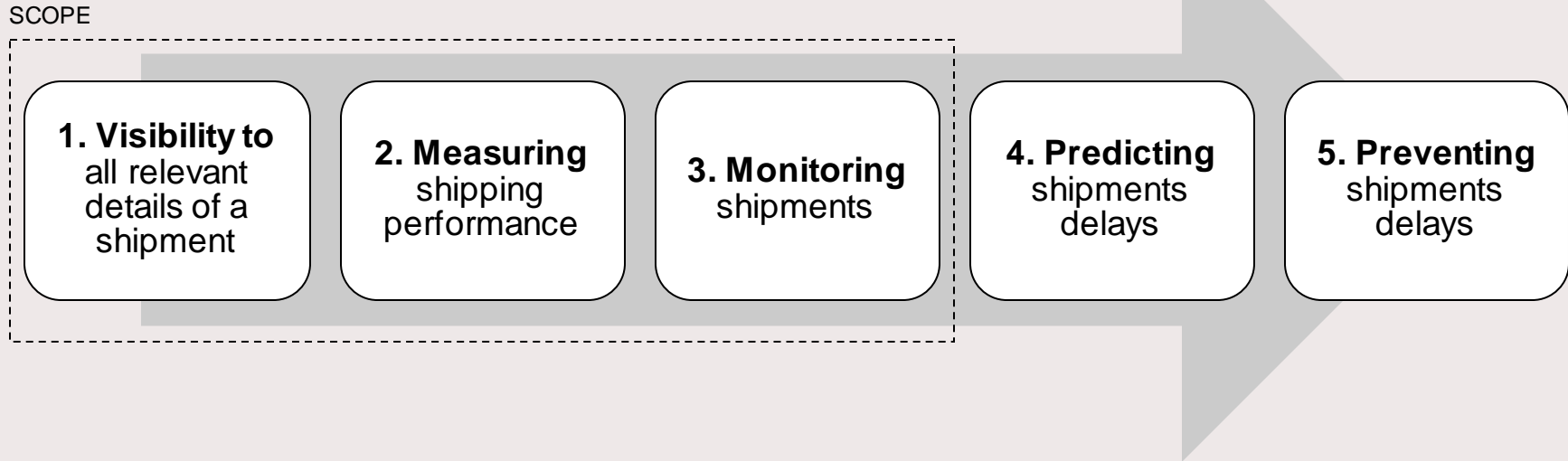
Rotterdam → Chicago
Q1 2005



$\mu = 19.0$ days

$\sigma = 3.4$ days

Roadmap towards proactive monitoring of shipments



Research questions

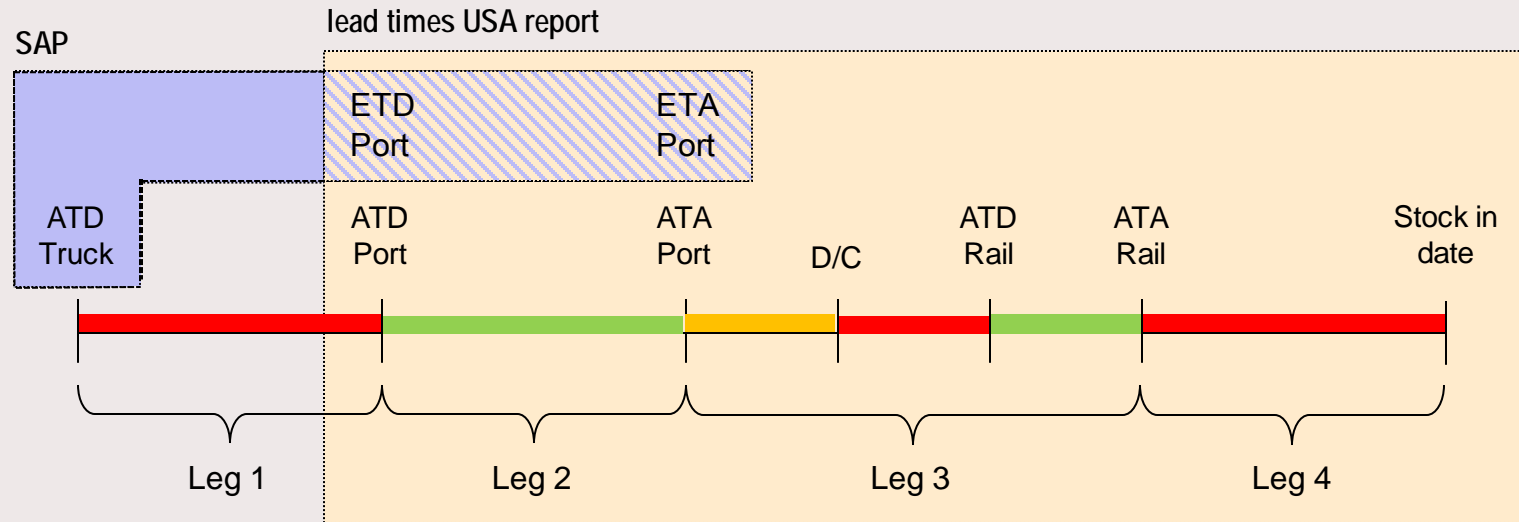
How can a visibility solution contribute to achieve control over the outbound logistics process in order to improve customer service and reduce costs?

