



# A More Prototypical Approach to Car Forwarding Software

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# Overview

- Car forwarding review, Prototype and Model
- Why a new computer program
- What it does (very high level)
  - Fundamentals
  - Advanced Features
  - Analysis
- Q & A

# Show of Hands

- Operating sessions?
- Car Cards and Waybills (CC&WB)?
- Switch Lists?
- Computer Software?

# **Car Forwarding Review**

# Prototype Car Forwarding

- Why? - Shipments of goods
- Where? - Waybills
- How? - Switch Lists

# Prototype Waybills – 3 Main Types

- Car Supply
- Freight
- Empty Return

ERIE RAILROAD COMPANY



EMPTY CAR WAYBILL  
AND  
HOME ROUTE CARD

Description of Car

INITIALS \_\_\_\_\_ NUMBER \_\_\_\_\_  
KIND OF CAR \_\_\_\_\_ TARE WEIGHT-TONS \_\_\_\_\_  
CAPACITY-TONS \_\_\_\_\_ COMMODITY GROUP  
OR, SPECIAL KIND \_\_\_\_\_  
INSIDE LENGTH \_\_\_\_\_ INSIDE WIDTH \_\_\_\_\_ INSIDE HEIGHT \_\_\_\_\_

Empty Car Waybill

BILLED FROM \_\_\_\_\_ DATE \_\_\_\_\_  
BILLED TO \_\_\_\_\_ DATE \_\_\_\_\_  
DIVERTED TO \_\_\_\_\_ DATE \_\_\_\_\_

Home Route Card

RECEIVED FROM \_\_\_\_\_ R. R.  
AT \_\_\_\_\_ DATE \_\_\_\_\_  
ISSUED AT \_\_\_\_\_ DATE \_\_\_\_\_

PLACE SPECIAL SERVICE PASTERS HERE

### FREIGHT WAYBILL — ORIGINAL

PATRON CODE

To be used for Single Consignments, Carload and L.C.P.C.

UNI-154

## 392 - GULF & MISSISSIPPI RAILROAD CORPORATION - 392

CAR INITIALS AND NUMBER T. <b>SOU 9466</b>		KIND <b>LB</b>	GROSS WEIGHT IN LBS	NET WEIGHT	LENGTH OF CAR IN FEET <b>50</b>	MARKED CAPACITY OF CAR ORDERED	STRIKED WEIGHT OF CAR
TRAILER INITIAL AND NUMBER O. <b>[ ]</b>		LENGTH	PLAN NUMBER	CUSTOMER No.	WAYBILL DATE <b>5/9/86</b>	WAYBILL No. <b>95584</b>	
TRAILER INITIAL AND NUMBER C. <b>[ ]</b>		LENGTH		BILL OF LADING DATE <b>5/9/86</b>	BILL OF LADING No.	INVOICE No.	

FOR (See Special Instructions)

CONSIGNEE AND ADDRESS AT STOP  
**1212**

STATION AT  
TO AT  
P AT

TO STATION STATE  
**CEDAR SPRINGS GA**

FROM No. STATION STATE  
**11127 HOUSTON MS**

B/A **14053 NEW ALBANY MS**

FROM (Full Name of Shipper, Street and Post Office Address)  
**UNION CAMP CORP  
4TH AVE NORTH  
HOUSTON MS 38851**

PATRON CODE

ROUTE Show each Junction and Carrier in Route Order to Destination  
**392-GMSR TUSCALOOSA SOU CIRR DLY**

Show "A" if Agent's Routing or "S" if Shipper's Routing → **S-AJ**

CONSIGNEE TO Mail or street address of Consignee —  
**GREAT SOUTHERN PAPER CO  
CEDAR SPRINGS GA**

PATRON CODE

PLACE X IF CHARGES DUE FROM OTHER THAN SHIPPER OR FORWARDER

SHOW TO WHOM CHARGES SHOULD BE BILLED IF OTHER THAN SHIPPER OR CONSIGNEE  
NAME  
ADDRESS  
CITY STATE ZIP

Subject to Section 7 of Conditions. If this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

SIGNATURE OF CONSIGNOR

WHERE STATE IS BASED ON VALUATION OF GOODS, INDICATE AGREED OR DECLARED VALUE NOT EXCEEDING

SCALE WEIGHT OR WEIGHING BUREAU STAMP

WEIGHED AT **Atlanta**

GROSS **141.320**

TARE **69.000**

ALLOWANCE **72320**

NET

PER IF CHARGES ARE TO BE PREPAID, WRITE OR STAMP HERE

"TO BE PREPAID"

NO. PKGS.	Description of Articles, Special Marks and Exceptions	402415	WEIGHT	RATE	FREIGHT	ADVANCES	PREPAID
98	BALES SCRAP PAPER FOR RECYCLING PURPOSES ONLY SL&C WEIGH & COLLECT		80000	.95	760.00		
			23000	4.00	120.00		
							N67543 01 01

Received Date **5/17**

Processed Date **5/19**

BUREAU INBOUND BILLING REF **5719**

NO. POINT OF ORIGIN, ROAD, CAR NO. DESTINATION, DATE, STATION AND ROUTING

TRAFFIC DEPT. CO-AUDITED

WGT. DES. EXT. **CL**

Outbound Junction Agent will show Junction stamps to agent and order provided. Additional Junction stamps and all yard stamps to be placed on back hereof

Destination Agent Will Stamp Herein Station Name and Date Reported

FIRST JUNCTION SECOND JUNCTION THIRD JUNCTION FOURTH JUNCTION

PLACE SPECIAL SERVICE PATERN

HERE

For Acct. Bureau Only

620 THE PENNSYLVANIA RAILROAD 620



INTERLINE FREIGHT WAYBILL—COPY

Class Tax Tare

38

TO BE USED FOR SINGLE CONSIGNMENTS, CARLOAD AND LESS CARLOAD—INTERLINE

STOP THIS CAR AT

1ST LEWISTOWN PA

WEIGHT IN TONS

LENGTH OF CAR

MARKED CAPACITY OF CAR

GROSS TARE NET

ORDERED

FURNISHED

ORDERED

FURNISHED

2ND SANDWICH ILL

CAR INITIALS AND NUMBER

KIND

C. L. Transferred to or L. C. L. Leading No.

DATE

60

WAYBILL No.

ATSF 91119

F

JULY 11 1963

50248

TO

STATION

STATE

FROM No.

STATION

STATE

Station No.

LEWISTOWN PENN A

Station No.

1075 NEW HOLLAND PENN A

ROUTE (Show each Junction and Carrier in route order to destination of waybill).

Show "A" if Agent's Routing or "B" if Shipper's Routing

LANCASTER ENOLA LEWISTOWN CONWAY  
CHICAGO CB&Q BX 7207 /NORMAL

FULL NAME OF SHIPPER AND, FOR C. O. D. SHIPMENTS, THE STREET AND POST OFFICE ADDRESS, AND INVOICE NUMBER IF AVAILABLE.

NEW HOLLAND MACHINE CO

Outgoing Patrons Code

INV 021951/54

70433/3

RECONSIGNEE TO

STATION

STATE

ORIGIN AND DATE, ORIGINAL CAR, TRANSFER FREIGHT BILL AND PREVIOUS WAYBILL REFERENCE AND ROUTING WHEN REBILLED.

AUTHORITY

CONSIGNEE AND ADDRESS

W L CREIGHTON

FINAL DESTINATION AND ADDITIONAL ROUTING

LELAND ILLINOIS

Inbound Patrons Code

WHEN SHIPPER IN THE UNITED STATES EXECUTES THE NO RECOURSE CLAUSE OF SECTION 7 OF THE BILL OF LADING INSERT "YES"

Indicate by symbol in Column provided how weights were obtained for L. C. L. Shipments only. B—Railroad Scale, S—Shipper's Tared Weights, E—Estimated—Weight and Corrod., T—Tare Classification or Minimum.  
ON L. C. L. TRAFFIC—INSTRUCTIONS (Regarding Tare, Ventilation, Heating, Milling, Weighing, Etc., if used, Specify to Whom Tare Should be Charged.)

AMOUNT

G.

O.

D.

TOTAL

WEIGHED

AT

GROSS

TARE

ALLOWANCE

NET

EWB 15578

DELIVERY SERVICE REQUESTED

YES NO

IF CHARGES ARE TO BE PREPAID WRITE OR STAMP HERE.  
\* TO BE PREPAID \*

ON L. C. L. TRAFFIC TRANSFER STAMPS TO BE SHOWN IN THESE SPACES

1ST STOP LEWISTOWN PA TO COMPLETE LOADING BY N H MACHINE CO

2ND STOP SANDWICH ILL FOR PARTIAL UNLOADING BY MCALLISTER SALES &amp; SERVICE

No. Page DESCRIPTION OF ARTICLES, SPECIAL MARKS AND EXCEPTIONS

591

1 FARM CROP DRYER /3 PCS/  
1 FARM FEED MILL /12 PCS/  
GGE 225 LBS SL&C

#

WEIGHT

RATE

FREIGHT

ADVANCES

PREPAID

6177

2325

1.50

REV WB TO BE MADE AND  
MAILED FROM HARRISBURG PADESTINATION AGENT'S  
FREIGHT BILL No.

No. of Cars

COPY

TAX

TOTAL

Railroad Agents Will Show Junction Stamps in Space and Order Provided. Additional Junction Stamps and All Yard Stamps to Be Placed on Each Carload.

FIRST JUNCTION

SECOND JUNCTION

THIRD JUNCTION

FOURTH JUNCTION

DESTINATION AGENT WILL STAMP  
HEREIN STATION NAME AND  
DATE REPORTED

# 671-RARITAN RIVER RAIL ROAD COMPANY-671

## FREIGHT WAYBILL

To be used for Single Consignments, Carload and Less Carload

CAR INITIALS AND NUMBER NYC 41162	KIND	WEIGHT IN TONS			LENGTH OF CAR		MARKED CAPACITY OF CAR	
		GROSS	TARE	NET	ORDERED	FURNISHED	ORDERED	FURNISHED
<b>STOP THIS CAR</b>		C. L. TRANSFERRED TO OR L.C.L. LOADING NO.			DATE 7/11/62	WAYBILL No. 330		
CONSIGNEE AND ADDRESS AT STOP								
AT _____								
AT _____								
AT _____								
TO No.	STATION	STATE OR PROV.	FROM No.	STATION	STATE OR PROV.			
( )	ALGOMA,	WIS.	( 150 )	WRIGHTS,	N. J.			

ROUTE (SHOW EACH JUNCTION AND CARRIER IN ROUTE ORDER TO DESTINATION OF WAYBILL) SOUTH AMBOY CNJ TAYLOR EL E. BUFFALO C&O (PMD) KEWAUNEE K&W CASCO JCT. A&W	ROUTE CODE NO.	FULL NAME OF SHIPPER, AND, FOR C. O. D. SHIPMENTS, STREET, POST OFFICE ADDRESS, AND INVOICE NUMBER. U. S. PLYWOOD CORP., WELDROK DIVISION	Code No.
SHOW "A" IF ASBESTOS ROUTING OR "S" IF SHIPPER'S ROUTING. RECONSIGNEE TO STATION STATE OR PROV.		ORIGIN AND DATE, ORIGINAL CAR, TRANSFER FREIGHT BILL AND PREVIOUS WAYBILL REFERENCE AND ROUTING WHEN REBILLED.	

AUTHORITY CONSIGNEE AND ADDRESS ALGOMA PLYWOOD & WENEER DIVISION	Code No.	AMOUNT C. \$ _____ D. \$ _____	WEIGHED AT PARLIN, N. J. GROSS 130600 TARE 57900 NET 72700
FINAL DESTINATION AND ADDITIONAL ROUTING		PICKUP SERVICE Yes No DELIVERY SERVICE REQUESTED Yes No	IF CHARGES ARE TO BE PREPAID, WRITE OR STAMP HERE, "TO BE PREPAID"
ON C. L. TRAFFIC—INSTRUCTIONS (REGARDING ICING, VENTILATION, MILLING, WEIGHING, ETC. IF ICED, SPECIFY TO WHOM ICING SHOULD BE CHARGED.)		WHEN SHIPPER IN THE UNITED STATES EXECUTES THE NO-RECOURSE CLAUSE OF SECTION 7 OF THE BILL OF LADING, INSERT "YES".	

ON L. C. L. TRAFFIC TRANSFER STAMPS TO BE SHOWN IN THIS SPACE.				INDICATE BY SYMBOL IN COLUMN PROVIDED HOW WEIGHTS WERE OBTAINED FOR L.C.L. SHIPMENTS ONLY. R—RAILROAD SCALE; S—SHIPPER'S TESTED WEIGHTS; E—ESTIMATED—WEIGH AND CORRECT; T—TARIFF CLASSIFICATION OR MINIMUM.			
NO. PKGS.	DESCRIPTION OF ARTICLES, SPECIAL MARKS AND EXCEPTIONS	COMMODITY CODE NO.	WEIGHT	RATE	FREIGHT	ADVANCES	PREPAID
1	C/L CALCIUM OF SILICATE & ASBESTOS COMBINED IN FLAT PCS. SC&L		72700	1.31	925.77 952.57		

**C. & O. RY.**  
JUL 15 1962  
DESTINATION AGENT  
KEWAUNEE, WIS.

JUL 15 1962  
LOCAL AGENT  
KEWAUNEE, WIS.

JUL 15 1962  
P. M.  
DESTINATION AGENT  
STURGEON BA

First Junction JUL 12 1962 RECEIVED TAYLOR, PA.	Second Junction JUL 15 1962 KEWAUNEE, WIS.	Third Junction	Fourth Junction
RARITAN RIVER RAIL ROAD COMPANY—671			

PLACE SPECIAL SERVICE PASTERS HERE

(A. A. R. Standard Form AD-98)

Form 6 30M 10-60 JIC

# 671-RARITAN RIVER RAIL ROAD COMPANY-671

## FREIGHT WAYBILL

To be used for Single Consignments, Carload and Less Carload

CAR INITIALS AND NUMBER <b>NYC 41162</b>	KIND	WEIGHT IN TONS			LENGTH OF CAR		MARKED CAPACITY OF CAR	
		GROSS	TARE	NET	ORDERED	FURNISHED	ORDERED	FURNISHED
<b>STOP THIS CAR</b>		C. L. TRANSFERRED TO OR FROM CARLOADING NO.			DATE <b>7/11/62</b>	WAYBILL NO. <b>330</b>		

CONSIGNEE AND ADDRESS AT STOP

AT \_\_\_\_\_

AT \_\_\_\_\_

AT \_\_\_\_\_

TO No.	STATION	STATE	PROV.
--------	---------	-------	-------

( ) ALGOMA, WIS.

FROM No.	STATION	STATE	PROV.
----------	---------	-------	-------

( 150 ) WRIGHTS, N. J.

ROUTE (SHOW EACH JUNCTION AND CHANGE IN ROUTE ORDER TO DESTINATION OF WAYBILL)	ROUTE CODE NO.
--	----------------

SOUTH AMBOY CNJ TAYLOR EL  
 E. BUFFALO C&O (PMD) KEWAUNEE KGB&W  
 GASCO JCT. A&W

FULL NAME OF SHIPPER, AND, FOR C.O.D. SHIPMENTS, STREET, POST OFFICE ADDRESS, AND INVOICE NUMBER.	CODE NO.
---	----------

U. S. PLYWOOD CORP., WELDROK DIVISION

RECONSIGN TO	STATION	STATE	PROV.
--------------	---------	-------	-------

ORIGIN AND DATE, ORIGINAL CAR, PREVIOUS FREIGHT BILL AND PREVIOUS WAYBILL REFERENCE AND ROUTING WHEN REBILLED.

