# TPSA
# Big Data

Big Data – What it means to the Ag-Chem Supply Chain






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# Love, War and Sex…

"From the dawn of civilization until 2003, humankind generated five exabytes of data. Now we produce five exabytes *every two days*…and the pace is accelerating."

- Eric Schmidt, Google





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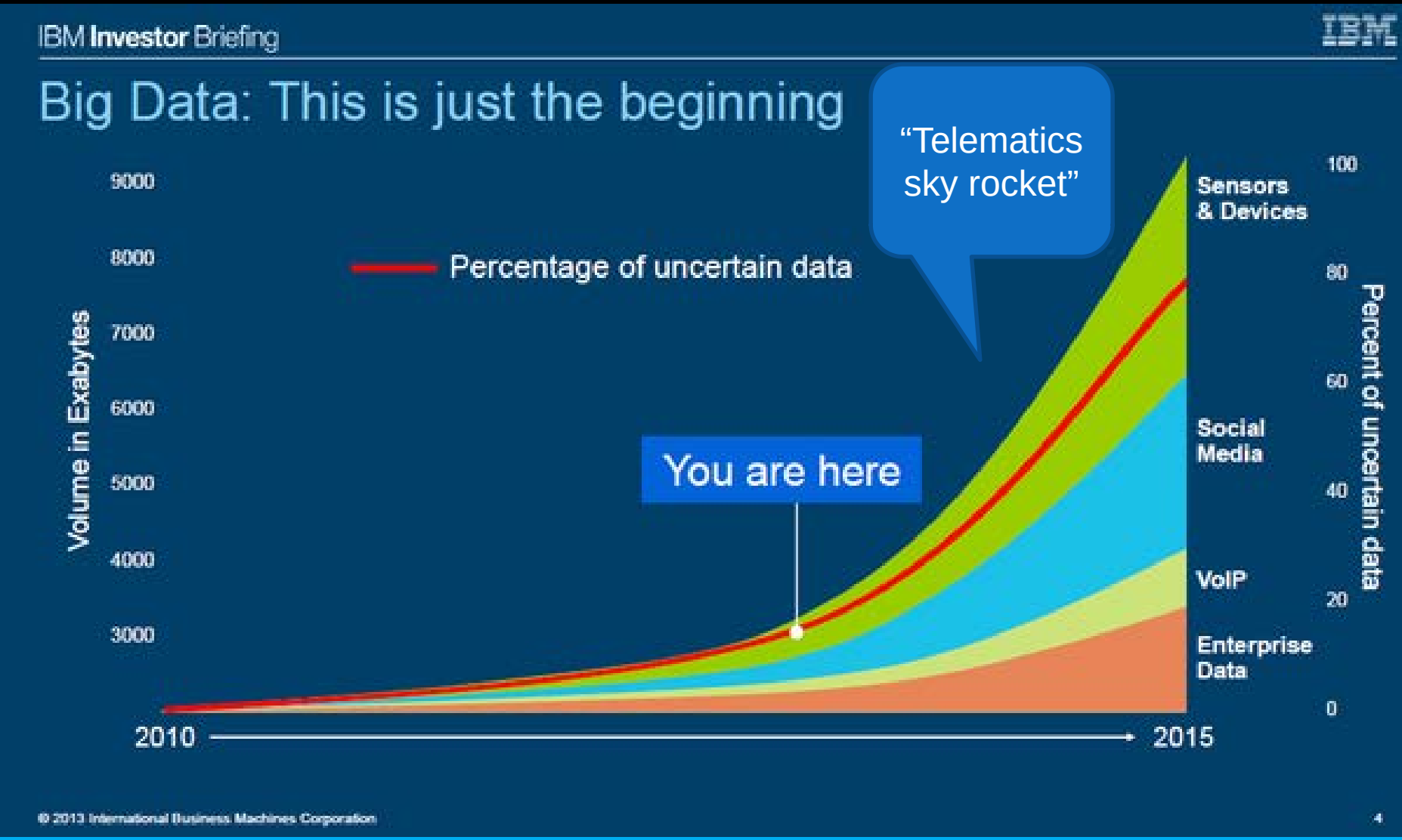
# The Rise of the Industrial Internet