- 1) What is the **current situation** within the context of outbound logistics?
- 2) What **causes** of long and fluctuated lead times do exist and why do they occur?
- 3) What kinds of **tools for supply chain visibility** are applicable to control the outbound logistics process?
- 4) What is the **quality** of real-time data for sea shipments?
- 5) How to **design** a tool that uses real-time data to monitor the outbound goods flow?
- 6) How can monitoring outbound transportation process using supply chain visibility tools **contribute** to improving the performance of the outbound logistics activities?

Methodology

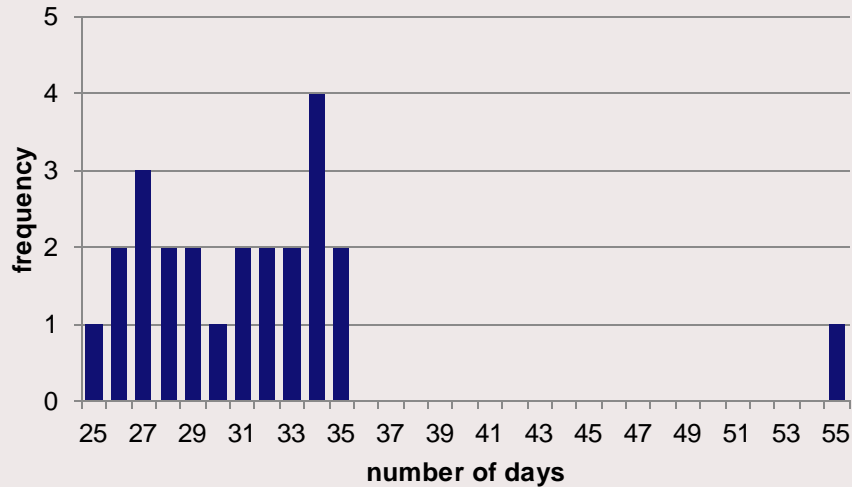
- Literature research
- Analysis of historical data
 - On-time performance
 - Transit time (per leg)
 - Travel time
 - Transfer time
 - Waiting time

