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IOT & CORPORATE PRODUCTIVITY

IN ACTION

A WHITE PAPER BY
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CONTENT

INTRODUCTION

Over the last few years the Internet of Things (IoT) has been one of these cool acronyms that must be in every IT leader PowerPoint presentation. But, as of today, that cool acronym has evolved into multiple solutions for the workplace.

There's an important list of technical concepts within IoT mentioned in my blog, "Analysis of IT Trends & Predictions for 2017".

The revolution of the synergies with IoT and Artificial Intelligence (AI) will drive the evolution of future connected devices. Let's start with the basics of IoT and how this concept became a reality with an unknown number of corporate applications.

THE DAWN OF THE INTERNET OF THINGS

What Came First?

Some may count ATM's (circa 1974) as the first Internet of Things objects, but I disagree. I think honor belongs to Carnegie Mellon University. In 1982, students connected a Coke machine to the internet –becoming the first internet-connected appliance that reported inventory and whether newly loaded drinks were cold.

Thirty-five years later, the evolution of the internet and the cost of connectivity has decreased so much that "things" can be connected to the internet without a big cost. In addition, the smartphone explosion has helped enable IoT as we know it today.

CARNEGIE MELLON UNIVERSITY
COKE MACHINE

IOT EXPLAINED

What Exactly is The Internet of Things?

IoT, in plain English, is any device with an on-off switch that is connected to the Internet. This includes any shape or form of device from cellphones to wearable devices—and everything in-between.

It also includes small components that may be part of a bigger object. I love the example of the Oracle Team USA where 1,000 points of data (including external sensors) are feeding hundreds of gigabytes of information which is being analyzed in multiple critical applications such as:

- Real-time feedback to sailors
- Course planning and race playbooks
- Yacht design
- Deep analysis and research

THE INTERNET OF DAVE

Another interesting example is how IoT and Big Data were used with David Haase, a four-time top American finisher in the Race Across America (RAAM). The IoT that equipped the cyclist were about 9 objects in addition to local weather data. All of these devices provided information about Dave's:

- Speed
- Cadence (or RPMs)
- Power
- Core and skin temperature
- Heart and breathing rate
- Upcoming weather changes and storm alerts

This leads to an open question—how will IoT change the future of high performance sports?

