Demand Driven Operations

The Operating Driver of the Easton & Potomac

by Keith Stillman – Superintendent of the Easton & Potomac

Background

During the more than 75 operating sessions held on the Easton & Potomac (E&P) my main goal has been to operate a railroad, not just run trains. I believe one of the main components of operating a railroad includes dealing with unplanned situations that arise during a session. These situations can be anything from equipment failures, to high volume traffic overloading the physical plant, to a lack of rolling stock to fill customer shipping requests and many more. While most of the situations that arise during a session are self generating (cars derailing, engines stop running, turntables breaking), random traffic levels are not. So I needed to come up with a process to generate random traffic levels and the situations that go along with them.

I also believe the layout should mimic the real world as much as practical. This includes reacting to customer demand that has both static and dynamic components. While some customers will have fairly constant traffic levels others will have widely varying traffic levels. But even the constant traffic customers can have periods of higher or lower traffic levels. These varying traffic levels will at times put a strain on the physical plant and cause situations that must be handled. It is these situations that I think bring the most fun to an operating session.

I also like having to locate empty (MT) cars to fill customer demand. While some of the traffic is constant with assigned MT cars flowing back to the customer for loading, other traffic is anything but constant. In fact most of the customers ship less than daily and when they are ready to ship they most likely will need an MT car spotted at their location. The MT request process is a major component of my session and I will go into this process more throughout this article.

However there are two things I don't like to deal with when it comes to model railroad operations: moving mis-spotted cars or updating routing software. So any system I used had to overcome these issues. To meet my requirements for random traffic levels and ease of staging I adopted a demand-driven system that simulates the dynamic traffic levels experienced in the real world and integrated it with a car tracking system that does not require a lot of staging effort between sessions.

So with this as background let's take a look at my layout and operating sessions and then dive down into the process that drives everything.

The Layout

The E&P is a bridge line set in 1925 running both freight and passenger operations. The E&P runs on a double-deck point-to-point layout located in a 16-foot by 18-foot room. (To view the track diagram go to www.easton-and-potomac.com/ep/eplayoutroom.html)

The layout has four external interchanges (N&W, Southern, RF&P and C&O). Because the layout does not have any staging, the external interchanges are the interface to the outside world. There are five primary online customers — Easton Potomac Steamship Company (EPSCO), Easton Transfer Company, Hood Brothers Packing, Hopkins Spring Mining Company, and Easton Lumber Company (ELC) — 14 other online customers, eight team tracks, two ash tracks and ten passenger stations for a total of 43 fixed location demand centers. As the name implies, a fixed location demand center does not change location versus a movable location demand center that can change location. There are two movable location demand centers, the CEO and the superintendent for a total of 45 demand centers.

I run two types of sessions. The "weekday" session is held on Saturdays and is three hours, representing a 12-hour work day based on a four-to-one fast clock. The "weekend" session, which runs under a different timetable and has a lot less traffic, is held during a weeknight and lasts two hours, representing an eight-hour work day. (Timetables for both of these sessions can be seen at www.easton-and-potomac.com/epops/epops_timetable.html) In all cases the next session picks up with the following day and the situation on the layout where the previous session left it.

Sessions are limited to nine attendees (including myself) for a weekend session and five (including myself) for a weeknight session. Weekend sessions provide positions for a dispatcher, operator, White Hall yardmaster and assistant, Thorny Point yardmaster, and four road crews. The weeknight session does not staff the dispatcher, operator or White Hall assistant positions and only has three road crews.

Demand-Driven Concept

Keeping with the concept of demand-driven operations, all car movements are initiated by either the interchange demand profile or the business demand profile. Car routing after the demand-induced initialization is controlled by car cards, waybills and MT requests (*Figure 1*), which are kept in card boxes located at each town with slots at a minimum for setout, pickup and off-spot or in the MT Request Rack at White Hall yard. Car cards can have one of three states: MT returning home, MT en route to a business, or loaded (*Figure 2*).

Demand drives all of the action on the layout and comes in two varieties, push demand and pull demand. Push demand initiates a car move with a final destina-

Figure 1

MT Return to C&O at White Hall	Southern Broadway Shenandoah	Southern Broadway Shenandoah
Kingan 601 RSM	#120 Southern Car Required RSM	#120 Southern Car Required RSM MT

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The only documents used to control car movements are the car card (left), waybill (center) and MT request (right).