Data sources



Total lead times

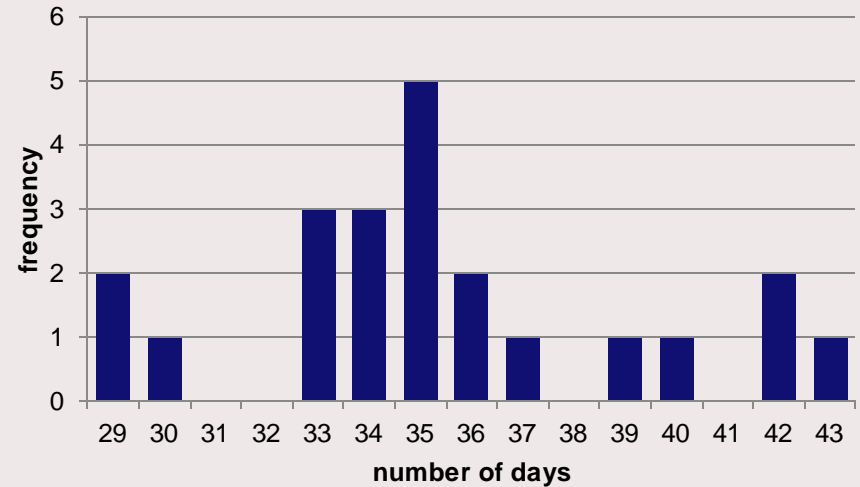
route: Venlo → Chicago



$\mu = 31.5$ days

$\sigma = 5.9$ days

route: Venlo → Columbus

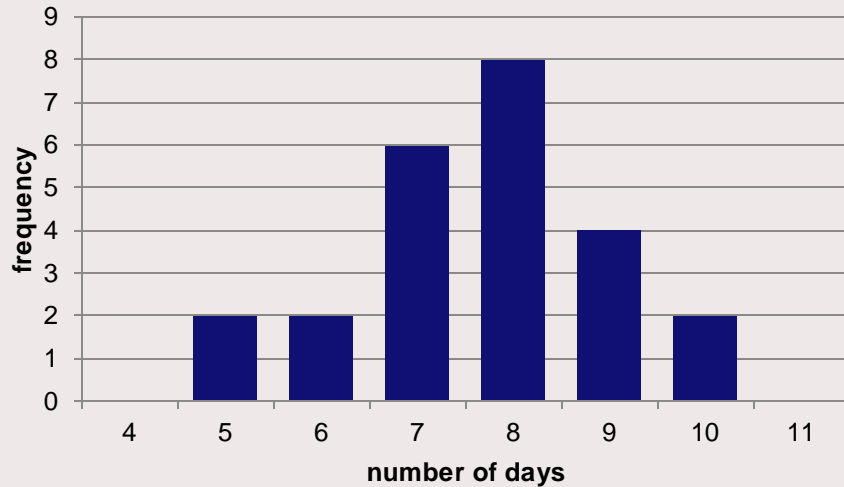


$\mu = 35.4$ days

$\sigma = 3.9$ days

Waiting time at port of lading: leg 1

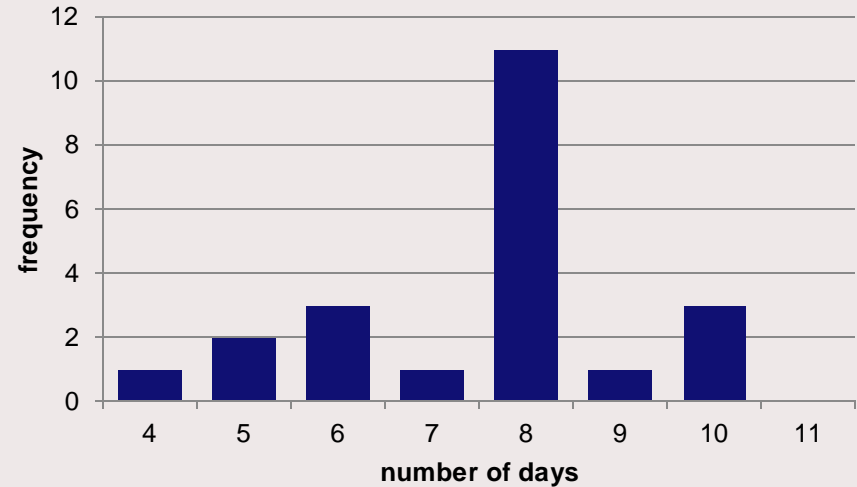
route: Venlo → Chicago



$\mu = 7.7$ days

$\sigma = 1.3$ days

route: Venlo → Columbus

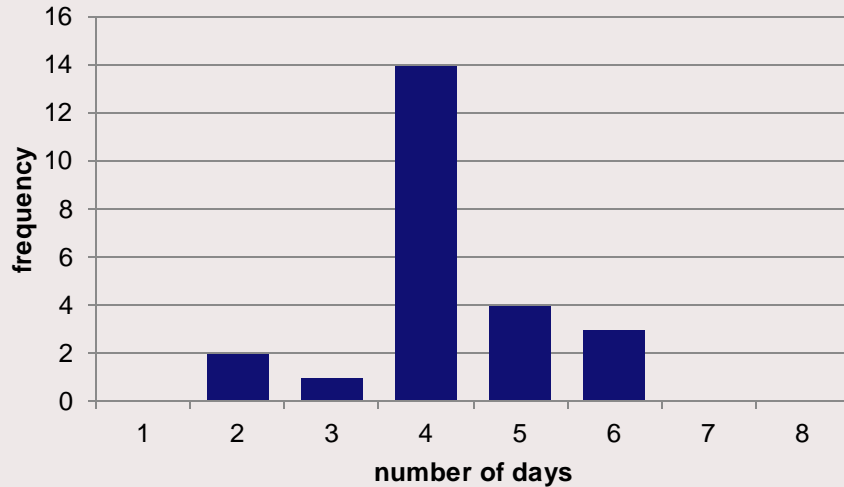


$\mu = 7.5$ days

$\sigma = 1.6$ days

Waiting time at port of discharge: leg 3

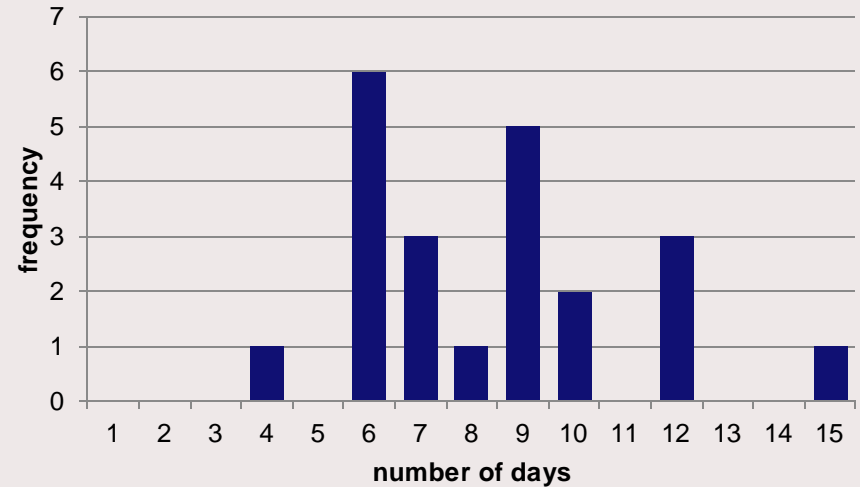
route: Venlo → Chicago



$\mu = 4.2$ days

$\sigma = 1.0$ days