The Internet of Dave
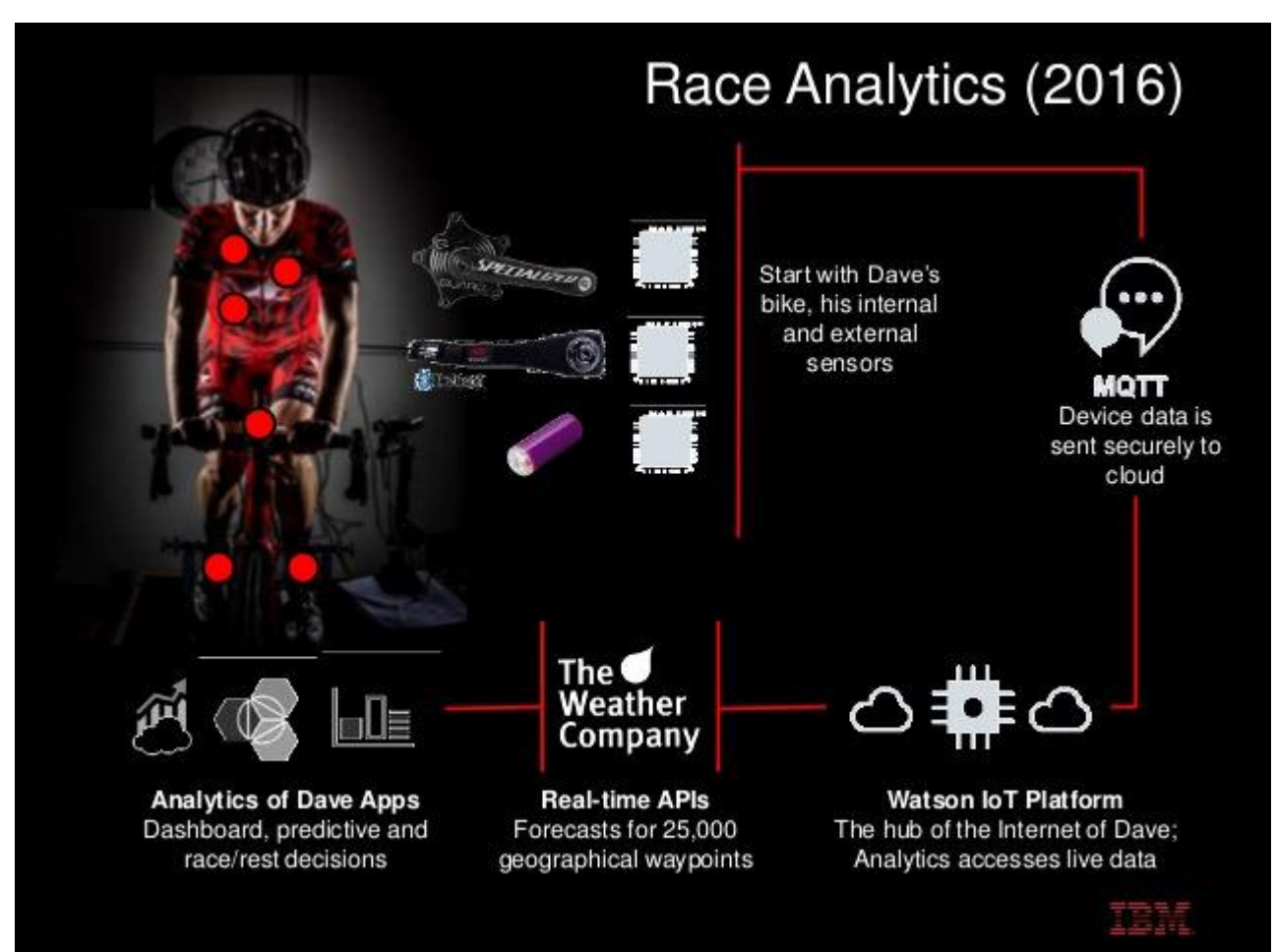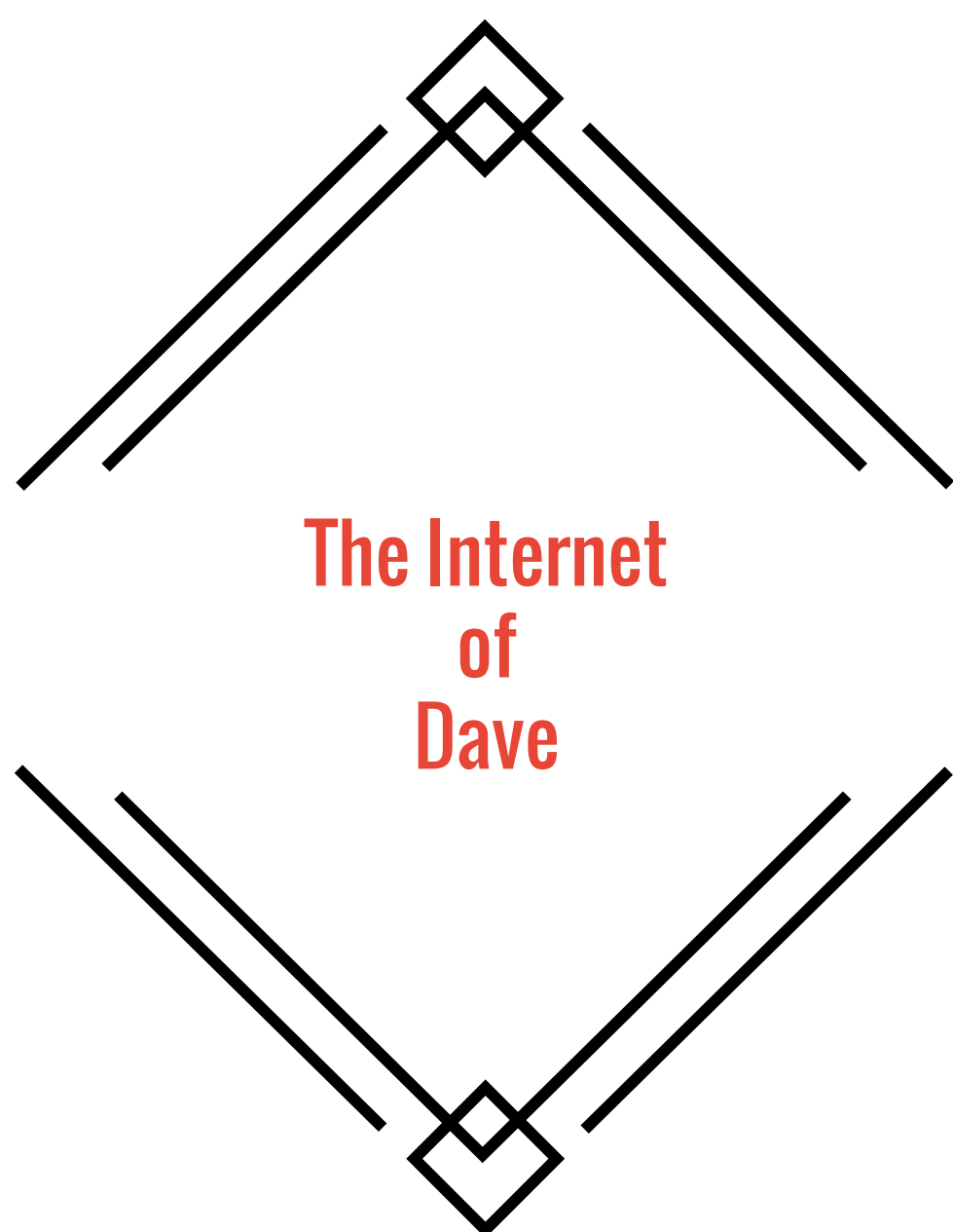
But, IoT is not limited to sensors. They might be also responsible for actions such as bulbs or locks, as well as purchasing habits in a store by tracking the smartphones. Furthermore, there's a concept of "Internet of Living Things" (IoLT) that describes networks of biological sensors to study DNA or other molecules.

