



DIGITAL LEADERSHIP

An interview with

Jack Levis

Director of Process Management at UPS

Putting Analytics in the Driver's Seat



Jack Levis

Director of Process Management
at UPS

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A reduction of one mile per driver per day translates to savings of up to \$50 million a year.
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Capgemini Consulting: Can you start by giving us a background to UPS and some of the unique challenges that a logistics player of your size faces?

Jack Levis: UPS is a business that thrives on managing complexity.

Meeting our high levels of customer service entails complexity. We not only aim to deliver every package on time, but we provide customers with multiple service options to meet their needs. We even allow adjusting of delivery choices while the shipment is in route. Executing this mission means constantly orchestrating orders, adjusting route schedules and following up on package deliveries with a massive fleet of ground and air vehicles. This exercise generates huge amounts of data feeds, from devices, vehicles, tracking materials and sensors. Each of these feeds also comes with its own data format. Our

goal is to turn that complex universe of data into business intelligence.

Let me give you an example. We have about 55,000 package car drivers in the US alone and around 106,000 drivers, globally, for our entire vehicle fleet, and we deliver more than 16 million packages daily. When you consider the fact that every driver at UPS has trillions of ways to run their delivery routes, the number of possibilities increases exponentially. However, not all of these routes are necessarily optimal in terms of fuel efficiency and distance. Consider the fact that a reduction of one mile per driver per day translates to savings of up to \$50 million a year. The question becomes: how do you mine the sea of data from our sensors and vehicles to arrive at the most effective route for our drivers?

Digitizing Operations

Capgemini Consulting: How did UPS start its digital transformation journey?

Jack Levis: Our digital journey started with an early adoption of data and analytics tools for improving our operations. As our operations became more complex and distributed in nature, the focus has been to improve business processes, increase efficiency and cut costs. We had been following a descriptive¹ and predictive analytics²-based system for a long time but what has recently changed is our shift to prescriptive analytics³. I can safely say that UPS is one of the few companies to effectively use prescriptive analytics to gain insight for successful optimization.

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Our digital journey started with an early adoption of analytics tools.
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Capgemini Consulting: You spoke of prescriptive analytics playing an effective role in route optimization. Can you give us more details on its role in overcoming your key challenges?

Jack Levis: We have implemented a number of prescriptive analytics projects across our business but the one that stands out from the rest is our route optimization program, based on prescriptive analytics, called ORION (On-Road Integrated Optimization and Navigation). We formally started the ORION project in 2003 and began to roll out the system in 2012. We are very serious about using prescriptive modeling for our routes. So much so, that we have 500 people dedicated to ORION. In fact, ORION is probably one of the largest prescriptive analytics systems ever deployed.

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Our analytics system enabled UPS to eliminate 85 million miles driven per year.
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As I mentioned earlier, effectively mining the sea of data from our sensors and vehicles to arrive at the most effective route for our drivers is a huge challenge. It is here that our prescriptive analytics system shines. It hides this large amount of alternative routes while giving drivers clear inputs, thereby taking the guesswork out of the equation. The best part is that the system produces these answers in as little as six to eight seconds. The idea is not to make big changes in driver routes. In fact, the optimized route might look very similar to the driver's normal route. However, the real benefit lies in the distance it helps reduce – a quarter mile shaved here and a half mile shaved there. So, the system keeps looking for ways to deliver minute savings throughout the day.



How Analytics Transformed Operations at UPS



The Logistical Complexities at UPS



55,000
package car drivers
in US alone

106,000
drivers globally



16 million
packages daily

**One driver = trillions of ways
to run delivery routes**

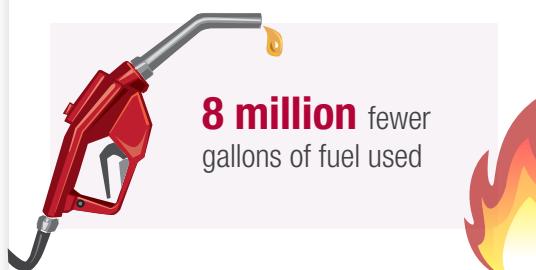
Shaving just one mile/ driver
= **\$50 million**
savings a year



The challenge: Arriving at the
most optimal route for drivers

Business Benefits of Analytics

Reduction of
85 million ↓
miles driven/ year



8 million fewer
gallons of fuel used

Reduction in **engine idling**
time by **10 million**
minutes



Reduction in **carbon**
footprint by **6,500**
metric tons



**Analytics has changed the way
UPS functions**

Capgemini Consulting: What have been the tangible benefits that you realized by deploying analytics systems in your operations?

Jack Levis: The deployment of descriptive and predictive analytics systems several years ago enabled UPS to reduce 85 million miles driven per year. That equates to over 8 million fewer gallons of fuel used. Prescriptive analytics adds to those gains.