route: Venlo → Columbus

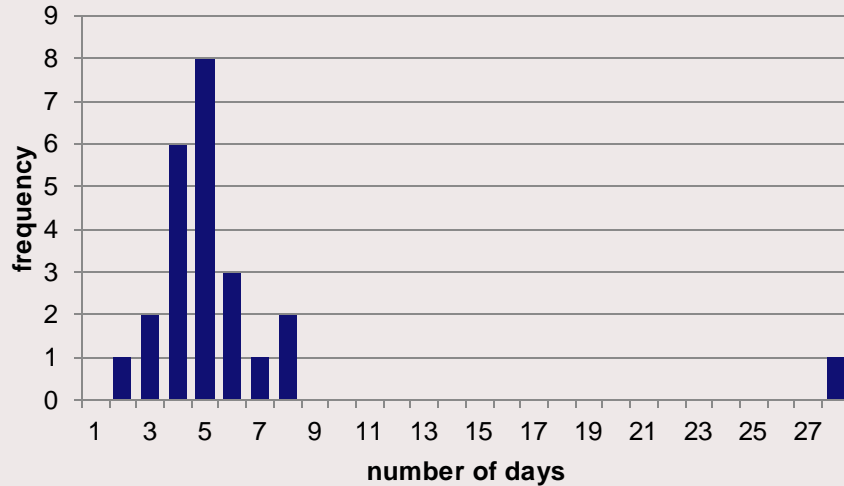


$\mu = 8.5$ days

$\sigma = 2.7$ days

Waiting time at container yard: leg 4

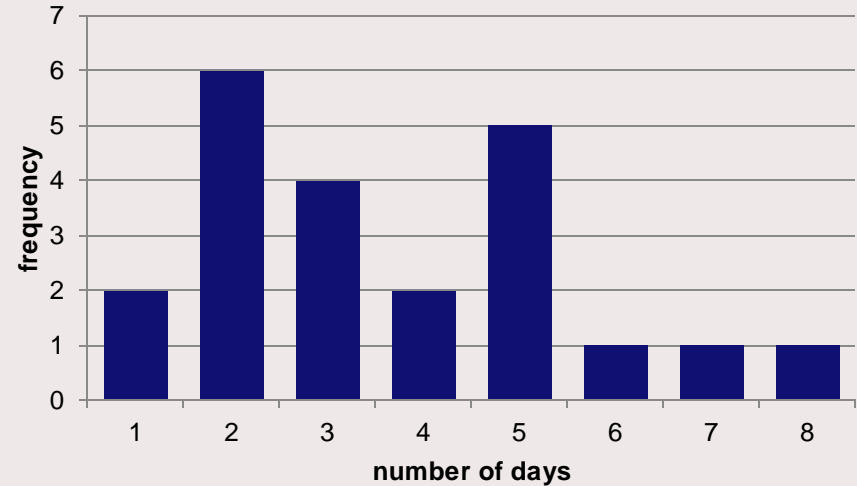
route: Venlo → Chicago



$\mu = 5.9$ days

$\sigma = 4.9$ days

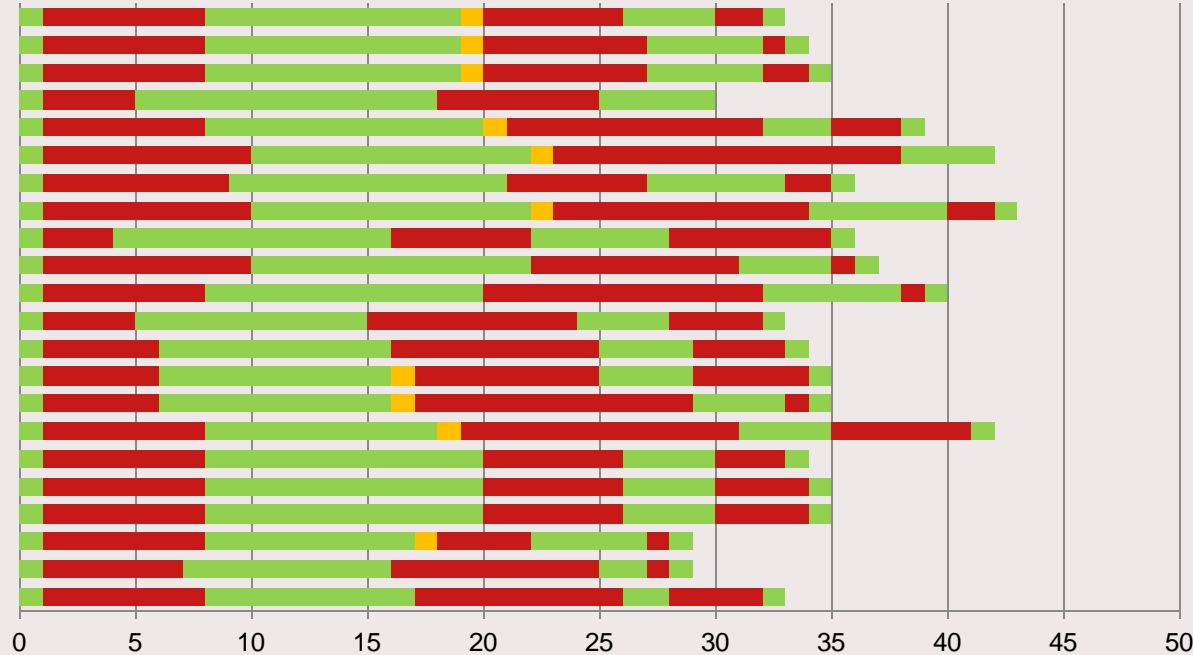
route: Venlo → Columbus



$\mu = 3.6$ days

$\sigma = 1.9$ days

Total lead times



49.1%

Travel time



0.2%

Discharge time



49.7%

Waiting time

Causes of long and fluctuating lead times

Growth of containership sizes

- number of departures decrease
- loading and unloading times increase
- handling problems at ports

Long waiting times

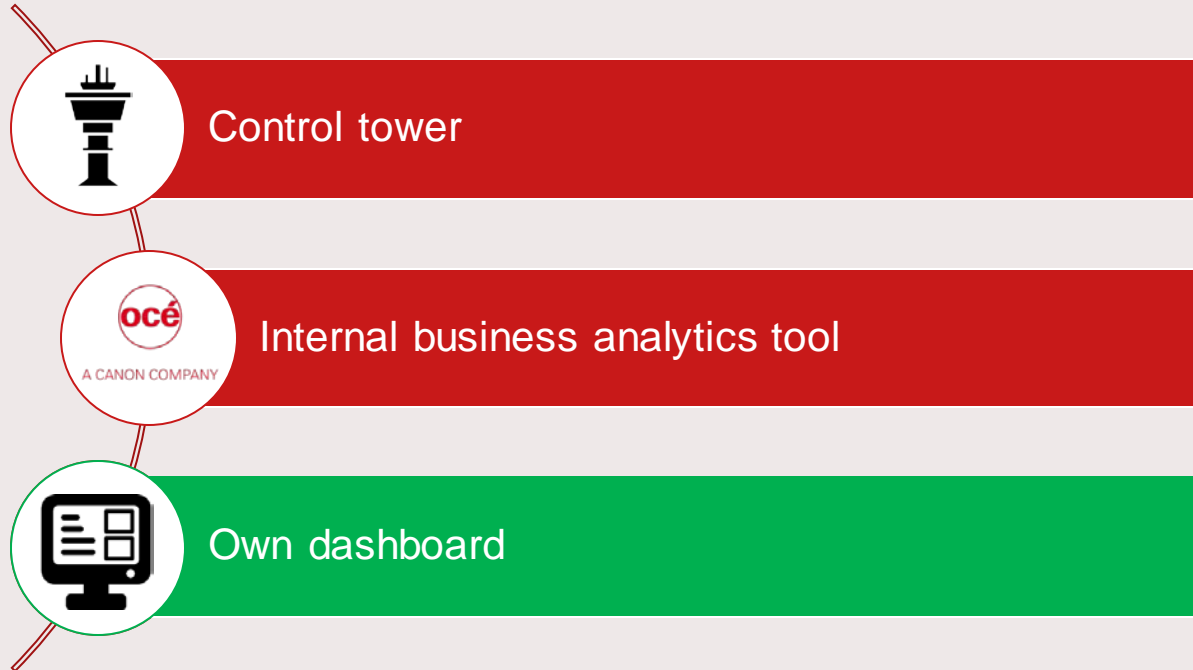
- Leg 1: carriers require being in the harbor 5 days before departure
- Leg 3: lack of communication
port congestions
- Leg 4: drayage only scheduled after arriving of container
low truck driver availability

Definition of Supply Chain Visibility

Supply chain visibility is defined as **collecting and analyzing real time information** related to shipments, including **logistics activities and the status** of events and milestones that occur during transportation of goods, to enable **shipment tracking and control** over this process by supply chain **disruption management** and **continuous improvement** of the supply chain.