AUTHORITY CONSIGNEE AND ADDRESS	CODE NO.
------------------------------------	----------

ALGOMA PLYWOOD & WENEER DIVISION

C. O. D.	AMOUNT	WEIGHED
	\$	AT <b>PARLIN, N. J.</b>
	\$	GROSS <b>130600</b>
	TOTAL	<b>57900</b>

FINAL DESTINATION AND ADDITIONAL ROUTING

ALGOMA PLYWOOD & VENEER DIVISION

FINAL DESTINATION AND ADDITIONAL ROUTING

ON C. L. TRAFFIC—INSTRUCTIONS (REGARDING ICING, VENTILATION, MILLING, WEIGHING, ETC. IF ICED, SPECIFY TO WHOM ICING SHOULD BE CHARGED.)

ON L.C.L. TRAFFIC TRANSFER STAMPS TO BE SHOWN IN THIS SPACE.

NO. PKGS.	DESCRIPTION OF ARTICLES, SPECIAL MARKS AND EXCEPTIONS	COMMODITY CODE NO.
1	C/L CALCIUM OF SILICATE & ASBESTOS COMBINED IN FLAT PCS.	SC&L

FEE	AT	PARLIN, N. J.
GROSS		130600
TOTAL		57900
TARE		
ALLOWANCE		
NET		72700
PICKUP SERVICE	YES	NO
DELIVERY SERVICE REQUESTED	YES	NO
IF CHARGES ARE TO BE PREPAID, WRITE OR STAMP HERE, "TO BE PREPAID"		

WHEN SHIPPER IN THE UNITED STATES EXECUTES THE NO-RECOURSE CLAUSE OF SECTION 7 OF THE BILL OF LADING, INSERT "YES".

INDICATE BY SYMBOL IN COLUMN PROVIDED \* HOW WEIGHTS WERE OBTAINED FOR L.C.L. SHIPMENTS ONLY. R—RAILROAD SCALE. S—SHIPPER'S TESTED WEIGHTS. E—ESTIMATED—WEIGH AND CORRECT. T—TARIFF CLASSIFICATION OR MINIMUM.

WEIGHT	RATE	FREIGHT	ADVANCES	PREPAID
72700	1.31	925.37		
		952.37		

**C. & O. RY.**  
**JUL 15 1962**  
 DESTINATION AGENT'S  
 KEWAUNEE, WIS.

15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31  
 JUL 18 1962  
 RECEIVED  
 LOCAL AGT.  
 KEWAUNEE, WIS.

707 4285  
 JUL 18 1962  
 P.M.  
 KEWAUNEE, WIS.

Outboard Junction Agent Will Show Junction Stamps and Stamps to be Placed on Back Hereof.			
FIRST JUNCTION	SECOND JUNCTION	THIRD JUNCTION	FOURTH JUNCTION
JUL 12 1962 RECEIVED TAYLOR, PA.	KEWAUNEE, WIS. JUL 15 1962		DESTINATION AGENT WILL STAMP HERRIN STATION NAME AND DATE REPORTED JUL 18 1962 ANNAPEE & WEST E. F. SUSHMAN STURGEON BAY

ARITAN RIVER RAIL ROAD COMPANY—671

# Model Car Forwarding (CC&WB)

- ~~Shipments~~
- **Waybills**
- ~~Switch Lists~~ – Only with a lot of manual effort

ROAD NAME CNW

CAR NO. 84028

TYPE Box

EU

WAYBILL 1

CARTYPE  
ROUTING:

CNW 84028

VIA:

TO SEATTLE, WA

RCVR NORTHWEST LUMBER

FROM DUNSMUIR, CA

SHPR PLANING MILL

CONTENTS RAW LUMBER

MEC 7573 GREEN  
LP 50' Pulpwood Rack

KIND	LP	Freight Waybill	1
TO STATION STATE	NH	FROM STATION STATE	VT
ROUTE	Groveton	NAME OF SHIPPER	E. St. Johns
CONSIGNEE AND ADDRESS	MEC Whitehead BM	ADDRESS	American Paper Co.
DESCRIPTION OF ARTICLES AND MARKS	White Mtn. Paper		
INSTRUCTIONS	Interchange at Whitehead Set out on pulp up		
DESCRIPTION OF ARTICLES AND MARKS	Pulp Wood		

ACFX 73011 WHITE  
T Georgia Kaolin Tank

KIND	T	Freight Waybill	1
TO STATION STATE	VT	FROM STATION STATE	GA
ROUTE	Gilman	NAME OF SHIPPER	Dry Branch
CONSIGNEE AND ADDRESS	MEC Gilman Georgia-Pacific Paper Mill	ADDRESS	
DESCRIPTION OF ARTICLES AND MARKS	Kaolin		

BM 79097 BLUE  
XM 50' PS Boxcar

KIND	XM	Freight Waybill	1
TO STATION STATE	NH	FROM STATION STATE	MA
ROUTE	Groveton	NAME OF SHIPPER	E. Deerfield
CONSIGNEE AND ADDRESS	White Mountain Paper Co.	ADDRESS	BM Agent
DESCRIPTION OF ARTICLES AND MARKS	Local: spot on outbound paper track		
DESCRIPTION OF ARTICLES AND MARKS	MTY		

DH 127 YELLOW  
HM 2 Bay Hopper

KIND	HM	Freight Waybill	1
TO STATION STATE	VT	FROM STATION STATE	PA
ROUTE	Gilman	NAME OF SHIPPER	Moosic
CONSIGNEE AND ADDRESS	MEC (CP) St. J Paper mill	ADDRESS	Hudson Coal Co.
DESCRIPTION OF ARTICLES AND MARKS	Coal		

MEC 6198 GREEN  
XM 40' Boxcar

KIND	XM	Freight Waybill	1
TO STATION STATE	NY	FROM STATION STATE	ME
ROUTE	Waterford	NAME OF SHIPPER	Eastport
CONSIGNEE AND ADDRESS	MEC St. J CP VTR D&H Grand Union	ADDRESS	Machiasport Canning Co.
DESCRIPTION OF ARTICLES AND MARKS	Canned Goods		



12th Street

BNSF North

BNSF South

BNSF

Sort



Kind: Coy. AAR  
B.R.No. 304717  
DND:  
FREIGHT WAYBILL  
3-27-75  
TO:  
FROM: 44

Kind: Coy. AAR  
B.R.No. 304717  
DND:  
FREIGHT WAYBILL  
3-27-75  
TO:  
FROM: 44

Bad Order  
Describe problem below

Kind: Coy. AAR  
B.R.No. 304717  
DND:  
FREIGHT WAYBILL  
3-27-75  
TO:  
FROM: 44

Track 1

Track 2

Track 3

Track  
4

Main

# Freight Waybill and Empty Return Bill

RID CODE  
**352**



SPEC  
HDLG  
**R40**

## WAYBILL

WAYBILL NUMBER

**310251**

DESTINATION

STATION NAME

**VANCOUVER**

CONSIGNEE

**PACIFIC PRODUCE**

ROUTE **GN DELV.**

**GN -PRCTN CQVR -RUBY CP**

PROV.

**BC**

TRACK

WEIGHT STCC  
**62000 0129990**

COMMODITY

**FRUIT, FRESH, NEC**

SPECIAL INSTRUCTIONS

SHIPPER

**CO-OP PACKINGHOUSE**

RID CODE  
**155**

SPEC  
HDLG

## EMPTY HOME ROUTING

WAYBILL NUMBER

**310251**

DESTINATION

STATION NAME

**KEREMEOS**

CONSIGNEE

**CO-OP PACKINGHOUSE**

ROUTE

**CP -RUBY CQVR -RUBY -PRCTN**

**GN**

PROV.

**BC**

TRACK

SPECIAL INSTRUCTIONS

**DUTY PAID IN CANADA**

# Car Supply Bill and Freight Waybill

RID CODE **CAR SUPPLY** SPEC  
**625** **WAYBILL** HDLG

WAYBILL NUMBER

**281601**

DESTINATION

STATION NAME

**MERRITT**

CONSIGNEE

**MERRITT DIAMOND SAWML**

ROUTE

**CQVR**

PROV.

**BC**

TRACK

SPECIAL INSTRUCTIONS

RID CODE **COQUIHALLA** SPEC  
**672** **VALLEY** HDLG  
**RAILWAY**

**WAYBILL**

WAYBILL NUMBER

**281601**

DESTINATION

STATION NAME

**SUFFIELD**

CONSIGNEE

**SHERWOOD LUMBER**

ROUTE

**CQVR -SPEBR CP -DELSONJ**  
**-ROUPT DH -ALBANY BA -SPGFD NH**

WEIGHT STCC

**57700 2421184**

COMMODITY

**LUMBER**

SPECIAL INSTRUCTIONS

SHIPPER

**MERRITT DIAMOND SAWML**

PROV.

**CT**

TRACK

# modeling the SP

Friday, February 4, 2011

## Waybills, Part 3

The development of a prototypical waybill for model use is an ongoing interest of mine. It all started with Bill Neale's article in *Model Railroader* ("Plastic pocket car cards," February 2009, pages 62-65), with his idea to use clear sleeves, intended for baseball-card collectors, to play the role of car cards. Waybills are simply inserted into the sleeves, which bear labels for individual cars. This meant that the waybills would be about the size of baseball cards, 2.5 x 3.5 inches, plenty of space for generous information (something I like) but small enough to fit in a shirt pocket and easy to handle. I thought Bill's waybills were a little primitive, but the car sleeve idea really caught my imagination.

The overall ideas I developed for better waybills were shown in my *RMC* article ("Prototypical Waybills for Car Card Operation," *Railroad Model Craftsman*, December 2009, pages 71-77) and expanded in *The Dispatcher's Office* ("Contents of a Waybill," April 2010, pages 17-24), a corrected version of the latter article being provided on Google Docs, as linked in my previous post, "Waybills-2" of January 31, 2011 (see <http://modelingthesp.blogspot.com/2011/01/waybills-2.html>). But the waybills shown in those two articles had some shortcomings.

A major one was the lack of space for car routing, something I wanted to include, and also (as indicated in my post "Waybills" of December 9, 2010,

### Reference pages

- [Weathering with acrylic washes: basic technique](#)
- [Weathering with acrylic washes: specific car types...](#)

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# modeling the SP

Friday, April 19, 2019

## Waybills, Part 63: filling out

In previous posts, I have explored many aspects of what waybills are and how they are used, always with the goal of informing model operations. Many of these prior posts can be found by using the word "Waybills" as a search term in the search box at the right. If you have particular interests within this topic, add one or more appropriate words to the search term you use.

The present post goes back to a very basic point, and one about which I am often asked: how does a model waybill get filled out? It was stimulated in particular by a recent layout visitor, who shall remain nameless, and who phrased it this way: "How do you dream up these waybills?" Overcoming a faint instinct of outrage at the word "dream," I realized he really meant to ask, "where does the information come from?" That's certainly a legitimate question.

The first issue to recognize is that of how cars are chosen for loading. Modelers often imagine all on-line loading to be in home-road cars. If this had been done on the prototype, obviously half of all car miles would have been empty car-miles, since all arriving foreign cars would be unloaded and sent home empty, while home-road cars were loaded exclusively. It was to reduce this problem that Car Service Rule 1 was written to say, in essence: "Do not load a home-line car if suitable foreign car is available or can reasonably be obtained."

### Reference pages

- [Weathering with acrylic washes: basic technique](#)
- [Weathering with acrylic washes: specific car types...](#)

### Search This Blog

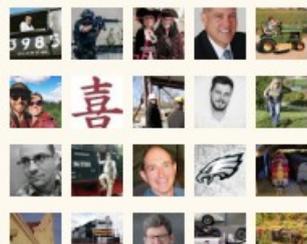
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# **Why a New Computer Program**

# **CC&WB Works Great ..... But:**

- Too much work
- Crews unsure what to do with a Car
- Hard to update for changes
- No insight into overall traffic flow

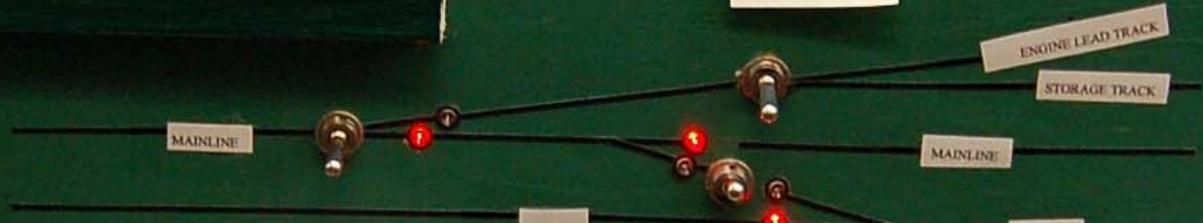


GN 7325/  
H  
SPECITS FERRY 101  
ST. PAUL COAL  
EPTY - TR #1

MILW 94601  
SEWELL 101  
BARCOCK COAL  
EPTY - 0001  
THE MILWAUKEE ROAD

*not locked  
set circuit loc  
white plug in  
change to red*

SWITCH MACHINES  
INSTALLED 12/03  
BY LARRY RAJACK



DCC INSTALLATION  
Sam Mc Coy  
Fred Soap  
Don Robinson  
1998 to 2002



SOUTH MARQUETTE  
City Job  
EJ&E 65245  
ELGIN, JOUET & EAST XM  
WAYBILL 3  
TO Superior  
FROM Lake City  
5

Marquette West Ya  
R.I.P. T  
MADISON DIVISION  
Madison Div Train  
DEPARTS - east  
MARQUETTE - WEST yard  
Block  
Callie  
Circuit - PDC  
4a

WAUKON  
ROCKTON  
DEPARTS - west  
MARQUETTE - WEST yard  
4

BEULAH  
Waterville Turn  
DEPARTS - west  
MARQUETTE - WEST yard  
3

OSSIAN  
CALMAR  
ROAD NAME CGW  
CAR NO. 15129  
TYPE XM  
WAYBILL 2  
TO Superior  
FROM Lake City  
2

CALMAR  
CALMAR  
NKP 15129  
43 ft 100 #  
AUSTIN, MINN - COM  
VIA CALMAR  
TRACK 1  
THE MILWAUKEE ROAD

MARQUETTE  
Yard Job  
west yard engine  
MARQUETTE - Clearing Track  
Marquette - Iowa grain door  
Marquette - R.I.P.  
Marquette - Stockyards  
DEPARTS - west yard engine  
MARQUETTE - WEST yard  
Mainline  
schnepf 1 MILW  
marquette-west sort tab cards

EDMORE PATROL  
#94  
MARQUETTE - PU LOCC  
TRAIN IS IN WEST YARD  
SPECITS FERRY - HI CARS  
Milar Rd.  
273  
END GM  
SHORT PASS  
Channel  
273



ROAD NAME UP  
CAR NO. 490164  
TYPE RBL reefer

EMPTY CAR  
RETURN TO



**WAYBILL**

**XM**

TO: Appaloosa Jct.  
RCVR: Cascades Cookies  
VIA: \_\_\_\_\_  
SHPR: Oregon Paper  
CONT: Packaging Material

Monday

**WAYBILL**

**RB**

TO: St. Peterburg, FL  
RCVR: Florida Warehouse Co.  
VIA: \_\_\_\_\_  
SHPR: Cascades Cookies  
CONT: Cookies

Tue

Type: RB (bunkerl. reefer)

RCVR: Cascades Cookies

TO: Appaloosa Jct.

**EMPTY CAR ORDER**

**INTERCHANGE**

TO: Grand Forks, ND

TO: Appaloosa Jct.