Figure 2

MT Return to C&O at White Hall	Hood Brothers Packing Hood Hood Turn	Southern Broadway Shenandoah Route
Kingan 601 RSM	Kingan 601 RSM	Kingan 601 RSM

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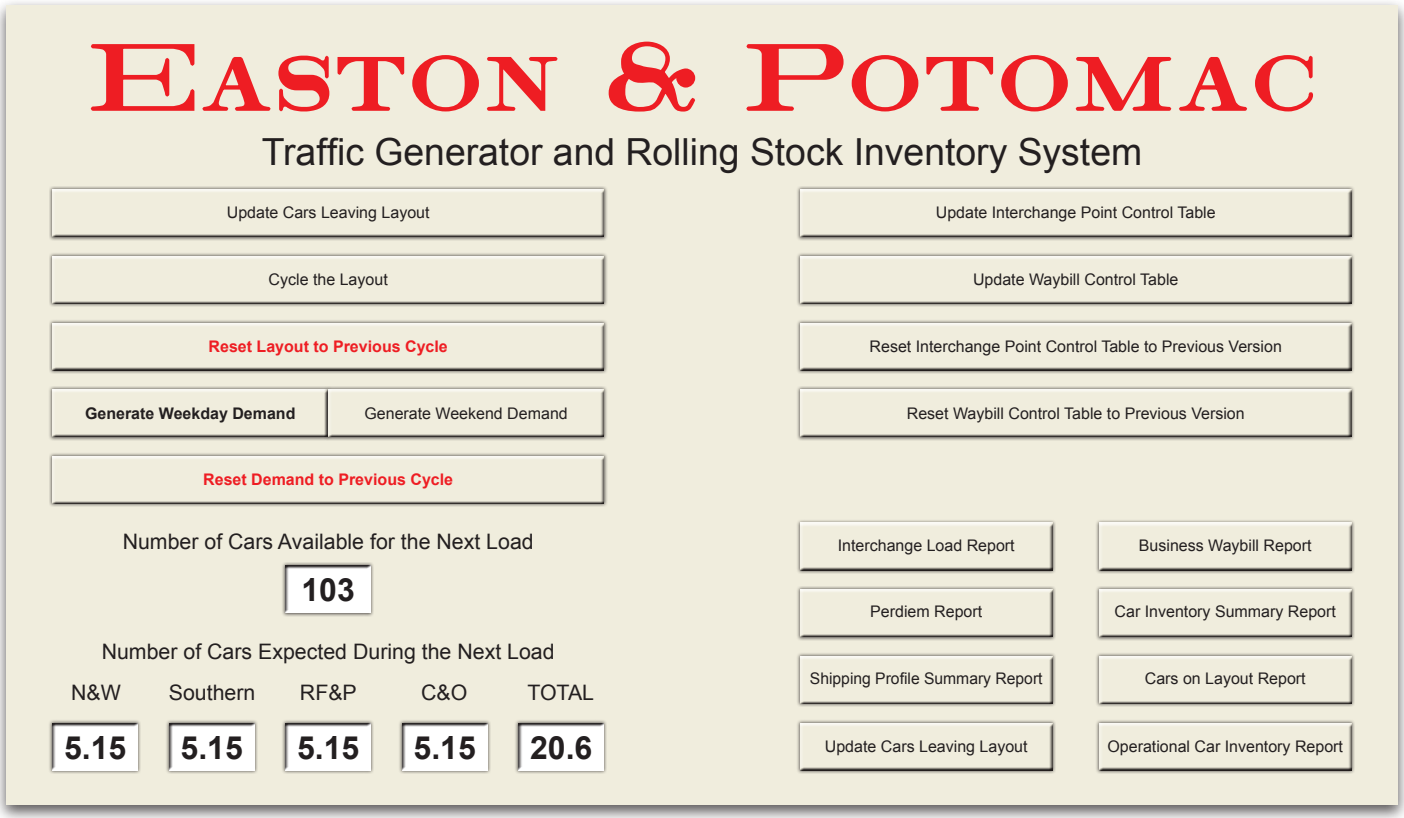
The only three valid car card states are (from left to right): MT car returning home (available for re-routing), MT car en route to a business (Hood Brothers Packing), and Loaded car (en route to the Southern).