Below is an infographic from Libelium showing a futuristic view of a Smart World with IoT.
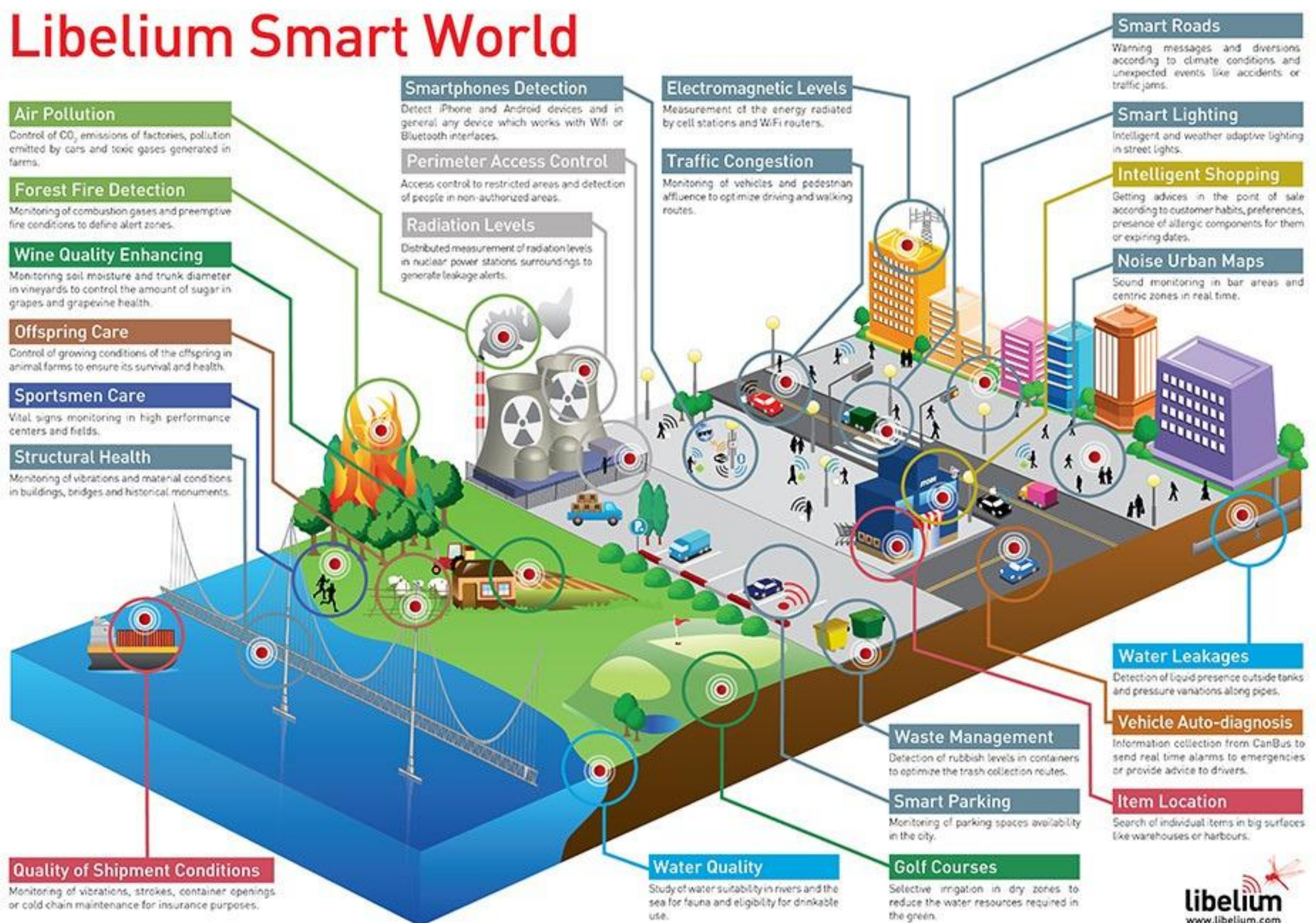
THE WIDE WORLD OF IOT

