INSURANCE IN THE ZETTABYTE ERA:
UNDERSTANDING THE IMPACT OF IOT, BIG DATA AND ARTIFICIAL INTELLIGENCE

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SVP, IoT Products / CTO
Persistent Systems

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Are insurers prepared for disruptive information technologies?

IOT

BIG DATA

AI / ML

“For P&C insurers, it is not the rapidly changing environment that poses the biggest threat – it’s acting on future challenges with strategies linked to the past.”

Source: The Internet of Things: Opportunity for Insurers – A.T. Kearney Inc., 2014

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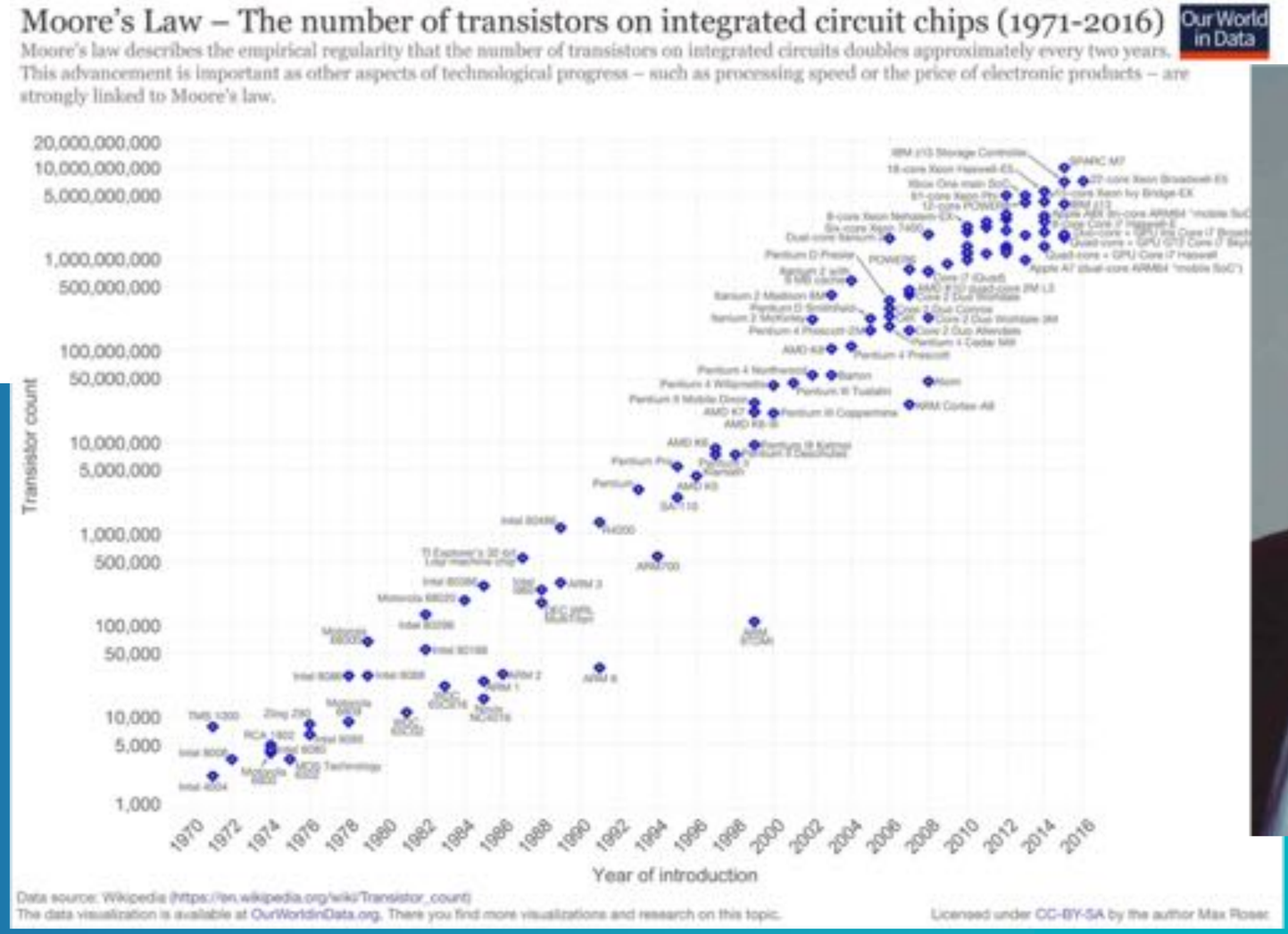
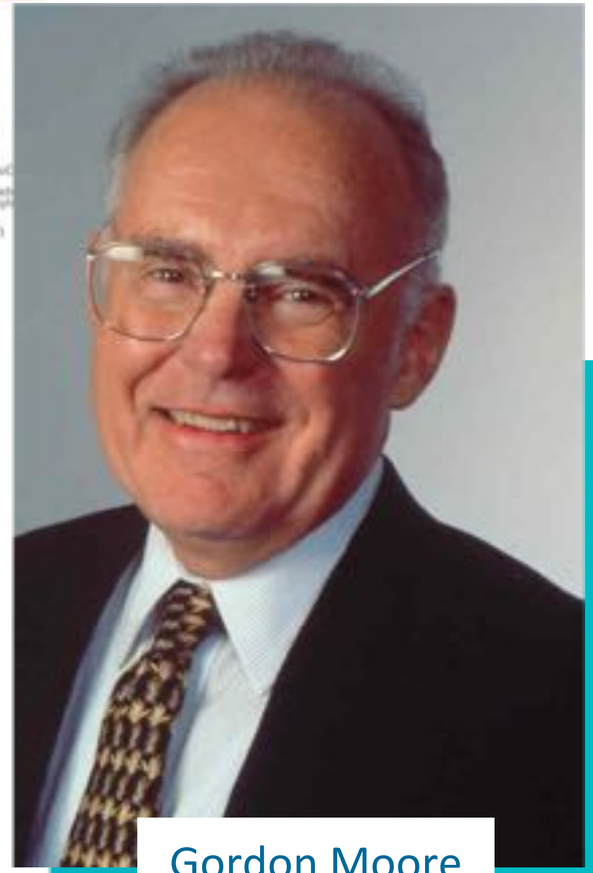
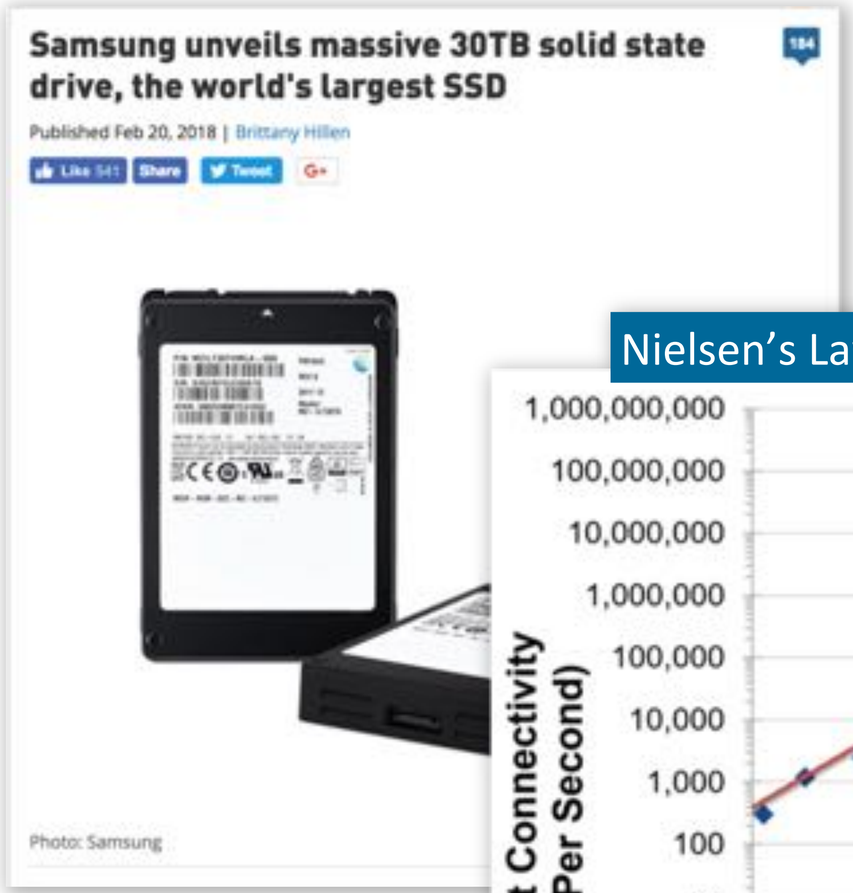
Disruption and the Information Age