We were also able to reduce engine idling time by 10 million minutes. This led to significant savings in fuel consumption – around 650,000 gallons – and we have reduced our carbon emissions by over 6,500 metric tons.

Now adding to this, deploying efficient prescriptive analytics systems has enabled UPS to eliminate miles from our routes in 2013. The surprising fact is that we have realized this additional benefit with only 18% of UPS delivery routes deployed.

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As we deployed analytics, we realized we could not continue relying on old metrics.
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Implementing and Measuring Digital

Capgemini Consulting: What is your approach to launching analytics initiatives?

Jack Levis: The business drives technology at UPS. We don't look at initiatives as 'analytics projects', we look at them as business projects. Before launching an initiative, areas where the greatest business need exist are

evaluated. We then look at the best way to meet those needs, and often analytics is needed.

Our goal is to make business processes, methods, procedures, and analytics all one in the same. For the front line user, the use of analytics results becomes just part of the job.

With systems that require large process change, we spend significant effort ensuring that the change can actually be attained. This often requires iterative prototyping so that we can successfully achieve the business gains.

We followed this approach for our prescriptive analytics system, ORION. We tested the system over two years. We had to prove that the program would, indeed, measurably impact costs. Not only were the numbers were impressive, but the fact that front line operators and drivers were supportive got everyone's attention. That helped convince our senior management to test the program at other locations across the country. After testing the system in 15 different locations, final approval for broad-based deployment of the initiative across the company was given.

Capgemini Consulting: As part of implementing analytics across your operations, did you have to change the way you traditionally looked at your metrics?

Jack Levis: An important thing to note about analytics systems – especially prescriptive analytics – is that change management is required. New ways of operating are being produced and front line employees must be educated and supported. This means changing behavior.

As we deployed analytics, we realized that we often could not continue to measure a new way of doing business with the same old metrics. So, we had to come up with new metrics that enabled effective measurement.

In the past, we used metrics that showed incremental change from year to year. We looked at things such as number of deliveries made per hour, or the amount of time expended for a route vs. a work measurement standard. Those used to be the measure of success for deliveries. But now, after implementing our prescriptive analytics system, the metrics have become far more sophisticated and nuanced. We have moved from looking at lagging indicators that focus on end results only to looking at leading indicators.

We created balanced scorecards that guide the front-line operators on areas to focus. The elements have been carefully selected and weighted. The balanced scorecard measure correlates highly with true business results.

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The key to managing change in roll out of digital initiatives is to take a collaborative approach.
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Capgemini Consulting: What were some of the biggest issues UPS faced when implementing its prescriptive analytics program?

Jack Levis: As I mentioned earlier, our analytics system has been built to tell us the best delivery route for a particular day. If you consider that there are going to be 55,000 different drivers, which means 55,000 different routes the model has to work for – that is a very hard model to build. We would have our parameters and all the dials tuned and the answer would be great on Tuesday. But the same system with Wednesday's data would not work. So, definitely the model needed to have a lot of heuristics, math, and business rules built in. That was a big challenge.



We spent years making our data better and changing the algorithm so it wasn't so sensitive to changes in data. We had to have an algorithm and process that didn't take a rocket scientist to use. In a step-by-step matter we tested not only that the algorithm could be created, but that we could transfer the knowledge to the front line.

Operational Excellence

Capgemini Consulting:

Implementation of digital initiatives entails large-scale change management. How did you convince drivers who relied on traditional route planning to shift to new analytical tools?

Jack Levis: We adopt a highly collaborative approach with our drivers in implementing these initiatives. We are acutely aware that our drivers aren't automatons who rely on insights from the analytics system. When you have a prescriptive analytics system, usually problems arise because of issues with data. Counteracting bad data requires collaboration with our drivers. This is why we have built-in buffers into our model where we acknowledge that the system is not perfect and that drivers have the opportunity to identify flaws. We let our drivers exercise their discretion. We tell them: if the model has you doing something that won't meet a customer's demand, do what's right.

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We now want to use our prescriptive analytics system to offer innovative services to our customers.
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It is because of this collaborative approach that our drivers are included in the process, which is why there hasn't been much resistance to change when implementing analytics initiatives. In many cases, drivers have said "my stress is reduced". This is because the system makes thousands of small decisions for them, freeing up the driver to make the larger decisions of servicing the customer.

Capgemini Consulting: With the significant shortage of digital skills across industries, how does UPS acquire its analytics talent?

Jack Levis: Our challenge hasn't been around identifying analytics talent as much as it has been in determining the best way to train the hundreds of business people who are using these tools. For this, we provide role-based training that teaches employees how to use the analytics system. When fully deployed, the system will offer our front-line supervisors and drivers the tools to test scenarios and make tradeoffs. They don't need to be data experts, but they need to understand which parameters impact which performance objective. Drivers are graphically shown how the algorithm is deriving different parts of the route so they can compare it with their own experience and attempt to beat it.

