

THE POWER AND PITFALLS OF BIG DATA

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AMERICAN FARM BUREAU FEDERATION®

Objectives

- ▣ What is “Big Data?” Discuss the intricacies of “Big Data” that exist today and what to expect ahead.
- ▣ Discuss the strengths, challenges and opportunities of “Big Data”
- ▣ AFBF’s “Ponder These Nine Questions.”
 - Ownership
 - Value
 - Privacy
- ▣ What is being done and what to prepare for in the era of “Big Data?”

What's the Next Big Thing for Agriculture?

- ▣ How can I be a better farmer than my neighbor?
- ▣ How can I incorporate new and innovative technologies on to my farm?
- ▣ How can I increase my output by 1 bushel per acre?



You

Have you considered all the data that surrounds you?



340 million tweets posted to Twitter every day by its 140 million active members. #wow



107 trillion emails were sent in 2010.



60 hours of video is uploaded to YouTube every minute. That's 1 hour every second.



845 million active Facebook users resulting in an average of 15TB of data collected each day.



50 billion pages indexed by Google.



8 zettabytes

How Much Data by 2015?



If a gigabyte equals a 60 Watt light bulb, it would take....



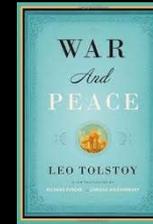
So if...

15.7 years

for the Hoover Dam to produce the amount of energy to power a Zettabyte of lightbulbs for 1 hour

A

A byte equals 1 character of text....



1,250 pages

But in Reality...

A Zettabyte would cover War And Peace at least

323 trillion times!

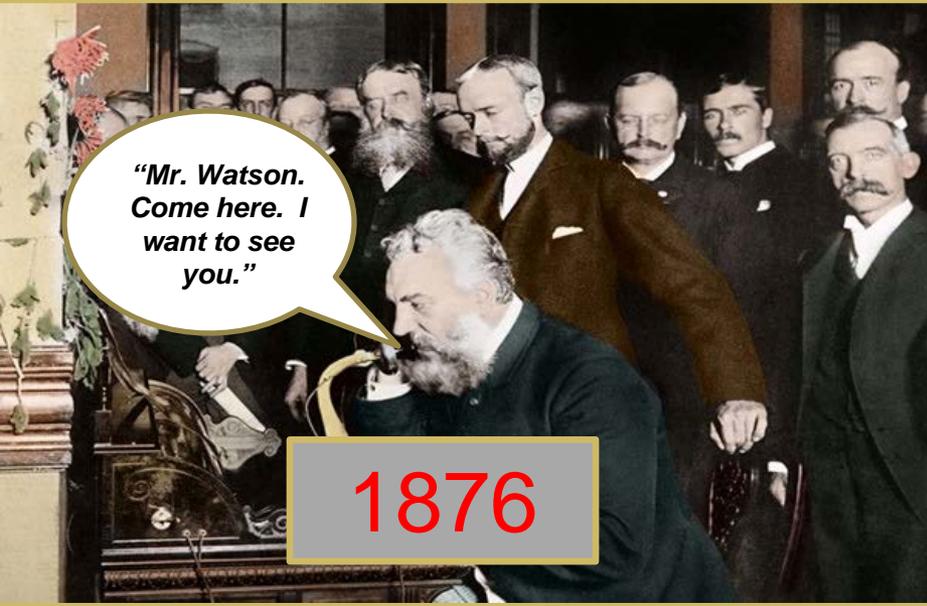


1 gigabyte can store 960 minutes of music....



So electronically a Zettabyte would be able to store just over **2 billion years of music!**

So...Just How Big is a Zettabyte?



"Mr. Watson. Come here. I want to see you."

1876



1970's



1990

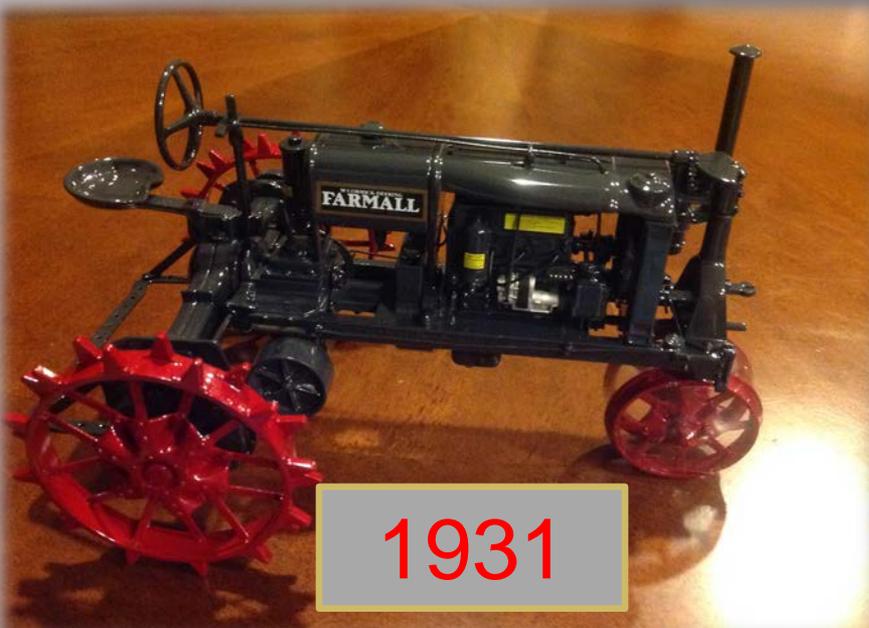


"OMG...total disaster...lol!"

#rockinthisdate

And Today...

Technology and Data Have Come A Long Way!