**INTERCHANGE**

REPORTING MARK  
FWD 750036  
NO. 1  
NAME  
50' DPD Box RBL  
XM, rbl 1  
To Springfield-A  
Clear Fir  
Loading Dock, trk 1  
Springfield - A  
Clear Fir trk 1 shipping  
BN GREEN

KENS Railroad

BURLINGTON  
NORTHERN  
FWD 750036

SOUTHERN  
PACIFIC  
SP 400 064

REPORTING MARK  
SP 400064  
NO. 1  
NAME  
LO 2-bay 1  
To Springfield-A  
National Metallurgy  
Input Dock  
Springfield - A  
National Metallurgy  
LARGE BLACK  
SOH - PAC -

COTTON BELT

SOUTHERN  
PACIFIC

SOUTHERN  
PACIFIC







# So..... Automate it!

- Keep the **richness** of the CC&WB system, but:
  - **Eliminate** the manual effort for set up
  - Operate using **Switch Lists**
  - **Analyse** Car movements over time for planning
- And **no** artificial assumptions or approximations
  - Car movements are always based on prototypical Shipments

**What the Program Does (Very High Level)**

# The Program:

- **Selects** suitable **Shipments** for Cars
- **Generates** necessary **Waybills** for Cars
- **Runs Trains** to pick up and deliver Cars according to their Waybills
- **Prints Switch Lists**
- **Records** an **Event Log** that can be analysed

# Program Features

# Fundamentals

# Fundamental Features

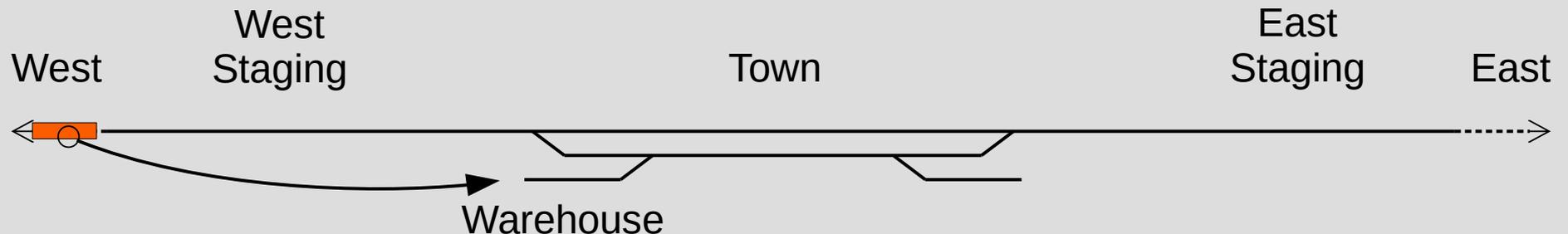
- Track Network
- Car Routing
- Running Trains
- Restaging of Trains
- Switch Lists for Operations

# Track Network

- Modelled layout plus external unmodelled areas
- A view from the Car's perspective
- Includes every place where a Car can “rest”
- Connections link one Track to another
- Used to route Cars
- Trains follow paths

# Simple Example

- West Staging, one Town and East Staging
- Shipment scenario:
  - **Reefer** to be delivered to the **Warehouse** in **Town** from Western Fruit, beyond **West Staging**

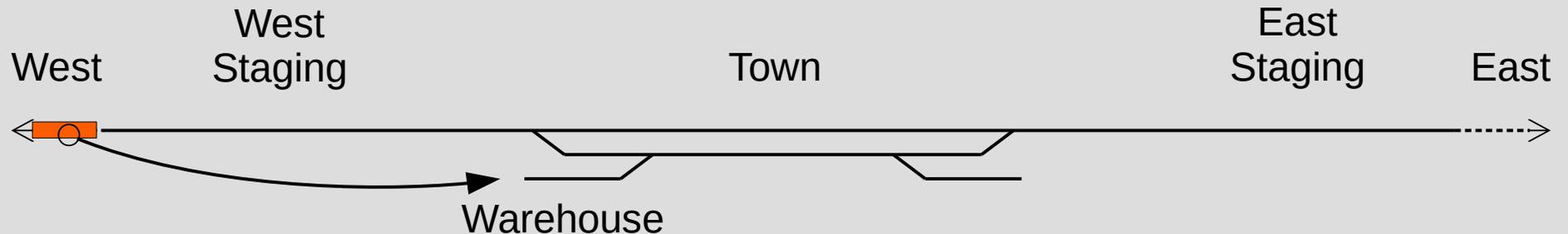


# Car Routing

- Shipments specify only start and end points
- The route follows a path between these points
- Paths are calculated from the Network of Tracks and Connections

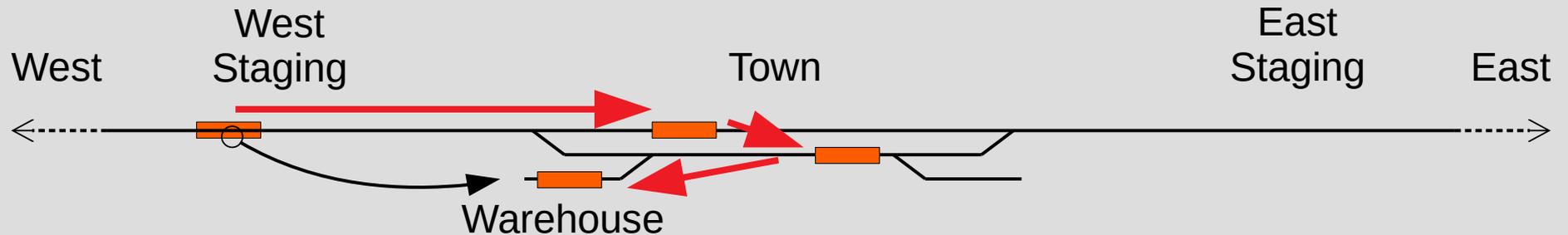
# Car Routing

- Shipper = Western Fruit
- Receiver = Town Warehouse
- Route = ??

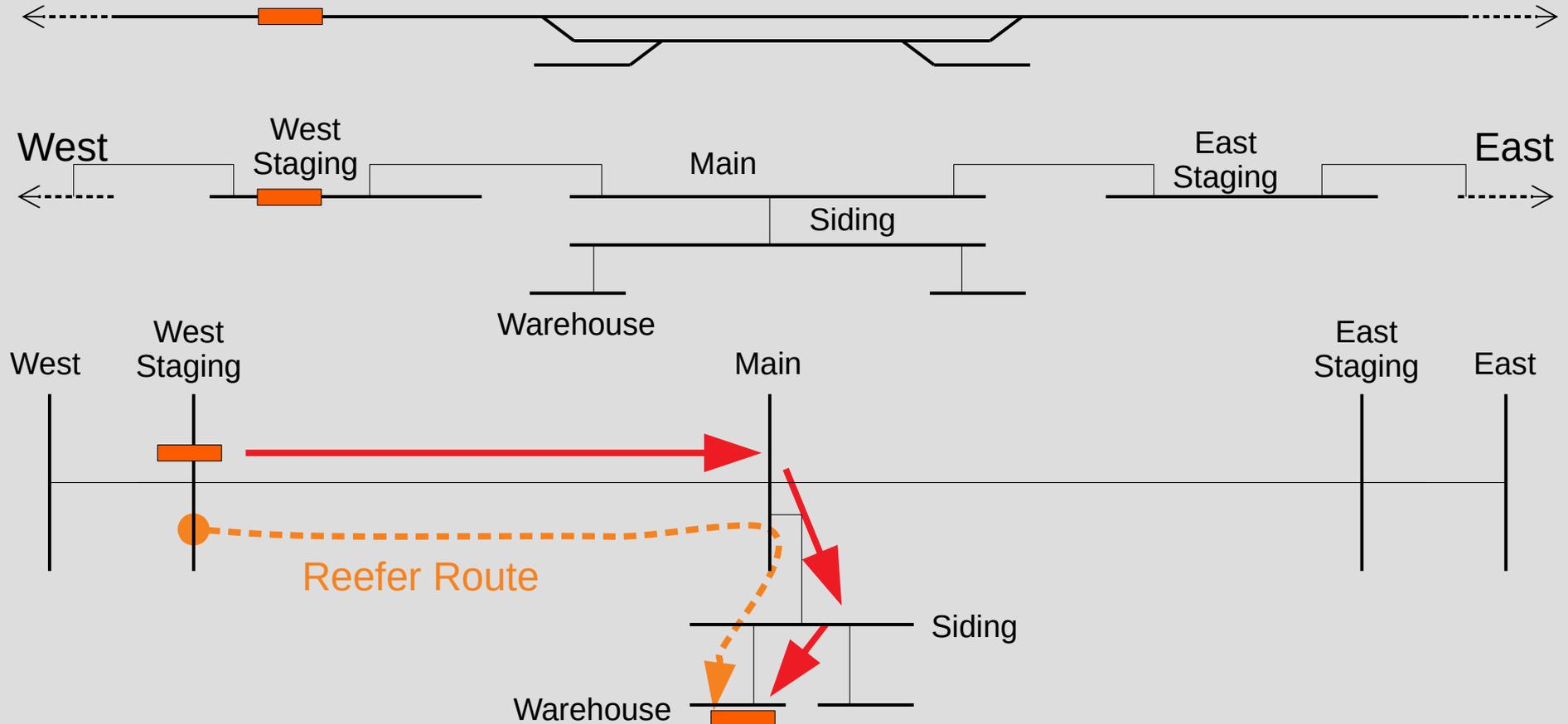


# Car Routing

- Route:
  - West Staging
  - Main Track
  - Siding
  - Warehouse

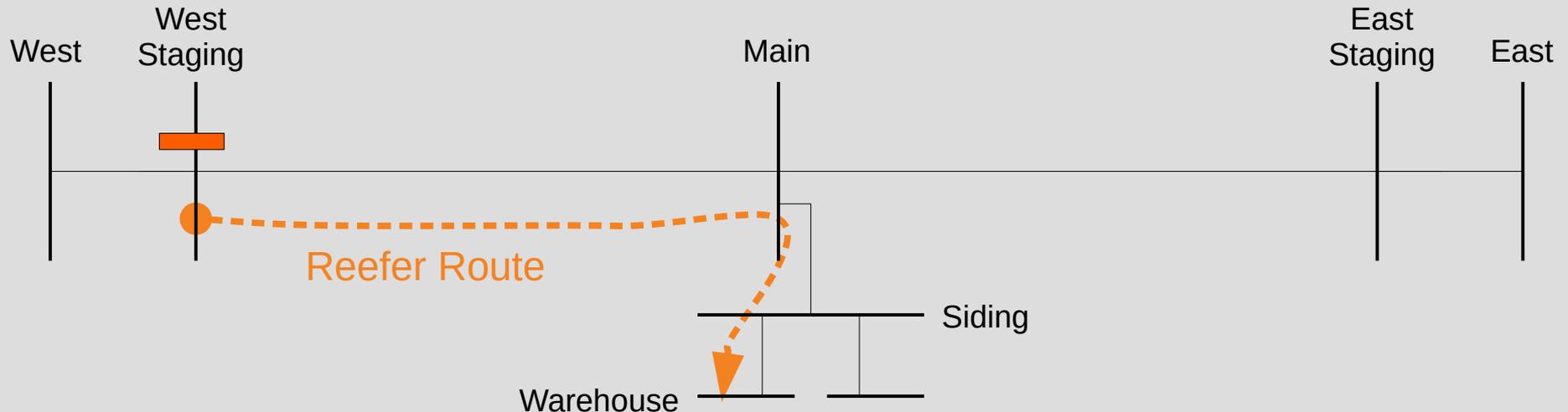


# Car Routing Schematic Diagram



# Car Routing and Trains

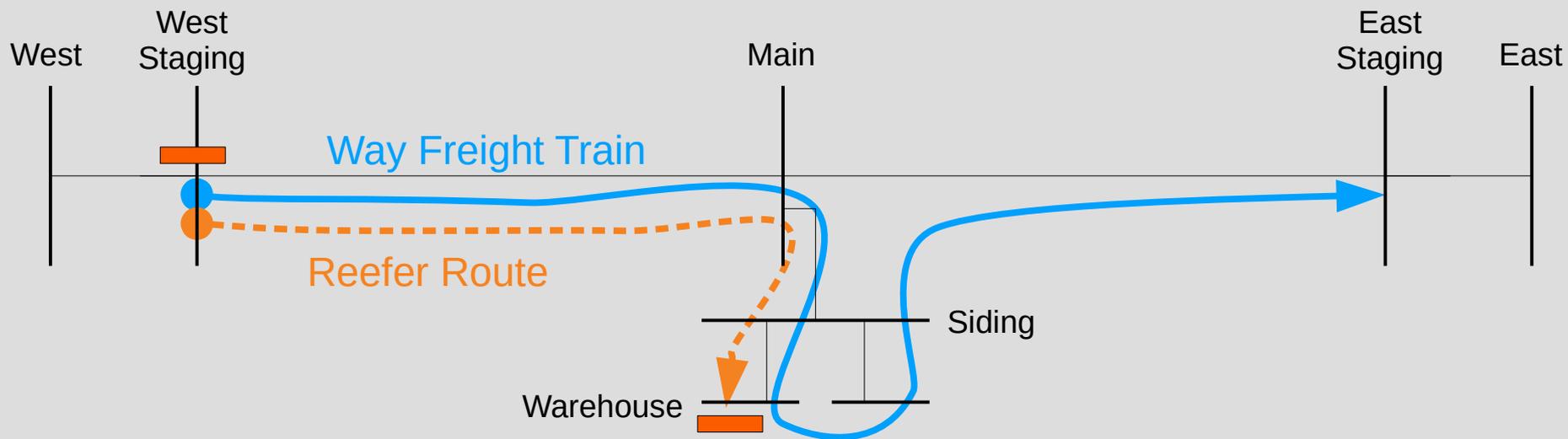
- What Trains are involved in moving the Car?
- Answer:
  - We don't know (yet), but the Car does not care!