Figure 3



The Traffic Generator (TG) is written in Microsoft Access and tracks all the rolling stock inventory and generates all session demand.

tion defined. Pull demand initiates a request for a car that, in turn, will initiate at least one and possibly multiple car moves. The interchanges are push demand centers because they place cars on the layout with predetermined destinations. Everything else is a pull demand center initiating a need for rolling stock without specifying a particular piece of rolling stock.

Demand is generated by either the request for a car to be placed on an interchange (push demand) as a result of the interchange demand profile or the generation of a waybill (pull demand) by the business demand profile. Each interchange and business has a demand profile that controls how many and what type of cars are needed during a session. This demand is dynamic and can result in a range of traffic from no cars to too many cars for the available sidings; and this demand varies from session to session. For practical reasons I try to limit the number of interchange cars to the capacity of the individual external interchanges.

Reporting and Tracking Demand

Two components report and track the fulfillment of demand. The first component is the Traffic Generator (TG) written in Microsoft Access (*Figure 3*). The TG initiates all demand and with it the initiation of all car movements. The second component is the car cards and waybills that will control and track subsequent car movements until the demand is met.

The TG has two outputs. The first TG output is the loading of the interchanges based on the interchange demand profile (push demand). The result of this output will be the cars on each interchange at the beginning of the session. The second TG output is the generation of business waybills based on the business demand profile (pull demand). In addition to producing all of the new waybills for the various businesses, this process can and usually does initiate the MT request process that is used to get MT cars to the businesses that need them. If a business generates a new waybill requiring a car type that is not currently located at its place of business an MT request (*Figure 1*) is used to move an MT car to that business location. When an available car is located the MT request is inserted into the car card (*Figure 2*) to route it to the requesting business. The MT request can be placed in the car card either during staging or during the operating session as we will see later.

The TG also generates two reports to guide layout staging. The first report is the Arriving Interchange Cars report (*Figure 4*) that lists all of the cars arriving on the interchanges, their load status and their destination. The second report is the Business Waybill Report (*Figure 5*) that lists the railroad's demand from each business for that day.

Layout Staging

Staging the layout consists of loading the interchanges, emptying and/or load-

ing cars that are correctly spotted, moving card cards from setout or off-spot to off-spot or pickup for those cars that were not correctly spotted and placing the "to be shipped" waybills at the various businesses. At no time do I move mis-spotted cars to their correct location via 0-5-0-ing (manually picking up and carrying a car).

Layout staging is started by going around to all of the towns and checking to see if any cars were mis-spotted. If any are found their corresponding car card is moved to either off-spot or pickup.

Three functions are then executed in the TG. The first is the "Update Cars Leaving Layout" function. This function updates the TG with the cars that arrived on the interchanges at the end of the last session and therefore will be leaving the layout. This is a manual function that consists of recording all the cars on the various external interchanges and entering this information into the TG. This is the only time the TG will be aware of a subsequent specific location of any car it has placed on the layout. This is because once a car is placed on an interchange its location is tracked/controlled only by the associated car card/waybill or car card/MT request.

Next, the "Cycle the Layout" option causes the TG to look at all of the operational off layout (OL) cars and uses the demand profile for the interchanges to select cars to be placed on the interchanges. The TG will not select any car recorded as arriving at an interchange for the next session, thus simulating car movements beyond the borders of the layout. (There are many options for controlling car selection, routing and load status and we will go into them later in this article.) Then the TG will assign a destination and load status to each of the selected cars based on the car's assigned interchange and the car's profile. This demand is reported in the Arriving Interchange Cars report (*Figure 4*). The result of this process is tracked on the layout via card cars and waybills placed in the pickup boxes for the associated interchanges.

The last function initiated in the TG is the "Generate Weekday Demand" for the Saturday sessions or the "Generate Weekend Demand" for the week night sessions. (Remember the Saturday sessions run a weekday schedule and the weeknight sessions run a weekend schedule.

Flow Chart

CHECK FOR MIS-SPOTTED CARS

Review each car spotted at a business

If this car is at the wrong business but in the right town, move the corresponding car card to the off-spot box.

If the car is in the wrong town, move the car card to the pickup box.