1931



1954



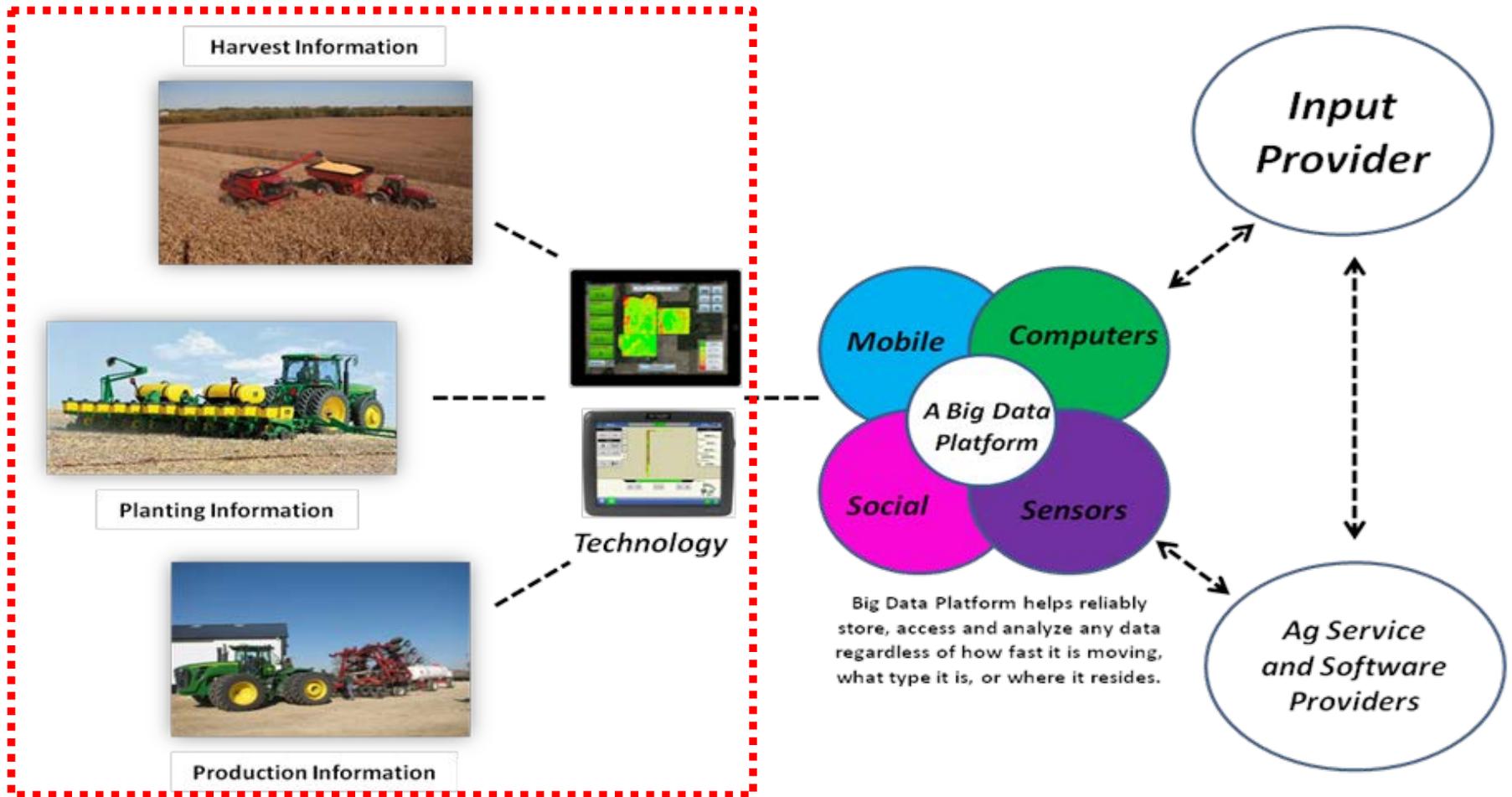
1965



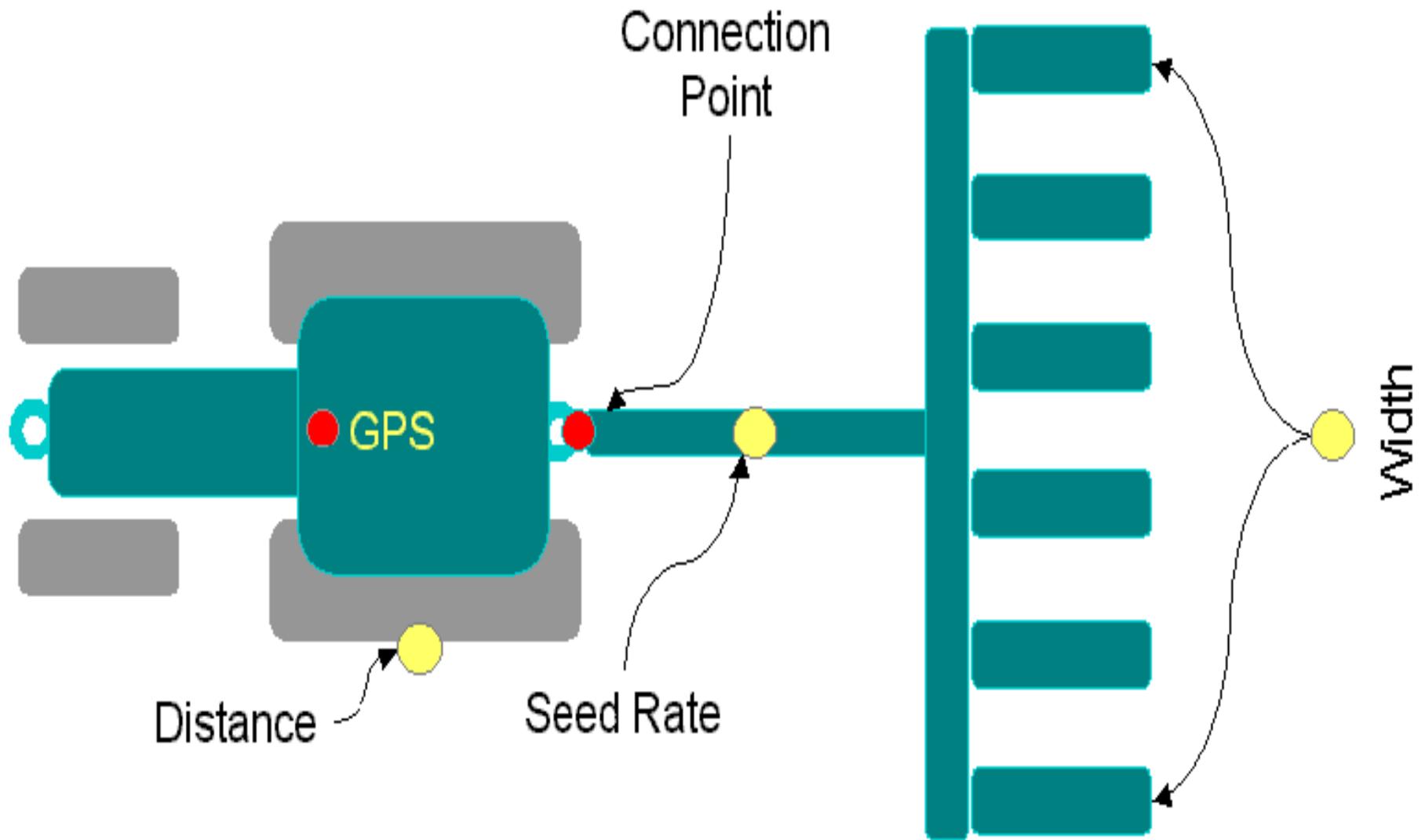
2011

Agriculture Is Not Any Different!

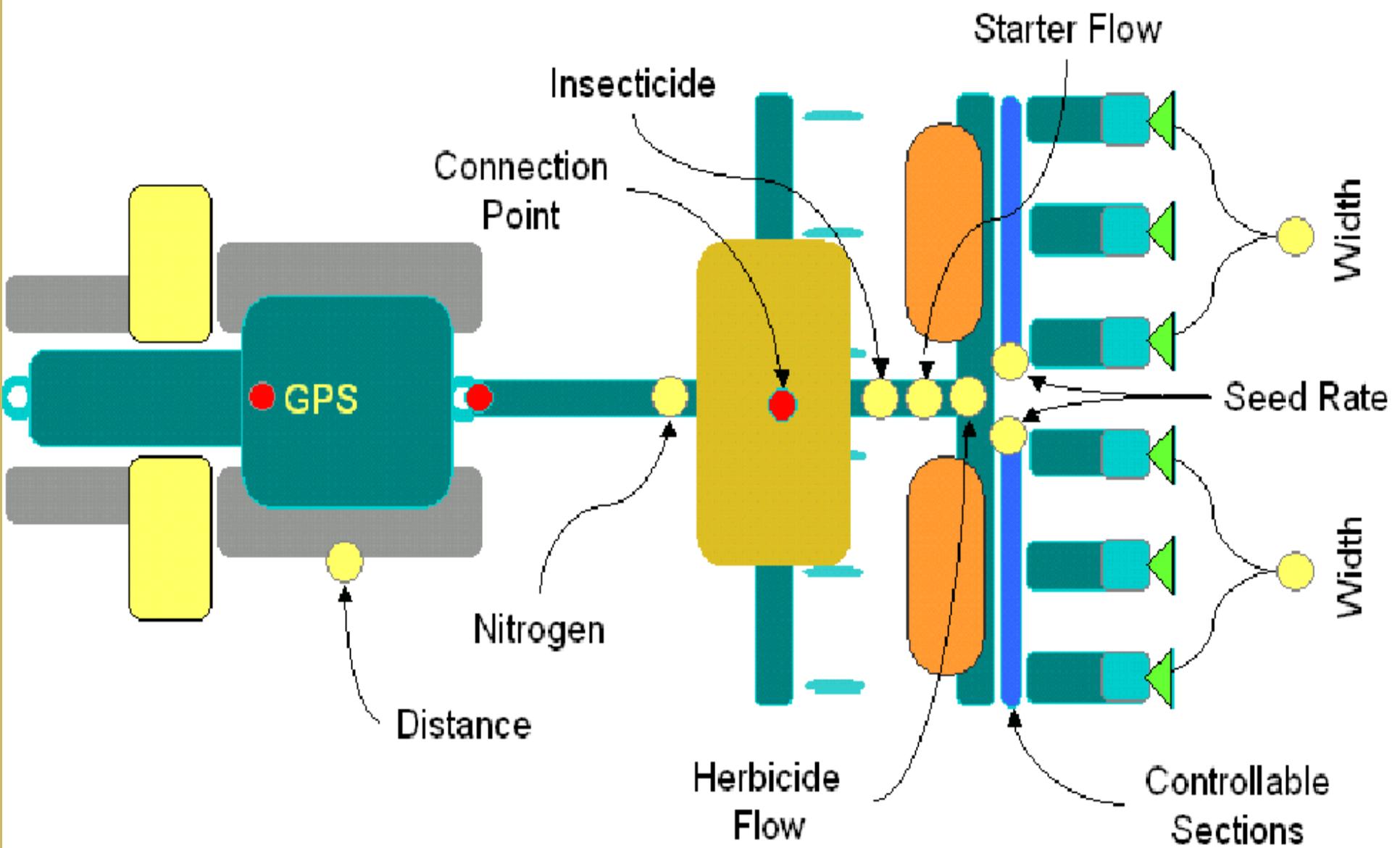
We understand this...