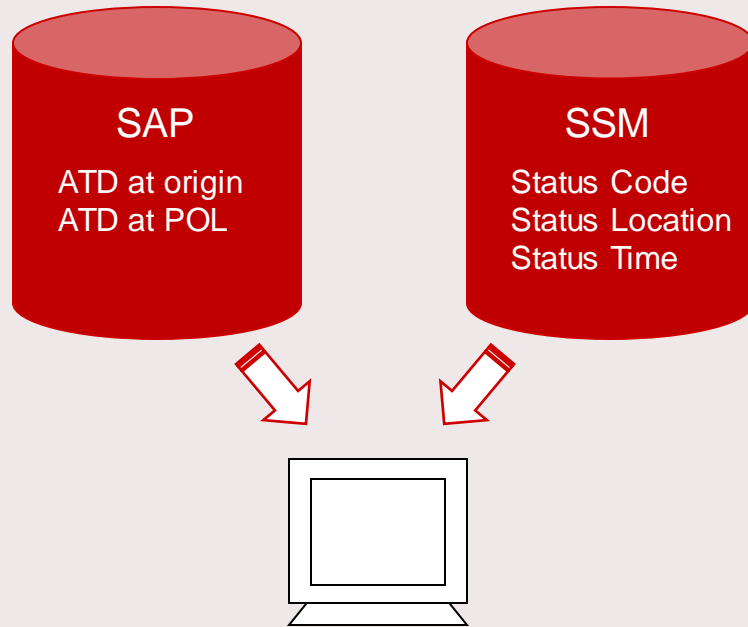
Supply chain visibility applications



Methodology

- Check available data sources
- Requirements analysis
- Design prototype

Data sources



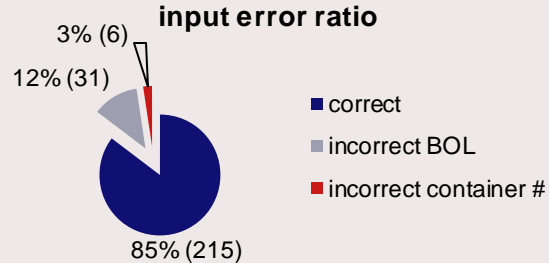
ATD: Actual time of departure
POL: Port of lading
SSM: Shipping Status Message

Data quality

SAP

Accuracy

- Errors in container number (3%)
- Errors in bill of lading number (12%)



Consistency

- 36% of ATD at POL equal to SSM portal

SSM portal

Completeness

- 92.2% of all SAP containers are covered
- Data available up to 90 days ago

Consistency

- Multiple status codes used for same logistics events

Timeliness

- Updated twice a day

Goals of application



Increase order visibility



Minimize impact of unplanned events



Recognize inefficiencies of lead times

Content of application



- Track & trace
- Alert system
- KPI dashboard
 - Transit times (per leg)
 - On-time performance
- Transportation costs
- Complete and damage-free delivery

Track & trace

The screenshot shows a Shiny web application interface for container tracking. The browser address bar indicates the URL is `http://127.0.0.1:3712`. The application has a dark sidebar with navigation options: Home, Dashboard, Track & Trace, Alerts, and Settings. Below the sidebar are three input sections: 'Add SSM file' with a file browser and 'Upload complete' button; 'Add SAP file' with a file browser and 'Upload complete' button; and 'Enter shipment number' with a text input containing '5156537' and an 'Update' button.

The main content area is divided into three sections:

- DELIVERED** (green header):
 - Empty Container Returned
 - 6/19/2019 10:26 AM EST
 - USCHI_BNSF LOGISTICS PARK CHIC
 - ETA
 - 6/19/2019 10:26 AM EST
 - FROM: VENLO TO: CHICAGO
- SHIPMENT DETAILS**:

Container ID	CMAU5578167	
Booking Number	RTM0916348	
Bill of Lading	CMDURT0916348	
Consignee	CANON USA	5156537
Carrier	CMDU	
Vessel	EVER LIFTING	
Port of Loading	NLRTM	
Port of Discharge	USORF	
- ALL SHIPMENTS IN CONTAINER CMAU5578167** (blue header):
 - Jun 19, 2019**
 - Empty Container Returned (10:26 AM EST)
 - USCHI_BNSF LOGISTICS PARK CHIC
 - Loaded on Truck (11:53 AM EST)
 - USCHI_CSK-59TH STREET
 - Full Out Gate from Ocean Terminal (11:53 AM EST)
 - USCHI_CSK-59TH STREET
 - Jun 1A, 2019**
 - Container Available Notice (1:54 AM EST)
 - USCHI_CSK-59TH STREET
 - Off Rail (5:30 AM EST)
 - USCHI_CSK-59TH STREET