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TELL THE COMPUTER ABOUT THE INTERCHANGE CARS

Review each interchange and record all the cars; these will be leaving the layout.

Enter these cars into the Traffic Generator. This tells the computer to take these cars off the layout.

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SELECT THE NEW CARS FOR THE INTERCHANGES

Execute the "Cycle the Layout" function in the Traffic Generator. This selects the cars for the interchanges and sets their load status and destination.

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GENERATE THE BUSINESS DEMAND

Execute the "Generate Weekday Demand" or "Generate Weekend Demand" depending on the session being set up. This determines which businesses have a need for a rail car.

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PRINT THE STAGING REPORTS

Print the Arriving Interchange Cars report and the Business Waybill Report. These two reports are all that is needed in the layout room for staging.

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UNLOAD AND LOAD THE INTERCHANGES

Remove all the cars on the interchange.

Using the Arriving Interchange Cars report, place the cars listed on the interchanges and insert the indicated waybills in the corresponding car cards.

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RECORD THE NEW BUSINESS DEMAND

Using the Business Waybill Report, place a waybill in each business card behind any existing waybills.

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REVIEW EACH BUSINESS' RAIL CAR NEEDS

Check each business to see if a car can be unloaded. If so remove the waybill from the car card.

Check each business to see if a car can be loaded (indicated by the presence of a waybill corresponding to the car type located at the business). If so place the next waybill from the business card in the corresponding car card.

If no car of the correct type is spotted at the business, check the town for the car. If one exists, place an MT request in its car card and place the car card in the off-spot box. This should move the car to this business during the next session.

If no car of the correct type is located in the town, place the MT request at the main yard. This directs the YM to locate and ship an MT car to the business.

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STAGING COMPLETE

Yes it's confusing to me too.) Executing either of these functions causes the TG to look at all of the demand centers (both fixed and moveable) and generate their demand for railroad resources based on the demand center's demand profile. This profile is made up of the shipper, the associated car types and the associated receivers. This demand is reported in the Business Waybill Report (*Figure 5*). The result of all of the demand centers' demand for a session is tracked on the

Figure 4

Arriving Interchange Cars

19 total cars arriving

ID	Type	NBR	Name	Load Status	Destination	Location
3 cars from the Chesapeake & Ohio						
285	GB	285	E&P	MTY	White Hall yard	White Hall
291	GB	96666	N&W	MTY	Norfolk & Western	Stanly
343	FM	5048	T&P	MTY	Southern	Broadway
5 cars from the Norfolk & Western						
22	XM	1	Cutler & Savidge	Loaded	Chesapeake & Ohio	White Hall
30	VM	18737	ACL	MTY	Richmond, Fredricksburg & Potomac	Brooke
188	XM	3492	Orient	MTY	Southern	Broadway
297	XM	81536	PMcK&Y	MTY	Rickmond, Fredricksburg & Potomac	Brooke
378	SM	378	E&P	Loaded	Hood Brothers Packing	Hood
5 cars from the Norfolk & Western						
18	XM	137710	Chicago & North Western	Loaded	Broadway Team Track	Broadway
63	RSM	4555	Swift	MTY	Chesapeake & Ohio	White Hall
115	VM	33801	Southern Pacific	MTY	Southern	Broadway
131	XM	7168	LNE	MTY	Southern	Broadway
379	SM	379	E&P	Loaded	Hood Brothers Packing	Hood
5 cars from the Norfolk & Western						
43	SM	724	Atlanta & West Point	Loaded	Hood Brothers Packing	Hood
87	RS	NADX 3012	Pluto Water	MTY	Chesapeake & Ohio	White Hall
111	FM	960	Canadian Pacific	Loaded	HS Mining Company	Hopkins Spring
214	RS	8078	Houston & Texas Central	Loaded	Chesapeake & Ohio	White Hall
215	RS	8065	Houston & Texas Central	Loaded	Logging Interchange	Broadway
329	HM	329	HS Mining Company	MTY	HS Mining Company	Hopkins Spring

The Arriving Interchange Cars report is produced by the TG and is used to load the interchanges during staging.

layout via waybills placed either in card cars or business cards.