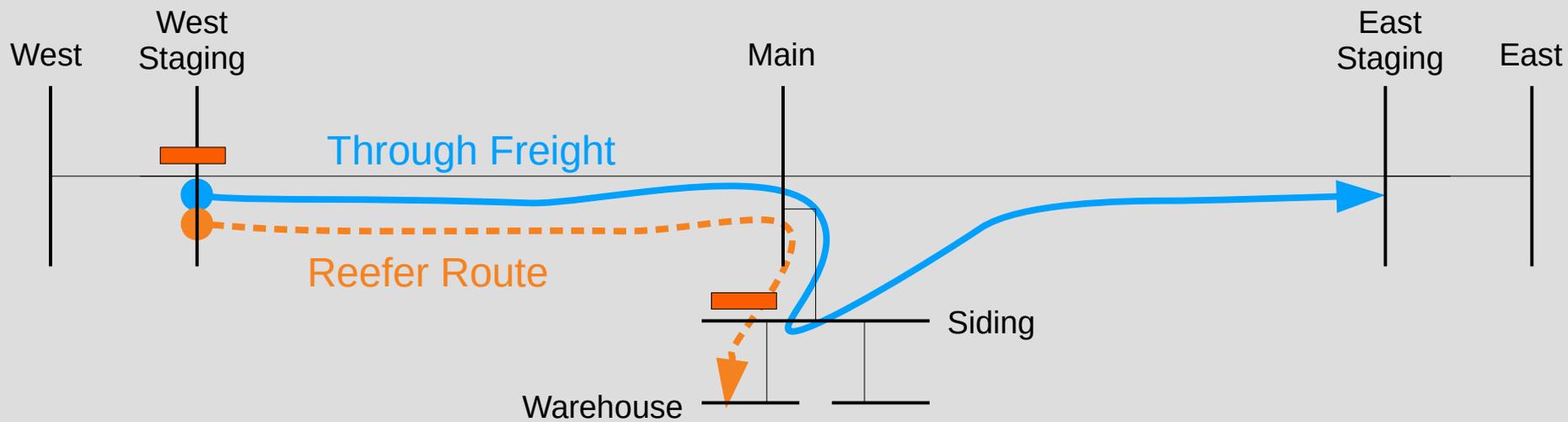
# Running Trains

- Each Train follows a specific Timetable consisting of an order list of Stops
- Each Stop specifies if the Train picks up, delivers, or just “visits” the Track
- Trains try to “advance” Cars along their route
- No guarantee that any Car will ever be moved!
- Think “Hitchhiking”

