The Cloud of Things

VITRIA®

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IDC predicts the Internet of Things will generate 4.4 Billion Gigabytes of data to the cloud by 2020.

IoT devices are becoming ubiquitous. Gartner, Inc. forecasted that 8.4 billion connected things would be in use worldwide in 2017, up 31 percent from 2016, and would reach 20.4 billion by 2020. Used in every industry, they range from mobile tablet devices for claims adjusters to metering devices for utilities, and sensors on refrigerators, all connected to the internet. The impetus for IoT is to improve productivity, reduce cost, minimize risks, and streamline processes. Garter asserts that IoT is the technology foundation on which a digital business is built and forecasts that IoT will add $1.6 Trillion into the worldwide economy by 2020.[1]

Without Analytics, IoT is meaningless. An IoT solution requires embedded technology in the IoT device, the ability to analyze the data generated from the devices, and the ability to consume the information generated to take intelligent action either automatically or through human intervention. For many IoT applications, gaining the data value is dependent on this streaming data being analyzed and acted upon in real time. Taking the preventative action required to address and react to a potential utility failure before it impacts revenue, the customer experience, and bottom line profit is a good example. The torrent of machine data generated from sensors and devices contains a wealth of information and insights but it must be mined to deliver value.

The Cloud of Things expresses the integration and symbiotic relationship between IoT devices and the elastic compute and storage capabilities of Cloud. IoT applications benefit from cloud's unlimited resources and capabilities and cloud benefits from IoT by extending its scope to support the management of business processes more dynamically, in a distributed way.[2]

Integration of IoT and the Cloud is critical given the volume of IoT data that must also be stored and analyzed and the need to develop smart IoT applications. The elasticity of the cloud enables rapid scaling and affordable storage and analysis of vast quantities of real-time, streaming data.

The Business Value for the 'Cloud of Things'

Business intelligence obtained through the Cloud of Things will become the digital company's competitive advantage. The data flow and what is done with this data is the intellectual property that supports process automation, personalizes the customer experience, and enables organizations to take actions based on highly accurate, comprehensive information.

In the past, companies have lacked data availability and the ability to act on information in a timely manner. With real-time visibility, insights, and actions, a company can improve operations on the fly. Whether it's increased revenues through supply chain efficiency, improved customer experience through self-healing networks, or increased manufacturing yields through predictive maintenance, real-time data analytics is the key to a sustained competitive advantage and accelerated innovation.

Using the scalability and compute power of the cloud along with sensor data from Internet of Things (IoT) and real-time data analytics, transformation is happening now for business operations across industry segments from manufacturing to retail, from medical services to transportation.

Challenges with the Cloud of Things

The business benefits are great but execution does not come without data, security and compliance challenges.

Data challenges

IoT data can be structured or unstructured. There are no standards currently in place for IoT sensor data. Streaming data is vast and fast moving. Any solution must have the ability to ingest large volumes of streaming structured and unstructured data and be able to combine these data streams for real time analysis.

Dealing with the disparity of data is a challenge. Examples of the disparity of IoT data abound. Data time-stamps might differ in format and granularity. Data schemas vary by manufacturer, device and even age present challenges establishing a common format. Before disparate data streams can deliver value, it needs to be combined and overlaid for analysis to be implemented. Rapid analytics delivers higher value and manual data cleansing is not feasible. Historically, some IT organizations report that 80% of the time spent on data analytics is allocated to manual data cleansing or "data munging".

Most use cases require real-time analysis to deliver value. These use cases involve anomaly detection, unexpected events outside the norm. Examples of this include: fraud detection in lines of credit card transactions, machine alerts identifying potential issues, or intrusion detection behaviors among machine logs. Batch processing of streaming data by definition does not suffice to deliver real-time analysis. The Cloud of Things analytics need to be real-time, and often need to include complex machine or deep learning regressions.