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# History of Big Data in Agriculture

- Thousands of years ago, agriculture began as a highly site-specific activity. The first farmers were gardeners who nurtured individual plants, and they sought out the microclimates and patches of soil that favored those plants.
- But as farmers acquired scientific knowledge and mechanical expertise, they enlarged their plots, using standardized approaches—plowing the soil, spreading animal manure as fertilizer, rotating the crops from year to year—to boost crop yields.
- Over the years, they developed better methods of preparing the soil and protecting plants from insects and, eventually, machines to reduce the labor required. Starting in the nineteenth century, scientists invented chemical pesticides and used newly discovered genetic principles to select for more productive plants.
- Even though these methods maximized overall productivity, they led some areas within fields to underperform. Nonetheless, yields rose to once-unimaginable levels: for some crops, they increased tenfold from the nineteenth century to the present.
- Data made this possible, the trend toward ever more uniform practices is starting to reverse, thanks to what is known as “precision agriculture.” Taking advantage of information technology, farmers can now collect precise data about their fields and use that knowledge to customize how they cultivate each square foot.

# Future is Transition to Data Farm Agriculture

- One effect is on yields: precision agriculture allows farmers to extract as much value as possible from every seed. That should help feed a global population that the UN projects will reach 9.6 billion by 2050.
- Precision agriculture also holds the promise of minimizing the environmental impact of farming, since it reduces waste and uses less energy. And its effects extend well beyond the production of annual crops such as wheat and corn, with the potential to revolutionize the way humans monitor and manage vineyards, orchards, livestock, and forests.
- Someday, it could even allow farmers to depend on robots to evaluate, fertilize, and water each individual plant—thus eliminating the drudgery that has characterized agriculture since its invention.