Moving into the statistics and research of IoT, Gartner has anticipated that in 2017 there will be 8.4 billion connected devices in use. And, by 2020 will reach 20.4 billion.

Category	2016	2017	2018	2020
Consumer	3,963.0	5,244.3	7,036.3	12,863.0
Business: Cross-Industry	1,102.1	1,501.0	2,132.6	4,381.4
Business: Vertical-Specific	1,316.6	1,635.4	2,027.7	3,171.0
Grand Total	6,381.8	8,380.6	11,196.6	20,415.4

Source: Gartner (January 2017)

Exploring the table above from Gartner, it is very important to understand the applications and use of IoT. Consumer will be the largest category of use, but the adoption in the corporate environments –as it becomes an ROI, and realistic, driven investment- will increase at a 30%+ pace. This is one of the biggest opportunities to enterprises presented since the dawn of the internet age. But, this opportunity also comes with many challenges. With billions of devices being connected together, IoT opens up companies all over the world to more security threats.

Let's explore how you can get started or expand your adoption of IoT in your organization.

HOW TO GET STARTED WITH IOT

The first step is to define the strategy which –based on what I will later explain- and requires one to "think big" on IoT. Our recommendation is to try to start identifying requirements based on your organizations low hanging fruit and map it to your ultimate business goals and strategy.

Organizations should begin with the detection of events or problems that are discoverable with the use of IoT. Based on those findings, you would then work on the data that needs to be collected to acquire insights that can help your business to create consequences based on the data. Because the volume of data can be big and the insights could be even bigger, you're in the perfect scenario to create comparisons that will directly impact productivity.

An IoT strategy does not apply only to big corporations with expensive production lines or logistic structure—it applies to every organization with a pain point and a need for better information.

It is very common for small and medium size organizations to rely more on people watching robots in the production line and communicating to the supervisors when something unexpected happens than exploring opportunities of automatic communication. With automatic communication, in the case of a failure in the quality models, an online sensor is triggered and sends a message to the ERP (for example Oracle E-Business Suite) that will prompt further inspection.

