# Tapping into the potential of **the Internet of Things**

The Internet of Things will disrupt the way how assets are acquired and used by end users. What is the benefit of connecting equipment used by businesses? What is the Internet of Things and how does it relate to telematics? This whitepaper aims to help you to understand what Internet of Things can mean for your business through providing a series of real case examples.

## See what counts.

# Introduction

Today's manufacturers[1] are continually faced with new technologies, each promising to revolutionize the way they do business. Recent tech trends such as Big Data, Digitization and Machine-to-Machine connectivity have one thing in common: data. The Internet of Things (IoT) is yet another example of an emerging data-centric technology with manufacturing industry applications.

Simply defined, IoT uses connected devices to create customer and business value. Many manufacturers are convinced that IoT has the potential to greatly impact their business. It will make manufacturers better at the things they do by enabling them to provide better customer service, new and innovative products, digital tools and enhancing their competitive position in the market. However, many manufacturers also struggle with defining what IoT means for their organization and using it to its full potential.

Sensors are the driving force of IoT. In an age when almost everything can be measured, businesses no longer have to make assumptions of what the real world looks like, but can rely on accurate and immediate measurements to adapt their businesses and products to best fill customers' needs.

These measurements are taken by sensors. GPS sensors allow manufacturers to remotely track the location of their assets, while other sensors measure temperatures in different locations or remotely read hour meters. Every asset  which is or has the potential to be equipped with sensors can be connected to the internet and unlock new business opportunities for manufacturers.

This whitepaper includes a series of examples from manufacturers operating in the industries of Construction, Office Equipment, Healthcare, Agriculture, Transportation, Materials Handling and Food. Every industry uses IoT in a different way. This paper offers real life examples of how frontrunners in different industries use IoT applications to improve their business processes. It concludes with a checklist which helps you determine if IoT is right for your business.

**Bluepaper**
A practical paper to inspire and improve our business performance together with our partners.

1. Manufacturers' refer to all companies designing/producing and/ or offering assets to end users.
2. Assets in this paper refer to equipment, devices, systems, units or products produced by a manufacturer.
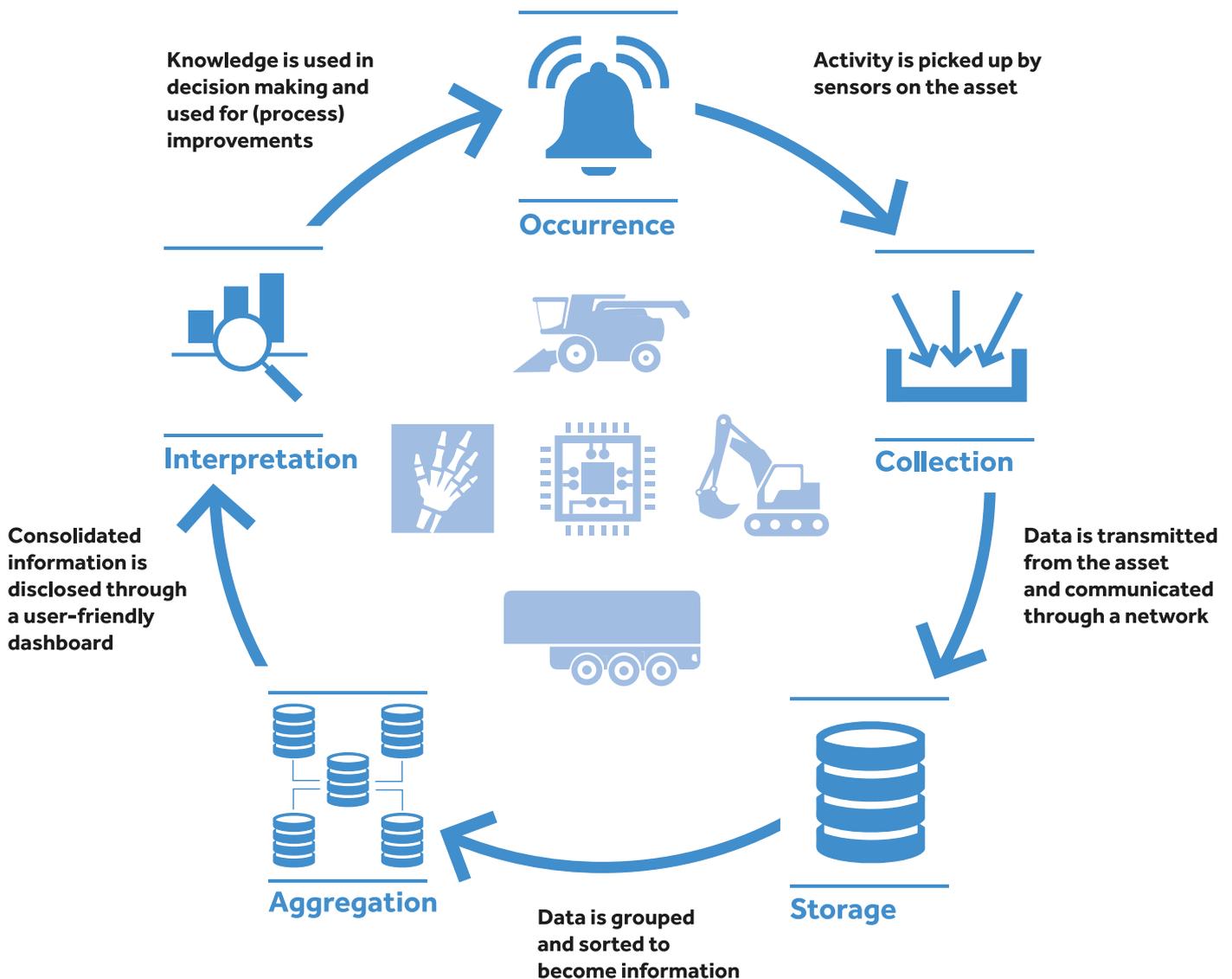
# Introducing the
# **Internet of Things**