In our analytics team, we also have people with business backgrounds who understand the overall system objectives from an organizational perspective. So, while an analytics person will sift through algorithms, the software engineer will translate it into code, the business person will ensure that the solution meets the desired objectives.

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Digital Future

Capgemini Consulting: Looking ahead, what are some of the new digital initiatives UPS is working on to further drive operational efficiency?

Jack Levis: Our current analytics systems are still largely static in nature – we need to change that. They do not account for unexpected situations, such as traffic delays or accidents. In such scenarios, our drivers are expected to take a discretionary call. In future, we anticipate moving from a static to a dynamic manifest. For this, we are trying to make our plans more flexible and with provisions for real-time updates.

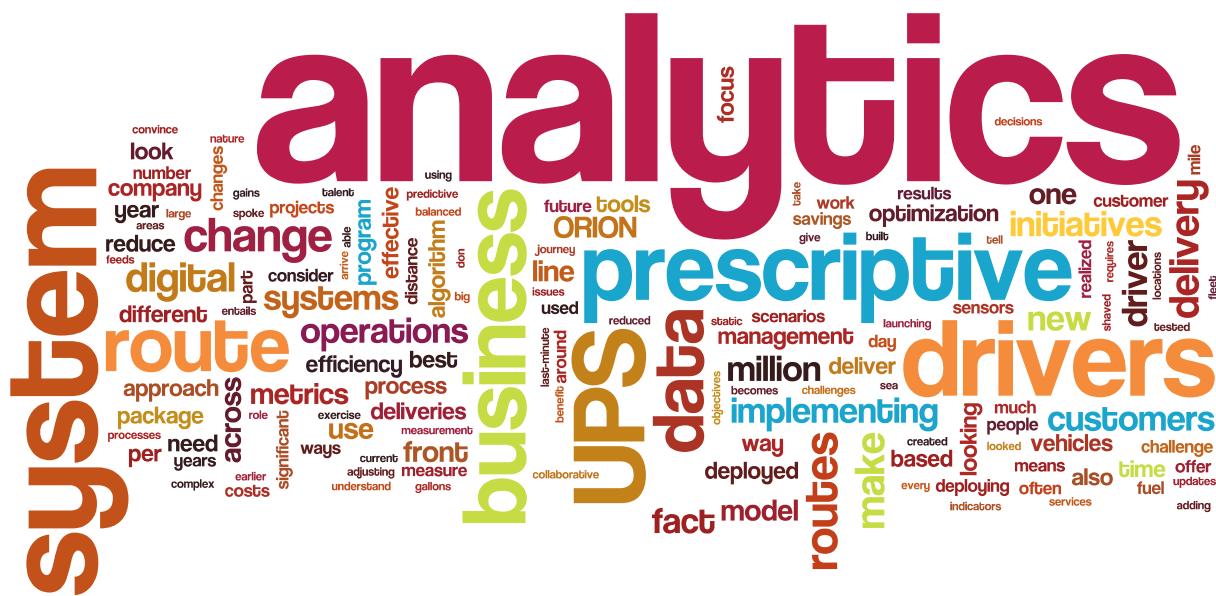


Capgemini Consulting: How do you perceive analytics adding further value to route efficiency at UPS?

Jack Levis: Our current focus has been in trying to reduce the distance covered during each delivery. We will continue to do that. But we also want to use our prescriptive analytics system to offer more innovative services to our customers. We have already opened up our internal supply chain to our customers to enable them to make specific pick-up/drop requests.

As we go in to the future, we hope to spin-off many new services based on real-time updates in the system. We want to be able to offer customers to make last-minute requests. Calculating the costs of last-minute request changes from customers is another aspect that an analytics system can deliver. This would enable us to possibly reschedule or re-prioritize deliveries based on several scenarios.

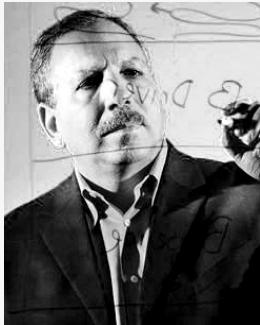
“Our goal is to move from our current static analytics systems to a dynamic manifest.



References

- 1 Descriptive analytics refers to a set of techniques used to describe or explore or profile any kind of data.
 - 2 Predictive analytics encompasses a variety of techniques that analyze current and historical facts to make predictions about future, or otherwise unknown, events.
 - 3 Prescriptive analytics represents the final phase of business analytics, which mines data to suggest decision options to take advantage of a future opportunity or mitigate a future risk.
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Jack Levis

Director of Process Management at UPS

UPS is a global package delivery company headquartered in Atlanta, USA. The company operates in over 220 countries with over 399,000 employees. In 2012, it had over 8.8 million customers with delivery volume of some 4.1 billion. The company generated \$54 billion in revenue in 2012. UPS has been at the forefront of deploying advanced analytics in optimizing its operations. Capgemini Consulting spoke with Jack Levis, Director of Process Management at UPS.

Capgemini Consulting

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