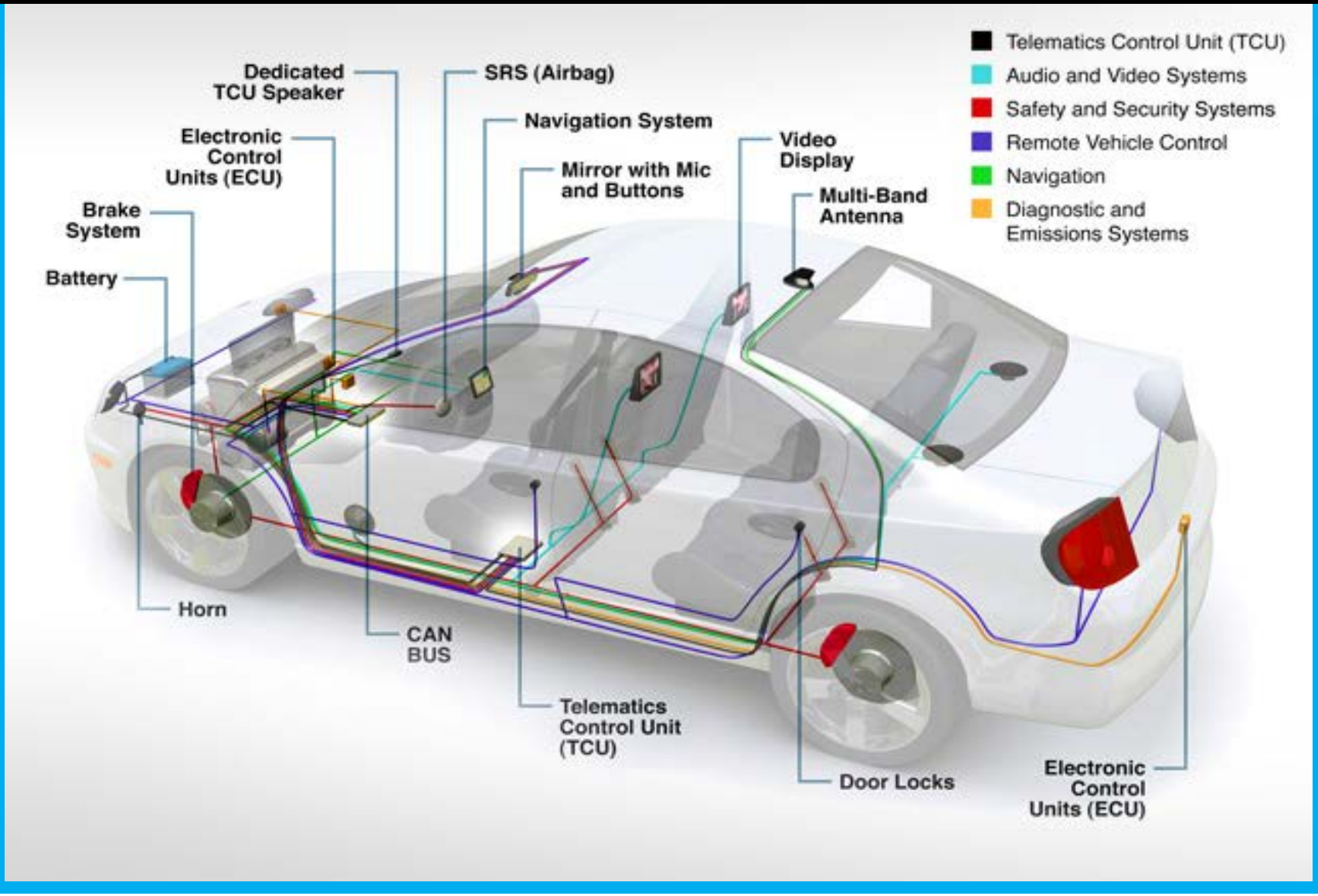
# Acre by Acre

- The U.S. government laid the original foundations for precision agriculture in 1983, when it announced the opening up of the Global Positioning System (GPS), a satellite-based navigation program developed by the U.S. military, for civilian use.
- Soon after, companies began developing what is known as “variable rate technology,” which allows farmers to apply fertilizers at different rates throughout a field. After measuring and mapping such characteristics as acidity level and phosphorous and potassium content, farmers match the quantity of fertilizer to the need.
- For the most part, even today, fields are tested manually, with individual farmers or employees collecting samples at predetermined points, packing the samples into bags, and sending them to a lab for analysis. Then, an agronomist creates a corresponding map of recommended fertilizers for each area designed to optimize production. After that, a GPS-linked fertilizer spreader applies the selected amount of nutrients in each location.

# Yield of Dreams

- Precision agriculture has already turned one of the oldest sectors into one of the most high-tech, but the best is yet to come. The next step likely involves “big data.” Farmers and agribusinesses are increasingly considering how to best take advantage of their treasure troves of data to boost profits and make agriculture more sustainable.
- In 2013, for example, the agriculture giant Monsanto acquired the Climate Corporation, a start-up founded by two Google alumni to use weather and soil data to create insurance plans for farmers and generate recommendations for which crop varietals are best suited to a particular plot of land.
- Tanklink and other technologies pave the way for further efficiencies and data collection to increase the value in the Ag supply chain.
- Operational Savings, Fuel Savings, Sustainability, EPA Safety and Labeling
- How do farms leverage “Big Data”