Agriculture's Big Data Complex



Agriculture Technology Systems



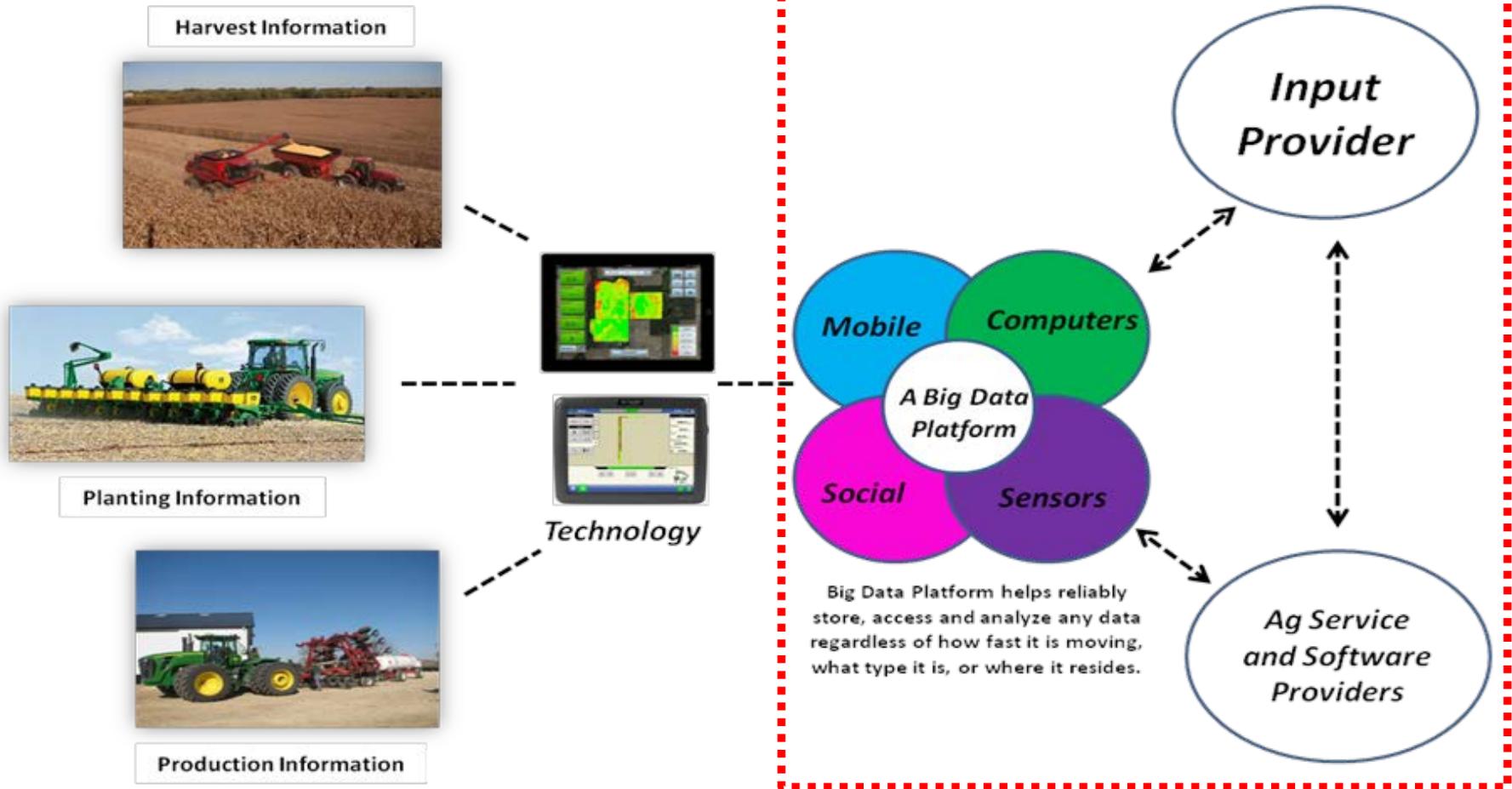
Enhanced Agriculture Technology Systems

- 1.) It's about optimization through data analytics on the resources we have in place...
- 2.) *3 out of 4 growers* surveyed use precision technology
Financial benefits outweighed the costs
Avg. cost savings of **6.8%** and avg. yield increased **7.6%**
- 3.) “Fewer skips or overlaps within field” biggest benefit
Followed by reductions in seed use, input costs, chemicals, fuel and time.



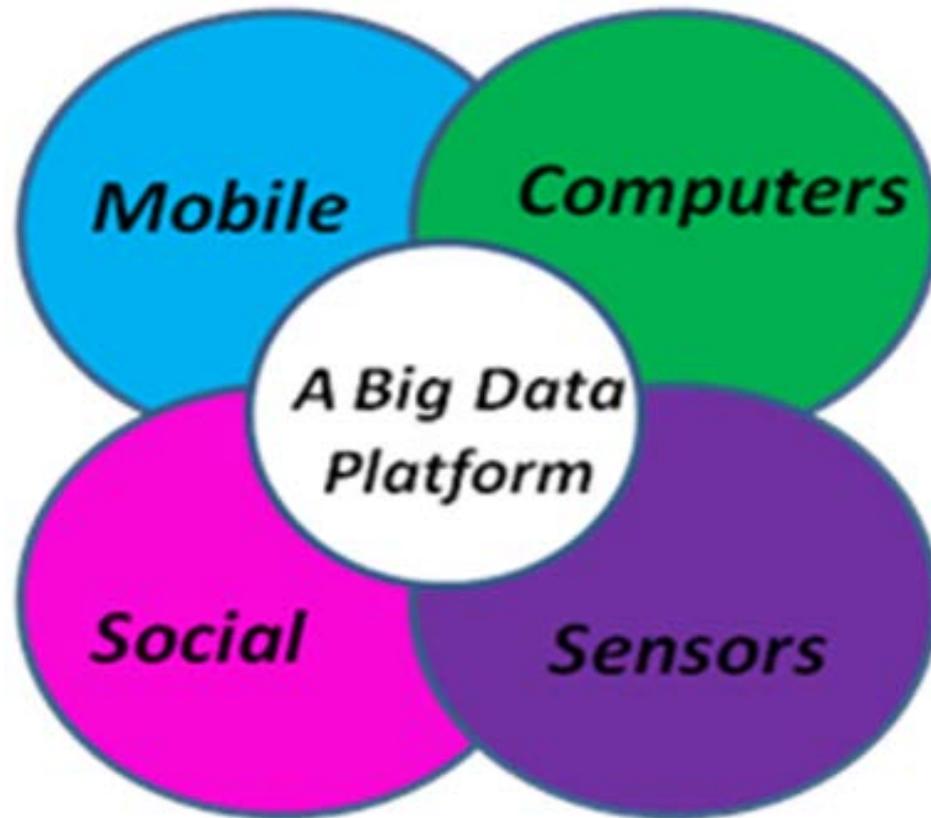
Benefits: Precision Agriculture

We understand this...



but do we fully understand this?

Agriculture's Big Data Complex



“Big Data platform helps reliably store, access and analyze any data regardless of how fast it is moving, what type it is, or where it resides.”

Agriculture’s Big Data Complex

By definition:

“Big Data platform helps reliably store, access and analyze any data regardless of how fast it is moving, what type it is, or where it resides.”

Matt's definition:

“Big data is just a large pile of numbers 0 through 9...it's how we organize, define and interpret the numbers that makes it so complex.”

Definition of “Big Data”



BUSINESS IS ALWAYS PERSONAL
IT'S THE MOST PERSONAL THING IN THE WORLD

| Personal Information | Non-Personal Information |
|--|--|
| Name | Browser Information |
| Postal address | Information collected through cookies, pixel tags and other technologies |
| Telephone or fax number | Demographic information and other information provided by the owner |
| Email address | Aggregated Information |
| Gender | GPS coordinates |
| Date of Birth | Soil type |
| Credit and debit card number | Moisture patterns |
| Banking Information, such as account and routing numbers | Yield |
| Vendor tax ID numbers | Products used |
| National ID numbers such as Social Security numbers | Agronomic observations |
| Financial information when you apply for credit | Management practices |
| Passwords and reminder questions/answers | Herbicide, pesticide and fertilizer usage |
| Purchase history | Weather Information |
| Date Information | Seed variety |
| Time Information | Planting population |

Personal vs. Non Personal Data

7:13 PM Not Charging

| ID | Crop | Area_Acres | Yield | Yield/acre |
|----|---------|------------|----------|------------|
| 1 | Carrots | 5.8391 | 31220.5 | 5346.8 |
| 2 | Cabbage | 31.7125 | 240210.0 | 7574.6 |

Navigation buttons: To Front, To Back, Forward, Backward, Delete, Property

7:50 PM Not Charging

Direction Cut

Target Feature: Plot002

Mode: Multiple

Direction: N40°41'18.8757"E

Area Unit: Acres

Total Area: 31.712

Cut Area: 10.57

Side: Side 1

Remaining Area: 0.002 Acres

Delete Original Area

(1 In:US Feet) 0 357.34

Just Because Your Name is Stripped...