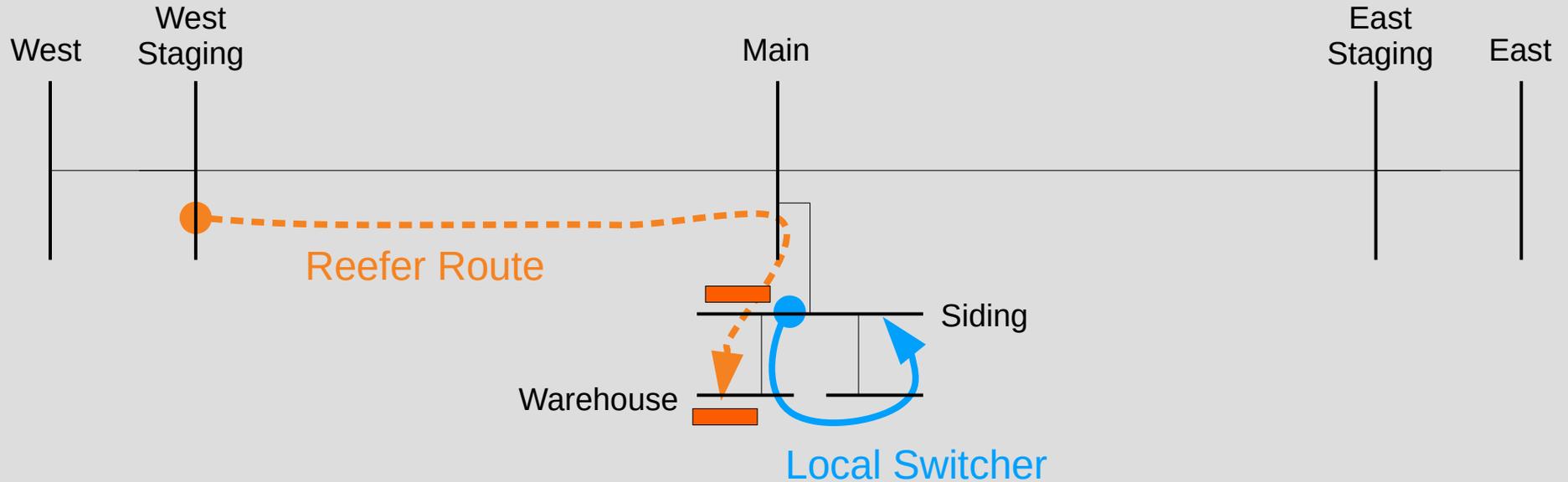
# Eastbound Way Freight



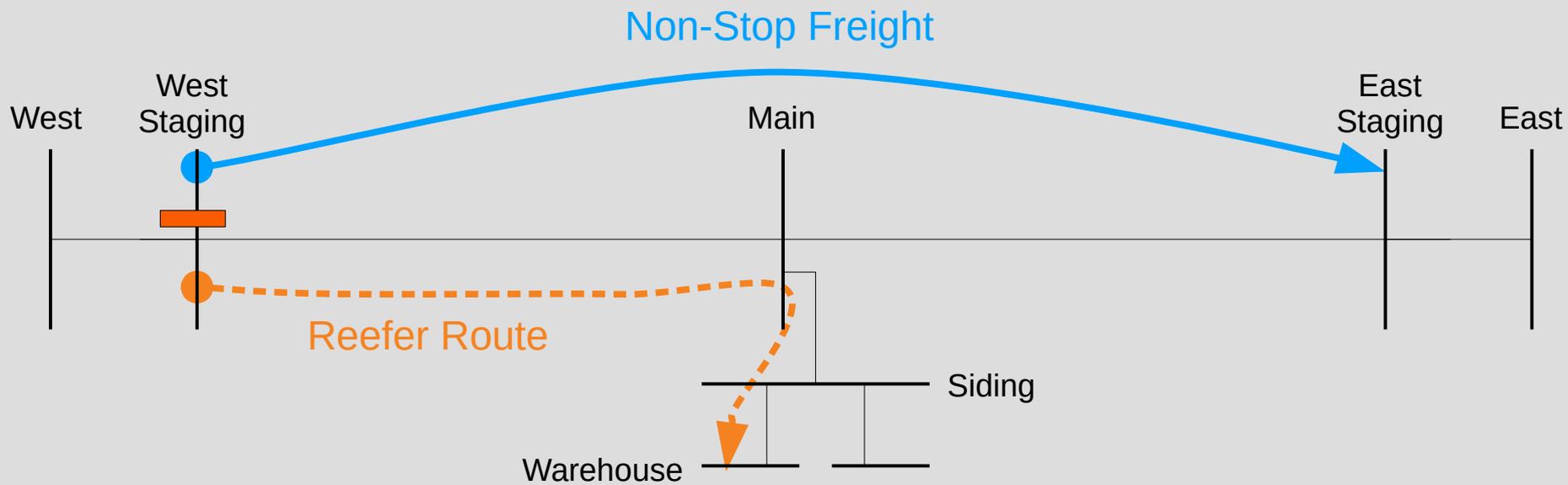
# Eastbound Through Freight

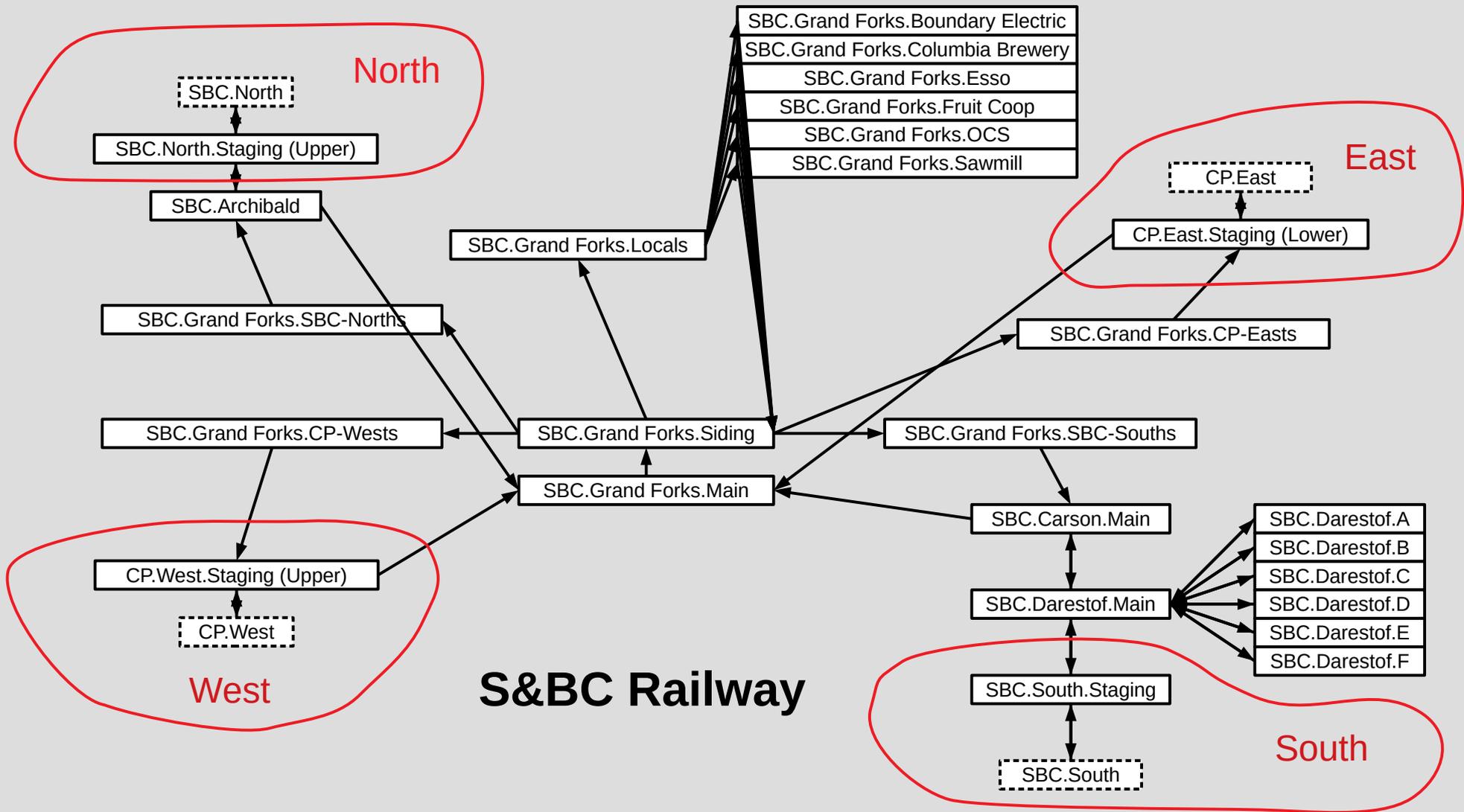


# ...followed by a Local Switcher

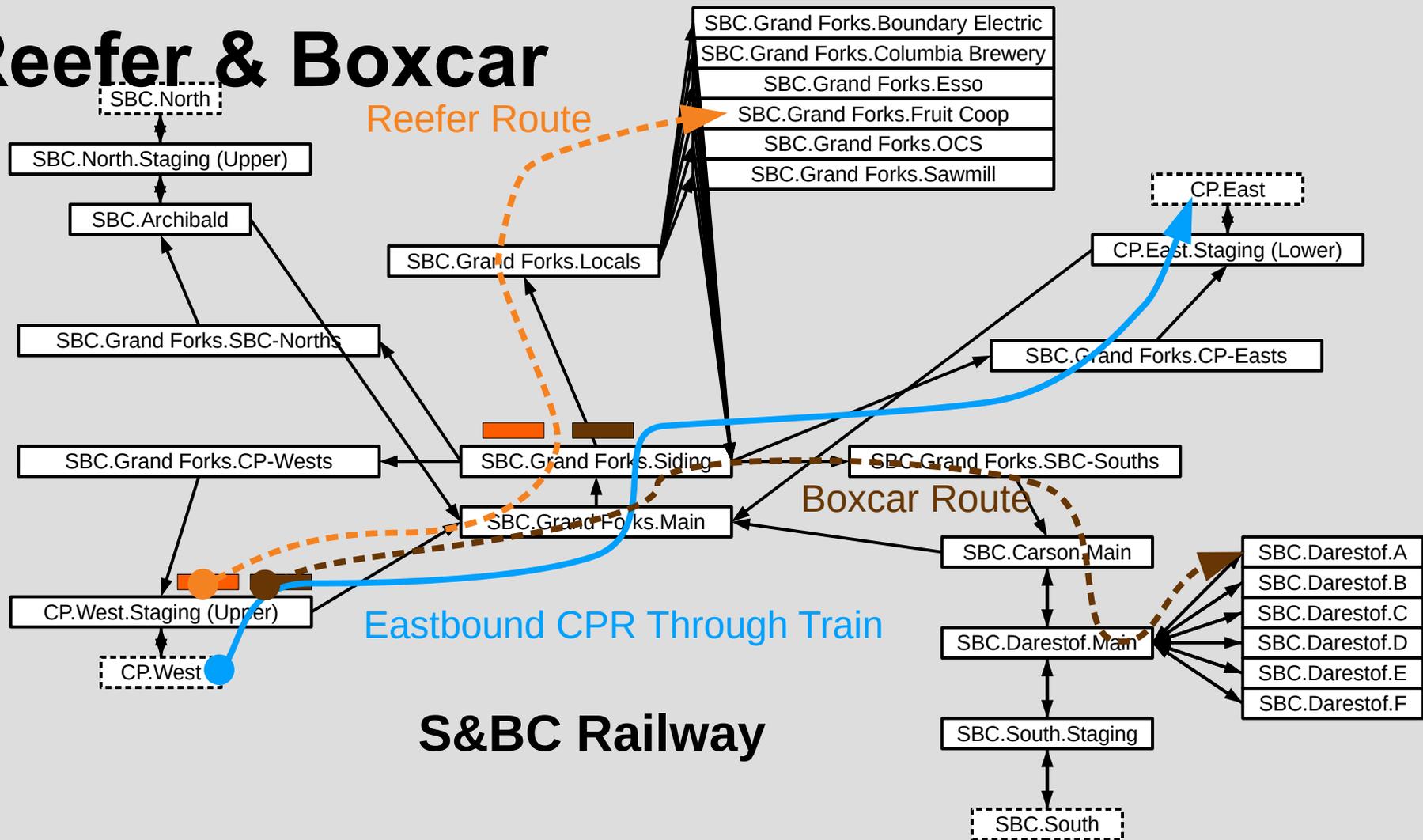


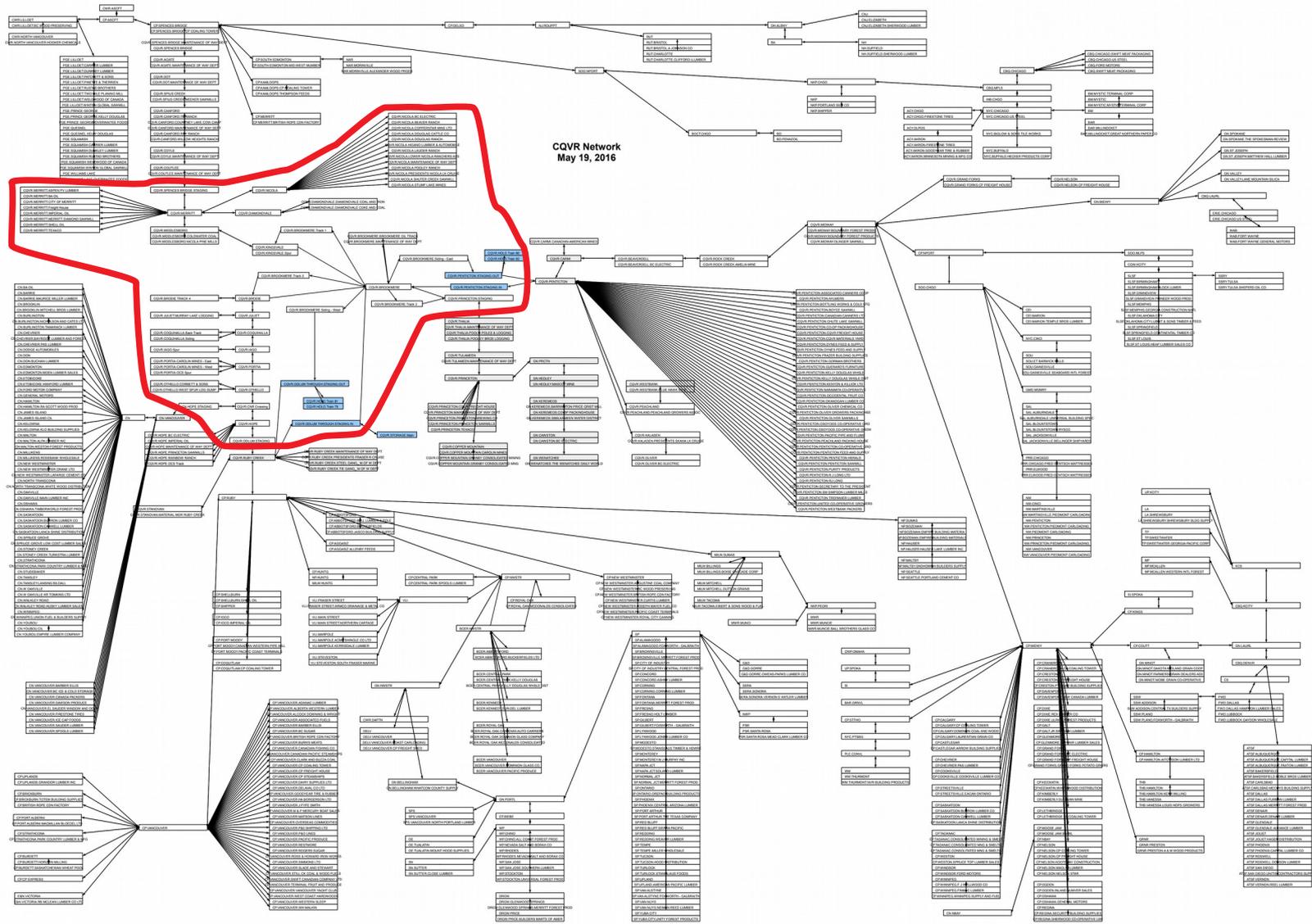
# Eastbound Non-Stop Freight

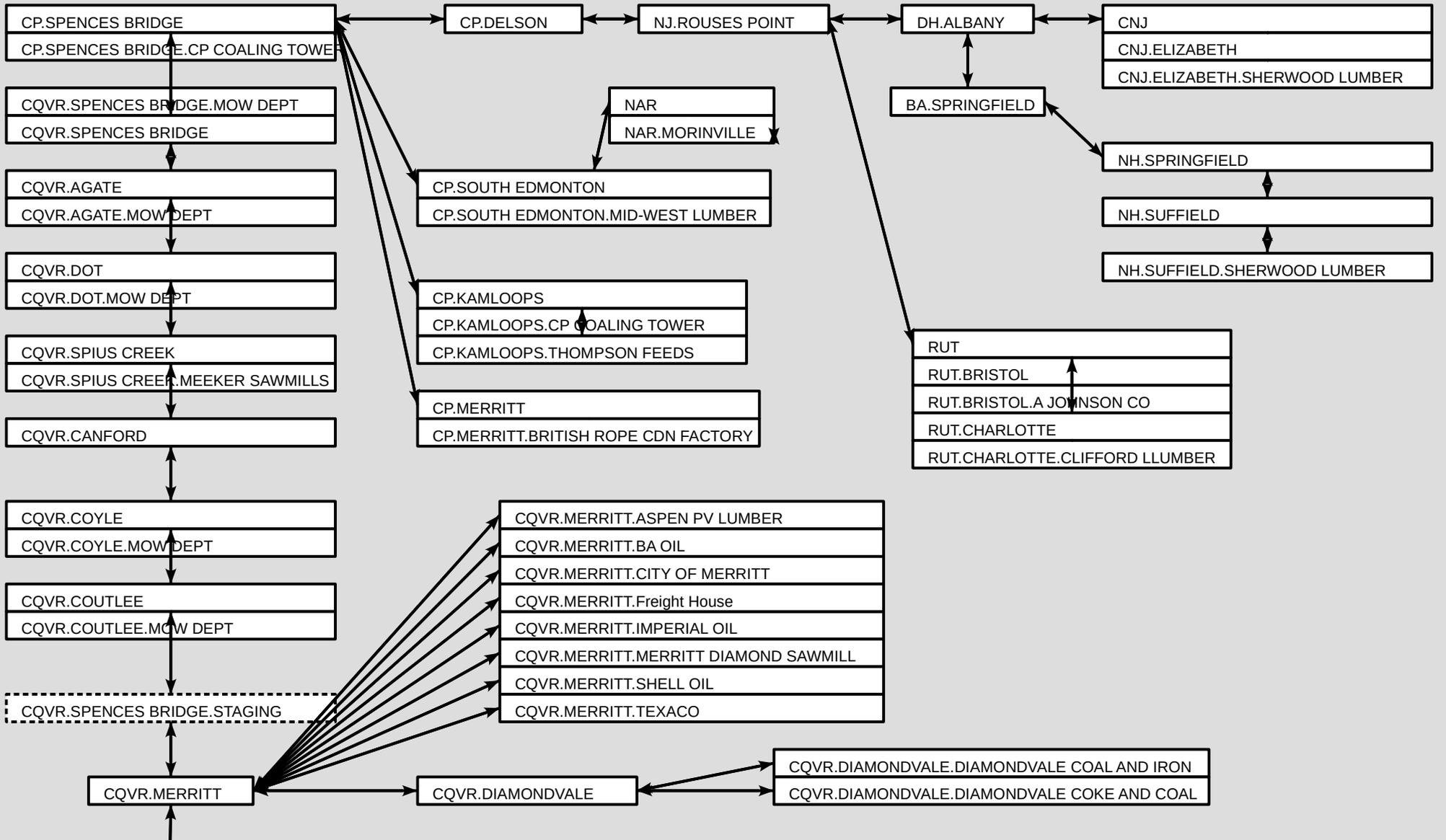




# Reefer & Boxcar







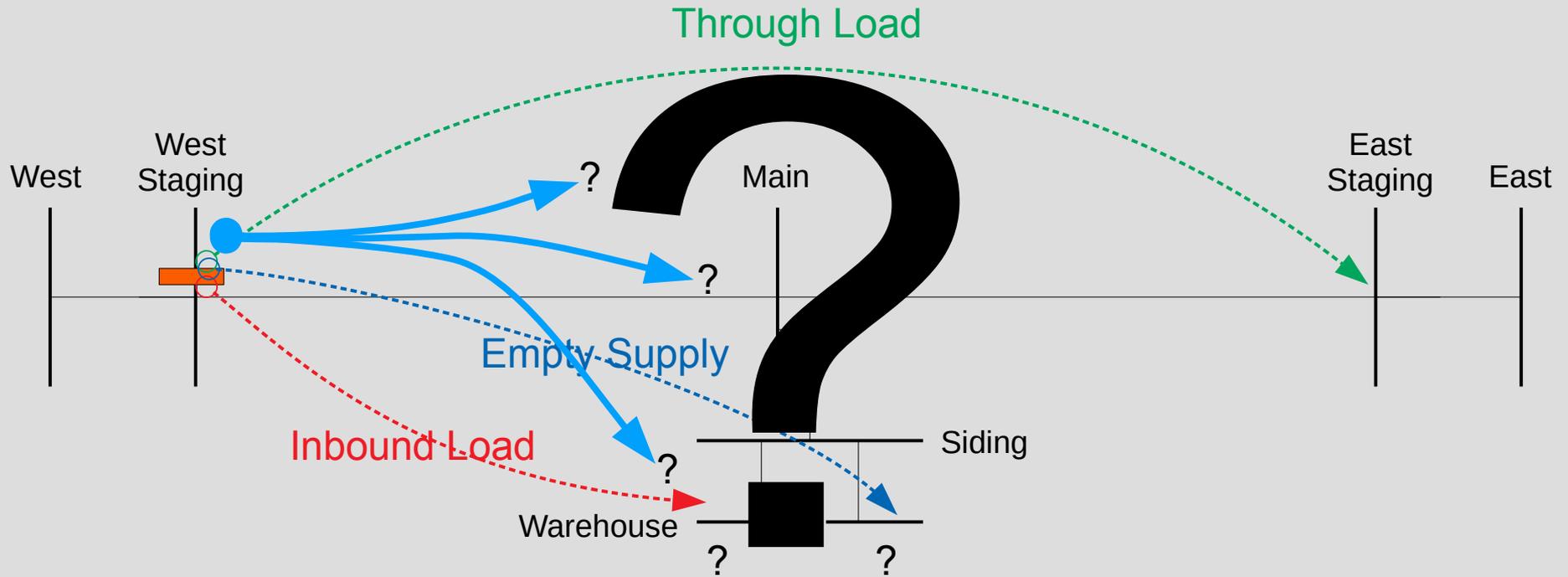
# Restaging of Trains

- **No** manual intervention
- Every Car assigned a “**doable**” Shipment
- **Random** selection from all suitable Shipments
- Shipment selection algorithm can easily be improved

# Restaging Process

- Each Car must be given a new “role” to play
- Find Candidate Shipments that are:
  - Suitable for Car and Type, and
  - Train can advance the Car
- Select one candidate at random
- If no candidates, Car is moved to Storage

# Candidate Shipment Selection



# Switch Lists

- Different formats for Road Trains and Switchers
- Simple files processed as a spreadsheet
- Will be integrated into the program
- Printed using a receipt printer

# Road Switch List Sample

UP 22 Southbound  
Start: April 28 1955 05:30  
Locomotive: UP SD7 455  
April 28 1955 05:30  
SBC North Staging (Upper)  
[Pickups: 8; ]

Road	Number	Type	Operation
CP	357156	Hopper	PICKUP
CP	357191	Hopper	PICKUP
CP	357643	Hopper	PICKUP
CP	357669	Hopper	PICKUP
CRR	52769	Hopper	PICKUP
GN	73608	Hopper	PICKUP
PRR	66009	Box	PICKUP
SP&S	11238	Box	PICKUP

April 28 1955 05:40  
SBC North Staging (Upper)  
[Reblocks: 8; ]  
Reblock Cars in the following order:  
The order in a block does not matter.

CP	357669	Hopper	Archibald.Rock Cand
CRR	52769	Hopper	Archibald.Rock Cand
CP	357191	Hopper	Grand Forks.OCS
CP	357156	Hopper	Darestof.A
SP&S	11238	Box	Darestof.B
GN	73608	Hopper	Darestof.D
CP	357643	Hopper	Darestof.D
PRR	66009	Box	Darestof.E

April 28 1955 06:40  
SBC North Staging (Upper)  
Road Number Type Operation  
DEPART with 8 cars.

# Road Switch List

<b>Nanaimo Turn</b>			
April 21 1965 00:15			
<b>BCH.S Yard.Nanaimo Build</b>			
[Pickups: 11 ]			
<b>Road</b>	<b>Number</b>	<b>Type</b>	<b>Operation</b>
CN	480715	Box	PICKUP
CN	480927	Box	PICKUP
CN	522781	Box	PICKUP
CP	223422	Box	PICKUP
CP	249463	Box	PICKUP
CP	283300	Reefer	PICKUP
CP	51662	Box	PICKUP
CP	51856	Box	PICKUP
PGE	8003	Box	PICKUP
SLSF	153197	Box	PICKUP
SOU	272418	Box	PICKUP

April 21 1965 06:10			
<b>BCH.McKay.Sears</b>			
[Pickups: 1 Deliveries: 4]			
<b>Road</b>	<b>Number</b>	<b>Type</b>	<b>Operation</b>
CN	480927	Box	DELIVER
CN	522781	Box	DELIVER
CP	249463	Box	DELIVER
CP	42610	Box	PICKUP
PGE	8003	Box	DELIVER
<b>BCH.McKay.Kelly Douglas.Grocery</b>			
[Deliveries: 2]			
<b>Road</b>	<b>Number</b>	<b>Type</b>	<b>Operation</b>
CP	51662	Box	DELIVER
SLSF	153197	Box	DELIVER
<b>BCH.McKay.Kelly Douglas.Produce</b>			
[Pickups: 2 Deliveries: 1]			
<b>Road</b>	<b>Number</b>	<b>Type</b>	<b>Operation</b>
CP	283300	Reefer	DELIVER
PFE	300207	Reefer	PICKUP
WFCX	8813	Reefer	PICKUP

# Road Switch List

<b>BCH.McKay.Nabob</b>			
[Deliveries: 1]			
Road	Number	Type	Operation
CP	223422	Box	DELIVER
<b>BCH.Nanaimo.Central Park Team Track</b>			
[Pickups: 4 Deliveries: 1]			
Road	Number	Type	Operation
CP	221856	Box	PICKUP
CP	286137	Reefer	PICKUP
CP	297510	Box	PICKUP
CP	51856	Box	DELIVER
GN	3594	Box	PICKUP
<b>BCH.Nanaimo.McGregor</b>			
[Pickups: 1 Deliveries: 1]			
Road	Number	Type	Operation
CN	480715	Box	DELIVER
UP	474037	Box	PICKUP

<b>BCH.Nanaimo.Associated Foundries</b>			
[Pickups: 1 Deliveries: 1]			
Road	Number	Type	Operation
GN	75658	Gondola	PICKUP
SOU	272418	Box	DELIVER
April 21 1965 06:15			
<b>BCH.S Yard.Main</b>			
[Deliveries: 9]			
Road	Number	Type	Operation
CP	221856	Box	DELIVER
CP	286137	Reefer	DELIVER
CP	297510	Box	DELIVER
CP	42610	Box	DELIVER
GN	3594	Box	DELIVER
GN	75658	Gondola	DELIVER
PFE	300207	Reefer	DELIVER
UP	474037	Box	DELIVER
WFCX	8813	Reefer	DELIVER
*****			

# Classify Switcher Switch List

<b>GF Switcher After CP 82 Eastbound</b>					
Start AFTER Train CP 82 has departed.					
April 24 1955 02:00					
<b>Road</b>	<b>Number</b>	<b>Type</b>	<b>From</b>	<b>To</b>	<b>Final Destination</b>
CP	357643	Hopper	Grand Forks.Siding	Grand Forks.SBC-Norths	Archibald.Rock Candy Mine
CP	357786	Hopper	Grand Forks.Siding	Grand Forks.SBC-Souths	Darestof.C
CP	50537	Box	Grand Forks.Siding	Grand Forks.Locals	Grand Forks.Boundary Electric
CP	89065	Box	Grand Forks.Siding	Grand Forks.Locals	Grand Forks.Boundary Electric
GN	5010	Box	Grand Forks.Siding	Grand Forks.Locals	Grand Forks.Boundary Electric
GN	73982	Cov Hopper	Grand Forks.Siding	Grand Forks.SBC-Souths	Darestof.C
MILW	716966	Box	Grand Forks.Siding	Grand Forks.Locals	Grand Forks.Boundary Electric
UTLX	76942	Tank	Grand Forks.Siding	Grand Forks.Locals	Grand Forks.Esso

# Local Industries Switch List

<b>GF Industries</b>					
April 24 1955 04:45					
<b>Road</b>	<b>Number</b>	<b>Type</b>	<b>From</b>	<b>To</b>	<b>Final Destination</b>
ATSF	11025	Box	Grand Forks.Locals	Grand Forks.Sawmill	Grand Forks.Sawmill
ATSF	156270	Box	Grand Forks.Sawmill	Grand Forks.SBC-Souths	South.Staging
BMMX	1809	Tank	Grand Forks.Esso	Grand Forks.CP-Wests	West.Staging (Upper)
CDLX	817	Tank	Grand Forks.Locals	Grand Forks.OCS	Grand Forks.OCS
CP	117832	Box	Grand Forks.Sawmill	Grand Forks.SBC-Souths	South.Staging
CP	240000	Box	Grand Forks.CP-Easts	HOLD	East.Staging (Lower)
CP	281472	Reefer	Grand Forks.CP-Wests	HOLD	West.Staging (Upper)
CP	357156	Hopper	Grand Forks.CP-Wests	HOLD	West.Staging (Upper)
CP	357488	Hopper	Grand Forks.CP-Wests	HOLD	West.Staging (Upper)
CP	357493	Hopper	Grand Forks.CP-Wests	HOLD	West.Staging (Upper)
CP	357669	Hopper	Grand Forks.CP-Wests	HOLD	West.Staging (Upper)
CP	357786	Hopper	Grand Forks.SBC-Souths	HOLD	Darestof.C
CP	50537	Box	Grand Forks.Locals	Grand Forks.Boundary Electric	Grand Forks.Boundary Electric
CP	89065	Box	Grand Forks.Locals	Grand Forks.Boundary Electric	Grand Forks.Boundary Electric
CP	89067	Box	Grand Forks.CP-Wests	HOLD	West.Staging (Upper)
EBAX	6008	Tank	Grand Forks.Locals	Grand Forks.Columbia Brewery	Grand Forks.Columbia Brewery
GACX	42764	Cov Hopper	Grand Forks.OCS	Grand Forks.SBC-Souths	South.Staging
GARE	9105	Reefer	Grand Forks.Locals	Grand Forks.OCS	Grand Forks.OCS
GN	23637	Box	Grand Forks.Locals	Grand Forks.Fruit Coop	Grand Forks.Fruit Coop
GN	5010	Box	Grand Forks.Locals	Grand Forks.Boundary Electric	Grand Forks.Boundary Electric
GN	73608	Hopper	Grand Forks.CP-Easts	HOLD	East.Staging (Lower)
GN	73982	Cov Hopper	Grand Forks.SBC-Souths	HOLD	Darestof.C
KPCX	1901	Tank	Grand Forks.Locals	Grand Forks.Esso	Grand Forks.Esso