The ability to economically capture and store this vast quantity of streaming data for aggregation and learning is also required. Each steaming data point by itself is worthless but aggregating this data over time can provide learnings that can improve the ability to predict events and automate the appropriate responses.

Security and compliance challenges

Balancing the opportunities of the Cloud of Things with potential security challenges is a recognised challenge. Gartner's 2016 IoT Backbone Survey showed that 32% of IT leaders cite security as a top barrier to IoT success.[3]

Some organizations remain fearful of hosting their data in the cloud, but many enterprises have realized that hyper scale cloud providers such as Amazon, Google and Microsoft have deeper security resources than they have in-house. So, their data might actually be safer in the cloud than in their own datacenter. That said, it remains the responsibility of every organization to secure their applications. Servers need to be hardened, penetration testing done, web application firewalls installed, and intrusion detection and prevention systems with 24/7 monitoring need to be in place.

Public cloud providers offer application and data hosting in multiple geographic regions. Data hosted in a country such as Germany will come under German law, which can differ greatly to American legal requirements. Consideration then must be given to the regulatory environment when it comes to Cloud of Things analytics. HIPAA, PII, GDPR and other data regulation measures can affect every company, regardless of size or sophistication when hosting data in the cloud and serving it to users worldwide.

Access control, who can log into the system is also a critical element of security. User authentication, granular permissions and password policies are all standard access control disciplines, but they become more important when an application sits beyond the corporate firewall.

Insecure passwords and unchanged root admin accounts can expose analytics systems and all the company's valuable data to unauthorized access.

Consistent and timely actions is needed when security updates and patching is required across the entire IoT solution. Failure to harden and patch all appropriate elements of the IoT solution is one of the primary causes for security failures.

As the Department of Homeland Security states, "risk models differ substantially across the IoT ecosystem, as do the consequences of security failures. Focusing on the potential consequences of disruption, breach, or malicious activity is critical for determining where in the IoT ecosystem particular security efforts should be directed."[4]

Point vs General Purpose Cloud of Things Solutions

Point solutions provide the devices, collect the data, send the data to an IoT platform and provide the users with API access. These point solutions typically solve a specific business problem. They can be rapidly implemented to deliver value quickly but the downside is that they are unlikely to integrate well with other business systems. Multiple point solutions may eventually be needed and these are also likely to require integration with each other.

General purpose solutions accept data from any device and they are built for integration. They are able to support multiple applications. The downside is that because these platforms are not addressing a single business problem, organisations need to have the capabilities and skills in-house or source the data scientists needed to build the IoT applications your organizations need.

To overcome this challenge and meet the needs for rapid time to market, development teams need visual development tools that can dramatically increase programmer productivity and streamline the development of the core analytical building blocks of an IoT analytics application. And, these tools should be accessible to citizen developers and power analysts. The general-purpose solution chosen should include these capabilities.

Most organizations are evolving so quickly they don't know tomorrow's questions. They need a flexible analytics platform which can adapt and evolve as they do.

Tips for success

Get started now. Take an agile approach. Build an analytic baseline data frame in sprints layering up the model. Get the insights into the hands of the operations team quickly and then continue to add data sources. The context will get richer, the regressions more accurate and visualizations easier to interpret. This helps build consensus internally, increases buy-in from lines of business, and delivers a faster time-to-value.

Build on what you have. Most organizations have a huge investment in current systems, whether a CRM system, or a solution for call management. Instead of building a new dashboard for those operators to use, make their current dashboards better. For example, let's take agents working on customer support in a contact center. They'll be monitoring the queues with support tickets, trying to manage response times. Perhaps they have a few queues for different channels, such as phone, text, social media, or for different product lines. In trying to improve response times to key customers, it's best not to introduce a new VIP queue to watch, but to integrate this data into the current support software. This avoids retraining, transition projects and overhead. Instead, the

agents get better data about which customers to prioritize, and the analytics stay in the background. Then, later, the analytics frame can start to match agents with tickets based on how likely the agent is to know the answer, or how well the agent might get along with the customer. Each iteration improves the service to the customer, enhances the efficiency of the contact center and avoids the forklift replacement of familiar systems.