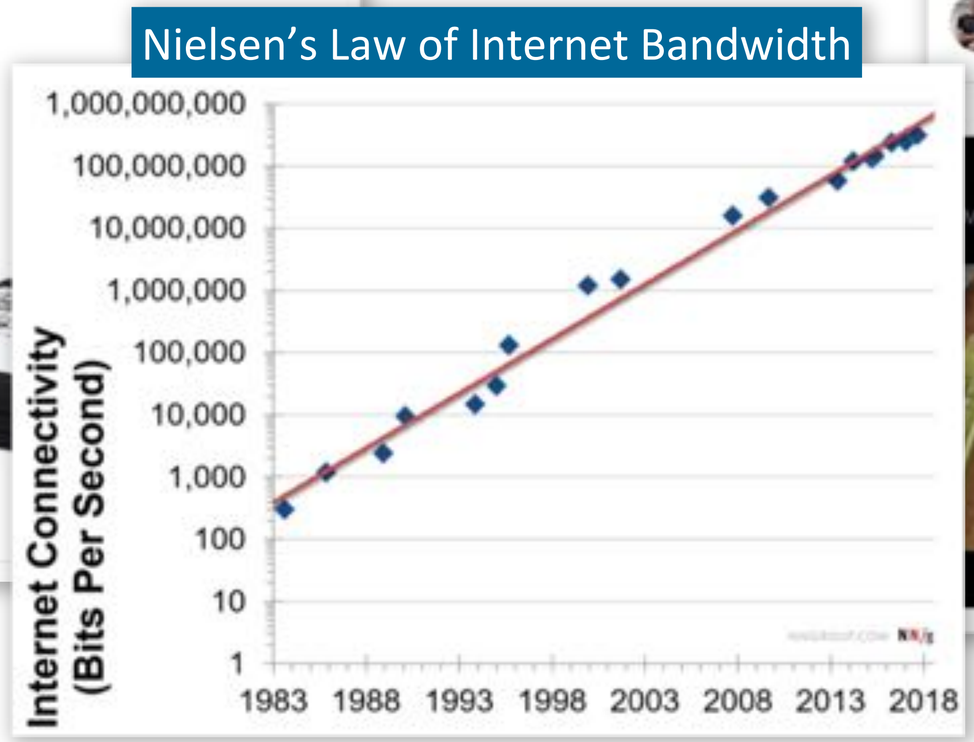




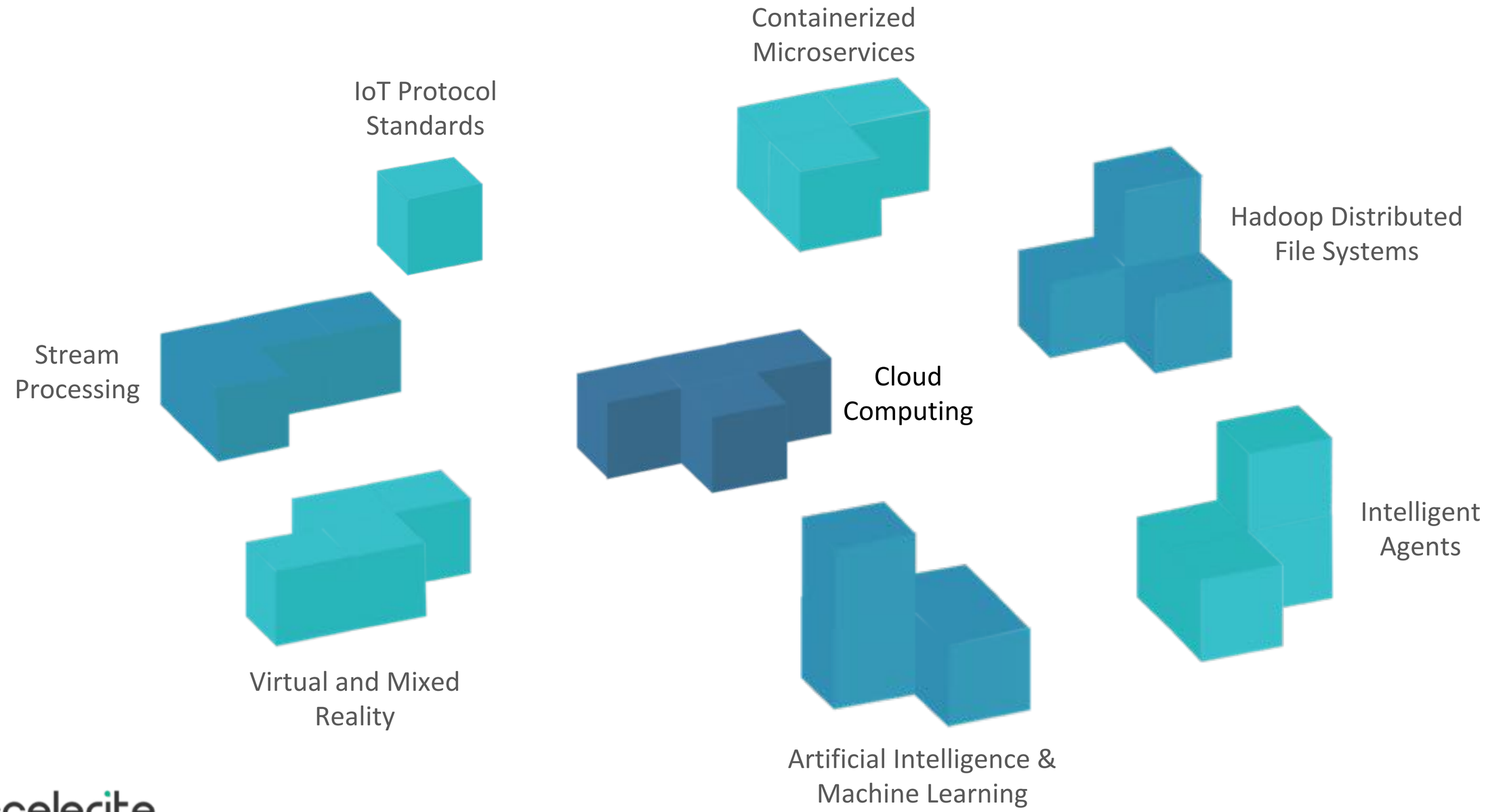
Gordon Moore
Intel Cofounder

“Moore’s law” affects more than computational performance





Disruptive software is also driving digital transformation



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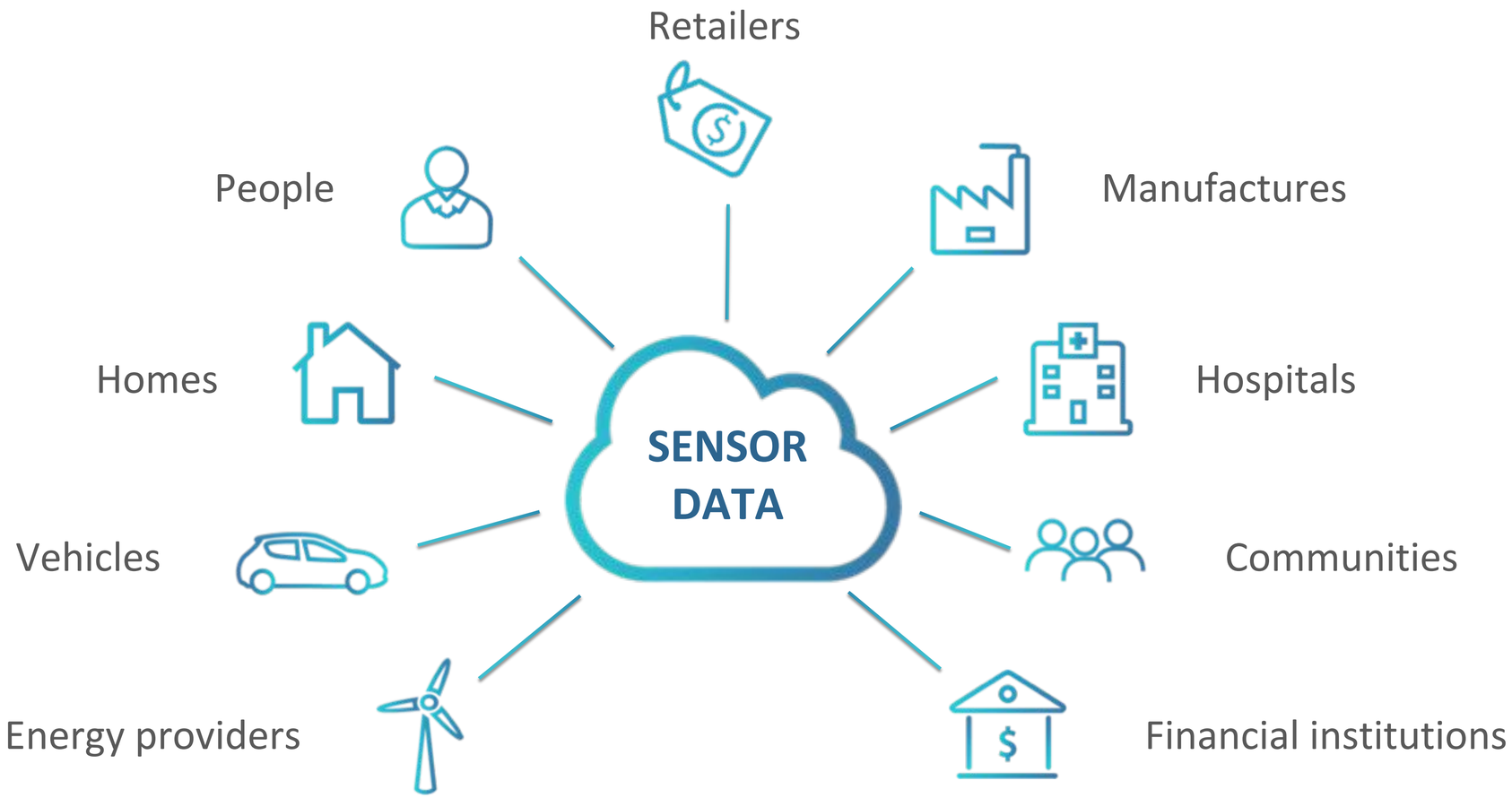
The result:
Every area of life can now be instrumented



The zettabyte revolution:
Enormous potential and daunting challenges

$1\ ZB = 10^{21}$ Bytes

$1\ ZB = 10^{12}$ GB

"In 2016 the annual run rate for global IP traffic was 1.2 ZB per year"

Source: Cisco Systems, 2017 report

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These three technologies hold the keys to success in the Zettabyte Era

IOT

BIG DATA

AI / ML

Master these and your business will not be disrupted!

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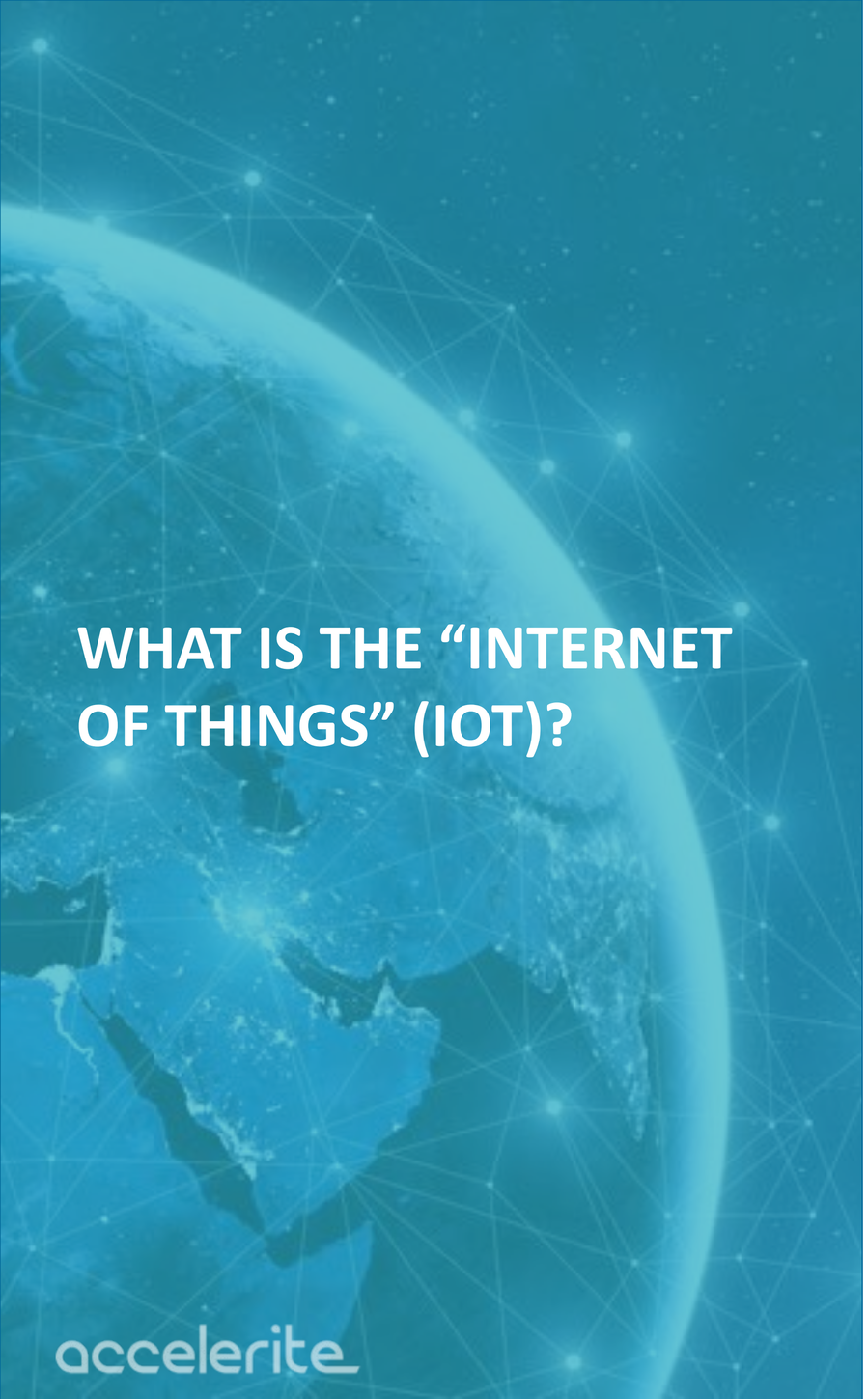
A BRIEF TECHNOLOGY PRIMER



WHAT IS THE “INTERNET OF THINGS” (IOT)?

Internet-based protocols and services that allow sensor-enabled connected devices (“things”) to communicate efficiently

How many IOT devices?

Growing from 31B by 2020 to 74B in 2025

What is Big Data?

Big Data Sources:

Social Media

IoT Sensor

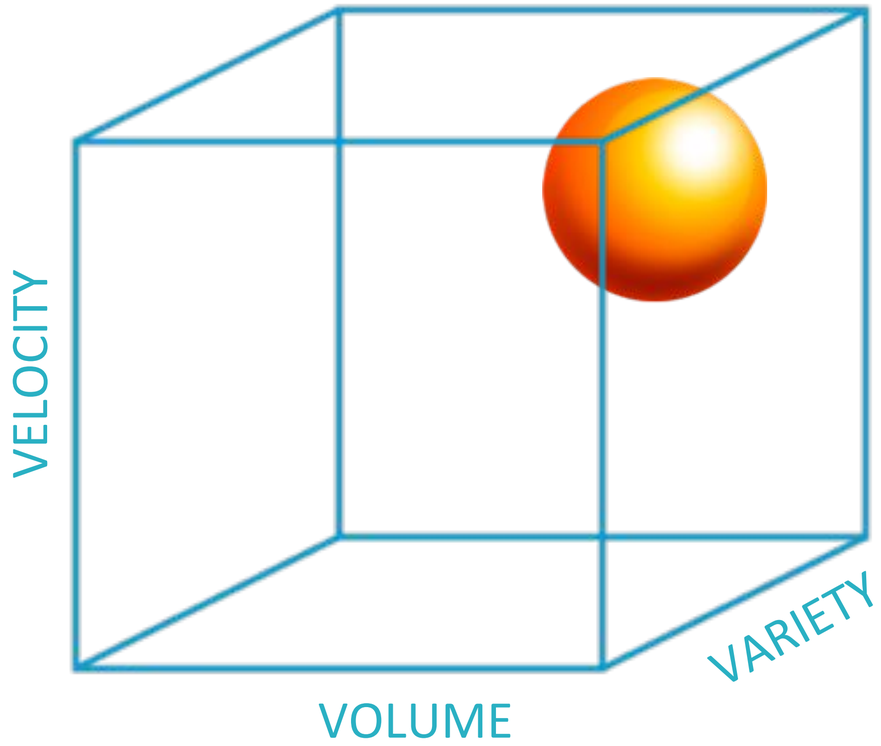
Digital Audio

Big Data

Digital Photography

Digital Video

The 3 “Vs” of Big Data



How much “Big Data”?