Alert system

~/Data2Sync/R/dashboard - Shiny
 https://127.0.0.1:3712/ Open in Browser Push

Application

Home
 Dashboard
 Track & Trace
 Alerts
 Settings

Add SCM file
 Browse... 377060311.238 Upload complete

Add SAP file
 Browse... SAP_SCRIPTFILEX Upload complete

Enter shipment number

 Update

300 OK

1 WARNING

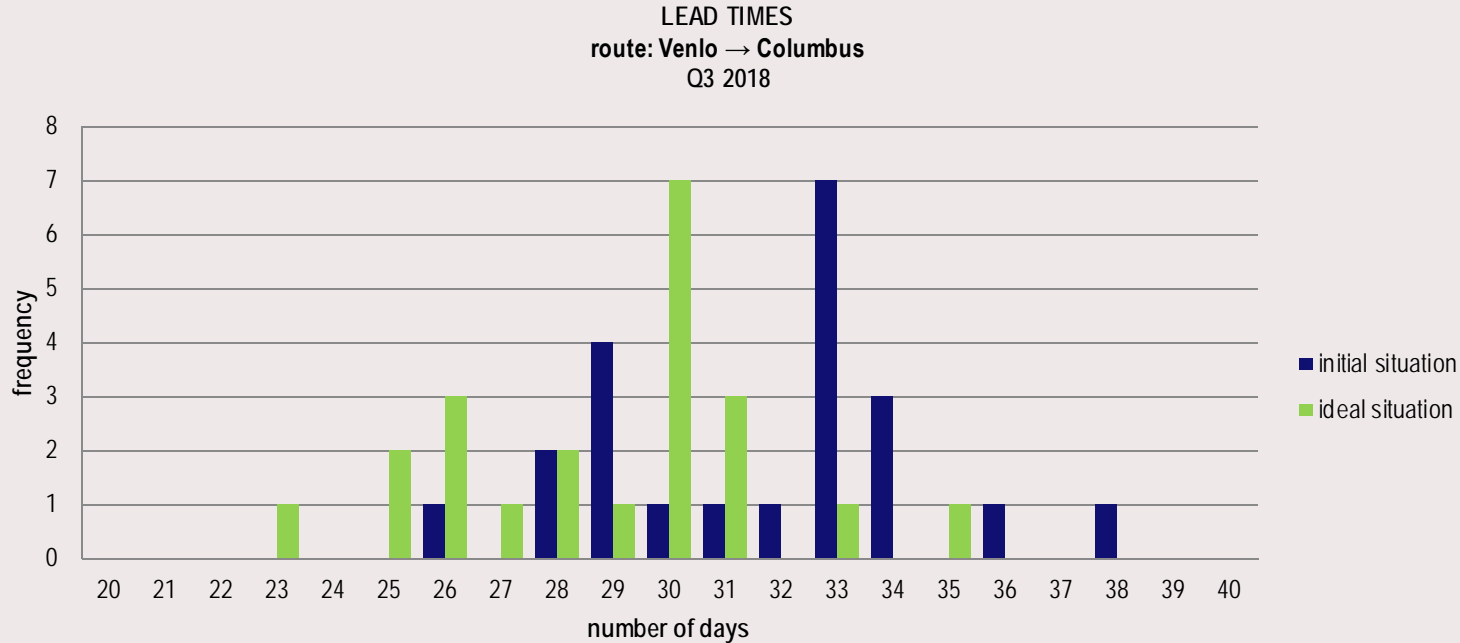
6 CRITICAL

Show 10 entries Search

Container.ID	alert.status	leg	Last_check	Last_update	Last_location	status.duration	status.name
MOAU1414997	warning	3	6/25/2019 2:53 AM JST	Full Container Discharged	KRPUS_PUSAN	3d 4h 58m	
CMAU5812736		4	6/26/2019 11:40 PM EST	Empty Container Returned	USCMH_CSX_COLUMBUS	17h 32m	
CMAU5600064		2	6/26/2019 11:10 PM AST	Full Container Discharged	USORF_NORFOLK INTERNATIONAL TE	19h 2m	
TCLU3517232		4	6/26/2019 4:51 PM THA	Empty Container Returned	THLCH_LAEM CHABANG	1d 12h 21m	
NYKU8491511		3	6/26/2019 1:30 PM CT	Vessel Departed from Transship Point Transship	SOSIN_SINGAPORE	1d 16h 42m	
KKTU8017105		2	6/26/2019 1:30 PM CT	Vessel Departed from Transship Point Transship	SOSIN_SINGAPORE	1d 16h 42m	
TRHU2433382		2	6/26/2019 1:30 PM CT	Vessel Departed from Transship Point Transship	SOSIN_SINGAPORE	1d 16h 42m	
FBHU0319300		2	6/26/2019 1:30 PM CT	Vessel Departed from Transship Point Transship	SOSIN_SINGAPORE	1d 16h 42m	
MDAU7723484		2	6/26/2019 1:30 PM CT	Vessel Departed from Transship Point Transship	SOSIN_SINGAPORE	1d 16h 42m	
GLDU9678140		2	6/26/2019 1:30 PM CT	Vessel Departed from Transship Point Transship	SOSIN_SINGAPORE	1d 16h 42m	