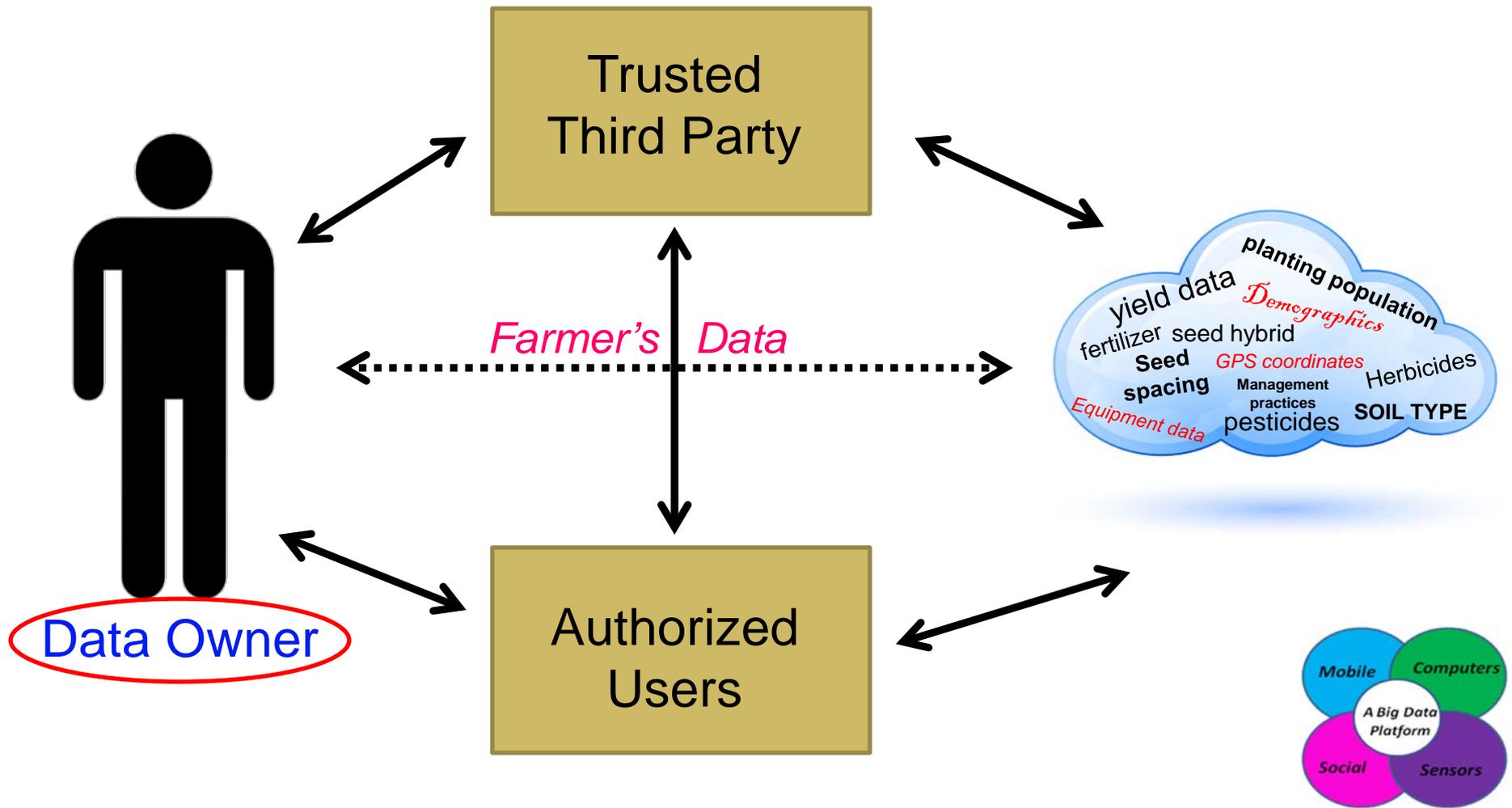
BIG PROBLEM

No one thought to bring an elephant pooper scooper.

Let's Address the Elephant in the Room

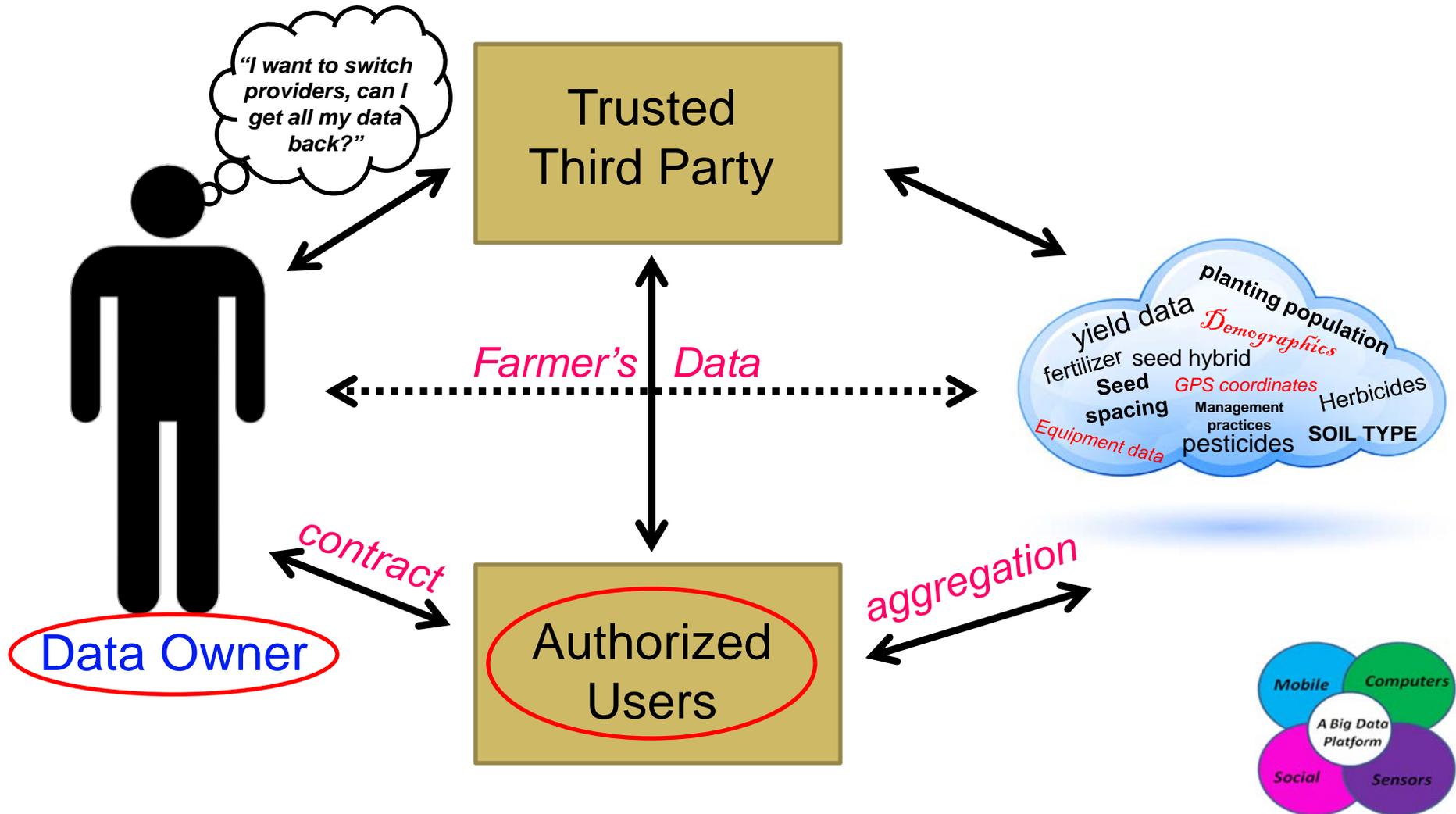
- 1.) Do I own the data?
- 2.) How will my data be used and what benefits can I expect from allowing a provider to include my data in a “Big Data” database?
- 3.) Will I control the management of that data?
- 4.) What is aggregation of data? How does aggregation protect me?
- 5.) Is my personal data anonymized? How is “anonymize” defined?
- 6.) Can I stop sharing my data once I have agreed to share?
- 7.) Who else might have access to my data? Can it be released to the public or third party?
- 8.) What is the value of my data to ME?
- 9.) What is the value of my data to the COMPANY?