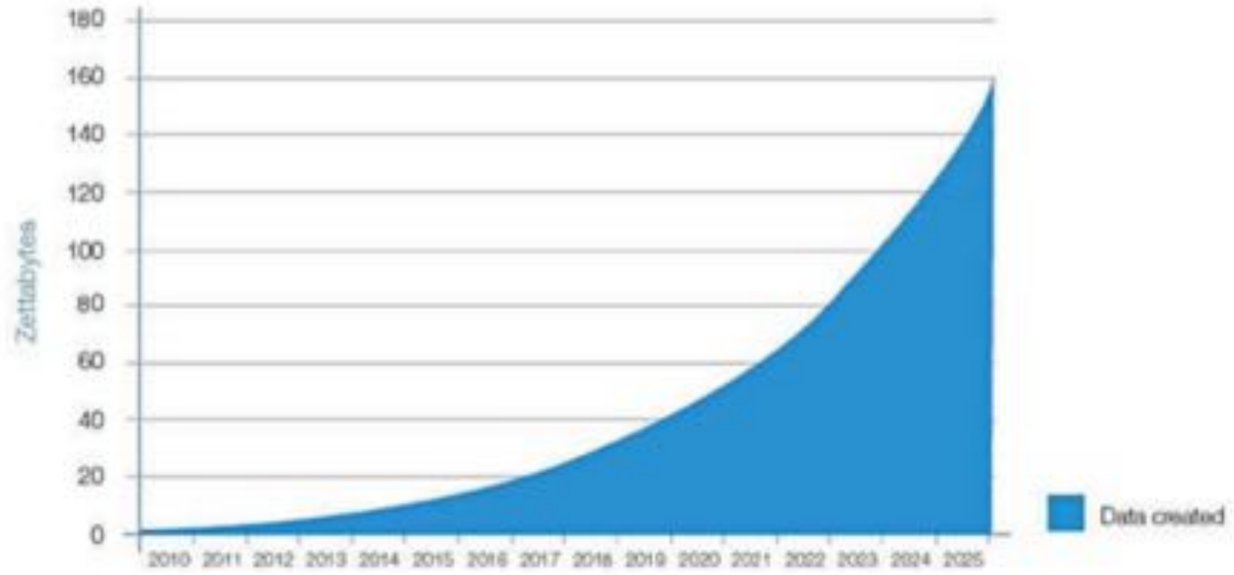
Growing from 31B by 2020 to 74B in 2025

- More data in the last two years than entire prior human history
- 1.7 MB of new information per person on earth created every second
- 300 hours of video uploaded to YouTube per minute

Data is Eating the World: 163 Trillion Gigabytes Will Be Created in 2025

Posted on April 18, 2017

Figure 2. Annual Size of the Global Datasphere



Source: IDC's Data Age 2025 study, sponsored by Seagate, March 2017

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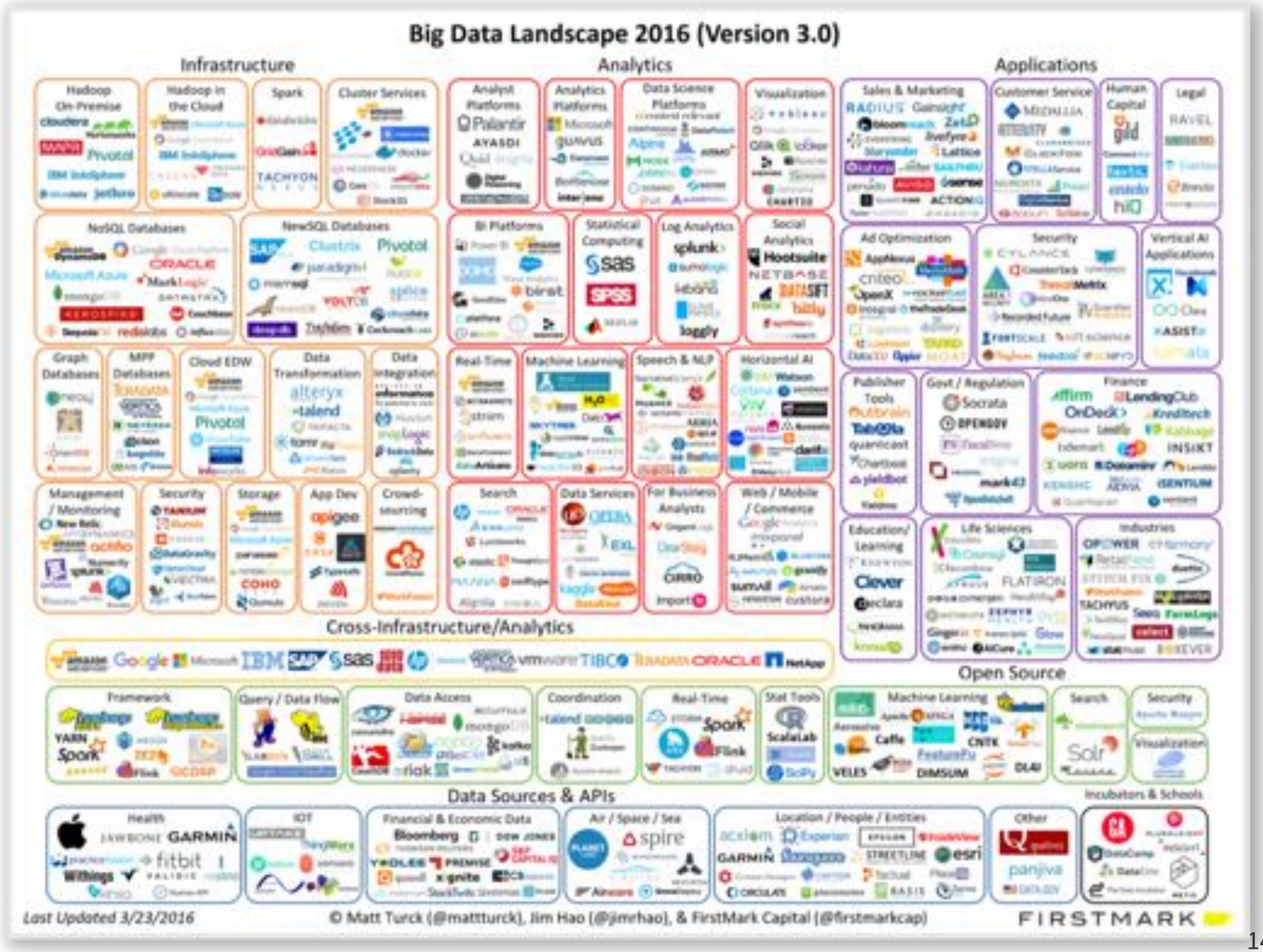
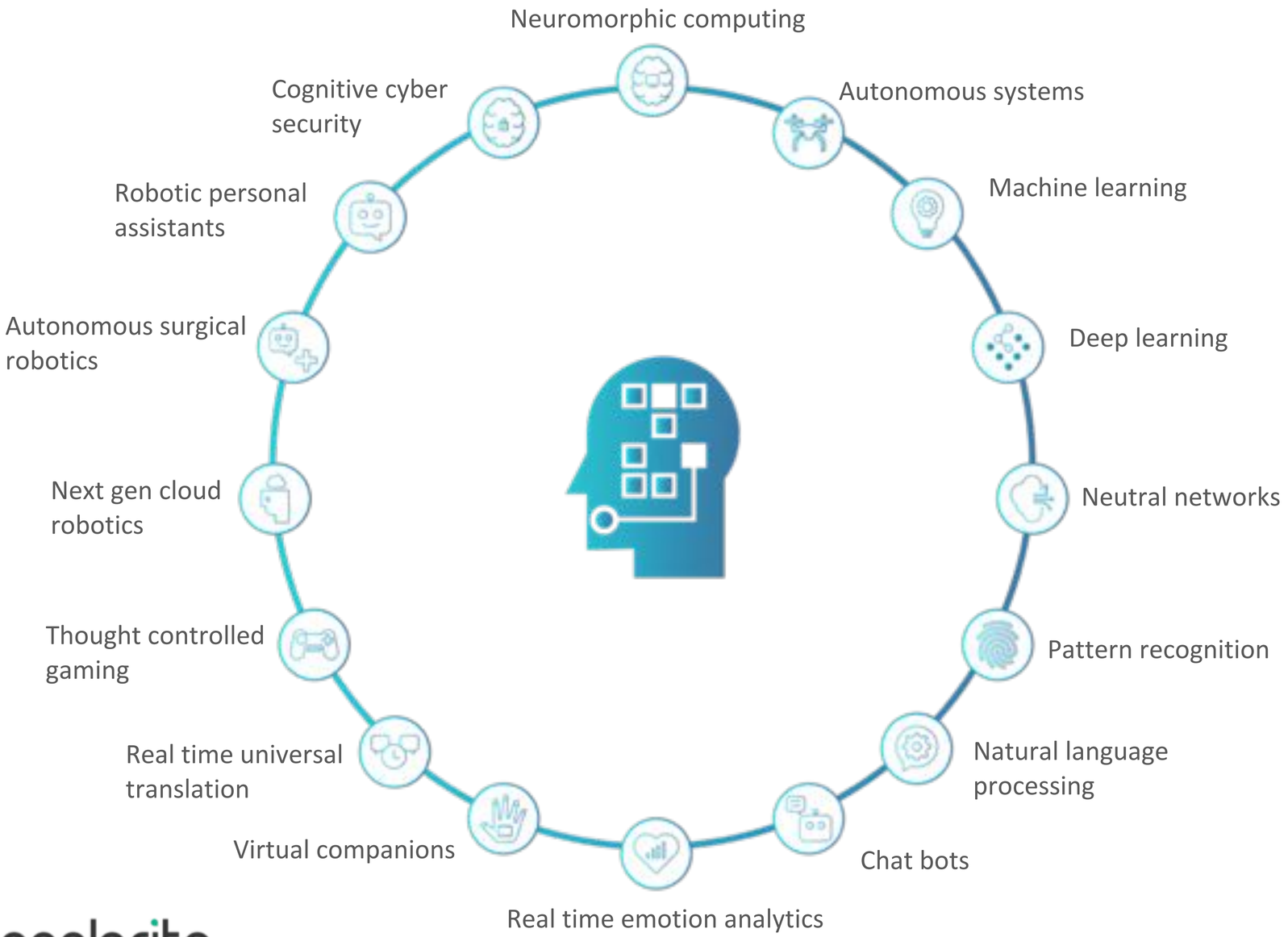
A complex and fluid Big Data technology landscape

TECHNOLOGIES FOR:

- Capturing
- Storing
- Searching/Querying
- Analyzing
- Visualizing
- Sharing



What is artificial intelligence?



The appearance of intelligence demonstrated by machine algorithms that can learn, infer, predict and problem solve.