HOW TO GET STARTED WITH IOT

The new paradigm on the Internet of Things era for industries is based on these pillars:

- Digitalization: converting from manual processes through automation
- New Business Models: understand new opportunities driven by technology
- Agile supply chain: online communication with suppliers
- Reduction of Total Cost of Ownership: lower operations by staying ahead of product maintenance

The internet of things (IoT), Big Data and Artificial Intelligence (AI) are going to be the drivers of the new Internet of Industrial Things.
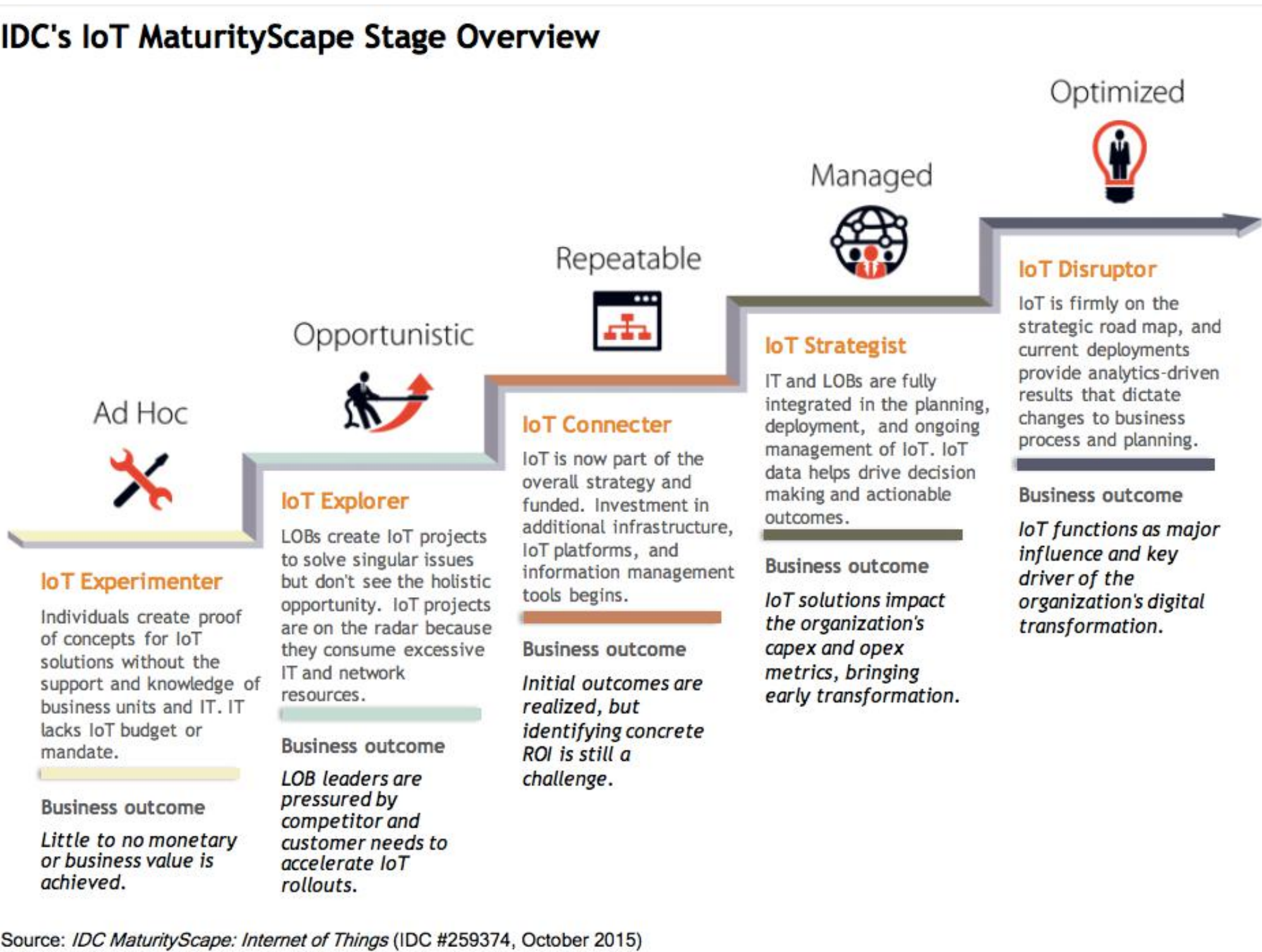
According to Frost & Sullivan, the major roadblocks for the Internet of Industrial Things are taking the theory into practice, especially with regard to return on investment which, through the lens of Industry 4.0, will possibly help organizations find a stronger financial justification.