Staging the layout proceeds by physically removing the cars and associated car cards from the layout for those cars reported to the TG as having arrived at the various interchanges. Then using the Arriving Interchange Cars report the physical car and its associated car card are located. These are placed on the indicated interchange and in the associated interchange car card box. The load status for each arriving interchange car is then examined. If the car is MT, no waybill is needed because the car card has a "MT return to" location designated (*Figure 2*). But if the car is loaded, the corresponding waybill is placed in the car card to route it as indicated by the Arriving Interchange Cars report.

With the interchanges done, attention is turned to the businesses. The Business Waybill Report determines what each business wants to ship for this session. This demand is recorded via a waybill placed in the business card (*Figure 6*) located in a card box in the business's home town. Each stationary demand center has a corresponding business card where the waybills generated for the session are placed behind any existing waybills giving a first-in-first-out priority to shipments.

The final step in the staging process is to review each business to determine if any cars need to be unloaded or loaded, or MTs routed to it. At each business I first look to see if there are any loaded cars correctly spotted for unloading. If so I removed the Waybill from the associated Car Card. Then I look for pending waybills. (Waybills located in the corresponding Business Card.) If the business has pending waybills then one of three things will happen. First if an MT car is sitting at the business and it matches the type needed for a shipment I load the Waybill into the corresponding Car Card. If no MT car of the required type is located at the business then I initiate the MT Request Process. I first look at other MT cars in the same town. If an MT car of the required type is available in town then an MT Request is placed in the cor-

Figure 5

Business Waybill Report

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MT Needed?	From	Type		To	BOL Needed?
	Hood Brothers Packing at Hood	RSM	Meat Reefer	Southern at Broadway	
	Hood Brothers Packing at Hood	GB	Gondola	Norfolk & Western at Stanley	
	Hood Brothers Packing at Hood	RS	Refrigerator	Easton Potomac Steamship Co. at Thorny Point	
	Hood Brothers Packing at Hood	XM	Box	Chesapeake & Ohio at White Hall	
	Hood Passenger Station at Hood	BE	Baggage	White Hall Passenger Station at White Hall	
	Hopkins Spring Passenger Station at Hopkins Spring	MA	RPO	Lacey Springs Passenger Station at Lacey Springs	
	HS Mining Company at Hopkins Spring	HM	Hopper	Richmond, Fredricksburg & Potomac at Brooke	
	HS Mining Company at Hopkins Spring	HM	Hopper	Thorny Point Fuel Track at Thorny Point	
	HS Mining Company at Hopkins Spring	HM	Hopper	White Hall Fuel Track at White Hall	
	Easton Lumber Co. at Lacey Springs	XM	Box	Easton Potomac Steamship Co. at Thorny Point	
	Lacey Springs Team Track at Lacey Springs	XM	Box	Chesapeake & Ohio at White Hall	
	Proctor Biggs at Lacey Springs	XM	Box	Norfolk & Western at Stanley	
	Easton Potomac Steamship Co. at Thorny Point	XM-LCL	Box LCL Load	Easton Transfer Company at Brooke	
	Thorny Point Passenger Station at Thorny Point	MA	RPO	Brooke Passenger Station at Brooke	
	Chairman at White Hall	PV-T	CEO departure time	CEO departs at 7AM at CEO Departure Location	
	Chairman at White Hall	PV	Private	Lacey Springs Passenger Station at Lacey Springs	
	Mar-K Apples, Inc. at White Hall	XM	Box	Southern at Broadway	
	White Hall Ash Pit at White Hall	GB	Gondola	Norfolk & Western at Stanley	
	White Hall Passenger Station at White Hall	BE	Baggage	Hood Passenger Station at Hood	

The Business Waybill report is produced by the TG to assign waybills to the business cards during staging.