# Telematics in the Auto Industry





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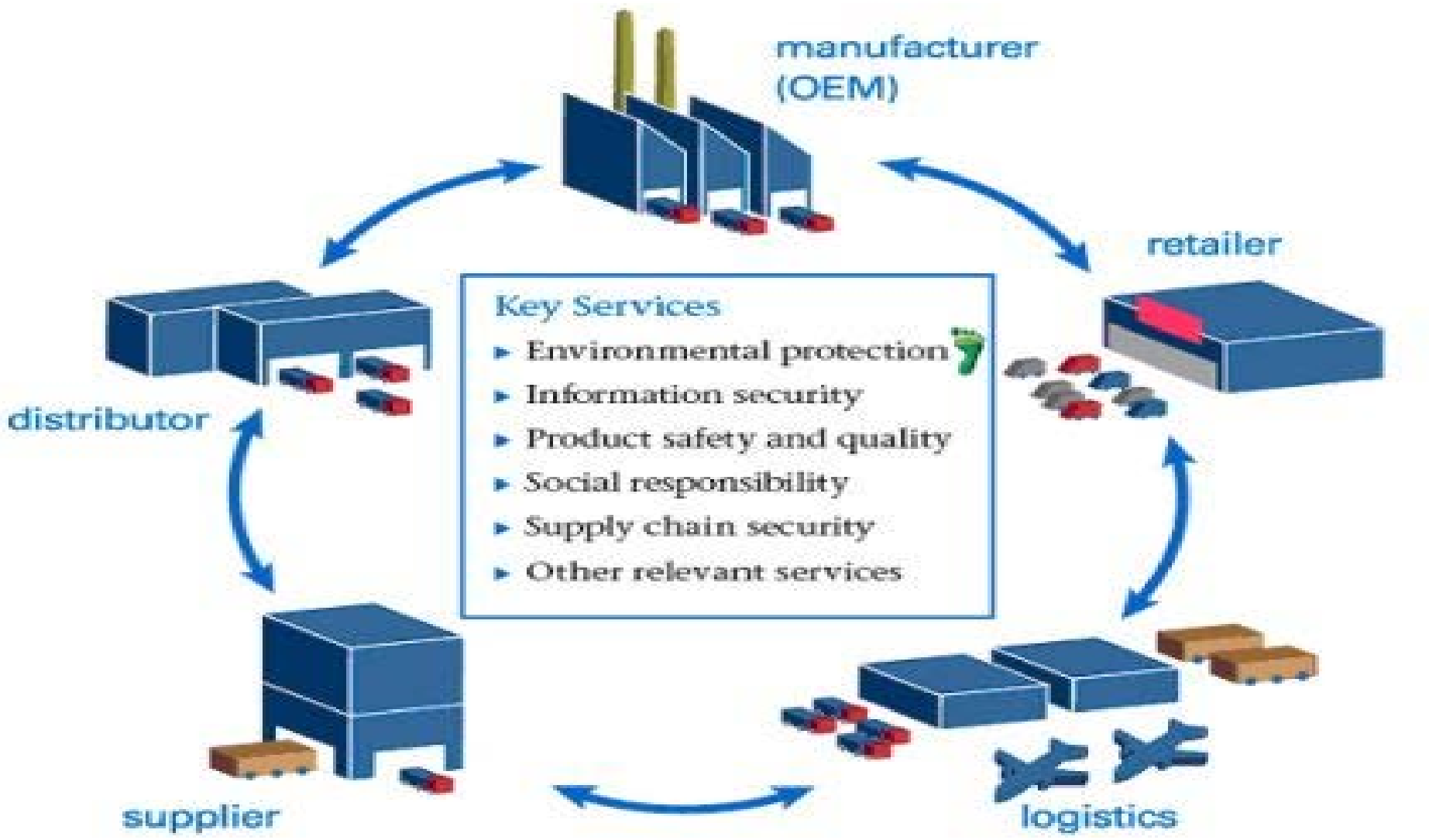
# Optimize Assets and Operations