While evaluating the ROI in an IoT project, no matter the size of the company and the level of automation, the key question organizations should ask is what are you going to track? In an Oracle IoT Blog, Supreet Oberoi states that a small manufacturing company looking to IoT to evaluate if the robots are running, which could be done simply by someone watching and texting to the supervisor, is like setting an IoT device to learn if your car is running or not.

This is why I said that thinking big is important. The questions you ask and insights that you gain are going to drive the ROI showing historical information, predictive data, comparative, average metrics, etc. The list could be unlimited and depends on the IoT device capabilities and the platform to digest it.

HOW TO GET STARTED WITH IOT

In the figure below, there's an overview by IDC on "IoT MaturityScape" that delineates the stages of IoT adoption and a framework for mapping their own state.

IDC's IoT MaturityScape Stage Overview

Ad Hoc

IoT Experimenter
Individuals create proof of concepts for IoT solutions without the support and knowledge of business units and IT. IT lacks IoT budget or mandate.

Business outcome
Little to no monetary or business value is achieved.

Opportunistic

IoT Explorer
LOBs create IoT projects to solve singular issues but don't see the holistic opportunity. IoT projects are on the radar because they consume excessive IT and network resources.

Business outcome
LOB leaders are pressured by competitor and customer needs to accelerate IoT rollouts.

Repeatable

IoT Connecter
IoT is now part of the overall strategy and funded. Investment in additional infrastructure, IoT platforms, and information management tools begins.

Business outcome
Initial outcomes are realized, but identifying concrete ROI is still a challenge.

Managed

IoT Strategist
IT and LOBs are fully integrated in the planning, deployment, and ongoing management of IoT. IoT data helps drive decision making and actionable outcomes.

Business outcome
IoT solutions impact the organization's capex and opex metrics, bringing early transformation.

Optimized

IoT Disruptor
IoT is firmly on the strategic road map, and current deployments provide analytics-driven results that dictate changes to business process and planning.

Business outcome
IoT functions as major influence and key driver of the organization's digital transformation.

Source: *IDC MaturityScape: Internet of Things* (IDC #259374, October 2015)

Given these aspects of "How to get Started" with IoT, a trusted advisor such as IT Convergence can partner with organizations to help look for opportunities that exceed a floor plant or typical cases of Internet of Things applications. Thinking outside the box can lead to new areas and possibly create revenue streams that were never before considered.

IMPLEMENTATION

Assuming you have selected the process within your organization that allow you to take a good chunk of insights, the ROI is clear, and the multiple questions you've anticipated can be captured by the IoT object, you are ready to implement.

There are many IoT Platforms in the market and some of the important metrics to compare in the selection process are:

- Integration
- Data Enrichment
- Data Storage
- Data Visualization

The integration is a series of adapters that allows a connectivity between IoT data and events to applications and process flows. It needs to include APIs and Command & Control. A good example is how you can use Oracle Cloud IoT and seamlessly integrate with Oracle Cloud PaaS, SaaS and Oracle Applications (such as Oracle E-Business Suite) unlimited through REST APIs.

Data Enrichment is the process by which programming logic can be used to trigger some action when an event occurs generating composite streams. This is connected with the data store so the amount of data can be queried enabling for Big Data analysis.

IMPLEMENTATION

At IT Convergence labs, we've been experimenting with Oracle Internet of Things (IoT) Cloud Service. It provides the capability to analyze massive amounts of IoT-related information, at scale, from connected devices in real-time. One of the best advantages against the competitor is how flexible topologies for devices can be connected using client library, gateway software or directly using REST API.

A big advantage when selecting Oracle IoT Cloud Service is that its agnostic view of the device type does not create an entry barrier.

The options for connecting are:

- Client Libraries: available in source and binary form under open source license, these components are available to the device developer to include within their device applications to enable secure, reliable connectivity of their device with the Oracle IoT Cloud Service. Client Libraries are available for a variety of platforms including C Posix, Windows, mbed, Java, Android, Javascript or iOS.