DLL defines the Internet of Things as: "The technology that connects assets to a network, applies analytics to the extracted data and provides information to be used in decision making."

Where machine-to-machine connectivity is the process of one asset sending its information to another device, Internet of Things goes further. IoT connects multiple assets through a network in order to compare, learn from and improve the assets. This whitepaper reviews the B2B markets in which assets play an important role.

## Introduction IoT information loop for connected assets

The following illustration shows the five stages of an IoT solution. Each stage describes what is necessary to eventually use IoT for, automated or manual fact based decision making.

**Knowledge is used in decision making and used for (process) improvements**

**Activity is picked up by sensors on the asset**

**Occurrence**

**Interpretation**

**Collection**

**Data is transmitted from the asset and communicated through a network**

**Consolidated information is disclosed through a user-friendly dashboard**

**Aggregation**

**Storage**

**Data is grouped and sorted to become information**

## Occurrence

The IoT information loop for connected assets starts with an occurrence. The Occurrence is an event or action that is detected by sensors on the asset. For example, sensors may detect the level of wear of the breaking system, alerting users when a specific part needs to be replaced.

## Collection

During the Collection stage, sensors send their information to the asset's on-board computer, often a Programmable Logic Controller (PLC) or a multidrop bus. This connection can be wired or wireless, but manufacturers frequently choose the more reliable wired option.

## Storage

To transfer the data to a database, an extra hardware module, usually a modem, must be installed on the asset. This piece of hardware translates the information from the on-board computer to a transferable data file. The modem can be equipped with a SIM card or sends the data using a Wi-Fi connection, necessitating the involvement of modem manufacturers and connectivity partners such as tele network providers. The data is eventually sent and stored in a database owned or rented by the manufacturer.

## Aggregation

Once the raw data has been transferred from the asset, it must be sorted and grouped with other relevant data points in order to translate into information useful to the end user. The aggregation process compares and analyzes the relevant data from other sensor-equipped assets as well as that of financial and historical sources.

## Interpretation

Before the information can assist the end user with decision making, it must first be displayed in a way the user can comprehend. This is accomplished with the use of web-based portals that display the aggregated data in a user-friendly format. The data has been translated into knowledge to support manual or automatic decision making. If, for example, a recurring error is noticed on several other assets, an asset improvement can be made. The asset can be provided with predictive maintenance or the part of the asset that gives the error can be improved during production. The whole loop repeats itself when a new activity is noticed by the asset.

"The ability to access IoT-generated data will likely be a challenge for many firms, which may result in the emergence of a new class of service providers, offering data "subscription" services in the manner of credit bureaus or market data providers. Firms that get ahead of this trend will likely be at an information advantage, where faster, better, and cheaper insight can create opportunities for improved customer experience and operational performance[3]."