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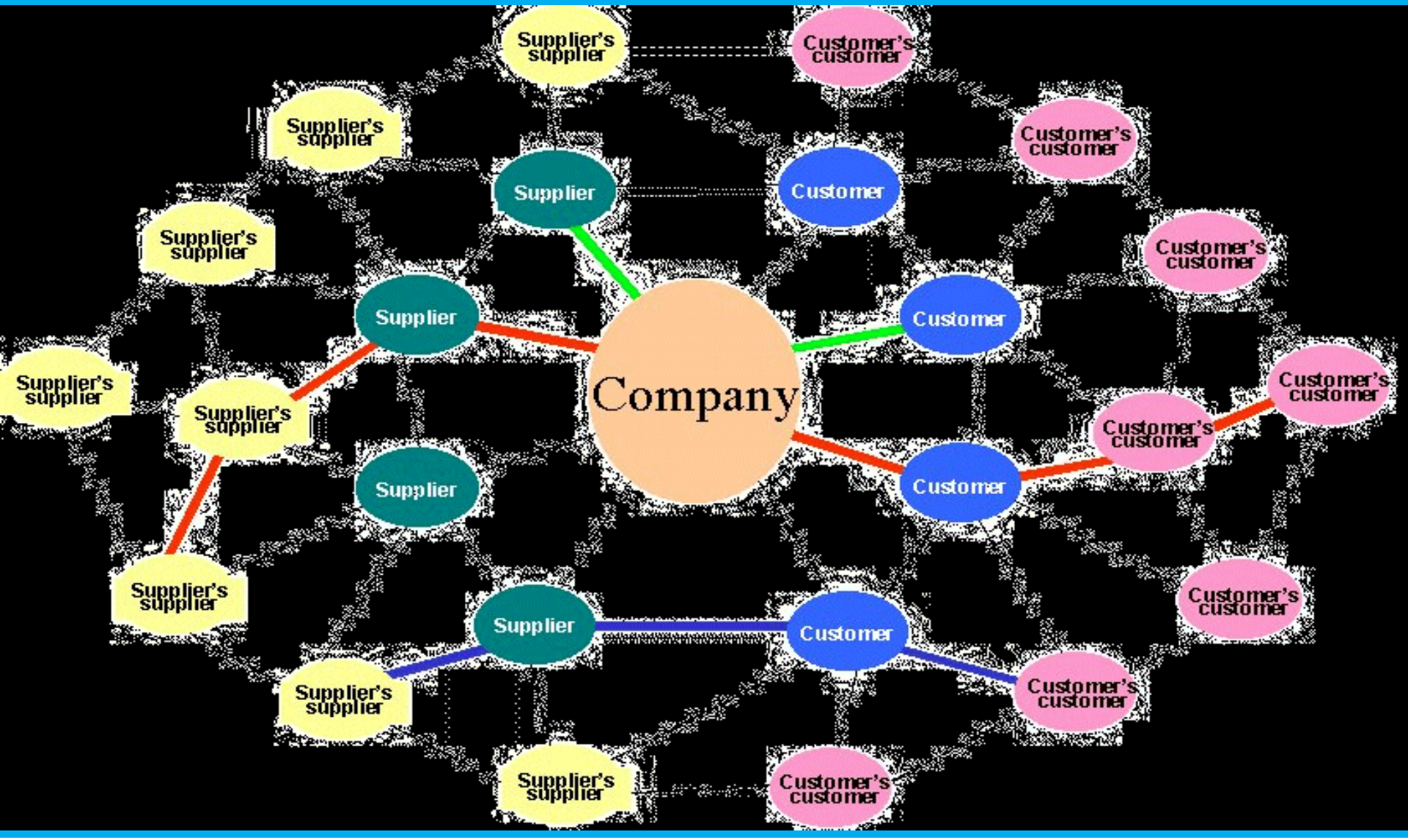
# Adjust Processes - New Ways To Use Data





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# IBC and Totes-What Data is possible?






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# Stackable IBC Level Monitors with GPS


Fill me up, I am almost empty!


Here I am, come and get me!