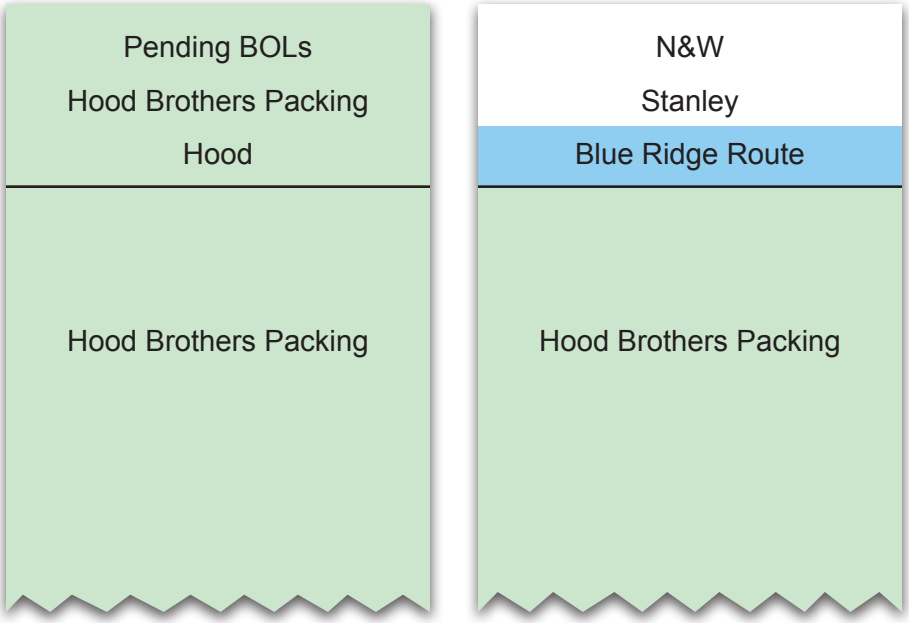
responding Car Card and the Car Card is placed in the off spot box.

If no MT car of the correct type is available in the town then an MT request is placed in the MT request rack at White Hall yard (*Figure 7*) to direct the White Hall yardmaster during the session to locate and route an MT car to that business.

There is one last step to staging and that is a review of the MT requests in the MT request rack at White Hall yard. If the requests for MT cars are backing up and current traffic does not look like it

Figure 7

Figure 6



All pending business demand is kept in business cards, one card for each business on the layout. The cards can have either no pending waybills (left), or show a pending waybill, such as going to the N&W (right).

will meet the MT demand anytime soon OL (off layout) cars are selected to fill this demand. (Any cars selected must be recorded in the TG's database and on whichever interchange they were placed.) This practice is like the E&P traffic department calling other railroads' traffic departments and requesting MT cars. Any cars I place on the interchanges through this process will be pre-loaded with the corresponding MT request relieving the White Hall yardmaster from having to match them up during the session. These cars are placed on the "MT Return To" location interchange because this was the route they took to their home road. However most of these MT requests I try to fill from the "MT Return to C&O" because the C&O interchange is located in White Hall next to the main yard. With that the layout is staged.

Generating Demand

Now let's take a look at how all of this demand is generated and controlled. The whole process is based on the shipper/receiver interaction. A shipper is usually an interchange or an online business. But it can be just about anything else you want. For example the CEO and supervisor are shippers. Even the departure time for the CEO is a shipper. The system gives unlimited flexibility to generate any type of situation.

Let's take the CEO for example. The CEO shipper is setup to generate movements of the CEO's private car to various locations around the layout. So the CEO shipper will have a demand profile that includes all of the possible locations the CEO could travel to and the probability she will during the current session. (Yes the CEO of the E&P is a female.)

To setup a new movement all you have to do is create a shipper and all of the possible destinations with the associated probabilities. The probabilities assigned to each destination will control how often this situation arises. In the case of the CEO's departure time the shipper is "CEO Departure Time" and the receivers are all of the valid departure times with a probability range assigned to each. (Note these probability ranges can not overlap or the CEO could be departing at two different times.) So the "CEO Departure Time" ships to a particular departure time that indicates when the CEO will be leaving.

The Technicals

Now let's look at the technical details. At this stage of development 24 tables are associated with the TG but only five of these directly control the demand generation. They are listed below with a brief description of their function and their critical fields.

The Car Table (*Figure 8*) contains all the information about all of the cars in inventory both operational and non-operational. Each car is uniquely identified by a record ID that can be, but usually is not, the number printed on the car. Currently this table contains 396 records. Seven fields in this table are critical to determining when a car will appear on an interchange, its destination and load status. They are:

CarID — a unique record id for every car in inventory.

MTLocation — determines where the car is routed when empty. This is also used to print the "MT Return To" location on the car card.

OnceCycleReturn — if TRUE, this will return the car to the layout after it has been off for one session. This was done to cycle E&P and local business cars such as HS Mining back in a reasonable time. Because the selection of OL cars is random no other way was found to ensure cars would come back to the layout within a specific time interval.