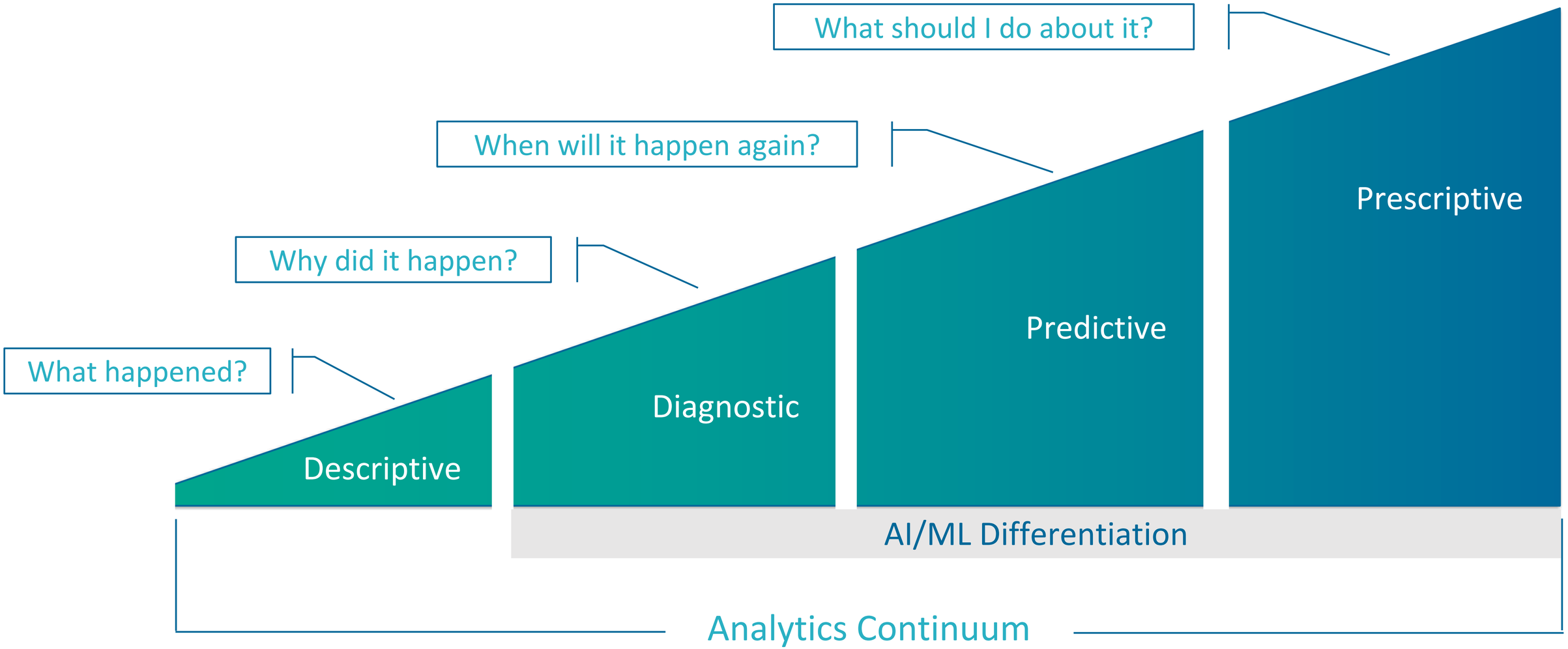
Why is AI important?

AI can effectively identify patterns in high volume/variety data that human analysis would miss.

AI can respond to high velocity data much quicker than humans to predict and prevent adverse outcomes.

Types of advanced analytics questions…

…where AI/ML can make a difference



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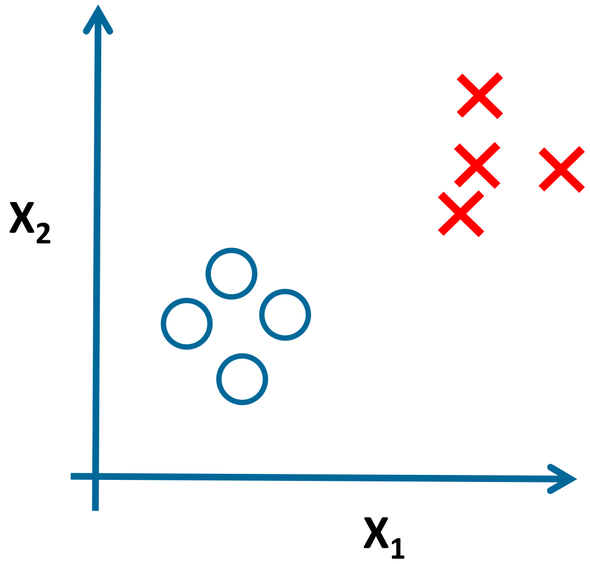
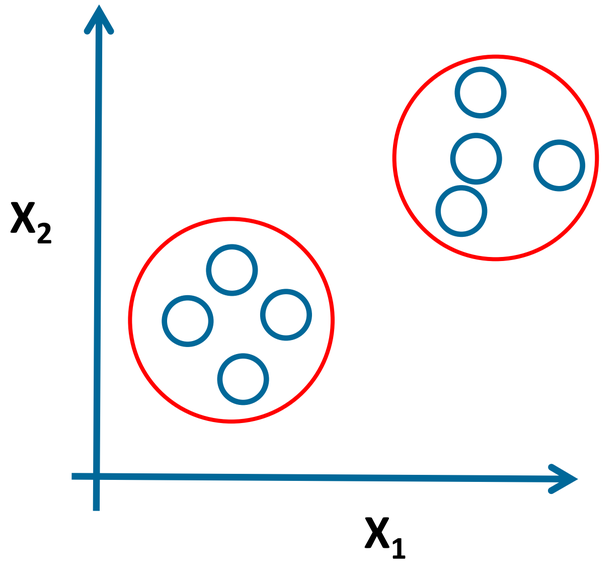
Supervised VS. Unsupervised Machine Learning

Supervised learning

Unsupervised learning

Algorithms learn from training dataset labels good and bad results





Algorithms just identify and classify similarities – no right or wrong answers

Many common problems need both approaches (called ”semi-supervised” learning)

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COGNITIVE COMPUTING vs. AI

A subtle but important difference

AI is an “umbrella term” with “cognitive computing” representing a branch of the technology focused on a specific goal – improving human-machine interaction (natural language processing, machine vision, digital assistants, etc.)

- Traditional AI analyzes data in order to make or recommend a distinct decision
- Cognitive computing is more concerned with helping humans interact with and obtain a clear understanding of data - so that they can make decisions

INSURANCE IN THE ZETTABYTE ERA: HOW IS THE INDUSTRY CHANGING? WHAT ARE THE CHALLENGES?

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AUTO INSURANCE

- Real-time driving behavior data are creating behavioral/usage-based products
- Collision Avoidance Systems (CAS) and Advanced Driver Assistance Systems (ADAS) reduce risk
- Semi-autonomous vehicles have the potential to reduce driving competency
- Fully-autonomous vehicles will shift liability away from the driver to the manufacturers and municipalities
- **Challenge: Auto insurers will need to become experts in assessing software-related risks**

HOME INSURANCE

- IoT sensors reduce risk, loss and associated payouts
    - Connected fire/smoke detectors that alert the fire department can cut payouts by as much as $35,000 (according to Business Insider Intelligence)
    - Security cameras and motion sensors can significantly reduce chances of a burglary (according to Safeguard the world)
    - Water leakage sensors can identify a problem before it causes major damage
- **Challenge: Insurers have a vested interest in testing and promoting products that work**
- **Challenge: Poor user experiences are turning off consumers**

LIFE & HEALTH INSURANCE

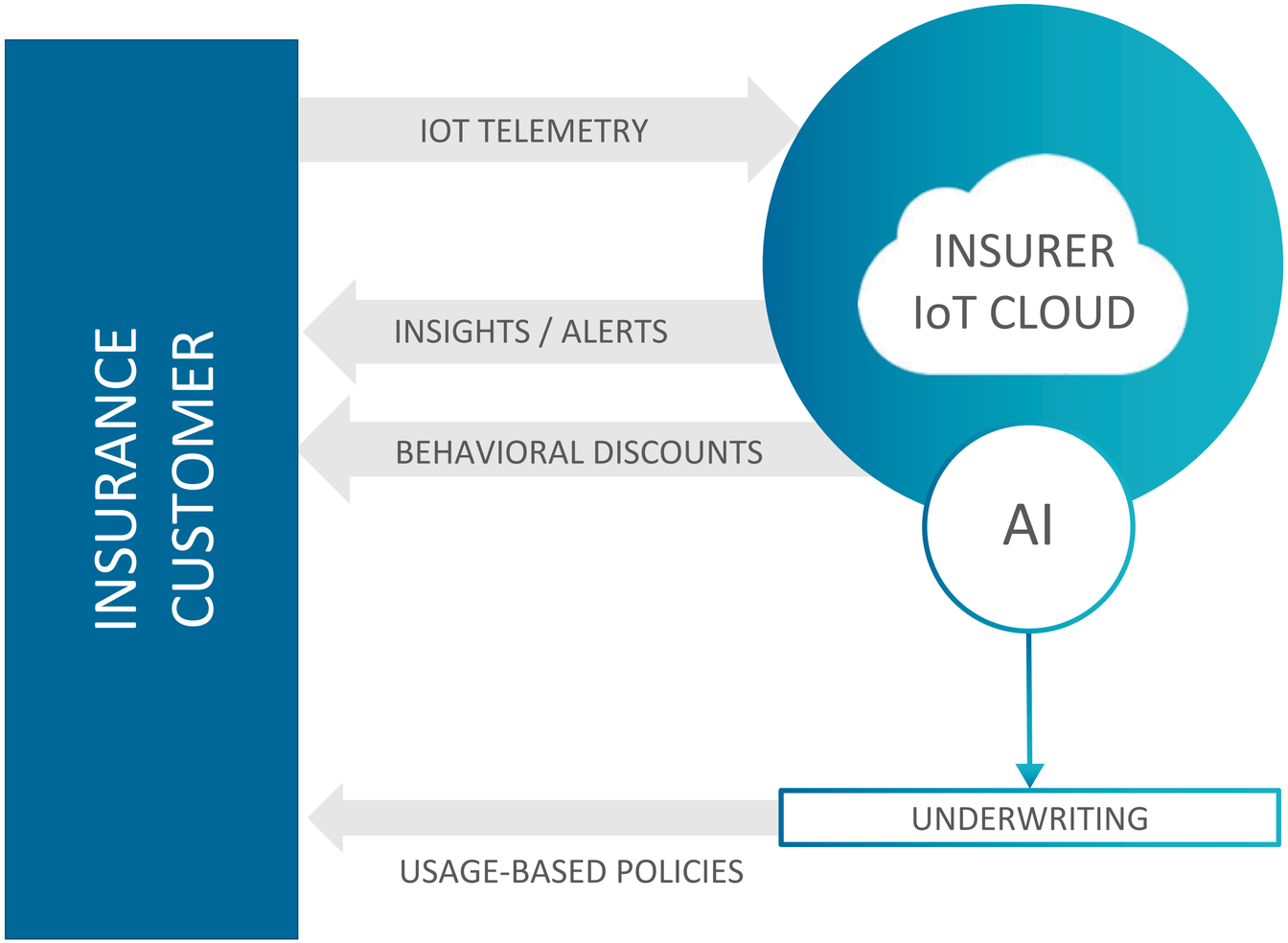
- Wearables can provide a more accurate view of a person's biological age and overall health
    - Individuals who share health data can benefit from advantageous premium adjustments
    - Proactive individualized lifestyle suggestion can reduce risk
    - AI-based health monitoring can predict problems before they happen
- Tele-health systems will reduce the cost of care
- Drug compliance sensors can improve healthcare outcomes
- **Challenge: Insurers will need to be able to generate timely insight from streaming health data**

WORKER'S COMPENSATION INSURANCE

- Workplace IoT data is invaluable
  - Wearables can reduce the risk of workplace injury or incapacitation
  - Equipment condition monitoring algorithms can improve worker safety
  - Environmental monitoring sensors can ensure regulatory compliance
  - Data from all of the above can be used to adjust premiums
- **Challenge: How to get businesses to allow you to harness this data**