Showing 11 to 20 of 307 entries Previous 1 2 3 4 5 ... 31 Next

Reduction of waiting times



Potential cost reductions

Reduction of cash flow in-transit

- Any reduction of lead time with 1 day → 1 million

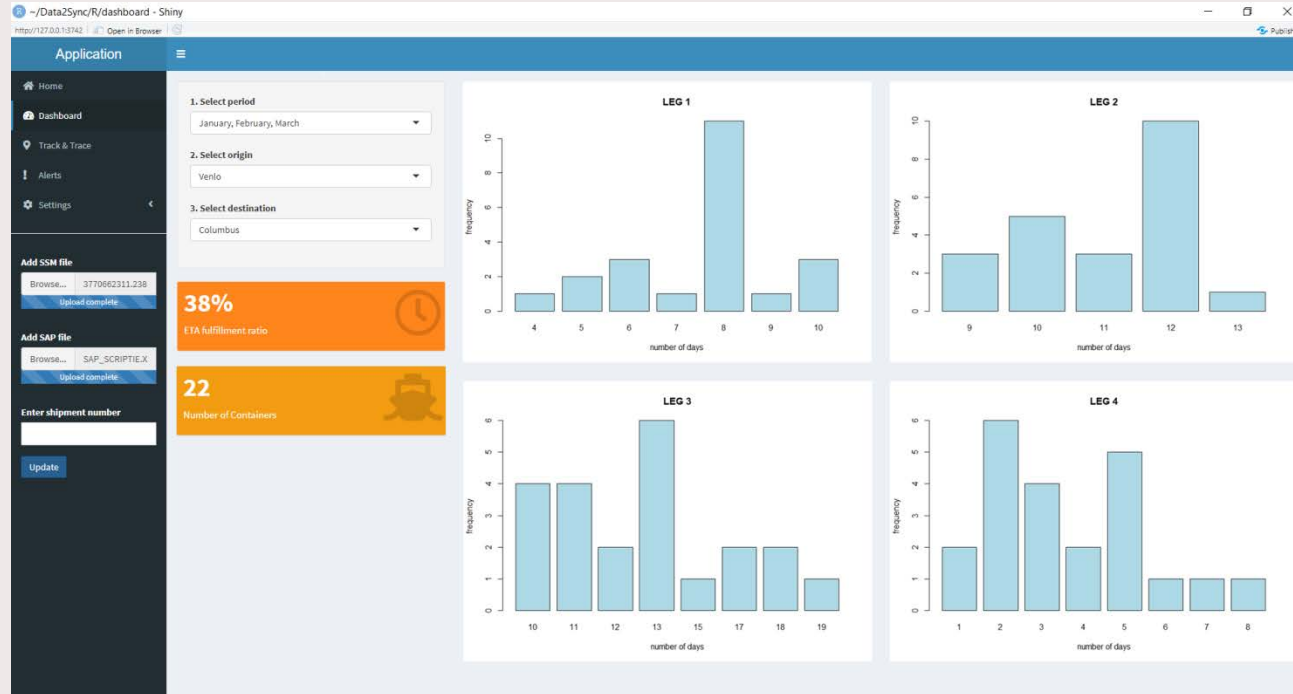
Reduction of demurrage costs

- For shipments to Chicago and Columbus → €4390 per quarter

Other cost savings:

- Lower inventory costs
- Decrease of downtime costs
- Less costs of lateness

KPI dashboard



Added values

Track & trace

- Better customer service
- Reputation of firm

Alert system

- Higher responsiveness to disruptions leading to cost savings

KPI dashboard

- Identify bottlenecks
- Carrier evaluation
- Port evaluation

Research questions

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Recommendations

	Océ	Canon
Deploy the supply chain visibility application	X	
Encourage shipping companies to share their data <ul style="list-style-type: none"> for instance: Kintetsu and Cosco shipping lines 		X
Improve data quality of SAP <ul style="list-style-type: none"> input of container and BOL numbers 	X	
Improve data quality of SSM portal <ul style="list-style-type: none"> accuracy and consistency across carriers 		X
Create ownership of alert system to solve each alert	X	X
Enhance collaboration between parties	X	X
Involve Canon Inc. in improving the supply chain visibility solution	X	X

THANK YOU