**Jim Eckenrode**
Deloitte Executive Director Center for Financial Services

In order to bring the IoT model to life, the following segment presents nine IoT case studies. Each case study is presented with the following structure:
- An introduction of the manufacturer.
- Identification of the "categories" of data that can be extracted.
- How the IoT information loop for connected assets is applied by the manufacturer.
- A description of the IoT offering.
- Benefits for the manufacturer and the end user.
- Focus areas for the manufacturer to further develop IoT.

3.  Eckenrode, J. (2015, October 13). The derivative effect: How financial services can make IoT technology pay off. Retrieved from https://dupress.deloitte.com

# Schmitz Cargobull Telematics

Schmitz Cargobull is the leading trailer manufacturer in Europe and a market leader in the area of Telematics. Since 2004, they started to deliver telematics solutions for all trailer types through their wholly owned subsidiary Cargobull Telematics GmbH. Schmitz Cargobull provides telematics solutions for trailers produced by Schmitz Cargobull as well as third party manufacturers.

## Collected data

**Usage data**
Tire pressure, brake wear, mileage and cool engine status to prevent trailer downtime and optimize driving performance and fuel consumption.

**Trailer temperatures**
To monitor whether cargo is transported at the desired temperatures from origin to destination.

**Trailer body data**
Axle load, door opening and closing, content of fuel tank and coupling status to prevent possible problems during transport.

**GPS data**
To track the location of the trailer throughout the world.

## Application IoT information loop for connected assets

The telematics unit is called TrailerConnect. Data is gathered from sensors on the trailer and sent every 15 minutes to a Schmitz Cargobull database via T-Mobile's SIM network. The data is then extracted from the database and plotted in the Cargobull Telematics portal. The hardware is produced by Bosch and includes the TrailerConnect Interface (TCI) unit and all sensors. To guarantee 100% reliability, Schmitz uses a Local Interconnected Network (LIN) within the trailer, which means that every sensor is connected through wires to the TrailerConnect Interface. For customers who are already using other portals, Schmitz can send the data via APIs to avoid the need for multiple interfaces.

## Offering

A monthly subscription provides transportation companies access to the portal and its underlying data. Cargobull Telematics offers four telematics packages, ranging from the most basic which provides standard data such as GPS and door opening and closing information to the most detailed which provides refrigeration and temperature information on the cooling unit. Fees are calculated per trailer, the subscription can be cancelled with one month's notice and users can choose to be billed on an annual or monthly basis. Cargobull Telematics also provides telematics for other trailer brands. Instead of installing sensors and wires at the point of production, as is done when the trailer is manufactured by Schmitz Cargobull, they are attached post-production and therefore not "hidden" inside the trailer panels.

| | Manufacturer | End user |
|---|---|---|
| **Benefits** | – Enhanced customer offering by providing integrated solutions rather than just the trailer.<br>– Added revenue stream of telematics services.<br>– Increased market reach due to the ability to provide telematics services to customers who use trailers provided by third party manufacturers. | – Access to real-time information of the trailer fleet via a user-friendly portal.<br>– "Evidence of good delivery" in case of disputes around the cargo.<br>– Predictive maintenance information prevents downtime of trailers.<br>– Customers of end users can monitor their freight to assure a good delivery. |
| **Focus areas** | – Transportation companies have to allow Schmitz Cargobull access to cooling unit information through a separate clause in the contract.<br>– Transportation companies are not able to use their own network provider; T-Mobile is the standard supplier for connectivity. | – End users are not able to filter information across a fleet of trailers. This functionality will be available in the new portal, which will be launched in early 2017. |

"End users can never falsely claim that transport companies did not cool the tomatoes at the right temperature as the temperature in the trailer is constantly monitored during transport."

**Roelof Palmers**
Schmitz Cargobull Telematics
Area Sales Manager Benelux

**For more information**
Please visit the Schmitz Cargobull Telematics website:
http://www.cargobull-telematics.com

# The Hyster Tracker

Part of the Hyster-Yale Group holding, Hyster is one of the leading manufacturers in the forklift and telematics market. In 2011, Hyster began investing in telematics and launched the Hyster Tracker in 2014.