AFBF’s “Ponder These Nine Before You Sign.”



Who Owns the Data?

Fundamental Question #1



Who Truly Owns the Data?

Velocity

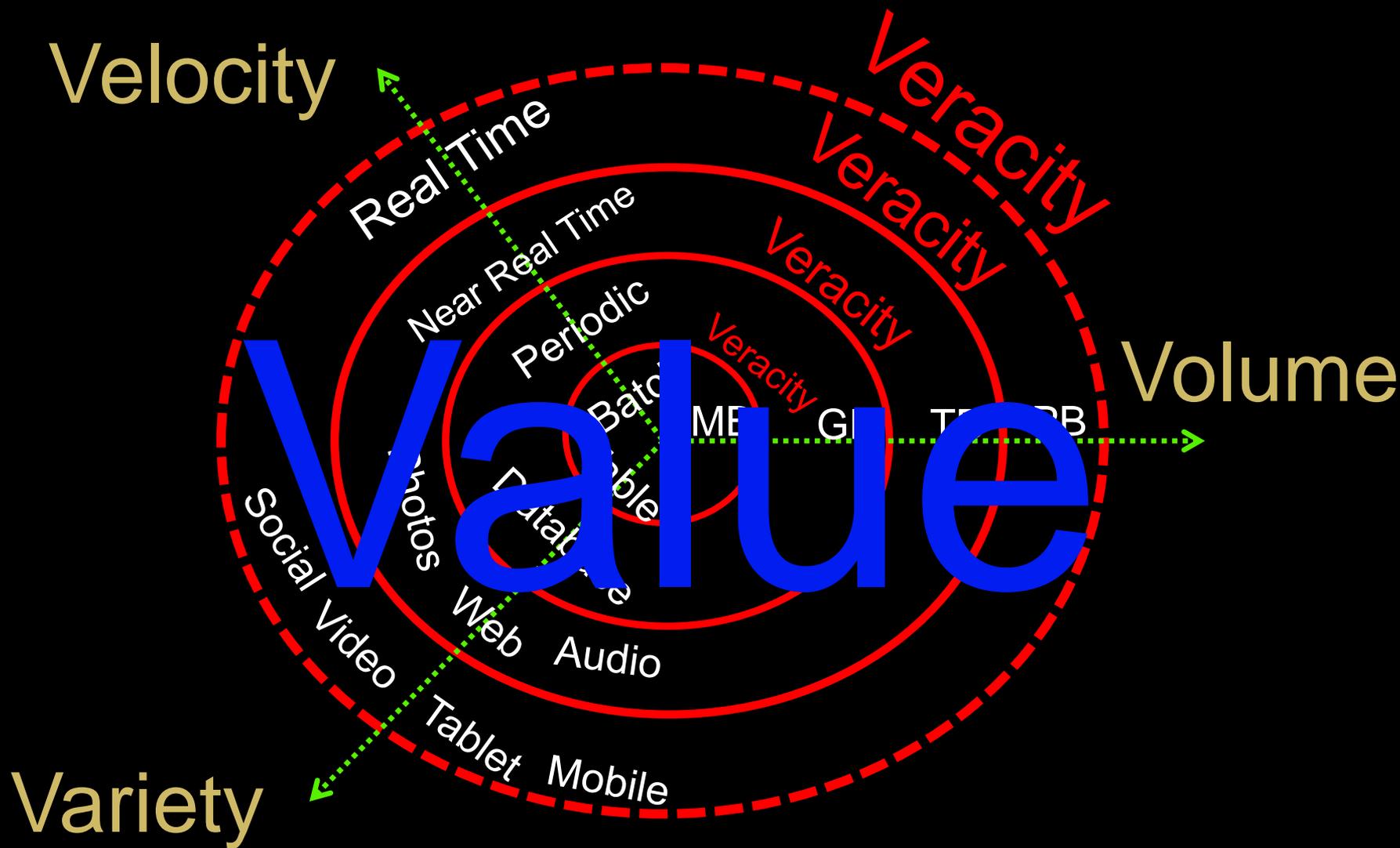
Volume

Variety

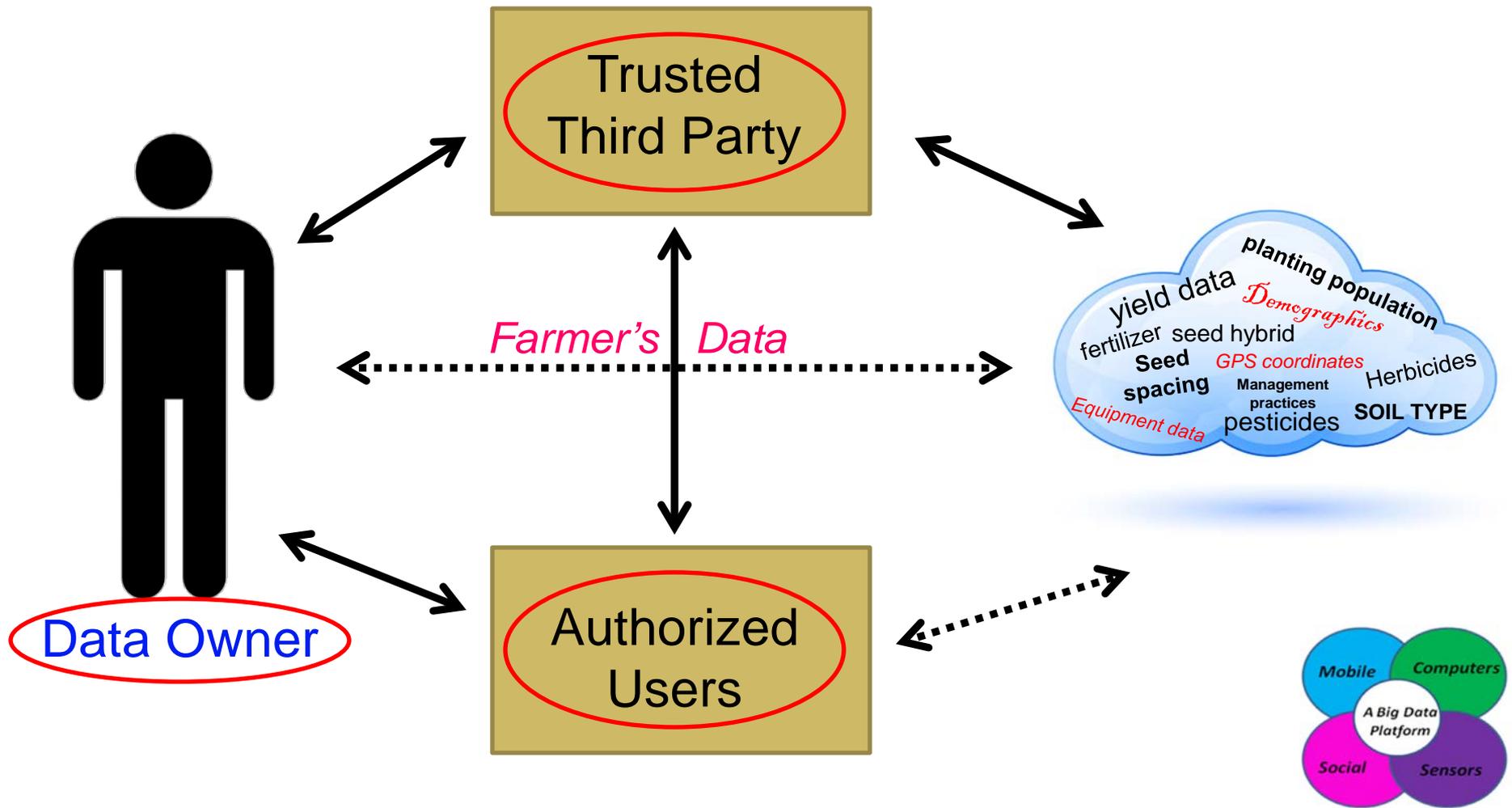
Value

Veracity

The Five “V”s of Big Data



All Five "V"s Expanding

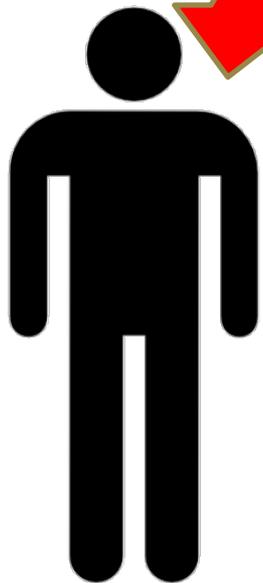


Who Values From the Data?