InterchangeLoadProcess — determines if a car arrives on the interchange always MT (N), always loaded (A) or if its load status is determined randomly (R). This was done to always return online business cars such as stock cars for Hood Brothers Packing loaded and other online business cars such as hopper cars for HS Mining empty. Most cars have this field set to random.

Operational — identifies if an OL car is operational and available for selection.

InterchangeLoadSatus — indicates if the car arrived on the interchange loaded or unloaded.

InterchangeDestination — indicates on which interchange the car will come onto the layout.

Let's look at the four records in this table in Figure 8:

The first record is for Chicago, Lake Shore & Eastern Ry. box car 7425. It is not operational (Operational = "FALSE") so it will not be considered for placement on an interchange.

The second record is for Gramps tank car 11055. It is operational (Operational = "TRUE") and so would be considered for placement on an interchange. Its "MT Return To" location is Southern (MT Location = "SOU") and it will be selected randomly for placement on an interchange (One Cycle Return = "FALSE"). Its load status is also determined randomly (Interchange Load Process = "R").

The third record is for HS Mining Co. hopper car 329. It is operational and so would be considered for placement on

Figure 8

Car ID	NBR	Type	Name	MT Location	One Cycle Returns	Interchange Load Process	Operational	Interchange Load Status	Interchange Destination	Interchange Point RN	Interchange Load Status RN	Interchange Waybill RN
1	7425	XM	Chicago Lake Shore & Eastern Ry.	CO	FALSE	R	FALSE			0	0	0
4	11055	TM	Gramps	SOU	FALSE	R	TRUE			83	18	11
329	329	HM	HS Mining Company	HSM	TRUE	N	TRUE	MTY	HSM	0	0	0
378	378	SM	E&P	NW	TRUE	A	TRUE	Loaded		0	0	0

For every piece of rolling stock, the Car Table lists one record containing its unique demand information, as well as other information.

an interchange. It will be selected after staying off the layout for one cycle (One Cycle Returns = "TRUE") and its load status will always be MT (Interchange Load Process = "N"). Because it will always arrive on an interchange MT its "MT Return To" location will always direct it back to HS Mining Co. (MT Location = "HSM").

The forth record is for E&P stock car 378. It is operational and so would be considered for placement on an interchange. It also will be selected after staying off the layout for one cycle however its load status will always be loaded (Interchange Load Process = "A"). An entry in the Interchange Waybill Control Table will direct it to Hood Brothers. When MT it will proceed back to the N&W based on its "MT Return To" location (MT Location = "NW"). Thus this car will provided a constant demand and route from the N&W to Hood Brothers and back to N&W over and over again.

The Interchange Point Control Table (*Figure 9*) lists all of the interchanges and the probability a car will arrive on it at the beginning of a session. This table has four records, one for each of the external interchanges.

The first record is for the C&O interchange (Entry Point = "CO") and the probability of an operational OL car being selected for this interchange is five percent (Probability Start Range = "1" and Probability End Range = "5"). I adjust these probability ranges to keep the interchanges from getting overloaded at the beginning of a session. Based on the records in this table about 20 percent of the operational OL cars will be selected for placement on the layout.

The Interchange Waybill Control Table (*Figure 10*) lists all of the possible interchange/car type/receiver combinations and the associated probability distribution. This table controls the random routing of loaded interchange cars. Currently this table has 436 records, one record for each interchange/car type/receiver. Looking at the records in this table in Figure 10 we see the C&O interchange (Shipper = "CO") can ship meat reefers (Type = "RSM") to six different locations.

The first record shows the probability of the C&O shipping a loaded meat reefer (if one should arrive on the C&O interchange) to the Southern interchange (Receiver = "SOU") is 30 percent (Probability Start Range = "1" and Probability End Range = "30"). This process only comes into play if a loaded car of the type listed arrives on the interchange listed. Otherwise the "MT Return To" location will route the car. The total probabilities for each shipper/car type should equal 100 percent to ensure any loaded car arriving on an interchange has a shipping location.