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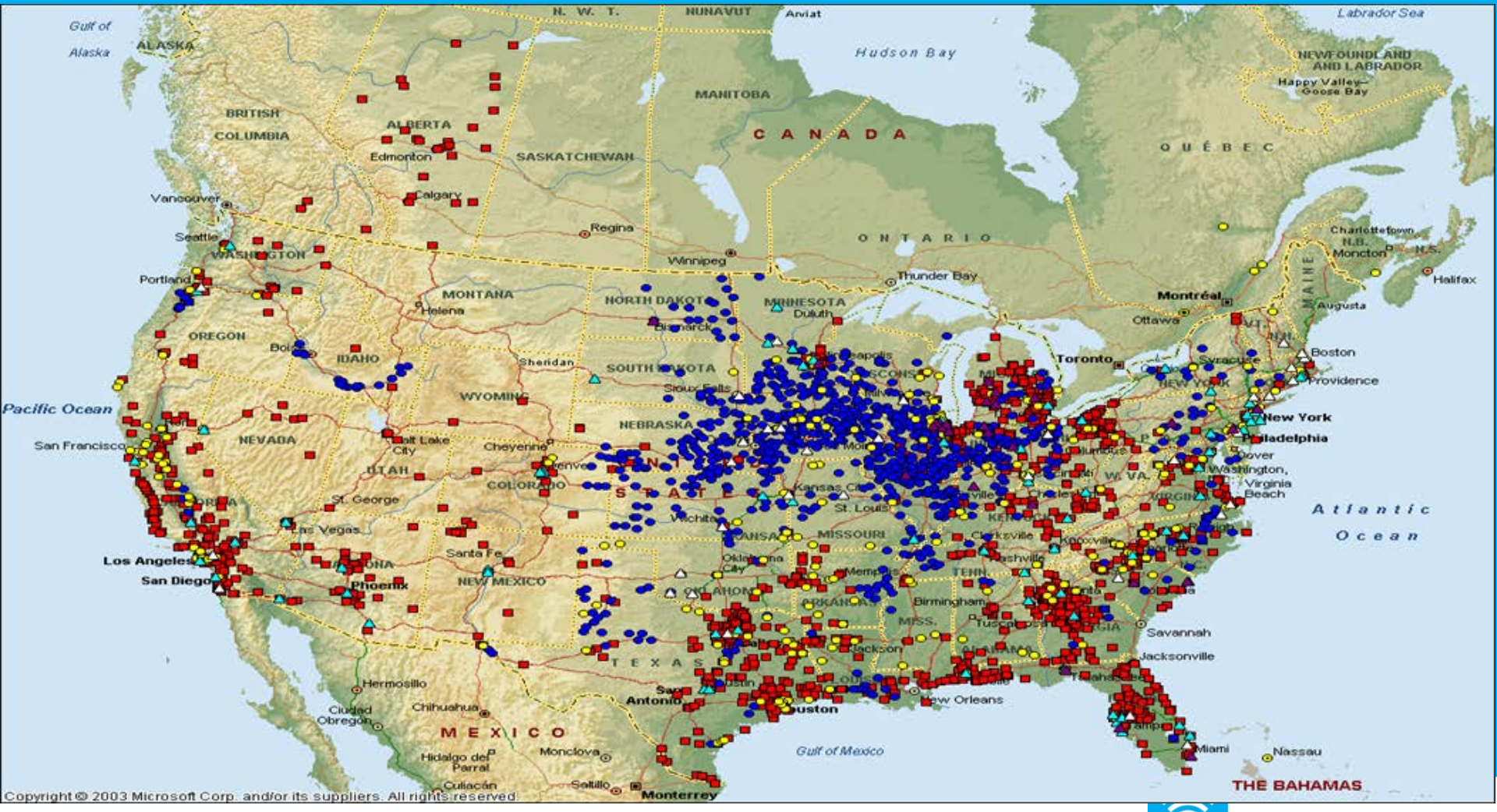
# M2M Telemetry Delivers Actionable Data





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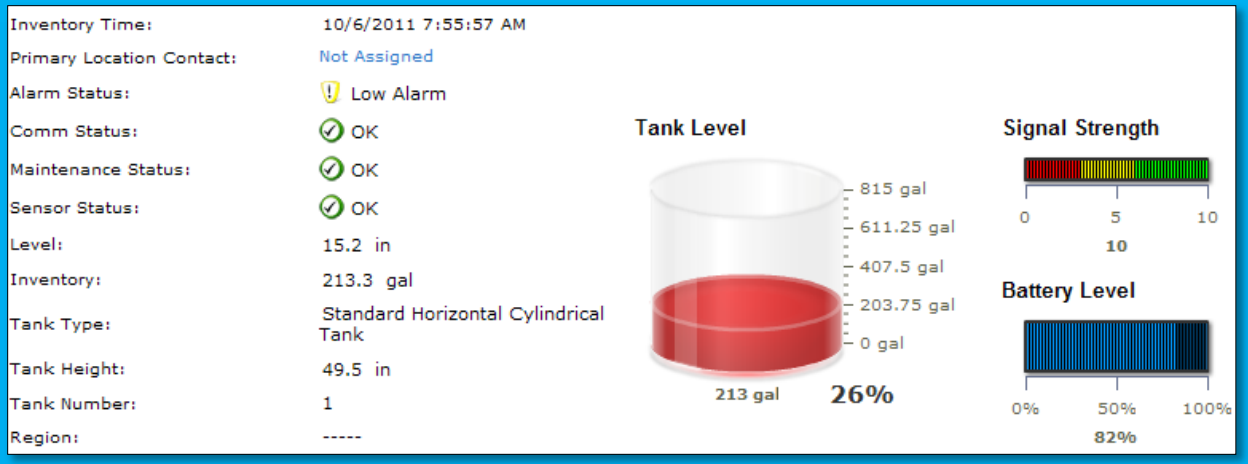
# www.tankdataonline Portal