“May” Value

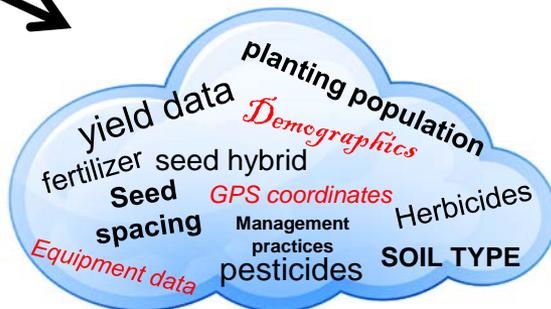
Fundamental Question #2

Am I guaranteed every year to increase my output or decrease my inputs?



Data Owner

- \$ = equipment
- \$ = services & analysis
- \$ = data collection
- \$ = privacy



Farmer's Data

“Will” Value

Farmers use their platform, equipment, services, and will enhance their predictive analytic capabilities.

Who's Value is Guaranteed From the Data?

47%

of healthcare executives say their organization cannot interpret and translate information into actionable insight



Poor data management costs major oil & gas producers up to **22%** of their annual income

1/3 of business leaders do not trust the information they use to make decisions

40% of healthcare executives say their current systems aren't designed to meet the specific needs of the industry

Poor data across businesses and the government costs the US economy **\$3.1 trillion** a year

The cost of bad or dirty data for US businesses annually exceeds **\$600 billion**



65%

of organizations say human error is responsible for data inaccuracy

130 M

The average billion-dollar company is losing \$130 million a year due to poor data management

Poor data quality, redundant data, and lost data can cost companies **15% to 25%** of their operating budget

27%

of organizations still manually examine data by working through databases line-by-line

1/3 of businesses say poor data quality leads to the loss of potential new customers

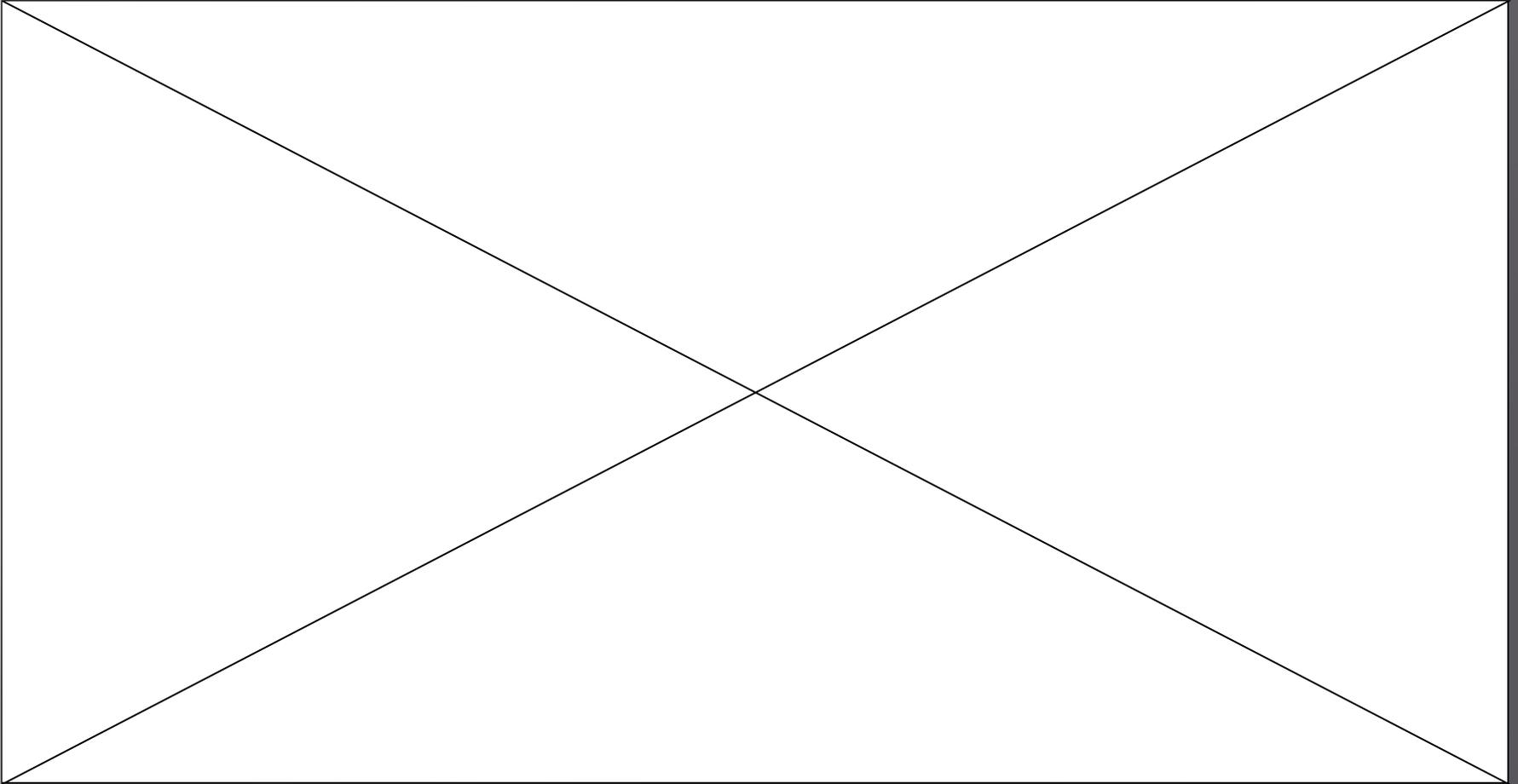
Data quality best practices can boost revenue by **66%**

If the median Fortune 1000 company were to increase the usability of its data by 10%, company revenue would be expected to increase by **\$2.02 billion**

THE COST OF MISMANAGED DATA

Whether your network has experienced a security breach, loss of data from insufficient network tool performance, or lacks a network monitoring architecture, mismanaged data can have a huge impact on businesses

The Value of Data



“We all need to be talking about this right now, but just not letting it happen in the background for us to think about it later.”

Cautions on Big Data?



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The Cost of Mismanaged Data



Profile of Edward Snowden

Born: June 21, 1983

Place of Birth: North Carolina

Education: Anne Arundel Community College, University of Liverpool

Occupation:

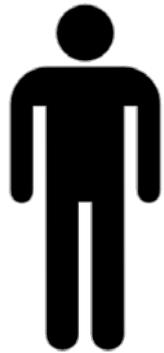
- Landed a job at NSA as a security guard.
- Landed an information technology job at CIA.
- Worked for the NSA as a **CONTRACTOR** through Booz Allen.

The Cost of the “Rogue” Employee



Trust?

The dealer receives and reviews the farmer's FieldScripts to ensure accuracy from an agronomic perspective.



Fertility Test Results
Yield Data
Field Boundaries



Farmers provide inputs to local DEKALB seed dealer.

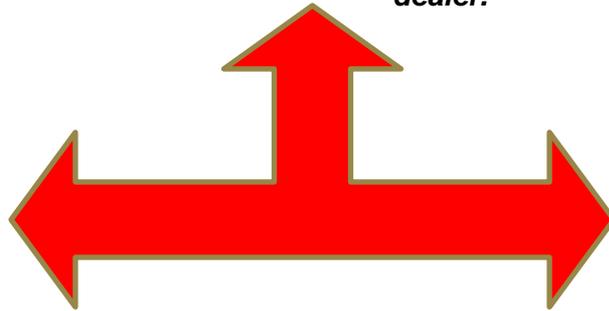
MONSANTO



DEKALB dealer submits farmer information to Monsanto. Monsanto cross analyzes the farmer information to develop hybrid recommendations and variable rate prescription unique to each farmer's field.