- Gateway: a ready to deploy Java SE-Embedded Application for gateway class devices running Java SE Embedded (included). The application provides a full set of capabilities for reliable and secure messaging, and also includes a device adapter framework to enable the capture and connectivity for devices not able to connect directly due to protocol support (eg: Bluetooth, ZWave, Modbus, OPC) or for security reasons.

- RESTful APIs: for development requirements not addressable by the Client Libraries or IoT CS Gateway, the services of Oracle IoT Cloud Service are exposed as a set of RESTful APIs.

IMPLEMENTATION

As mentioned before, security is a big topic. All connected endpoint and devices through Oracle IoT Cloud Service are uniquely registered and authenticated, according to policies set by the user and implemented using OAuth2. In addition, all messaging encrypted using HTTPS.

In order to make things even easier for companies to adopt IoT and look for opportunities to maximize ROI, Oracle has developed some Internet of Things Applications which are prebuilt solutions and include predictive, machine learning algorithms and extendable core process with real-time IoT data and insights.

These IoT applications are:

IoT Asset Monitoring Cloud
o Track any asset, anywhere, anytime, indoor or outdoor, and achieve ROI in days
o Instantly transform assets into digital twins, and intelligently monitor the assets' health, location, and utilization
o Predict asset and equipment failures before they happen, and minimize the unplanned downtime
o Optimize the enterprise supply chain and improve customer experience with intelligent IoT insights

IMPLEMENTATION

IoT Production Monitoring Cloud
o Leverage best-in-class production monitoring for factories, products, and machines
o Gain real-time visibility through the digital transformation of factories and operations
o Improve machine and factory uptime with machine learning models
o Integrate seamlessly with manufacturing and supply chain systems, enabling you to act on decisions without doing manual entries

IoT Fleet Monitoring Cloud
o Get real-time vehicle location, status, and health—all at your fingertips
o Instantly connect your fleet and digitally transform your logistics operations
o Improve customer experiences with better ETA predictions and its impact on the supply chain
o Built to optimize transportation and logistics processes

IoT Connected Worker Cloud
o Real-time visibility into work environments at a worksite manager's fingertips
o Score and improve effectiveness of safety procedures and policies
o Improved regulatory adherence through accident prevention using wearable and proximity sensors
o Manage workplace incidents to improve wellness, and automate time and labor tracking to enhance productivity

This would be the best, easiest and safest path to embrace IoT swiftly since it provides out of the box integrations with Oracle Cloud SaaS applications in SCM, CX, HCM and ERP. These integrations are not limited to Oracle Cloud SaaS and any on premise application could be integrated leveraging all the benefits of a robust IoT platform.

CONCLUSIONS

IoT continues its path with a constant evolution defying Metcalfe's law with some variations every moment that a new IoT object gets connected given the inexpensive value, easy assembly, and easy-going integration for insights.

The first step is to understand where the introduction of IoT will make sense—understanding where the true value and return on investment (ROI) resides. As stated in the document, thinking big is how your organization can gain the most benefits. Lastly, organizations should consider Cloud as an enabler for a lean and fast deployment approach.

As Cloud, whether is on platform or service, gives the flexibility and speed to deploy complete solutions, development cycles need to be short and incorporate breakpoints along the way to track the progress and how the long term (or big thinking) is aligned.

The IoT strategy needs to be complemented by a complete view including big data and analytics to provide the insights that you need. In addition, organizations need a trusted partner that brings the knowledge of implementing the right technology with the appropriate business background.

If your organization is starting the path to IoT, IT Convergence can help you. Let's have a one-to-one meeting so we can help you create a master plan on your next Internet of Things project.

Contact us at contact@itconvergence.com

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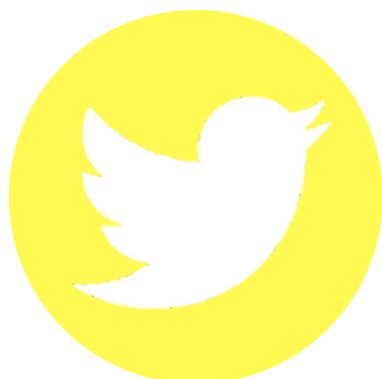
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