CONNECTING INSURERS TO IOT DATA: TWO ZETTABYTE ERA USE CASES

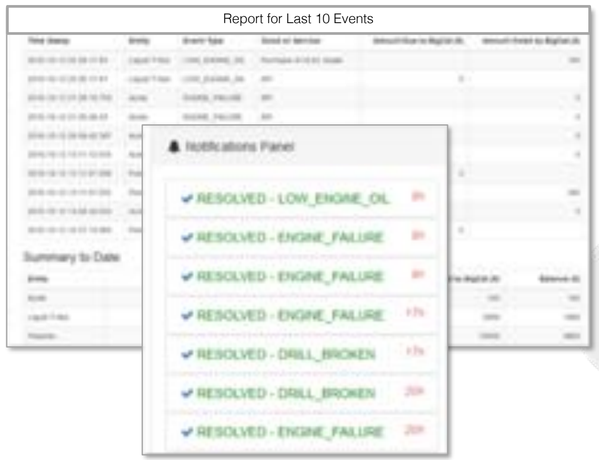
Connecting to the customer



USE CASE: SMART MINING

Smart Mining

Smart Mining Services Today



APIs

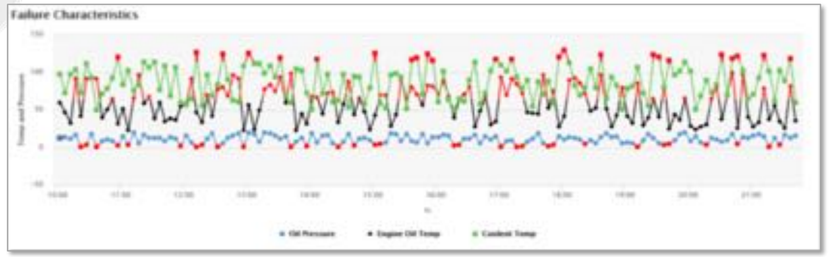
Field Support Service

APIs

Predictive Alerting Service

Vehicles Telematics Service

APIs



Devices / Sensors

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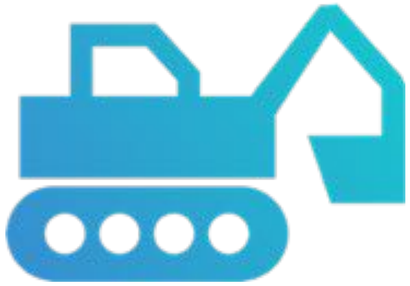
Smart Mining Evolution:
Insurance-related telemetry

Earth Moving Vehicles:



- GPS, WiFi Location
- Engine condition monitor
- Hydraulic sensors
- Tilt sensors and accelerometer

Conveyors and Crushers:

- Engine condition monitoring
- Conveyor load monitor

Workers:

- Wearable providing accurate location, heart rate, temperature

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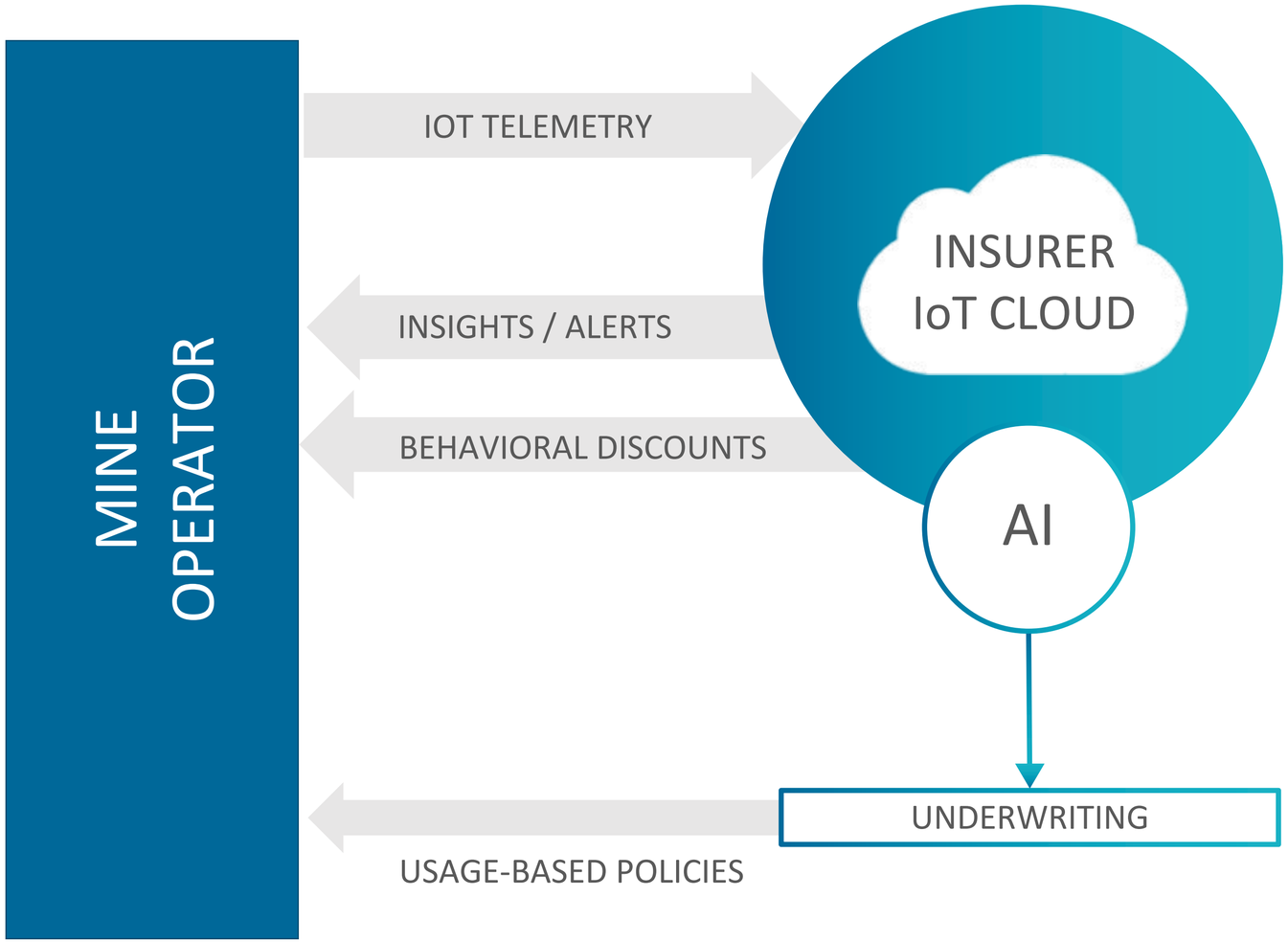
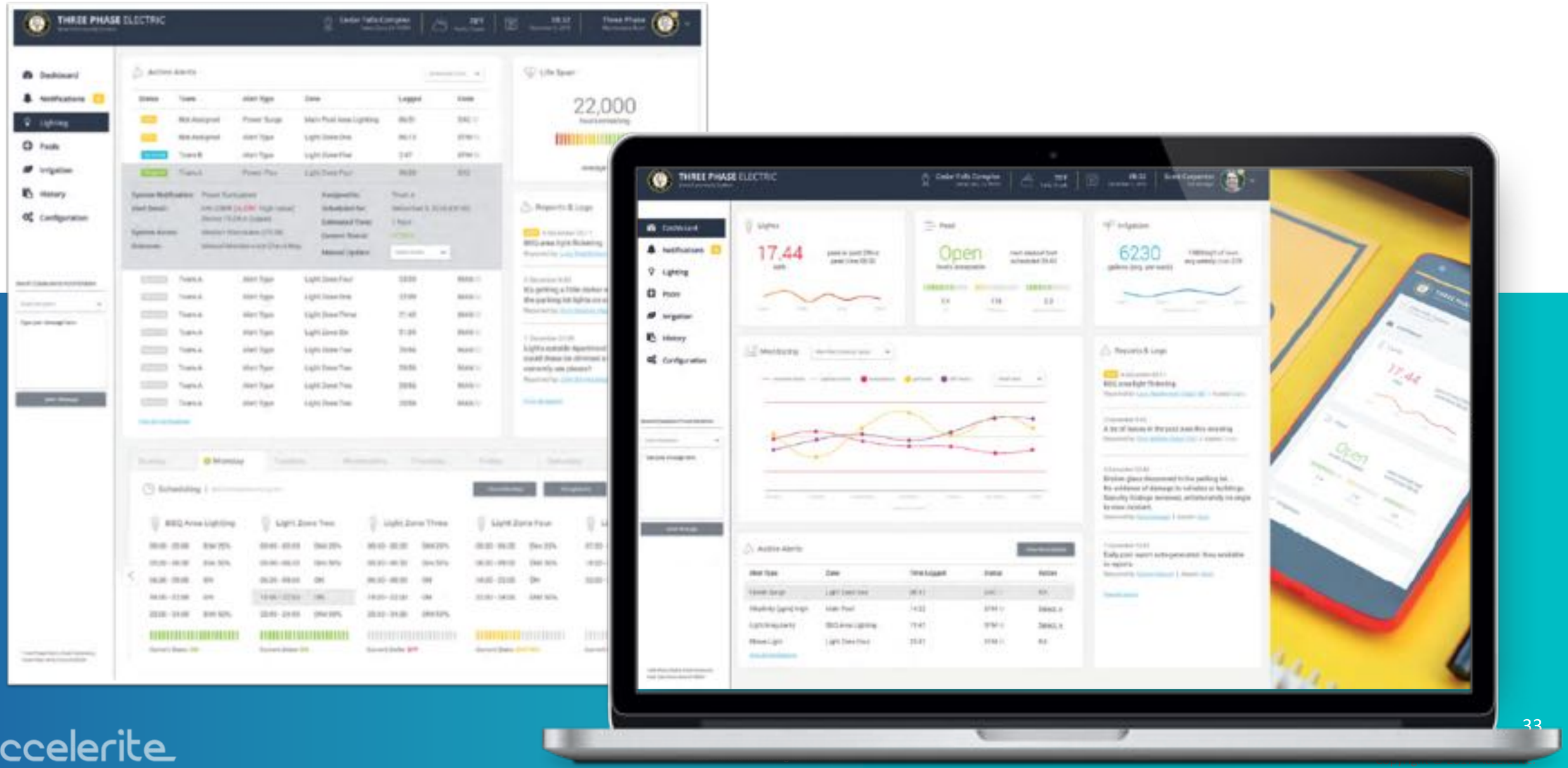
Smart Mining:
Insurance Partner Algorithms

- Unsafe location geo-fencing with alerts
- Lockout of non-credentialed equipment operators
- Equipment misuse monitoring (speed, tilt, location, operator hours)
- Operator health monitoring with safety alerts
- Predictive equipment maintenance alerts