Farmer

Farmers consult with their certified DEKALB seed dealer



DEKALB dealer delivers FieldScripts through FieldView iPad app. Script is executed through 20/20 Seed Sense monitor in tractor cab and the script is executed.



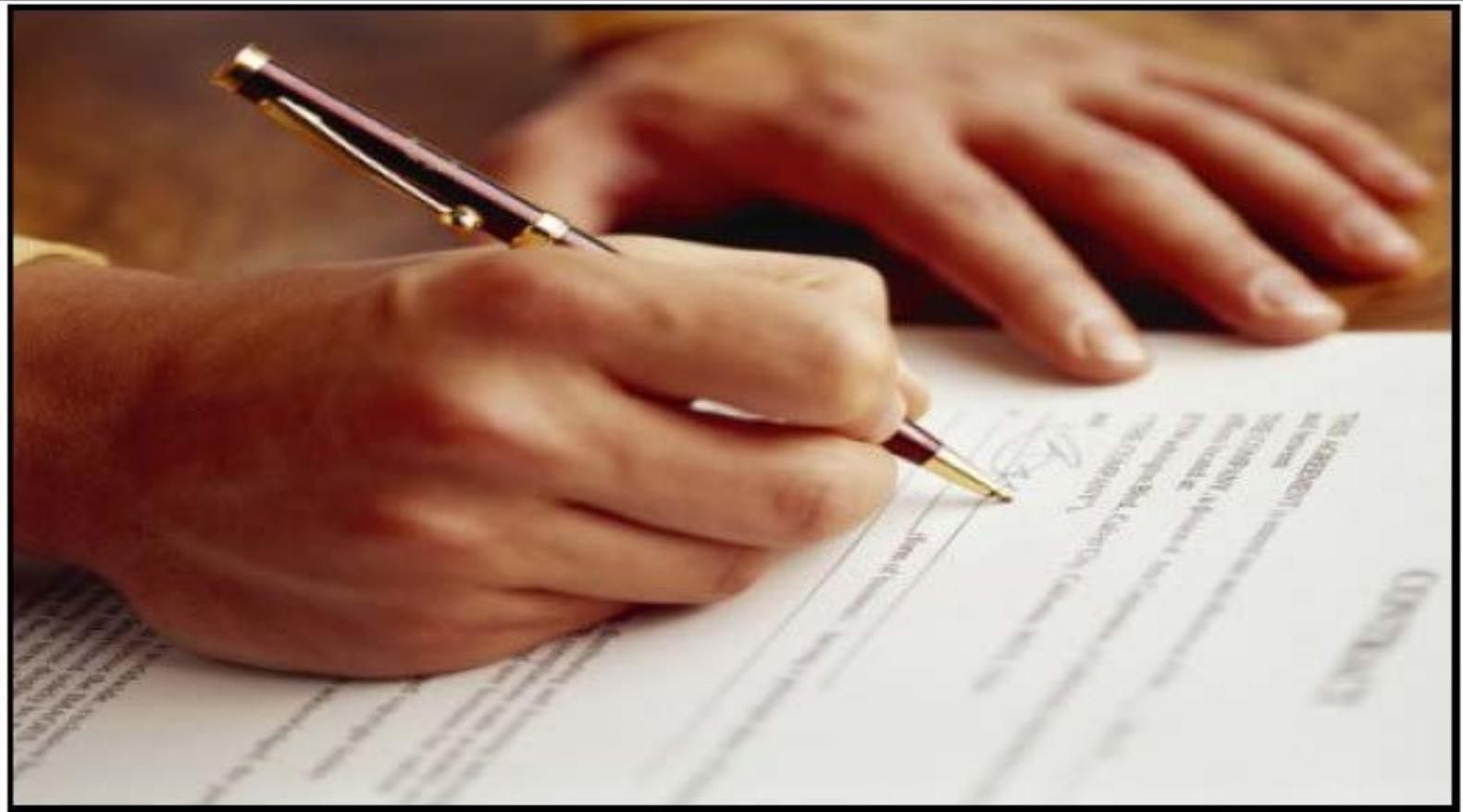
Midseason check-up



Harvest Data Collection



Monsanto Field Scripts: How it Works



CONTRACTS

What the large print giveth,
the small print taketh away.

motifake.com

Or is this it?

Consent Flow – Defaults



Data Usage

Welcome to the Operations Center.

We are committed to giving you choices concerning data in your account.

Before you can take advantage of Location History, Wireless Data Transfer and other Data Management tools in the Operations Center, we ask that you make certain choices about how John Deere may use the data in your account.

Learn more: [John Deere Data Principles](#), [FAQ](#) / [How can I benefit?](#)

Machine Data for John Deere Use

John Deere may use machine data to provide you services, and internally to improve your experience with our equipment and to develop new products and services.

Production Data to Provide You Services and for Anonymized Internal John Deere Use

John Deere may use production data to provide you services, and once the data is anonymized, use the data internally to improve your experience with our equipment and to develop new products and services.

Anonymized Machine/Production Data for External Sharing

John Deere may anonymize data from your account and share it externally for benchmarking and other information services.

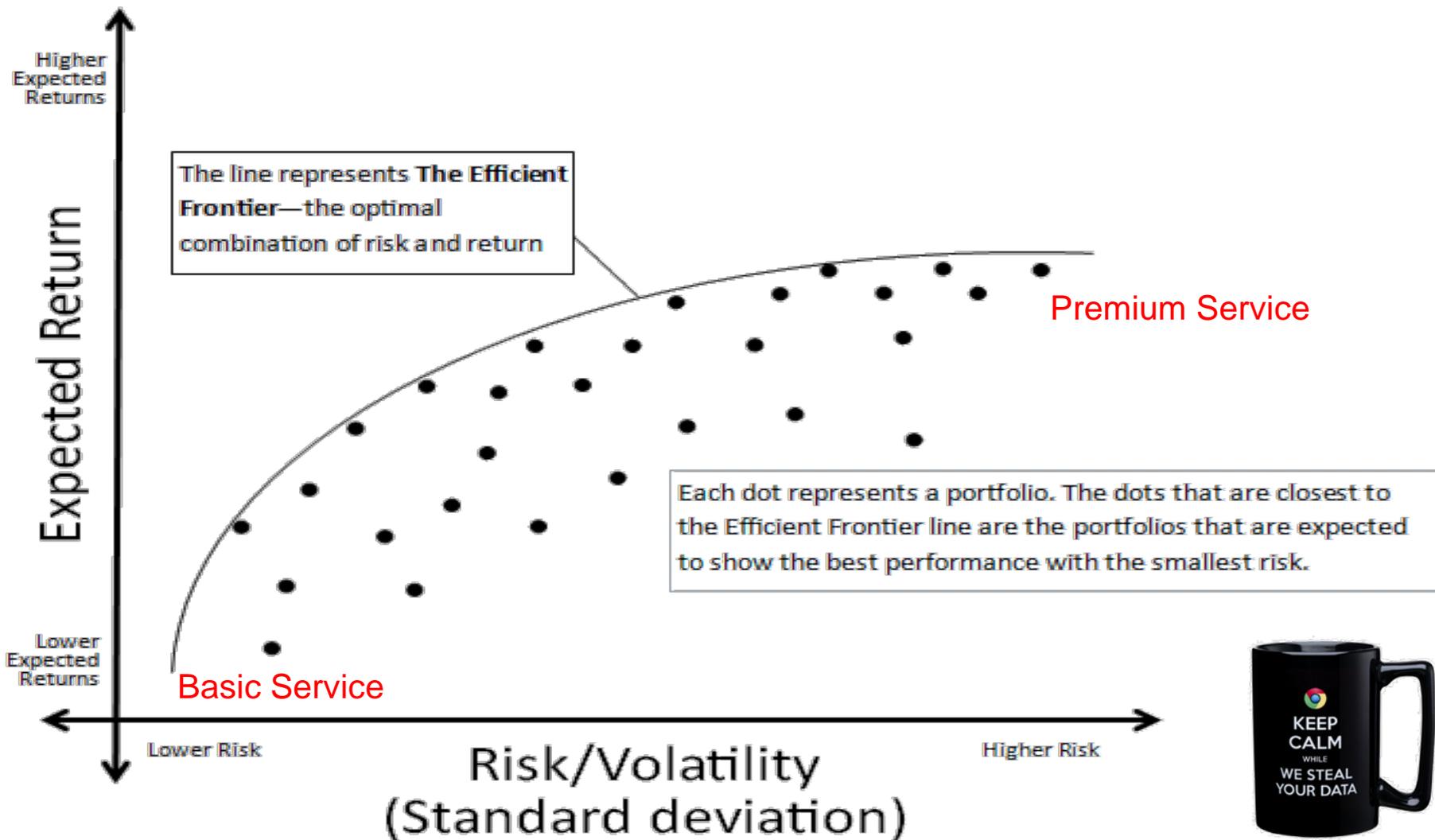
Tell us what you think

Agree to Default Choices

Customize My Choices

CONFIRM

Example Consent Form



One Way to Look at Risk and Return...