The Shipper Control Table (*Figure 11*) lists all of the shipper/car type combinations and holds a generated random number that is copied to the Business Waybill Control Table to force all of the shipper/car type combinations to the same random number. This ensures only one waybill will be generated for any shipper/car type combination. If I want the possibility for more than one shipment from a given shipper for a particular car type then I create another shipper/car type entry. This is done by entering the same shipper/car type and adding one to the number field. Currently this table has 131 records.

The Shipper Control Table entries shown in Figure 11 are for Hood Brothers (Shipper = "HB"). We can see that HB has the possibility of shipping one gondola (GB), one refer (RS), up to three meat refers (RSM), one tank car (TM) and one boxcar (XM). None of these will be shipped on the weekend (Weekend Shipper = "FALSE"). And we see the random numbers that have been generated for each entry.

The Business Waybill Control Table (*Figure 12*) lists all of the shipper/car type combinations and the probability distribution indicating where that shipper/car type combination can be shipped and the random number that determines if this combination will be selected. Currently this table has 597 records.

Figure 9

Entry Point	Probability Start Range	Probability End Range	Selection Count
CO	1	5	1
NW	6	10	1
RFP	11	15	1
SOU	16	20	1

The Interchange Point Control Table contains one record for each external interchange.

Figure 10

Shipper	Type	Probability Start Range	Probability End Range	Reciever
CO	RSM	1	30	SOU
CO	RSM	31	35	ELC
CO	RSM	36	50	EPSCO
CO	RSM	51	55	LOG
CO	RSM	56	85	NW
CO	RSM	86	100	RFP

The Interchange Waybill Control Table contains one record for each interchange/car type/destination combination.

Figure 11

Shipper	Type	NBR	Weekend Shipper	Business Waybill RN
HB	GB	1	FALSE	22
HB	RS	1	FALSE	22
HB	RSM	1	FALSE	43
HB	RSM	2	FALSE	74
HB	RSM	3	FALSE	79
HB	TM	1	FALSE	65
HB	XM	1	FALSE	25

The Shipper Control Table contains one record for each shipper/car type combination.

Figure 12

Shipper	Type	NBR	Probability Start Range	Probability End Range	Desc	Receiver	Business Waybill RN
HB	RSM	1	1	30		CO	43
HB	RSM	1	31	60		SOU	43
HB	RSM	1	61	65		EPSCO	43
HB	RSM	1	66	66		LOG	43
HB	RSM	1	67	96		NW	43
HB	RSM	1	97	100		RFP	43
HB	RSM	2	1	15		CO	74
HB	RSM	2	16	30		SOU	74
HB	RSM	2	31	45		NW	74
HB	RSM	2	46	48		EPSCO	74
HB	RSM	2	49	50		RFP	74
HB	RSM	3	1	7		CO	79
HB	RSM	3	8	14		SOU	79
HB	RSM	3	15	21		NW	79
HB	RSM	3	21	22		EPSCO	79

The Business Waybill Control Table contains one record for each interchange/car type/receiver combination.

The Business Waybill Control Table entries shown in Figure 12 are for Hood Brothers (HB) meat reefer (RSM) shipments. Here we can see the three meat reefers HB can ship during a session (NBR 1,2,3) and where they can be shipped denoted by the Receiver and the probability they will ship based on the Probability Start Range to Probability End Range. We also see that all of the entries for a given shipment entry have the same random number. This keeps the system from shipping the same car twice during a session. Based on this data HB will only ship one RSM this session and that is to the Southern interchange (SOU). This is recorded in the second record entry because the random number 43 falls between the Probability Start Range of 31 and the Probability End Range of 60.

Conclusion

That is about it. This demand process has been very robust over the years and has provided a nice variation in the sessions keeping each session unique from the previous session but at the same time keeping enough routine to allow operations to flow smoothly, for the most part.

One unique process to my sessions (at least I haven't come across it at any other session) is the MT Request Process. The White Hall yardmasters say they like looking for MT cars to re-route to the requesting businesses. This process is also used to replace cars in the Thorny Point yard that are used to unload the steamer *Easton* and provides interaction between the two yardmasters during the session.

I have been very pleased with this process and with the demands it puts on the operations from time to time. I also like the flexibility it provides for generating other types of activity such as CEO and superintendent moves. The latest addition is a demand profile for track inspections that is generated by the superintendent. While that has yet to come up I suspect it will disrupt the normal schedule and give the dispatcher a very challenging day!