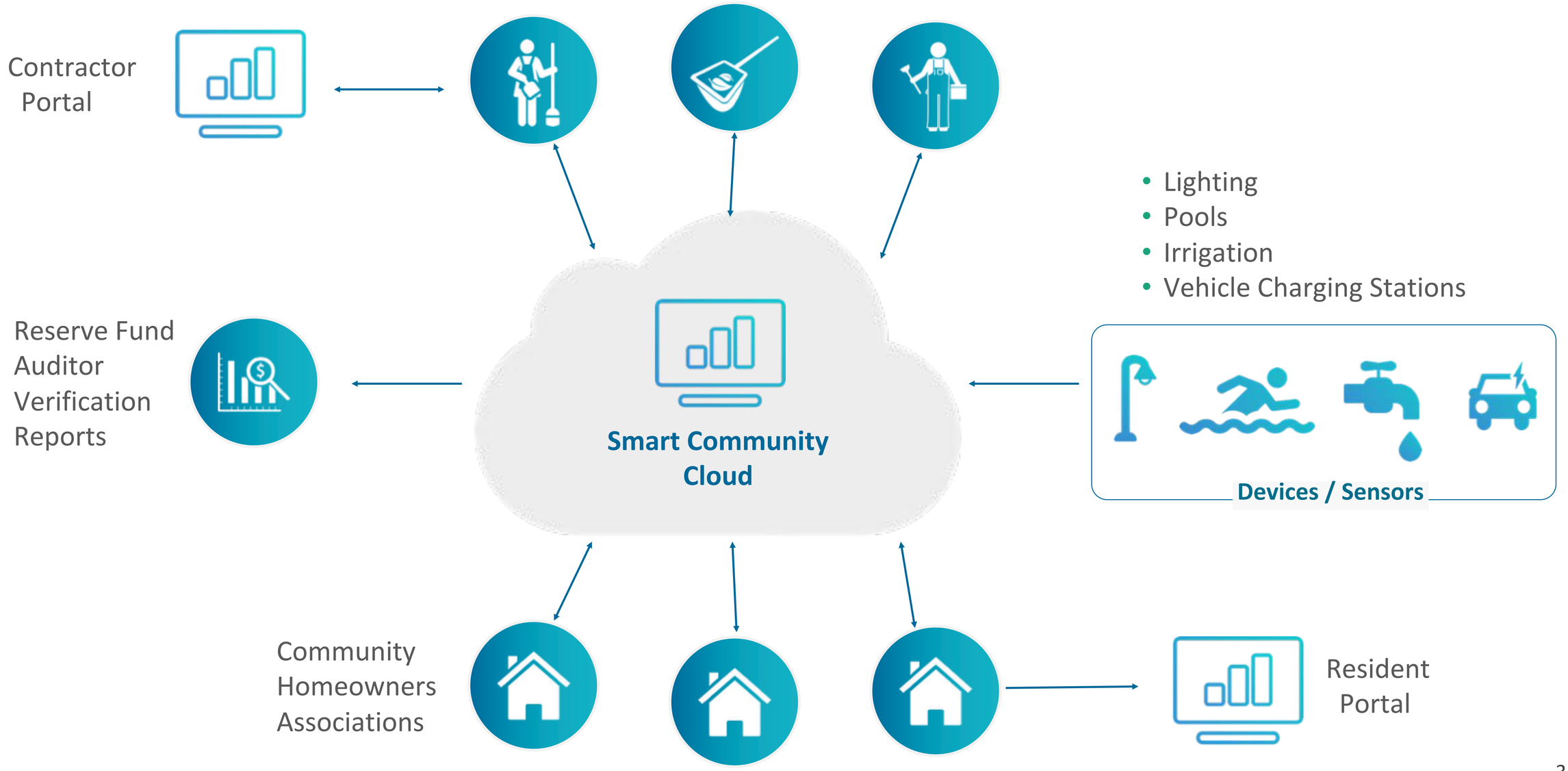


USE CASE: SMART COMMUNITY (HOMEOWNER'S ASSOCIATION)

Smart Communities



Smart Communities Today:
Maintenance Insight for HOAs



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Smart Communities Evolution:
Insurance-related telemetry

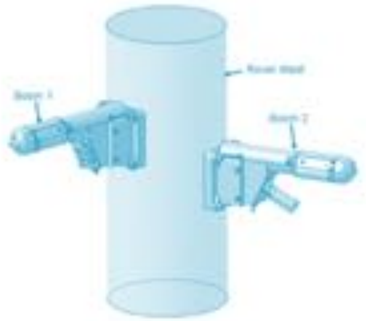
Safety Sensors

- Ambient light (for walkways, parking lots)
- Pool chemistry
- After-hours pool/spa motion detectors
- Vehicle speed monitor

Security Sensors

- Security cameras
- Security patrol location tracking

Environmental Sensors



- Storm drain / gully monitor
- Air quality monitor

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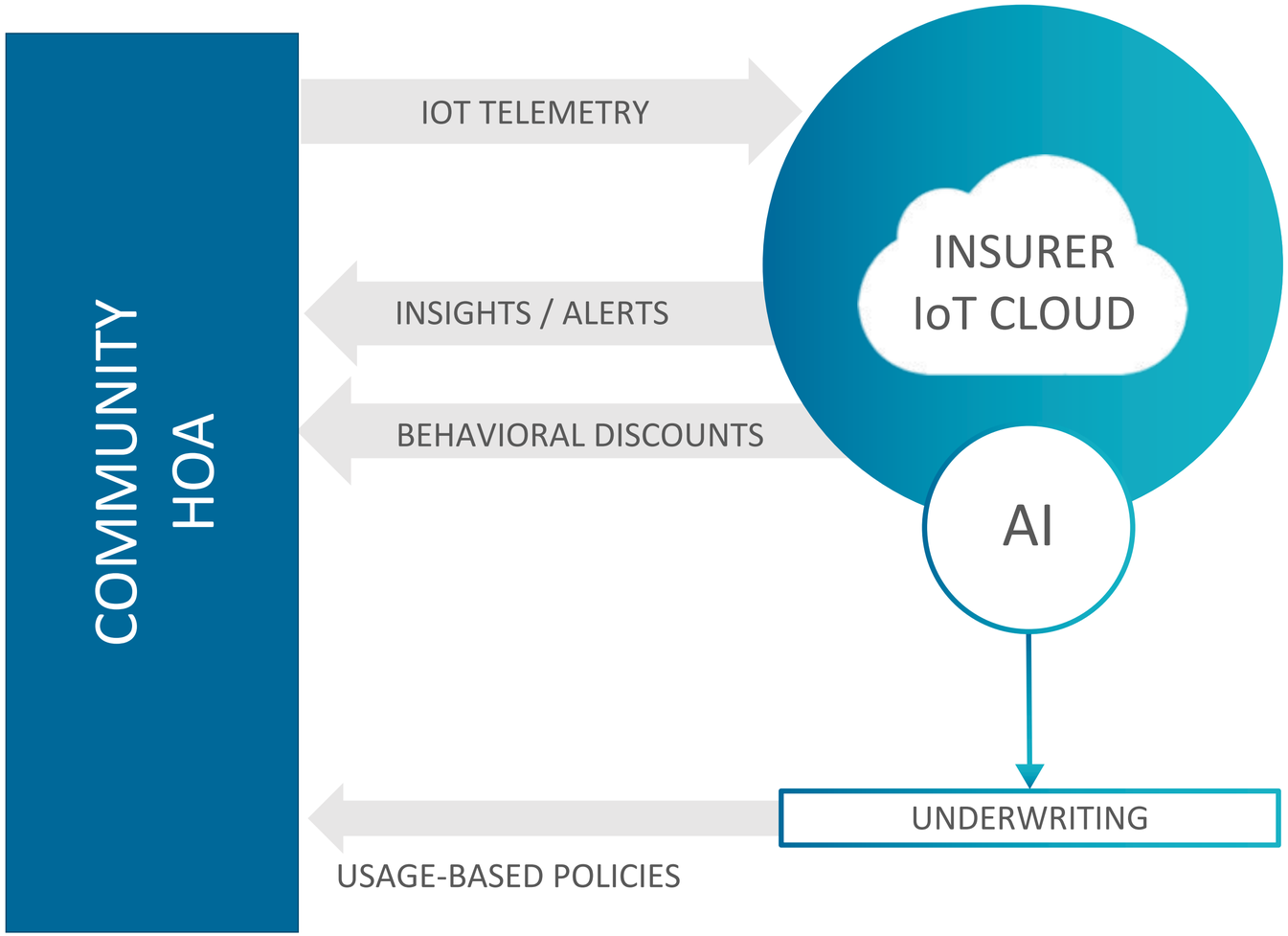
Smart community (HOA):
Insurance Partner Algorithms

- Dynamically adjust lighting for resident safety
- Motion-based video capture throughout community
- Capture and track vehicle license plates
- Alert security patrol to unsafe driver activity (speeding)
- Automatically close pool if chemicals are at unsafe levels
- Alert security of after hours pool activity
- Ensure security patrols provide consistent area coverage
- Alert maintenance staff to blocked storm drains



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ZETTABYTE ERA INSURANCE TRANSFORMATION: THE SHIFT FROM BUSINESS INTELLIGENCE TO OPERATIONAL INTELLIGENCE TECHNOLOGIES

What is the difference between BI and OI

BUSINESS INTELLIGENCE

- Helps you to analyze what has happened in the past
- Batch processing (daily, weekly, monthly, etc.) is sufficient

OPERATIONAL INTELLIGENCE

- Helps you to analyze what is happening **NOW** and what may happen in the **NEAR FUTURE**
- Real-time streaming analytics is the key

Operational Intelligence (OI) technology landscape

ESTABLISHED BIG DATA TECHNOLOGIES

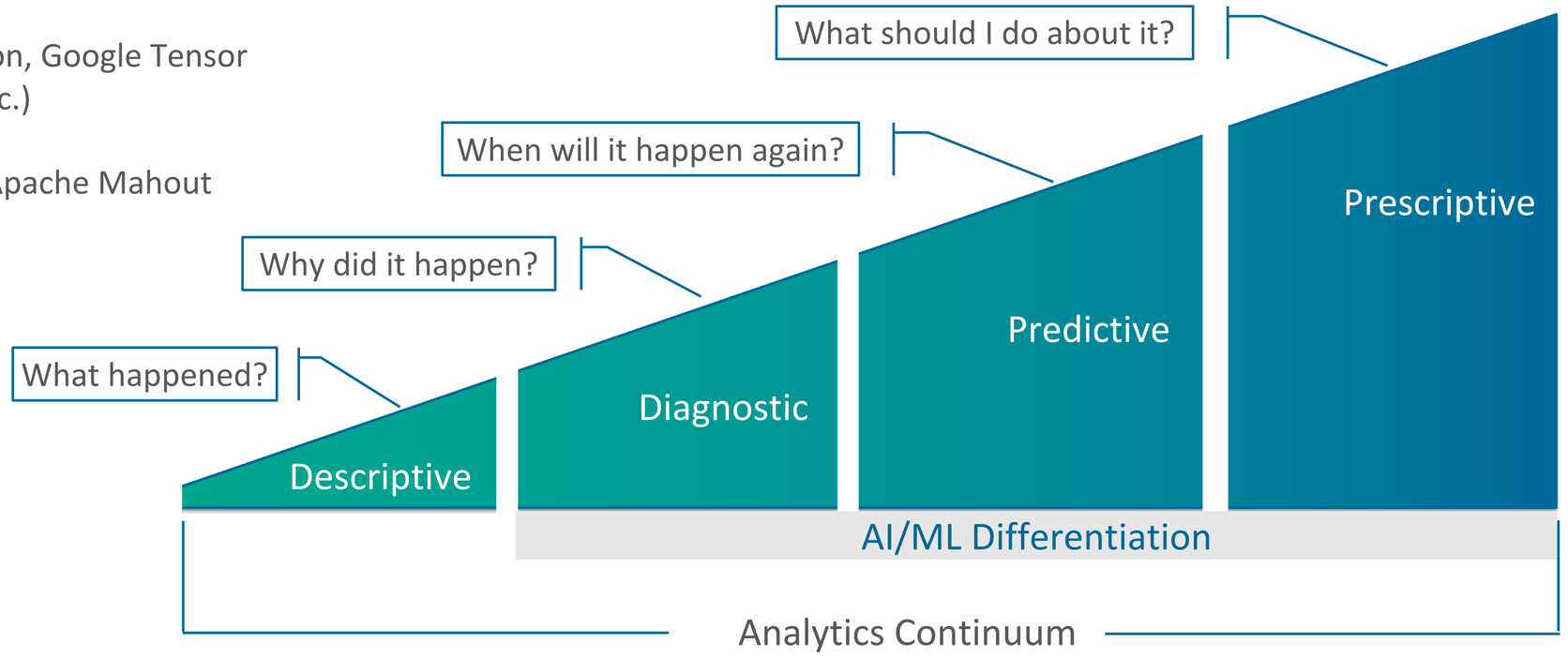
- Hadoop Distributed File System (HDFS)
- Data Processing (Apache Spark)
- Stream Ingestion (Apache Kafka)

DATA SCIENCE TOOLKITS

- Open Source Web Services (IBM Watson, Google Tensor Flow, Apple Core ML, Amazon Polly, etc.)
- Python, R, Java, C++
- PredictionIo, Eclipse DeepLearning4j, Apache Mahout
- Jupyter Notebooks

EMERGENT TECHNOLOGIES

- Self-Service ML Model Management
- Self-Service Event Orchestration
- Self-Service Dashboard Creation