Will Precision Technology Providers
Follow The Apple Model?

iPad 1st Generation



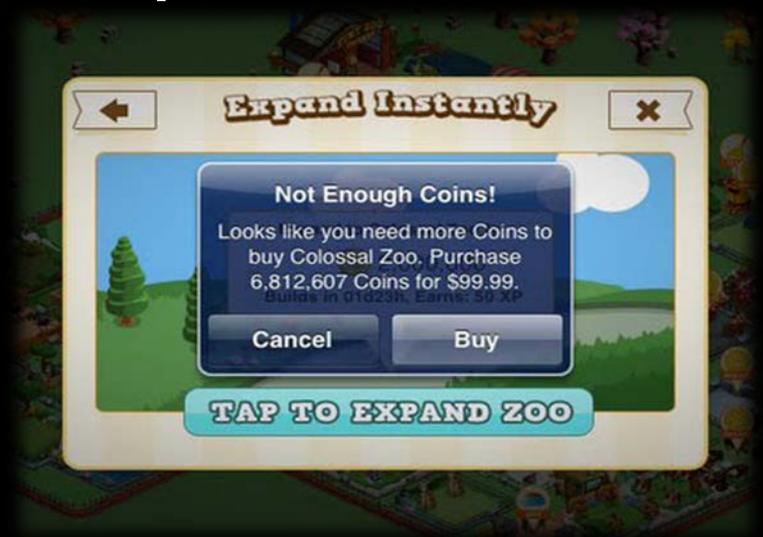
Were early adopters at a disadvantage buying the 1st Generation iPad?

Will Precision Technology Providers Follow The Apple Model?

Apps



In-app purchases?



Will Precision Technology Providers Follow The Apple Model?

SWOT Analysis (Example)

| | Helpful to achieving the objective | Harmful to achieving the objective |
|-----------------|---------------------------------------|---------------------------------------|
| Internal Origin | Strengths | Weaknesses |
| External Origin | Opportunities | Threats |

SWOT Analysis (Example)

| | Helpful to achieving the objective | Harmful to achieving the objective |
|-----------------|---|---|
| Internal Origin | Strengths <u>Examples</u> Reduces input costs Improves bottom-line | Weaknesses <u>Examples</u> Initial cost Invest time & education |
| External Origin | Opportunities <u>Examples</u> Data aggregation Hedge against extremes | Threats <u>Examples</u> Data privacy Acceptance |

1) Monsanto – Integrated Farming Systems

- 1) Precision Planting
- 2) Climate Corporation
- 3) Solum
- 4) DEKALB

Goal: Gaining more expertise (through data) by integrating seed science, field science, data analysis and precision equipment...the whole crop gamut!

2) John Deere/DuPont Pioneer/DOW Partnership

Goal: To deliver innovative solutions tailored to each farmer's specific environment.

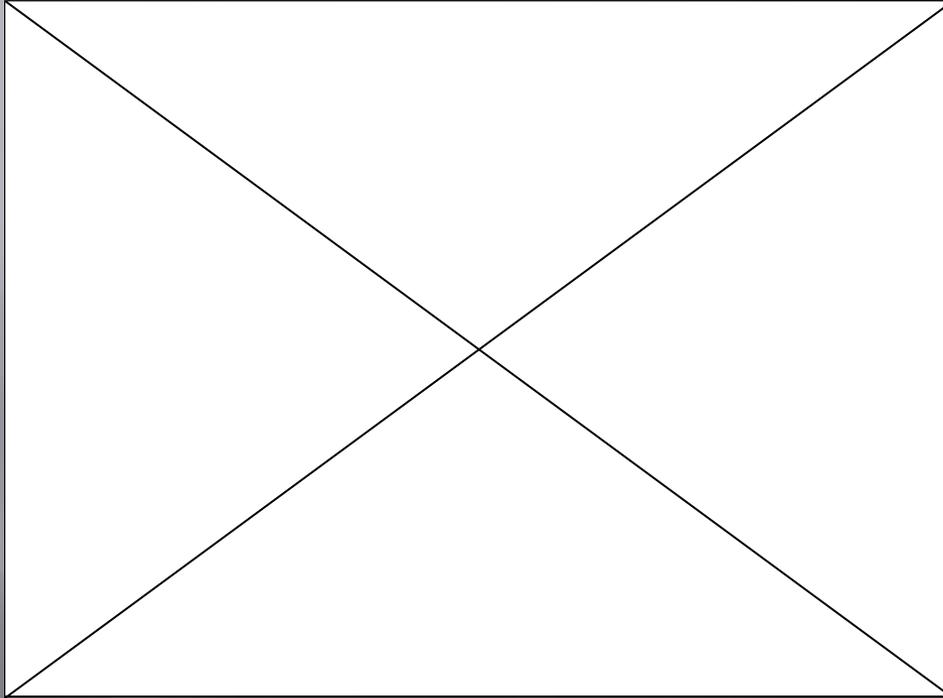
What's needed: Common definition standardization

Different Uses of Data From Companies

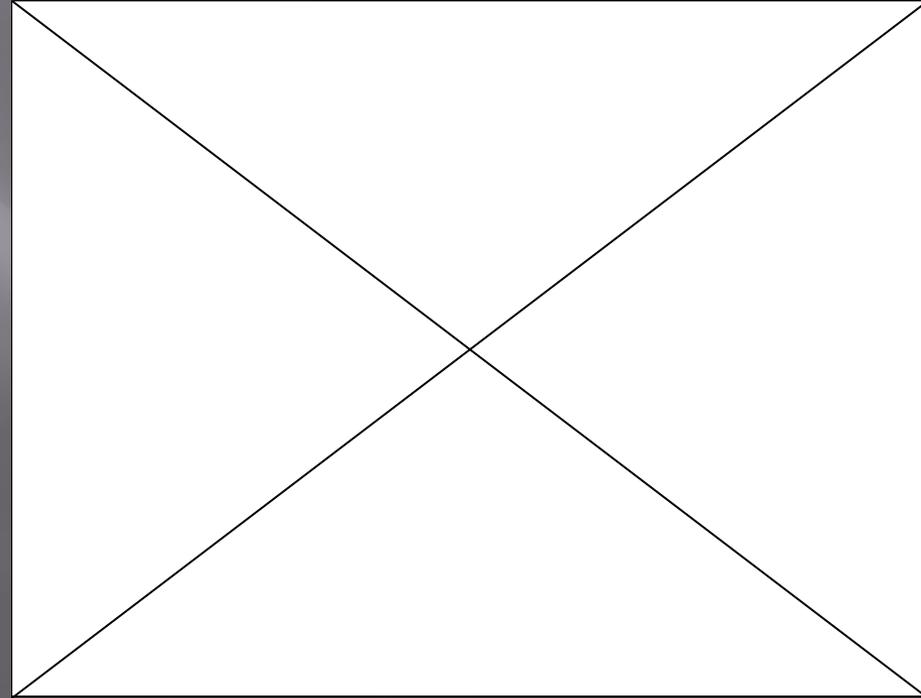
Where Could We Be Headed?

“Mayday” Button

Data when you need
it...anywhere...anytime



*Imagine this to be your
agronomist, equipment rep or
even crop consultant.*



*Imagine this in your combine
or tractor window or truck.*

- 1) Precision technologies and “Big Data” have a chance to revolutionize agriculture.

However, I believe we have one shot to get this right.

- 2) What to ask yourself...

Don't ask yourself: Are you ready to give up the privacy of your individual farm? Those days are LONG gone...

Ask yourself: Do the short-term and long-term benefits of giving farm-level data to another entity outweigh the costs associated with the possibility that the farm-level data would be released or misused by others?

- 3) Educate and engage on the questions that need to be asked and answered!

We all need to be talking about this right now, but just not letting it happen in the background for us to think about it later.

- 4) AFBF's “Ponder These Nine Before You Sign.”

Concluding Thoughts

Thank You!
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AMERICAN FARM BUREAU FEDERATION®