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UNIFIED DATA

Big Data & Rail Transportation

John Edwards, Technology Journalist & Author
7/4/2013
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Besides efficiently moving virtually all types of freight from one place to another, railroads also excel at one other thing: generating data.

This fact should come as no surprise. After all, since at least the mid-19th century, railroads have needed to set and maintain precise routes and schedules. It was the railroad industry that pioneered standard times across cities and time zones and set benchmark rates for specific types of loads.

With the help of data published by railroad companies, a manufacturer located in Philadelphia could quickly figure out the best way of sending a shipment of gas lamps to a customer in San Francisco. By consulting railroad-supplied data tables, the manufacturer could quickly discover the date and time the shipment would leave Philadelphia, when it would arrive in San Francisco, and how much it would cost to move the load to its destination. The company could then compare this information against data supplied by competing railroads to get the best deal on transporting the shipment.

By the 20th century, it became increasingly easy for businesses to access waybill records to build an enhanced operating strategy, or plow through mounds of financial data to boost the bottom line. Reliable data sources included time-series economic data from the Interstate Commerce Commission (now the Surface Transportation Board) and voluminous statistics from the Association of American Railroads, such as the "Green Book," which eventually became the bible of railroad statistics.

Rolling along
Railroads today continue to spew out mountains of data. Powerful computers, high-speed networks, and an array of sophisticated location reporting and physical sensor technologies are giving both railroads and shippers a wealth of vital information and insight. The technologies railroads now use to build big data sources for shippers and their own planners include tablet computers, GPS receivers, automatic equipment identification (AEI) readers, electronic data interchange (EDI) systems, and video cameras. Thanks to all of these sophisticated tools, railroad data is growing in both quantity and quality.

In the years ahead, big data analytical tools will be essential for keeping pace with what promises to be an upcoming tsunami of railroad-generated information. Many railroads are already using such tools to conduct numerous kinds of in-house studies. CSX's Traffic Flow Analyzer (TFA), for example, archives three years of train and car movements inside a specialized data warehouse. The system provides data extraction and mapping tools that can be used to generate geographic pie maps of yard activity, traffic density maps, and various other types of detailed reports.

The TFA records the actual route taken by each train and railcar on every journey. The system stockpiles the types of information that are extremely useful when railroad engineers (the ones who manipulate mathematical formulas, not locomotive throttles) conduct studies on bridge and line segment loads, rolling stock wear and tear, environmental impacts, and so on.

Final point

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- ○ Financial services
- ○ Food and beverage
- ○ Government
- ○ Healthcare
- ○ Insurance
- ○ Manufacturing
- ○ Media
- ○ Real estate
- ○ Religion

Final point

Although railroads have been around for a very long time, big data promises to help both shippers and the railroads themselves create new services and uncover hidden inefficiencies, helping to keep one of the oldest mechanized transportation modes relevant and competitive for at least another several decades.

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Saul Sherry, User Rank: Blogger
7/16/2013 | 6:28:24 AM

Re: Route Optimization
Great place to start but it all fits into the same competitve advantage approach - by minimizing costs now, what more can you plan for?

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Pradeepta Mishra, User Rank: Bit Player
7/16/2013 | 6:27:11 AM

Re: Route Optimization
@Yes, I agree..i was talking more from a cost minization point of view.

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Saul Sherry, User Rank: Blogger
7/16/2013 | 6:17:23 AM

Re: Route Optimization
As population continues to expand @pradeepta all that data (mixed in with business/production/population projections) should also help not just optimization in the present - but future scenario planning too.

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Pradeepta Mishra, User Rank: Bit Player
7/16/2013 | 6:13:59 AM

Route Optimization
As you said correctly the railroad corporation spew voluminous amount of data to be analyzed in order to decide the route for the cargo supplies and the shipment of products from one place to another place. Big data can help the corporation to solve the minimum cost route for shipping one product from place to another. The route optimization model is a complex model to calculate through ordinary software's and given the complexity of the model the processing time is more in comparison to other models. Hence big data platform like cloud and other computing methods can be best platform to process huge amounts of data.

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Saul Sherry, User Rank: Blogger
7/8/2013 | 9:05:40 AM

Re: Planning For Future Loads
One key element there is will be the use of sensors which can be added retroactively to the infrastructure. To recreate the rails would be a huge undertaking, but the increase in coverage coupled with the economy of scale which can now be found on such sensors means we can at least monitor the system in a modern fashion.

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dcawrey, User Rank: Bit Player
7/6/2013 | 3:16:07 PM

Re: Planning For Future Loads
I agree that this fact should come as no surprise. I think that one of the reasons that we have not previously put into consideration the amount of data rail generates is because we weren't really monitoring it and analyizing it like we are now.

Big data can contribute to effeciency and performance modeling in a big way and rail is a natural fit for that, as you have pointed out here.

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Mike Lata, User Rank: Blogger
7/5/2013 | 6:45:32 PM

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A short video over view of the need for data governance.
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Re: Planning For Future Loads

I think that big data could definitely help in many ways like finding the right areas to build new stations and the right stops that would be along the rail going from one main destination point to the other. I would also like to think big data is used to find the right times that the rail is running, which I dont think is always the case. For instance, it's impossible to get out of San Francisco past 11 or so pm using the caltrain rail. I almost got stuck at some night events I went to the city for without a way back. I really think big datanwould agree with me that on weekends, at least, they should keep it running until like 2 am or so.

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legalcio, User Rank: Exabyte Executive
7/5/2013 | 2:06:21 PM

Re: Planning For Future Loads

Good point Saul. I'd guess the majority of the rail infrastructure, at least here in the US, is decades old. It's not going to change much, so Big Data has to be used to mitigate travel on it. Rail is experiencing a resurgence in popularity as it is more efficient than road shipping. Big Data can only help it. Now, how about more Big Data use in passenger movement, both for over the land rail and subways?

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Saul Sherry, User Rank: Blogger
7/5/2013 | 2:49:53 AM

Re: Planning For Future Loads

Common problem @Netcrawl - it has to be asked if you were to plan/build your infrastructure today, would you have taken the same steps you did when setting up?

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netcrawl, User Rank: Petabyte Pathfinder
7/4/2013 | 7:48:55 PM

Re: Planning For Future Loads

@John that was great, and interesting, Big data is taking a big role in transportation sector, especially the railroad industry, data is being generated at an accelerating rate from an array of sophisticated computers, GPS transceivers, RFID readers, smart meters and sensor technologies, data is captured, analyzed and used to optimize railroad operations, management and drive business intelligence to realize immediate business opportunities and achieve growth.

@Saul there's one big serious issue here- the rate of change, its killing the IT, here the data volumes were practically doubling every month, crippling our IT infrastructures. Trying to cope with that tremendous growth was an extremely challenge, especially if your systems weren't designed to deal with that kind of growth.

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