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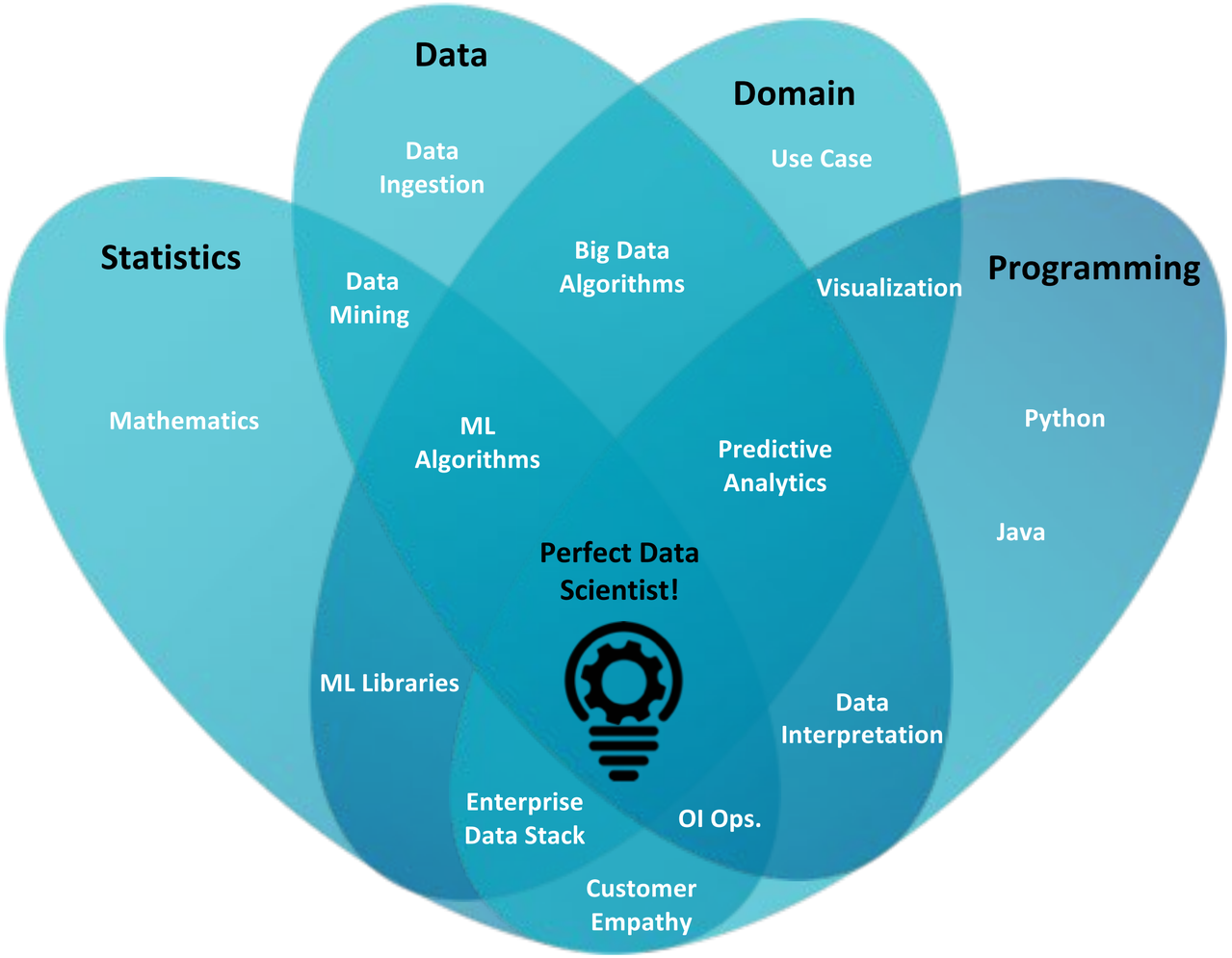
To scale your operational intelligence in your organization



…you need a

Perfect Data Scientist

with these skills..

https://yanirseroussi.com/2016/08/04/is-data-scientist-a-useless-job-title/

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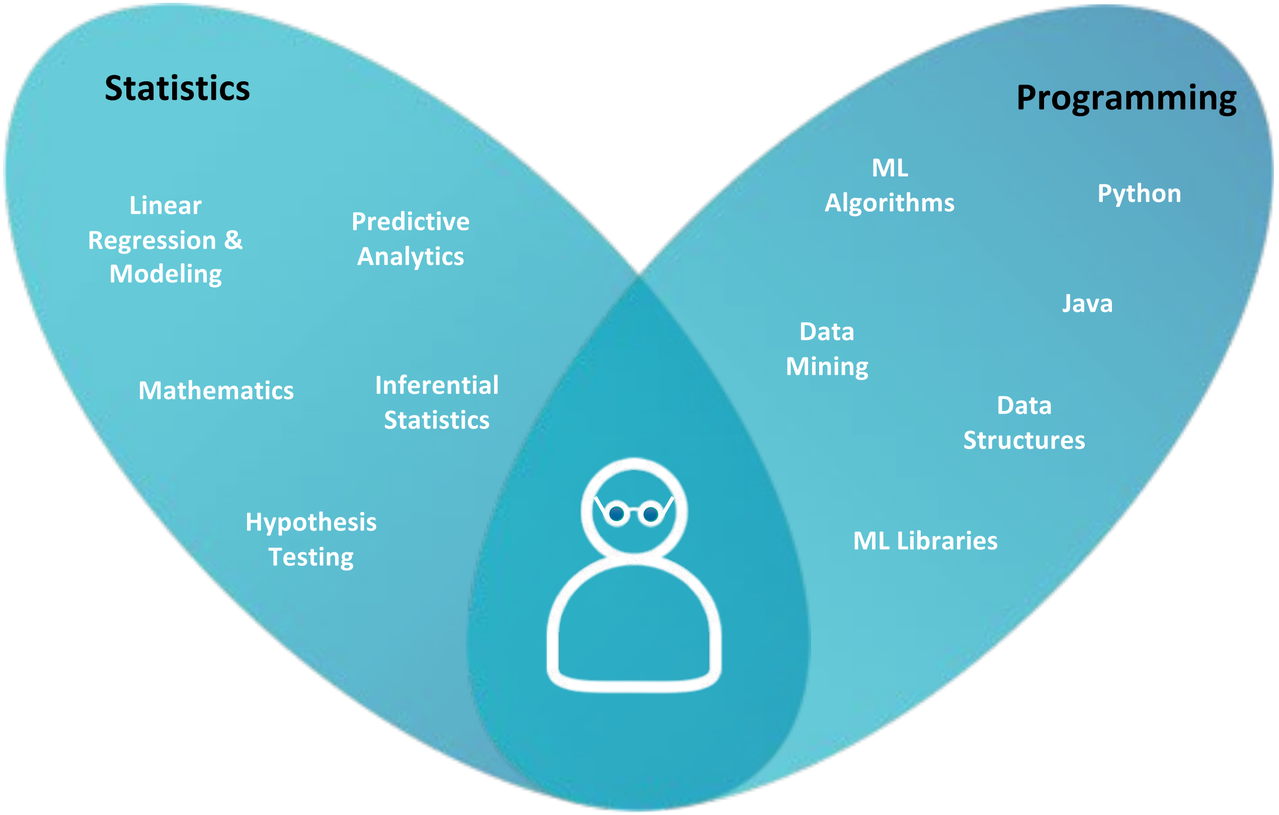
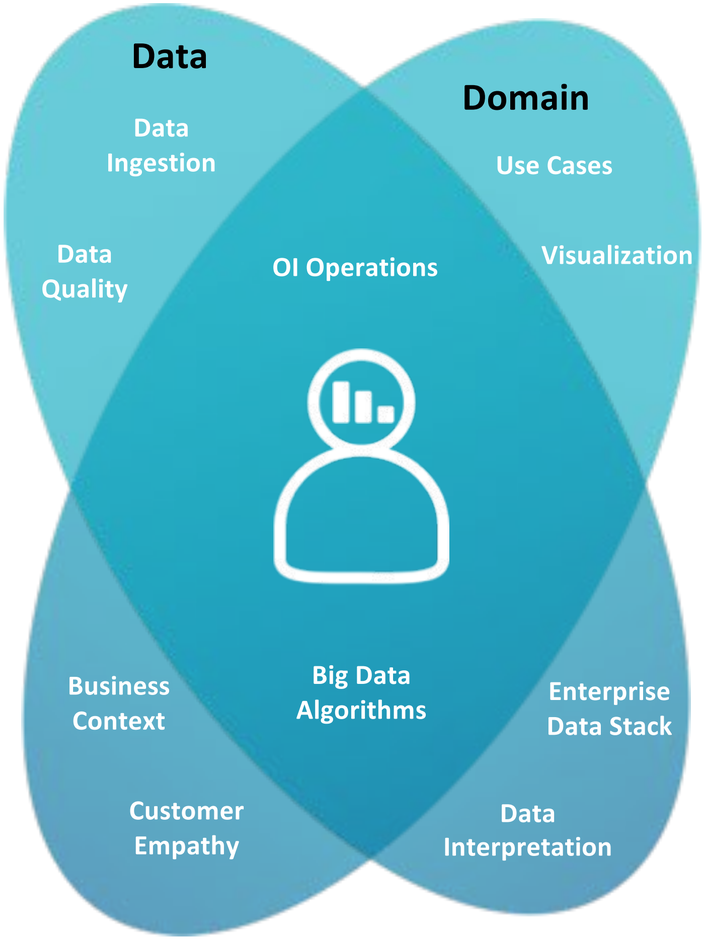
Divide and conquer with a new persona: ‘OI Data Analyst’



Data Scientist



OI Data Analyst/Engineer

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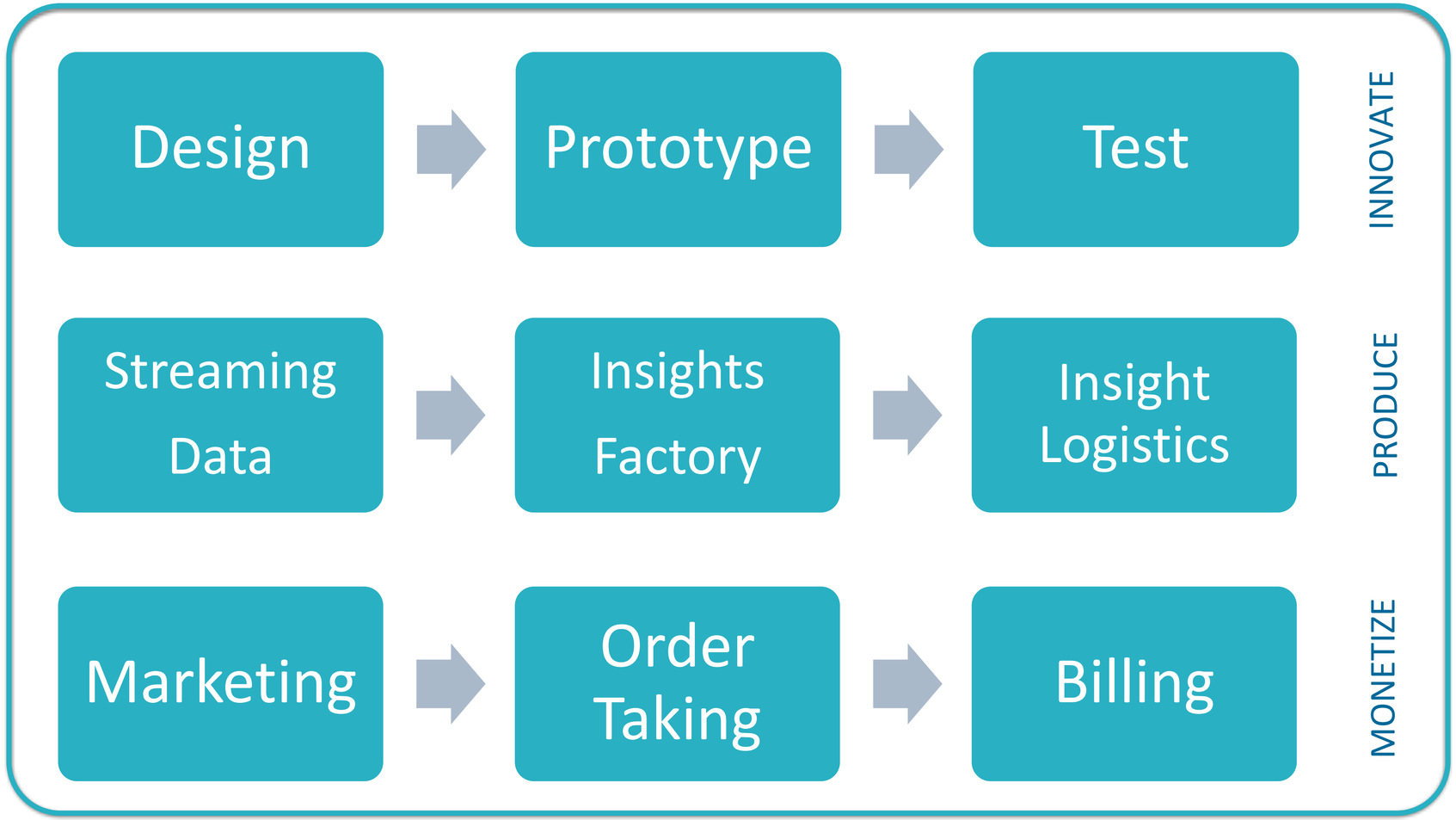
Operational Insights Monetization – An exciting new area

YOUR INSIGHTS OFFERINGS



YOUR INSIGHTS PLATFORM

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IT operational security technologies will need a major upgrade

- Data lake and data warehouse operations and security policies
- Data architecture and quality management
- Guaranteed trust for operational insights

- Continuous vulnerability assessment
- Highly responsive threat management

- Identity proofing
- Continuous risk=based authentication
- Highly responsive threat management
- Non-repudiatable customer consent

- Security process modeling, testing, operations and monitoring

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ZETTABYTE ERA INSURANCE TRANSFORMATION: WILL PEOPLE OR MACHINES RUN THE SHOW?