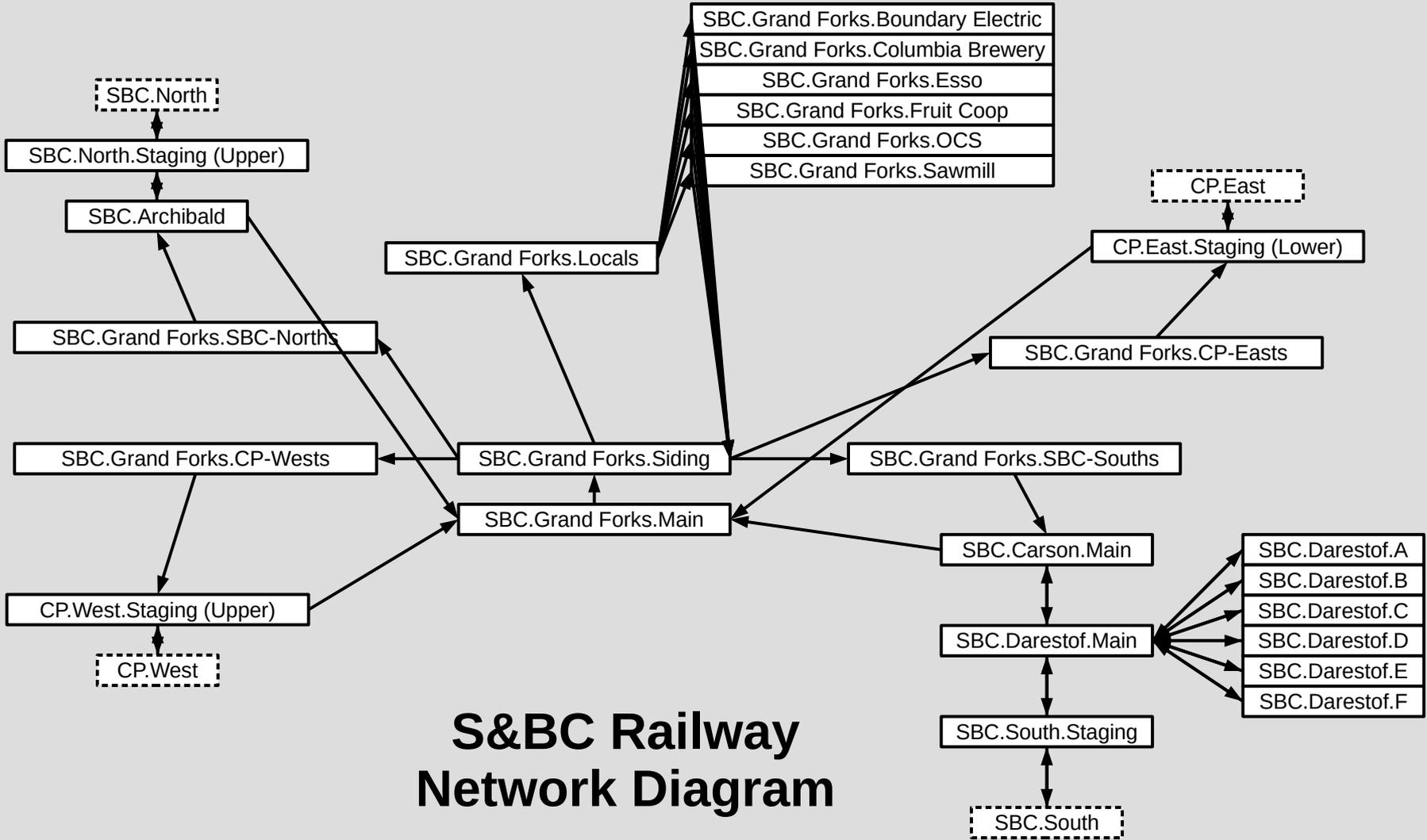
# **Advanced Features**

# Advanced Features

- Track network diagrams
- Train schedule “String Diagrams”
- Car Exchange
- Car Orders
- Train Lineups

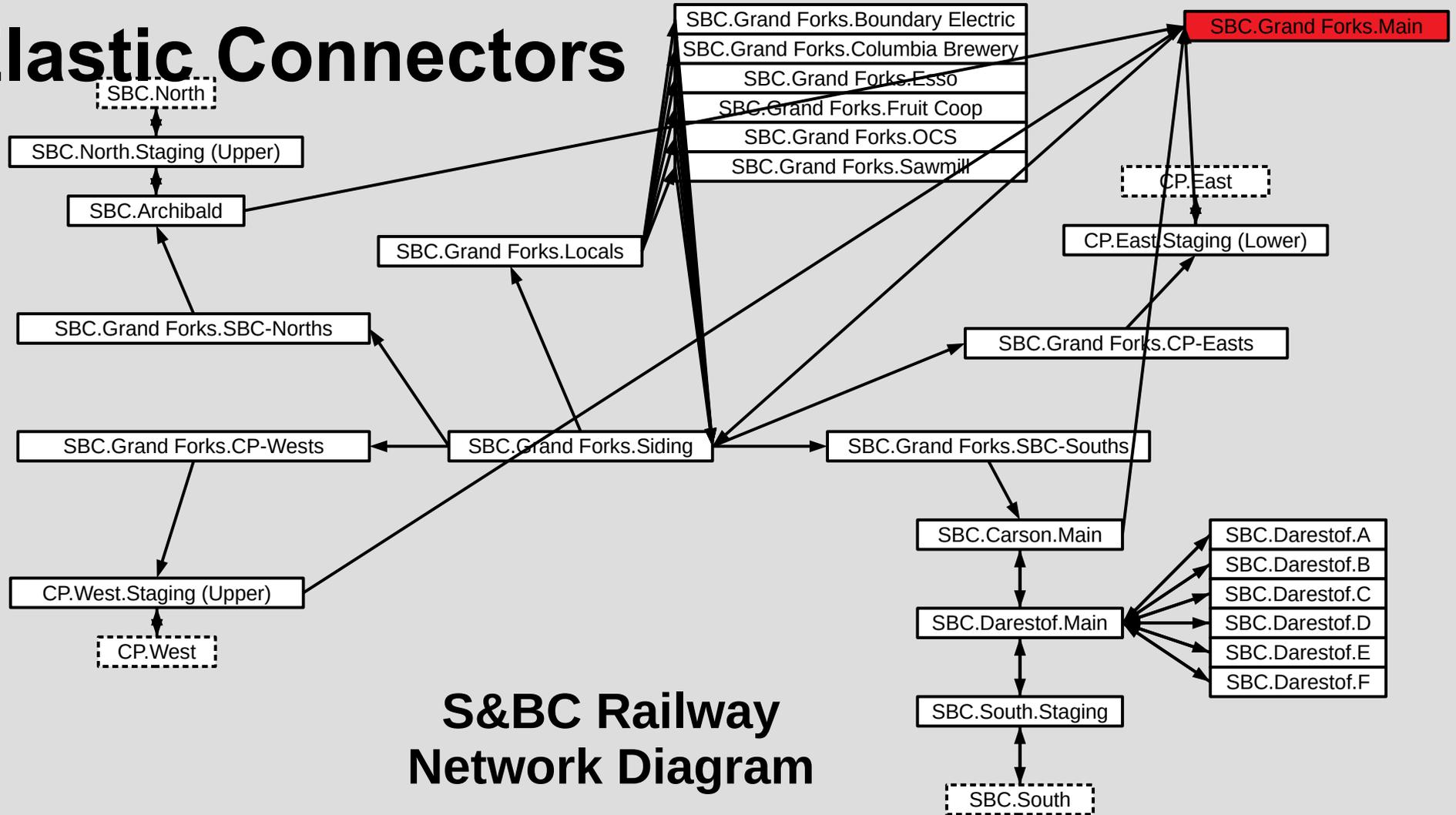
# Track Network Diagrams

- Generated directly from the track network
- Currently uses LibreOffice Draw
- Only need to arrange Track positions
- Could become an integrated editor later



**S&BC Railway  
Network Diagram**

# Elastic Connectors

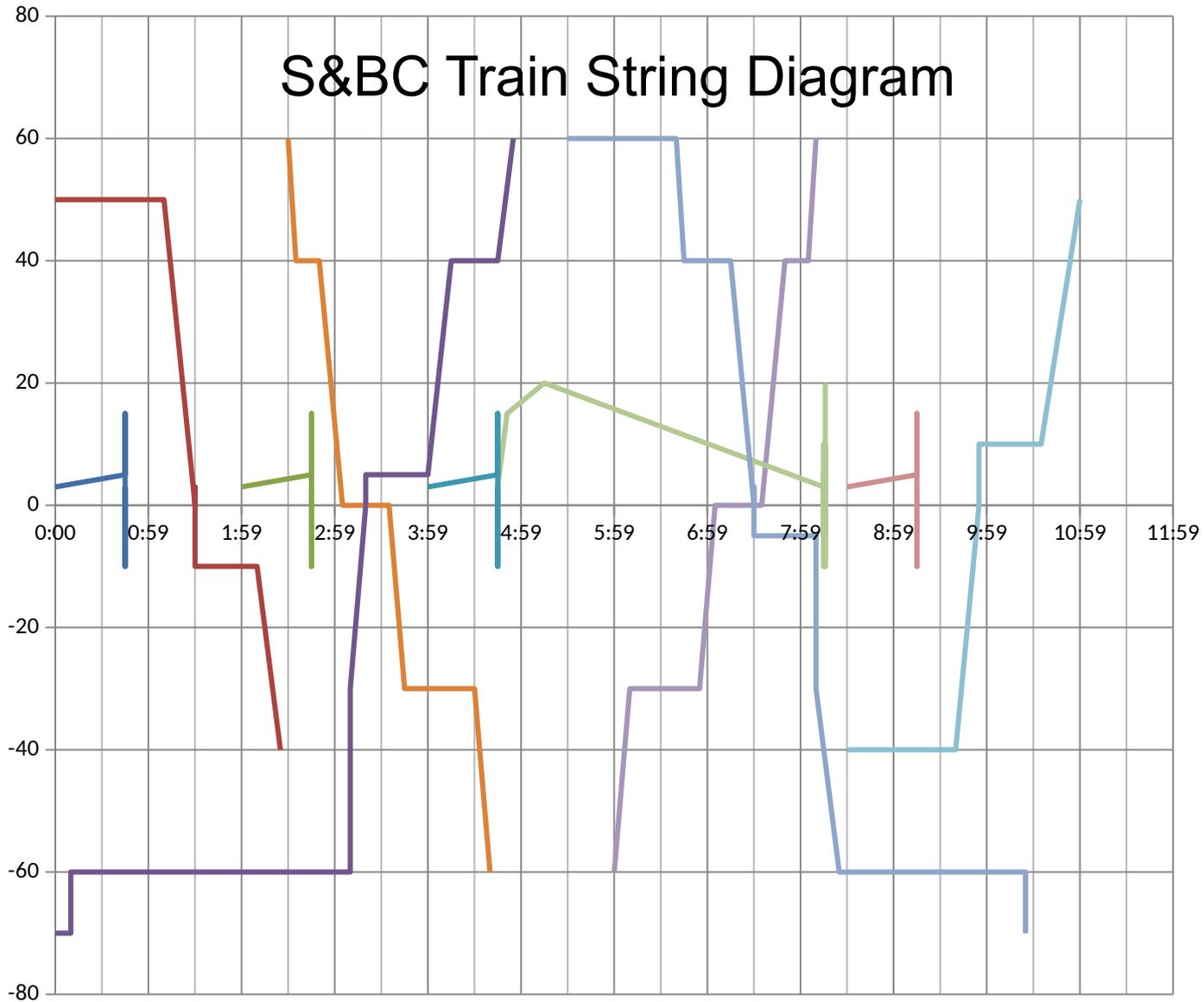


## S&BC Railway Network Diagram

# String Diagrams

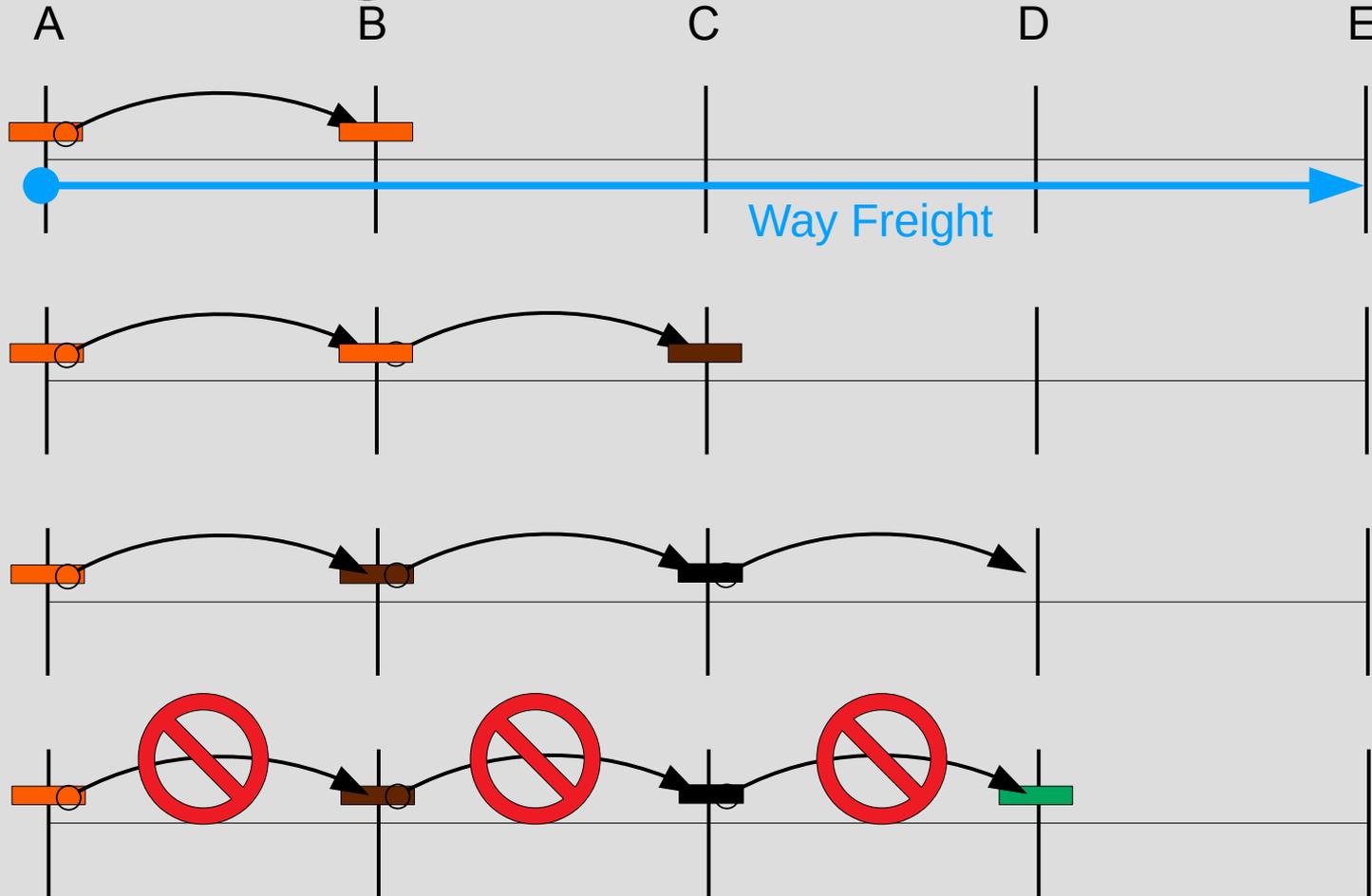
- Generated directly from Train Timetables
- Uses simple spreadsheet program to display
- Could be integrated later