- **TankLink Portal provides**
  - Tank Level
  - Signal Strength
  - Battery Level
  - Alarms and sensor status
- **Usage and consumption statistics - forecasting**
  - Total usage during a  period
  - Total fills during the selected period
  - Time left before low or critical low alarms and empty




| Estimated Delivery Information | |
|---|---|
| Number of Fills: | 3 |
| Last Fill Date: | 9/23/2011 |
| Last Fill Amount: | 402.7 gal |
| Total Fill Amount: | 612.2 gal |
| Avg Fill Amount: | 204.1 gal |
| Max Fill Amount: | 402.7 gal |
| Avg Time Between Fills: | 8.5 days |
| Avg Inventory: | 164.8 gal |

| Estimated Usage Information | |
|---|---|
| Time Span: | 27.0 days |
| Actual Date Range: | 9/6/2011 - 10/5/2011 |
| Total Active Usage : | 412.3 gal |
| Total Inactive Usage : | 0.0 gal |
| Avg Daily Usage: | 15.3 gal |
| Max Daily Usage: | 52.3 gal |
| * Time to Low Alarm (LA): | Re-Order Now! |
| * Time to Critical Low Alarm (CLA): | 3.3 days |
| * Time to Empty: | 14.0 days |



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# Container Labeling, Collection, Reuse

- Container labeling information can be scanned per device
- Optimize the collection of containers and use data to manage lading, UN testing dates, and all other needed information
- Sustainability and safety is an EPA directive, and is now economically possible with lowered fees to monitor and collect data

# Mapping: Satellite View

**Tank Details**

| | | | | | |
|---|---|---|---|---|---|
| **Tank Name:** | Tank 720231303 Tank 4 | **Cellular ID:** | 50766166428 | **Location:** | Albrook Mall |
| **Organization:** | Albroock Mall | **Serial Number:** | 720231303 | **Address:** | Ave. Marginal. Corregimiento de Ancon. Panamá. Panamá - 00000, Panamá, Panamá - 00000 |
| | | **Number:** | 1 | **Product/SGU:** | propano - 1.00000 |

**Location Map**

Show All Tanks

Albrook Mall

| | |
|---|---|
| Number of Tanks : | 3 (1 > 10 mi. Distant) |
| User Location Number : | |
| Primary Contact : | E. Ibarra |
| 1 Tank 720231303 Tank 4 | 720231303 |
| Inventory Time : | 10/6/2011 8:10:06 AM |
| Inventory (Gross) : | 362.1 gal |
| Available Capacity : | 137.9 gal |
| Product : | propano |
| 2 Tank 720231984 Tank2 | 720231984 |
| Inventory Time : | 10/6/2011 8:53:50 AM |
| Inventory (Gross) : | 788.3 gal |
| Available Capacity : | 211.7 gal |
| Product : | propano |
| 3 Tank 720231921 Tank 1 | 720231921 |
| Inventory Time : | 10/6/2011 8:22:26 AM |
| Inventory (Gross) : | 813.5 gal |






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# One final thought…….

"*The farmer is the only man in our economy who buys everything at retail, sells everything at wholesale*, and *pays the freight both ways." -John F. Kennedy*

*Data has changed the landscape of the AG supply chain- the technology is available and its about solving problems for the farmer and those that serve them.*

# Thank you!


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