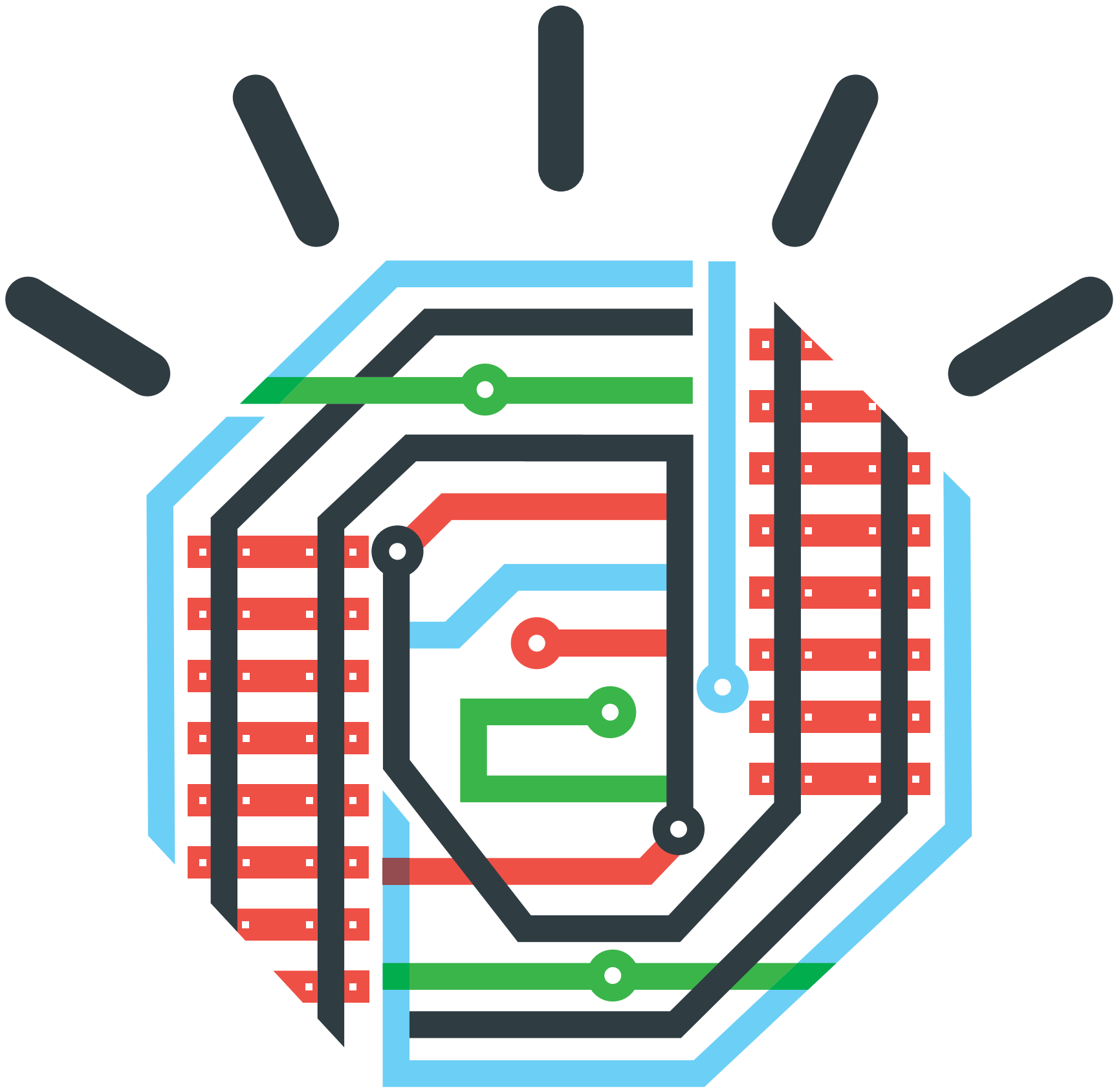

Next stop: a smarter planet.

For the better part of the past two hundred years, the world's railway systems stood as a symbol, and literal engine, of modernity. They were integral to the Industrial Revolution, the expansion of the American West and the opening of the global economy to peoples everywhere. They connected communities, fostered the growth of cities, and allowed goods to be moved within and among them.

While our romance with trains may be behind us, our dependence on them is anything but. Every year, the planet's rail lines carry 10 billion tons of freight and 21 billion people. And given current population trends and patterns of mass urbanization, this demand is only going to grow. Between 2006 and 2007, the global rail market increased by 9%. U.S. demand alone for freight rail is projected to double in the next 25 years.

And that demand is a good thing. Rail is two to five times more energy efficient than road or air transportation. One ton of rail freight can be moved 423 miles using one gallon of fuel. And a single freight train on a track can replace 280 trucks on a road, reducing fuel use, congestion and emissions. In fact, passenger travel by rail produces three to ten times less CO_2 than cars or airplanes.

The problem is, global demand for rail is outpacing capacity, straining the planet's existing systems, creating bottlenecks and limiting the ability of fragile economies to grow. Trains can be delayed in congested hubs or are forced to stand aside on one-track lines. Passenger reservation and ticketing systems need to be modernized. Growing urban populations are driving an unprecedented need for rail, and governments are placing increasing demands on railroads to ensure safety. Quite simply, today's aging infrastructure and technology won't support the transportation needs of a smarter planet.

Imagine a smart rail system instead – one infused with enough intelligence to increase capacity and utilization and reduce congestion. A system in which schedules are dynamically adjusted to cope with weather-related outages. In which delays are reduced by self-diagnosing subsystems. In which smart sensors detect potential problems before they cause delays or derailments. In which train cars monitor themselves and supply chains, and passenger travel patterns are analyzed to minimize environmental impact.

Fortunately, we don't have to wait to begin seeing some of these impacts, because smarter rail systems are already being implemented around the world. The Union Pacific Corporation is testing a wireless monitoring system that will capture and analyze critical data on trains, from air pressure to brake monitoring to wheel-bearing temperature to axle health. Commuters on Singapore's public transport system use smart cards to pay for train and bus fares, and the data collected helps routes and schedules to be shaped by their behavior. Netherlands Railways uses advanced analytics software to weigh 56,000 variables, including the railroad's infrastructure and passenger demand, to assemble and schedule more than 5,000 passenger trains per day, improving operating efficiency by 6% with an estimated annual savings of 20 million euros. And the State of California anticipates that high-speed trains can help eliminate more than 12 billion pounds of greenhouse gases and save 12.7 million barrels of oil each year.

Over the last two centuries, we measured the increasing sophistication of trains in miles of track and miles per hour. In this century, we can measure it by smarts per mile.

Let's build a smarter planet. Join us and see what others are thinking at **ibm.com**/think

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