# S&BC Train String Diagram



- GF Switcher Start of Day
- CP 82 Eastbound
- GF Switcher After CP 82 Eastbound
- UP 21 Northbound
- GF Switcher After UP 21 Northbound
- Passenger South
- UP 22 Southbound
- GF Switcher After UP 22 Southbound
- GF Industries
- Passenger North
- CP 81 Westbound

# Car Exchange



# Car Orders

- For specific Shipments
- Both empties for outbound and inbound loads
- Helps ensure a uniform supply of cars
- Considered before random selection
- Rules can be enhanced later

# Train Lineups

- View of all activity at specific Tracks
- Great for yardmaster to know what is expected

# Grand Forks Yard Line-up - Arriving

April 24 1955 01:30					
CP 82 Eastbound					
[Deliveries: 8; ]					
Road	Number	Type	To	From	Final Destination
CP	357643	Hopper	Grand Forks.Siding		Archibald.Rock Candy Mine
CP	357786	Hopper	Grand Forks.Siding		Darestof.C
CP	50537	Box	Grand Forks.Siding		Grand Forks.Boundary Electric
CP	89065	Box	Grand Forks.Siding		Grand Forks.Boundary Electric
GN	5010	Box	Grand Forks.Siding		Grand Forks.Boundary Electric
GN	73982	Cov Hopper	Grand Forks.Siding		Darestof.C
MILW	716966	Box	Grand Forks.Siding		Grand Forks.Boundary Electric
UTLX	76942	Tank	Grand Forks.Siding		Grand Forks.Esso
*****					

# Grand Forks Yard Line-up - Departing

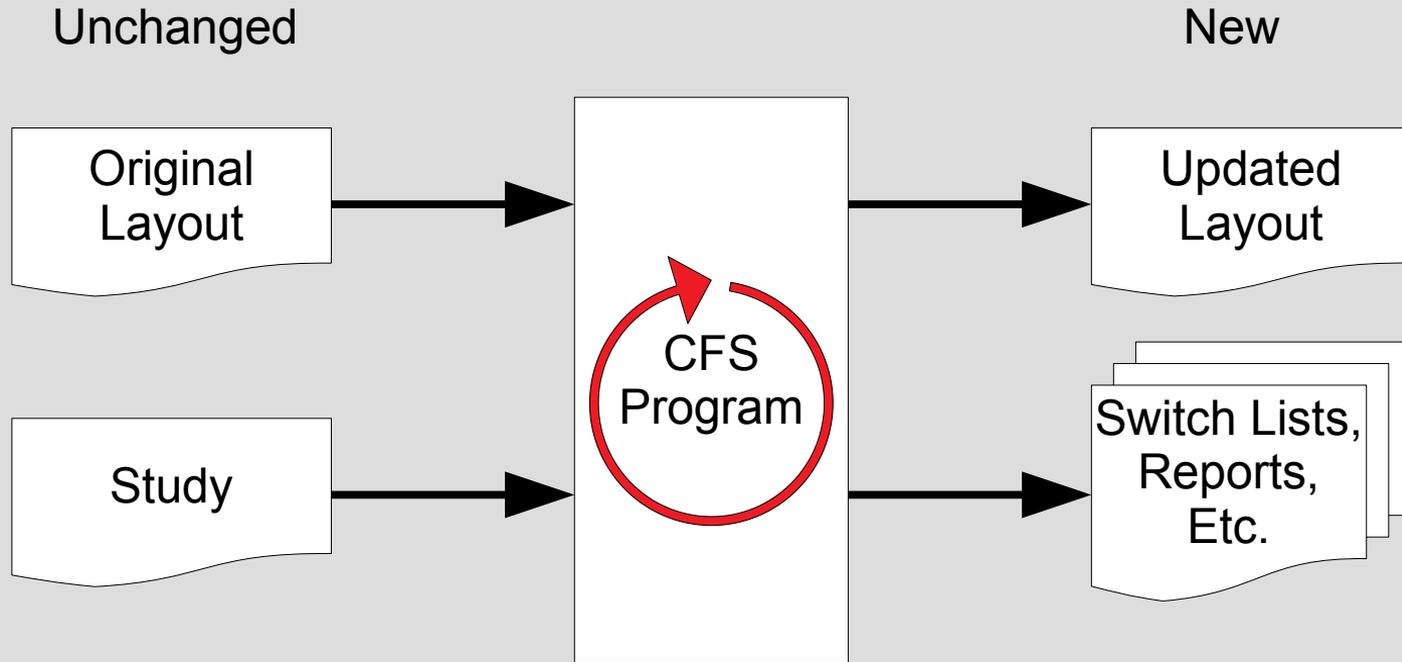
April 24 1955 01:40					
CP 82 Eastbound					
[Pickups: 10; Holds: 4; ]					
Road	Number	Type	To	From	Final Destination
ATSF	11074	Box	East.Staging (Lower)	Grand Forks.CP-Easts	East.Staging (Lower)
CNW	84028	Box	East.Staging (Lower)	Grand Forks.CP-Easts	East.Staging (Lower)
CP	240000	Box	Grand Forks.CP-Easts	HOLD	East.Staging (Lower)
CP	51856	Box	East.Staging (Lower)	Grand Forks.CP-Easts	East.Staging (Lower)
CRR	52769	Hopper	East.Staging (Lower)	Grand Forks.CP-Easts	East.Staging (Lower)
DTDX	38134	Tank	East.Staging (Lower)	Grand Forks.CP-Easts	East.Staging (Lower)
GN	73608	Hopper	Grand Forks.CP-Easts	HOLD	East.Staging (Lower)
MON	3029	Gondola	Grand Forks.CP-Easts	HOLD	East.Staging (Lower)
MP	112350	Box	East.Staging (Lower)	Grand Forks.CP-Easts	East.Staging (Lower)
NWP	1904	Box	East.Staging (Lower)	Grand Forks.CP-Easts	East.Staging (Lower)
TCX	270	Tank	Grand Forks.CP-Easts	HOLD	East.Staging (Lower)
UP	101	Cov Hopper	East.Staging (Lower)	Grand Forks.CP-Easts	East.Staging (Lower)
UP	185038	Box	East.Staging (Lower)	Grand Forks.CP-Easts	East.Staging (Lower)
UP	419	Cov Hopper	East.Staging (Lower)	Grand Forks.CP-Easts	East.Staging (Lower)

# **Analysis**

# Analysis Features

- Study concept
- Multiple day simulations for analysis
- Data output for analysis as a spreadsheet
- Could be integrated later

# Study Concept



# S&BC Study for 7 Days

```
<?xml version="1.0" encoding="UTF-8" standalone="no"?>
<study comment="This is a test..." cycles="7" layout="sbclayout.csv" version="1.0">
  <message message="Starting Study" start="01:00"/>
  <runtrain start="00:00" format="switcher" timetable="GF Switcher" />
  <runtrain start="00:00" format="road" timetable="CP Eastbound" />
  <runtrain start="02:00" format="switcher" timetable="GF Switcher" />
  <runtrain start="00:00" format="road" timetable="SBC Northbound" />
  <runtrain start="04:00" format="switcher" timetable="GF Switcher" />
  <runtrain start="02:30" format="road" timetable="Passenger Southbound" />
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</study>
```

# CP Eastbound Timetable

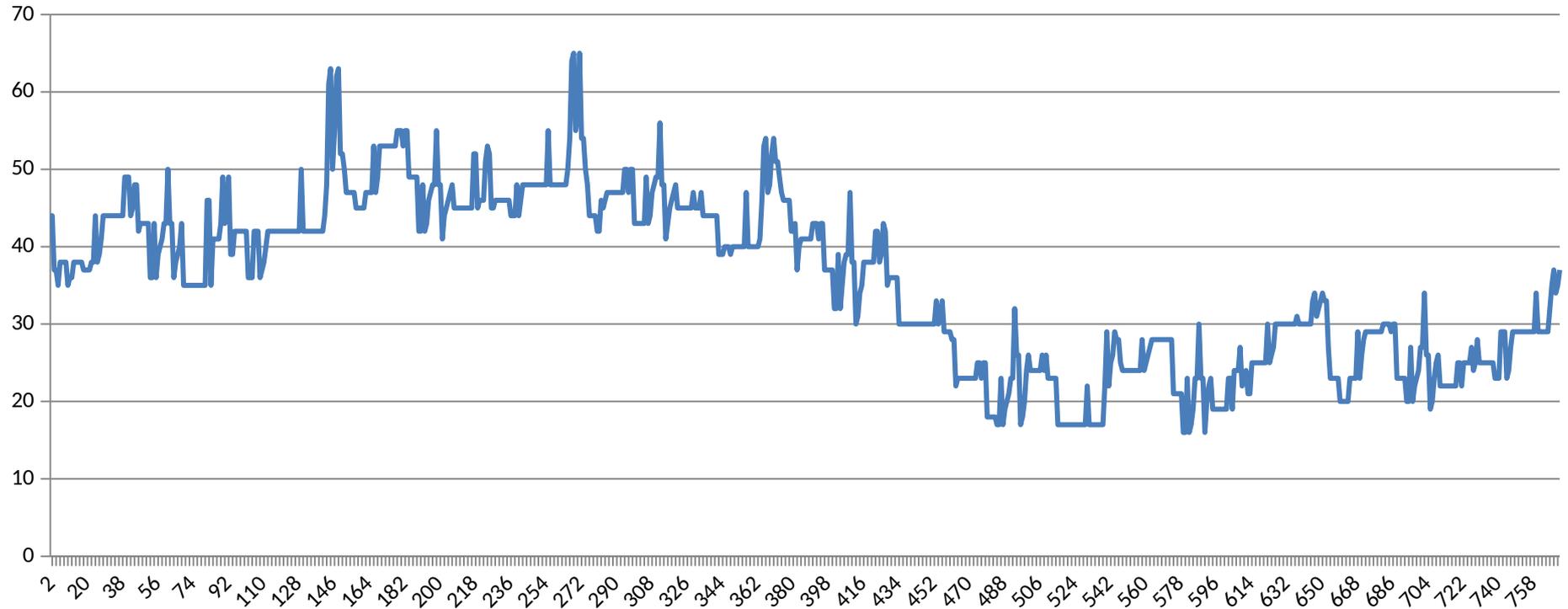
CP Eastbound	0:00	CP	West	Staging (Upper)	Note	Train is on Track 1
CP Eastbound	0:00	CP	West	Staging (Upper)	RESTAGE	
CP Eastbound	0:10	CP	West	Staging (Upper)	REBLOCK	GFEastBound
CP Eastbound	1:10	CP	West	Staging (Upper)	Depart	
CP Eastbound	1:30	SBC	Grand Forks	Main	Arrive	Check with GF Yard
CP Eastbound	1:30	SBC	Grand Forks	Main	VISIT	
CP Eastbound	1:30	SBC	Grand Forks	Siding	DELIVER	
CP Eastbound	1:30	SBC	Grand Forks	Siding	VISIT	
CP Eastbound	1:40	SBC	Grand Forks	CP-Easts	PICKUP	
CP Eastbound	1:55	SBC	Grand Forks	CP-Easts	Depart	
CP Eastbound	2:25	CP	East	Staging (Lower)	Arrive	Keep left when entering
CP Eastbound	2:25	CP	East	Staging (Lower)	Note	Train goes to Track 1
CP Eastbound	2:25	CP	East	Staging (Lower)	DELIVER	

# Reports

- Various metrics can be plotted against time
- Shows if the operations are in “balance”
- Simplest is Car count at a location over time
- Car history of locations it has been at, etc.
- Produced by post-processing of the Event log
- Easy to develop more