THE GOOD NEWS

We are a long way from an autonomous insurance underwriting AI

WHY?

- Companies won’t trust an AI with unsupervised decision making
- Regulators require transparency into decision making
- Machine learning algorithms (like deep learning) can be highly opaque

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MORE GOOD NEWS:
How will AI/ML algorithms be used?

AI/ML “Intelligent Assistants” will complement human decision making

OI ASISSTANT ALGORITHMS WILL:

- Help customers reduce risk and loss
- Provide input scores for dynamic pricing adjustments
- Identify patterns associated with fraud

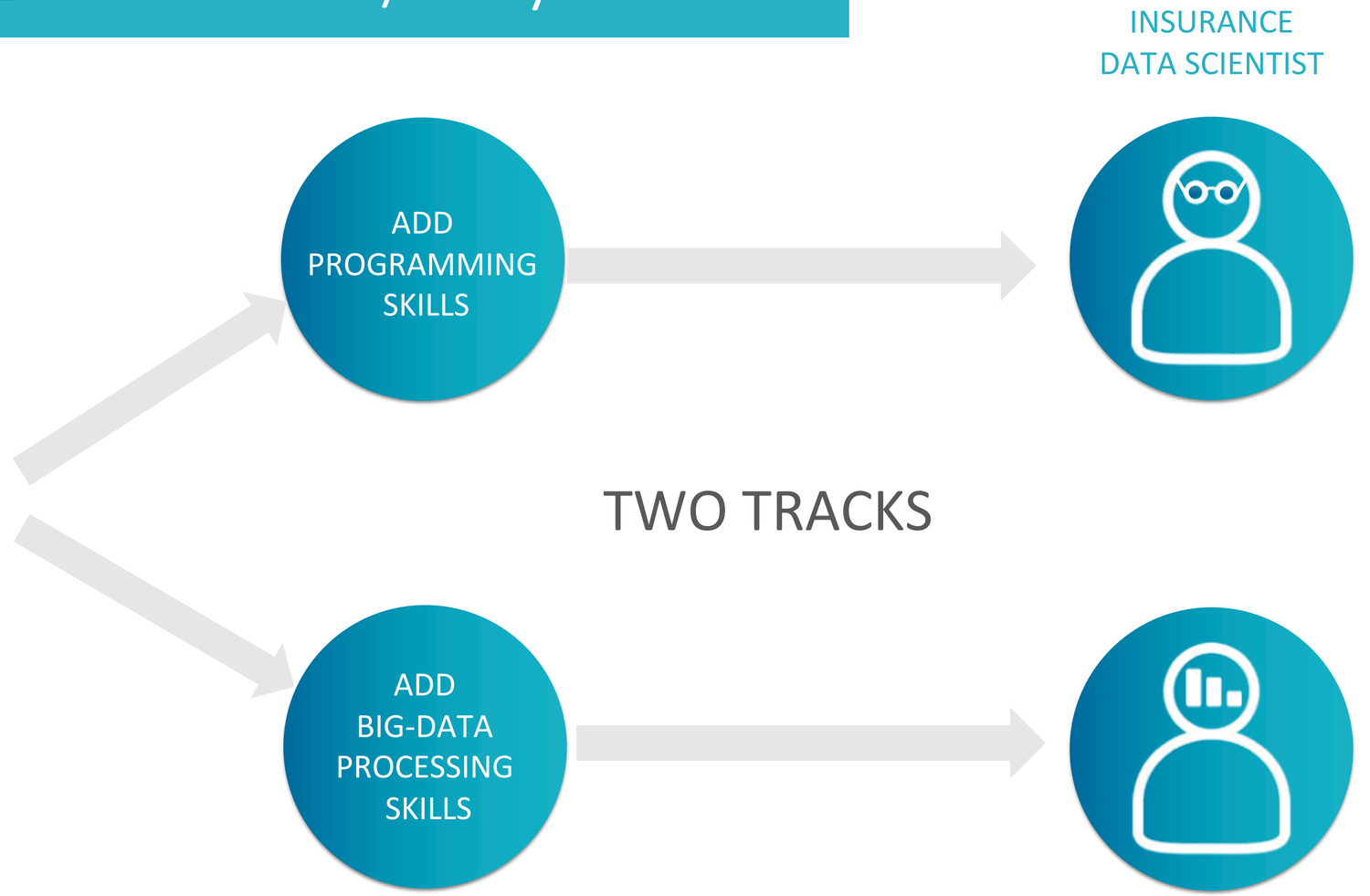
BI ASSISTANT (COGNITIVE COMPUTING) ALGORITHMS WILL:

- Identify patterns and trends could be missed
- Predict potential outcomes
- Advise on pricing strategies to achieve business goals

Even more good news:
Actuaries make excellent AI/ML data scientists/ analysts

ACTUARY STRENGTH:

- Mathematics
- Statistical analysis
- Financial theory
- Understanding of domain



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NOW THE BAD NEWS:
(Which is not really bad news)

As AI algorithms for reducing operational risk become more accessible, more companies may self-insure

- Traditional risks will be more easily managed directly by the customer
- But customers will now need operational self-insurance help
- New / less manageable risks will emerge – creating new insurance opportunities

ZETTABYTE ERA INSURANCE TRANSFORMATION: RECOMMENDATIONS FOR THE FUTURE

How to prepare for disruption?

The only certainty is that the rate of disruptive innovation will continue to increase.

Develop a mindset focused on three things:

VARIETY:

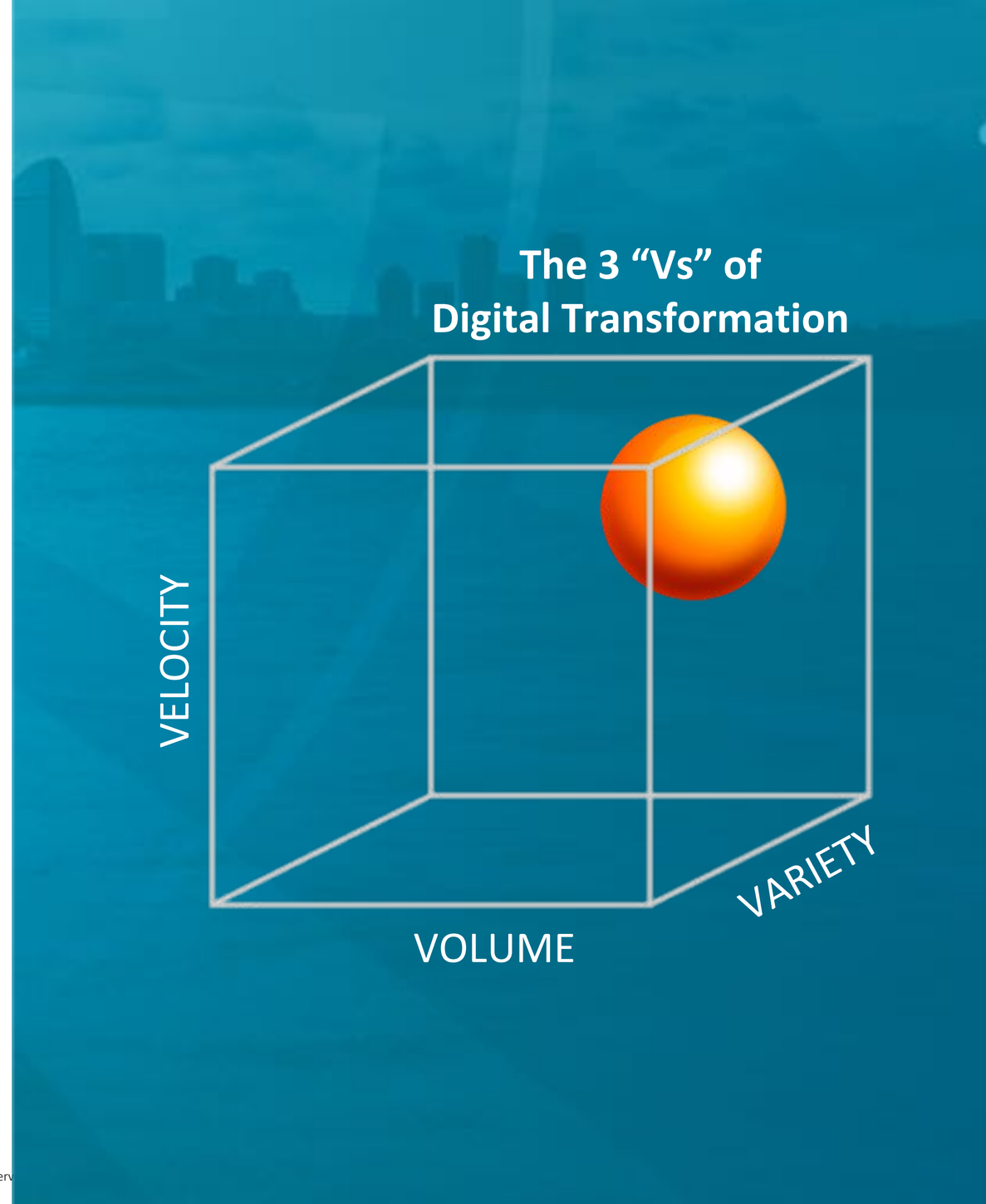
Experimentation is the key to success. Be bold!

VELOCITY:

Move fast. Fail fast.

VOLUME:

Be prepared to scale out.



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Transforming the business:
Upgrade IT Data Infrastructure

- Deploy a streaming data ingestion platform (for IoT and non-IoT data)
- Implement a data lake and big-data processing infrastructure (on private or public cloud)
- Deploy high performance, big-data self-service analytics tool (for OI data analysts)

Transforming the business:
Upgrade IT Security

- Deploy identity proofing and continuous risk-based authentication technologies
- Upgrade vulnerability awareness and threat management technologies
- Employ Robotic Security Process Monitoring (RSPM) technology

Transforming the business:
Upgrade Workforce Skills and Tools

- Build an insurance data science organization - with augmented programming skills and tools
- Build an OI data analyst **organization** – with tools designed to leverage AI/ML models and produce timely insight to stakeholders and customers
- Empower traditional teams to consume advanced analytic insight in a self-service manner

Transforming the business:
Create and Insights-as-a-Service Product Business

- Deploy and insights monetization platform
- Develop a data/insight partner ecosystem
- Develop and insights innovation process

Transforming the business:
Offer innovative new products to grow the business

The only thing better than being covered for a loss is avoiding the loss entirely!

For example:
Offer enterprise customers risk reduction insight-as-a-service

- Help your customer manage operational risk continuously
- Connect to customer devices and datasets and provide timely insight to prevent loss
- Offer insurance rebate incentives for risk reduction
- **These services will offset revenue losses from price erosion in traditional areas**

Final Recommendations

Preparing for the "Zettabyte Era" is a digital transformation journey – not a destination

- Choose an experienced technology partner
- Look for early wins / opportunities
- Use an iterative implementation process – "Rome wasn't built in a day"
- Don't just transform technology. Transform culture!

QUESTIONS

THANK YOU