Avoid the lure of the point solution. Choose an analytics platform that will support multiple applications and integrate with your existing business processes. Choose a solution that enables you to build applications without the need for highly specialized data scientists.

VIA by Vitria

Vitria is the leader in Cloud of Things analytics. VIA by Vitria is both a complete analytics solution and a general-purpose analytics platform. It provides operations and the lines of business they support a way to transform streaming data from the IoT into near real-time actions that improve business outcomes. VIA puts the power into the hands of line of business and operation users, empowering them to materialize real-time analytics value in days, not months, and providing them the agility to evolve their solutions as fast as the business evolves.

The VIA Platform includes:

- Fast data ingestion and integration
- Advance analytics - real-time, trend, predictive and prescriptive
- Visualization engine
- Intelligent action automation

VIA is flexible, operationalizes in weeks and quickly adapts to changes in the business requirements as well as to changes with the data flows. The scalable platform features a highly efficient, programmable ingest layer that doesn't require specialized data science skills or knowledge of complex coding. This lowers the overall cost to implement and maintain.

VIA 's productivity is achieved through its interactive visual modeling environment which uses a library of drag and drop, configurable building blocks to define the analytics process. While customers leverage VIA's growing library of building blocks, VIA also includes an SDK for developing new building blocks. VIA's low code/no code development environment lets organizations get started quickly and rapidly build or modify existing IoT applications.

The VIA analytics solution from Vitria also integrates with existing workflows and big data investments which speeds both integration and deployment.

The VIA IoT Analytics Platform allows organizations to:

- Gain the real-time process visibility into end-to-end performance business processes
- Manage processes by exception in real-time
- Take automated or semi-automated actions based on process analytics, including predicted process paths.
- Implement solutions rapidly with VIA's model-driven Visual Development Environment that is easy for power users and business analyst to use.

Let's look at a few examples where VIA has delivered value.

Situational Marketing: VIA provides real-time situational analytics on key metrics including cellular and Wi-Fi subscriber activity in the network. As wireless subscribers use services, their behavior, service consumption and geospatial position can be evaluated continuously in real-time. Telecom providers leverage VIA to offer data roaming, customer specific services, and promotions based on their profiles and location.

Differentiated Customer Experiences: Different tiers of subscribers require different levels of service. VIA is enabling our telecom customers to ensure that the best customers receive the best possible service when network performance becomes an issue under certain network conditions or particular locations.

Real Time Operations: VIA's operational analytics enables our utilities customers to manage operations more easily and effectively by highlighting critical exceptions in real-time. VIA provides operational analysts and managers with the tools to pinpoint which operational events and activities are real and prioritize these to ensure more reliable services for their customers.

Predictive Maintenance: Far flung utility networks include a wide range of complex equipment and legacy devices that need frequent service. VIA enables utilities to lower costs and improve reliability by predicting maintenance requirements. Continuous analytic evaluation and predictions help operators to prioritize, predict and remediate operational issues via automated or semi-automated response.

VIA is a complete analytics solution that leverages platform functionality capable of visualizing, analyzing and acting on streaming IoT and machine data, as well as batch data, with machine learning and APIs. Unlike point products or platform tool kits that limit customization or require complex coding, VIA uses our low code / no code development environment to improve business outcomes and speed time to value. Contact us today for a demonstration.

[1] Internet of Things: The Foundation of the Digital Business, Webinar, Gartner, Inc.

[2] Special Issue on "Cloud of Things", Elsevier

[3] Internet of Things Primer for 2017, Gartner, Inc., 23 January 2017

[4] Strategic Principles for Securing the Internet of Things, Department of Homeland Security, November 2016