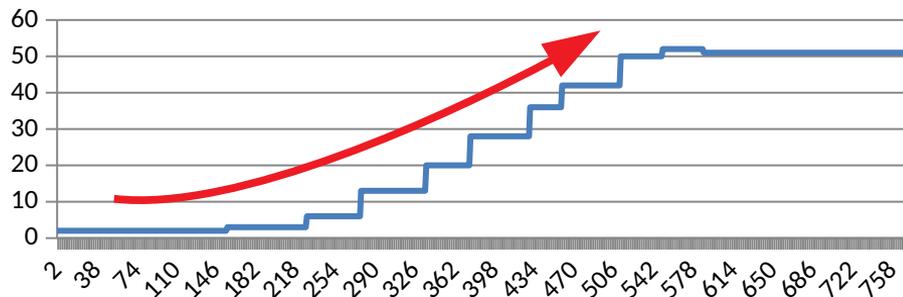
# Simple Car Counts Over Time

BCH.S Yard

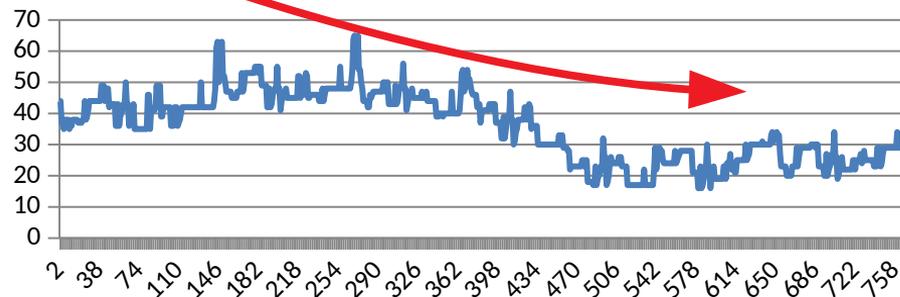


# Inbound and Outbound Conflict

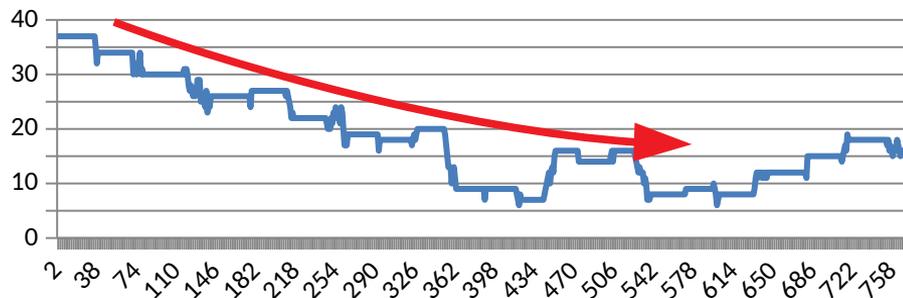
## BCH.Storage



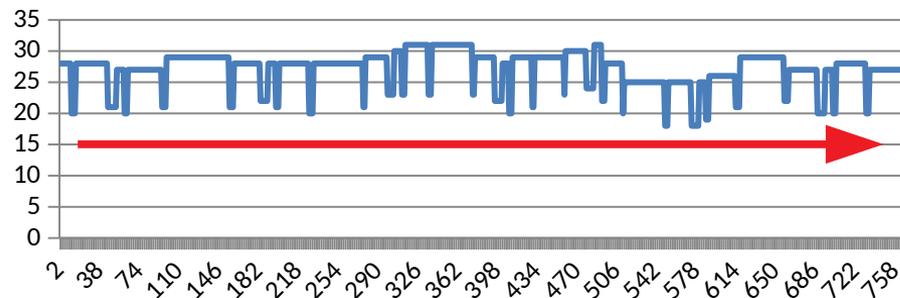
## BCH.S Yard



## Hill

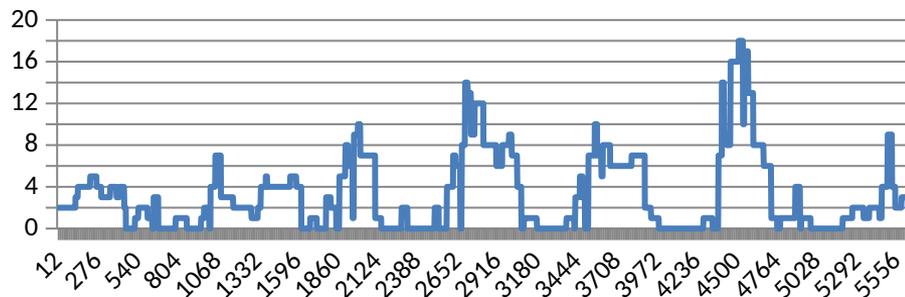


## Staging

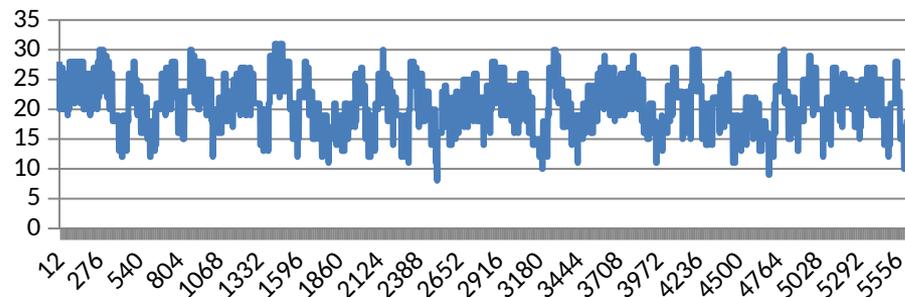


# Oscillations

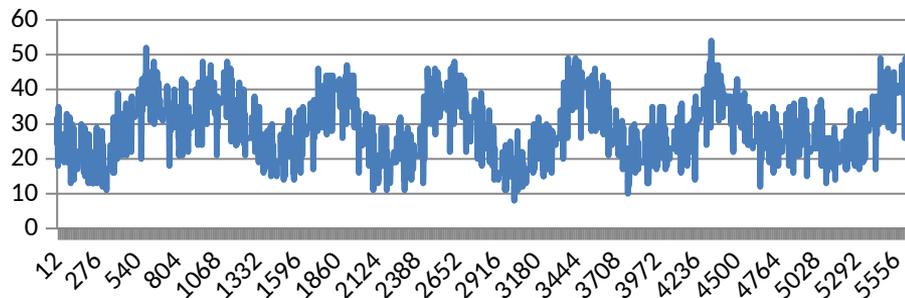
## BCH.Storage



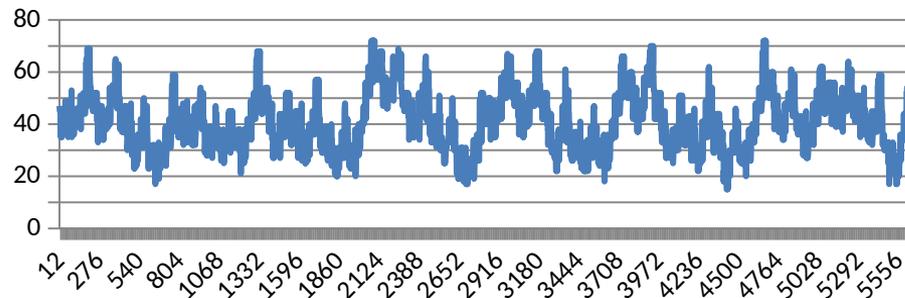
## Staging



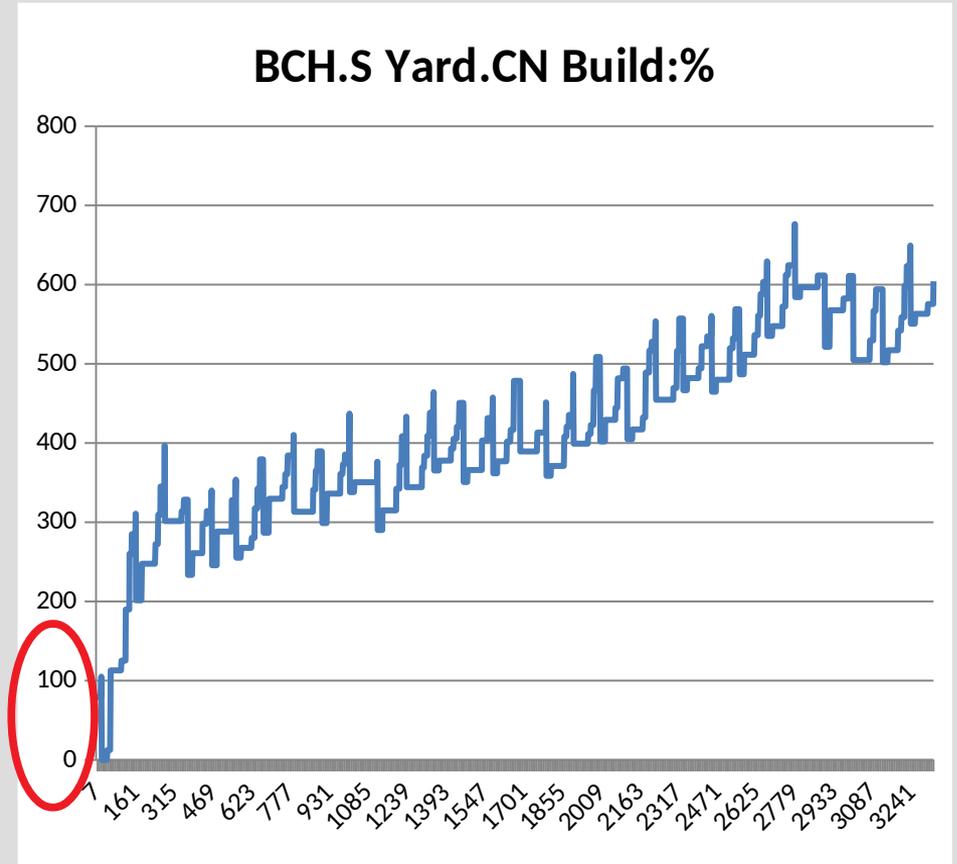
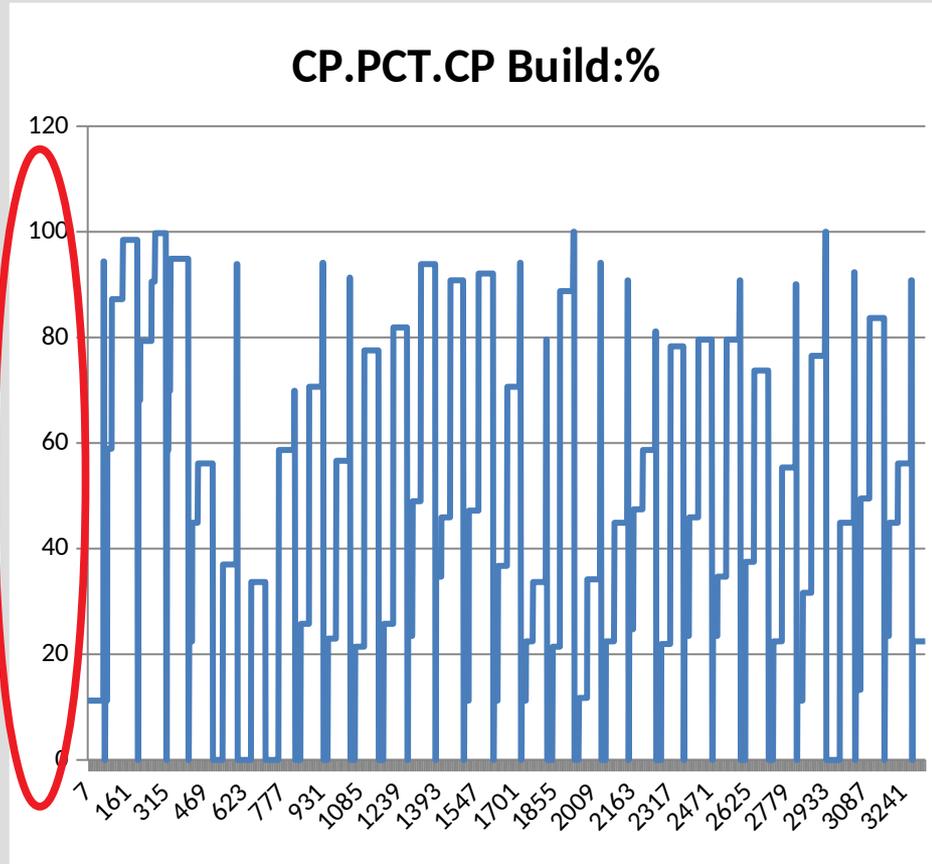
## CP.PCT



## BCH.S Yard



# Not Clearing Outbound Cars to CN





# Restaging Shipment Counts

stn	ind	dir	total	Boxcar	Cov Hopper	Flat	Gondola	Hopper	Log	Ore	Reefer	Stock	Tank
HOPE	STAGING	INBOUND	10	9	0	0	0	0	0	0	1	0	0
HOPE	STAGING	THROUGH	19	17	0	0	0	0	0	0	2	0	0
HOPE	STAGING	OUTBOUND	315	261	0	0	0	42	2	5	0	5	0
ODLUM THROUGH	STAGING	INBOUND	19	10	0	0	2	0	0	0	1	0	6
ODLUM THROUGH	STAGING	THROUGH	42	31	5	0	4	0	0	0	0	0	2
ODLUM THROUGH	STAGING	OUTBOUND	315	261	0	0	0	42	2	5	0	5	0
ODLUM	STAGING	INBOUND	5	1	0	0	2	0	0	0	0	0	2
ODLUM	STAGING	THROUGH	2	1	1	0	0	0	0	0	0	0	0
ODLUM	STAGING	OUTBOUND	315	261	0	0	0	42	2	5	0	5	0
PENTICTON	STAGING	INBOUND	24	5	0	3	15	0	0	0	0	0	1
PENTICTON	STAGING	THROUGH	79	35	1	5	14	1	0	0	23	0	0
PENTICTON	STAGING	OUTBOUND	315	261	0	0	0	42	2	5	0	5	0
PRINCETON	STAGING	INBOUND	1	1	0	0	0	0	0	0	0	0	0
PRINCETON	STAGING	THROUGH	29	25	0	0	2	0	0	0	2	0	0
PRINCETON	STAGING	OUTBOUND	315	261	0	0	0	42	2	5	0	5	0
SPENCES BRIDGE	STAGING	INBOUND	11	7	0	3	0	0	0	0	0	0	1
SPENCES BRIDGE	STAGING	THROUGH	88	67	0	13	2	0	0	0	1	4	1
SPENCES BRIDGE	STAGING	OUTBOUND	315	261	0	0	0	42	2	5	0	5	0

# Track Shipment Counts

stn	ind	inbounds	outbounds
BROOKMERE	BROOKMERE OIL TRACK	2	0
BROOKMERE	MAINTENANCE OF WAY DEPT	4	0
DIAMONDVALE	DIAMONDVALE COAL AND IRON	0	11
DIAMONDVALE	DIAMONDVALE COKE AND COAL	2	0
HOPE	BC ELECTRIC	1	0
HOPE	IMPERIAL OIL	2	0
HOPE	MAINTENANCE OF WAY DEPT	3	0
HOPE	OCS Track	2	0
HOPE	PRINCETON SAWMILLS	1	47
HOPE	RAINBOW RANCH	0	1
IAGO	Spur	5	0
JULIET	MURRAY LAKE LOGGING	0	2
KINGSVALE	Spur	2	23
MERRITT	ASPEN PV LUMBER	0	47
MERRITT	BA OIL	2	0
MERRITT	CITY OF MERRITT	1	0
MERRITT	Freight House	20	0
MERRITT	IMPERIAL OIL	4	0
MERRITT	MERRITT DIAMOND SAWMILL	0	50

# Car History for Two Shipments

time	car	cartye	stn	ind	train	operation
1955-05-13 00:00:00	CP-89065	Box	South	Staging	UP 21 Northbound	RESTAGED
1955-05-13 00:00:00	CP-89065	Box	South	Staging	UP 21 Northbound	PICKUP
1955-05-13 03:20:00	CP-89065	Box	Grand Forks	Siding	UP 21 Northbound	DELIVER
1955-05-13 04:00:00	CP-89065	Box	Grand Forks	Siding	GF Switcher After UP 21	PICKUP
1955-05-13 04:45:00	CP-89065	Box	Grand Forks	Locals	GF Switcher After UP 21	DELIVER
1955-05-13 04:51:00	CP-89065	Box	Grand Forks	Locals	GF Industries	PICKUP
1955-05-13 05:15:00	CP-89065	Box	Grand Forks	Sawmill	GF Industries	DELIVER
1955-05-14 05:15:00	CP-89065	Box	Grand Forks	Sawmill	GF Industries	PICKUP
1955-05-14 08:15:00	CP-89065	Box	Grand Forks	SBC-Norths	GF Industries	DELIVER
1955-05-15 03:30:00	CP-89065	Box	Grand Forks	SBC-Norths	UP 21 Northbound	PICKUP
1955-05-15 04:55:00	CP-89065	Box	North	Staging (Upper)	UP 21 Northbound	DELIVER
1955-05-15 05:30:00	CP-89065	Box	North	Staging (Upper)	UP 22 Southbound	RESTAGED
1955-05-15 05:30:00	CP-89065	Box	North	Staging (Upper)	UP 22 Southbound	PICKUP
1955-05-15 07:30:00	CP-89065	Box	Grand Forks	Siding	UP 22 Southbound	DELIVER
1955-05-15 08:30:00	CP-89065	Box	Grand Forks	Siding	GF Switcher After UP 22	PICKUP
1955-05-15 09:15:00	CP-89065	Box	Grand Forks	Locals	GF Switcher After UP 22	DELIVER
1955-05-16 04:51:00	CP-89065	Box	Grand Forks	Locals	GF Industries	PICKUP
1955-05-16 05:15:00	CP-89065	Box	Grand Forks	Sawmill	GF Industries	DELIVER
1955-05-17 05:15:00	CP-89065	Box	Grand Forks	Sawmill	GF Industries	PICKUP
1955-05-17 08:15:00	CP-89065	Box	Grand Forks	CP-Easts	GF Industries	DELIVER
1955-05-18 01:40:00	CP-89065	Box	Grand Forks	CP-Easts	CP 82 Eastbound	PICKUP
1955-05-18 02:25:00	CP-89065	Box	East	Staging (Lower)	CP 82 Eastbound	DELIVER

# Summary

- **Selects** suitable **Shipments** for Cars
- **Generates** necessary **Waybills** for Cars
- **Runs Trains** to pick up and deliver Cars according to their Waybills
- **Prints Switch Lists**
- **Records** an **Event Log** that can be analysed

# Not Covered

- Districts for Car selection and home routing
- Shipments and Car Orders can be “fuzzy”
- Car wait times are configurable
- Car location summary
- CSV and XML file formats

# Not Covered

- Track Pools and “elastic” Tracks
- Diagnostics to help find data errors
- “Stuck” Cars
- Developed in Java using Netbeans on a Mac

**Q & A**

# References

- Tony Thompson's blog on "Modeling the SP":  
<http://modelingthesp.blogspot.com/2012/05/handout-for-waybills-talk.html>
- The Operations Special Interest Group  
<http://www.opsig.org>

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