## Collected data

**Usage**
View and manage usage by truck, fleet or location.

**Preventative Maintenance Tracker**
A recurring servicing signal alerts user to maintenance needs.

**Access control**
Key cards control forklift usage and prevent unauthorized operation by untrained individuals.

**Event-based data reporting**
Tracks and responds to diagnostic trouble codes and shocks registered by the truck.

**GPS**
Tracks the location of forklifts and monitors whether the trucks are in stationary or operating mode.

## Application IoT information loop for connected assets

Each forklift sends collected data to a remote server via a cellular or Wi-Fi connection. The data is then plotted in the cloud-based Hyster Tracker portal. The Hyster Tracker hardware can be installed on lift trucks from any manufacturer as well as other assets such as agricultural tractors. The telematics device uses a machine identification module (MIM), which is comparable to a SIM module for machinery. In comparison to other assets, forklifts often operate in a fixed location, facilitating data transfer via a Wi-Fi connection. Hyster combines previously-deployed RFID badge systems (such as entrance or work clock cards) with the Hyster Tracker access card, which prevents operators from having to use multiple cards.

## Offering

Three package versions of the Hyster Tracker portal are available for purchase. The level-one Wireless Monitoring package remotely tracks machines equipped with Hyster Tracker hardware in the Hyster Tracker portal. The level-two Wireless Access package adds an access control card and enables automated shutdown of the lift trucks. The level-three Wireless Verification package provides an additional digital checklist that ensures the operator's safety. The Hyster Tracker solution allows dealers and end users to monitor their entire managed fleet, regardless of where each piece is located around the world.

| | Manufacturer | End user |
|---|---|---|
| **Benefits** | – Enables Hyster and their service partners to detect errors before they escalate.<br>– The relative maturity of Hyster's telematics solution gives the company a competitive advantage over industry competitors. | – User-friendly portal enables easy analysis of real-time fleet data that can be customized to fit the needs of the end user<br>– Can now remotely monitor the entire lift fleet over different locations throughout the world<br>– Ability to monitor the use of forklifts increases operator accountability |
| **Focus areas** | | – End users sometimes struggle to balance the requirements of the health and safety regulators and the work council that is protecting the privacy of the operators.<br>– Hyster and its dealer network can provide consulting support in overcoming these hurdles. |

"Hyster Tracker delivers comparable data from the fleet of lift trucks, enabling end users to cut costs and improve productivity."

**Thomas Toenders**
Hyster Telemetry Solution Specialist

**For more information**
Please visit the Hyster Tracker website:
http://www.hyster.com/north-america/en-us/account-services/hyster-tracker-wireless-asset-management/

# Soilmec's Drilling Mate System

Soilmec is a mechanical engineering company belonging to the Trevi group with their headquarters in Italy. They design and manufacture new ground equipment and especially crawler drilling rigs. Soilmec offers with their drilling mate system (DMS) the customer the opportunity to real time monitor their drilling activities. The DMS consists of 3 different modules, DMS onboard, DMS PC and DMS manager.

## Collected data

**Drilling data**
Including amongst others ground depth, concrete pressure and hydraulic pressure to provide the operator, site manager and engineers with real time drilling data.

**Consumption data**
Diesel engine status to see in one overview how much it costs to place a pile.

**GPS**
To oversee the entire fleet in a world map.

**Alarms**
All anomalies from the machine to quickly respond and prevent down time.

## Application IoT information loop for connected assets

All the data on the drilling rig is gathered in the DMS onboard. This is the whole group of electronic devices and instrumentation installed on the asset. The production and consumption data can be transmitted from the drilling rig via a USB, e-mail or a cellular network and is displayed in the DMS PC. The cellular network option sends its information to a database and this option can only be chosen if the customer also has DMS manager. When a customer has a problem which needs to be solved by Soilmec's customer support, the Soilmec mechanic can "dial in" to DMS onboard. Herewith the mechanic can help the customer remotely and intermediately. The customer support mechanic has the ability to take over the DMS onboard via his own pc. The drilling rigs are equipped with a 3g modem which enables the data transmittal to a database or via e-mail.

## Offering

DMS manager allows the customer in addition to only seeing production and consumption data also the possibility to oversee GPS data and machine alarms. Whereas the DMS PC gives the information for the engineers, the DMS manager offers an entire fleet management system. Soilmec offers a standard package where the customer can make use of the DMS onboard and the DMS pc software and the advanced scenario which also includes the DMS manager. The DMS onboard is installed at the point of production or can be installed in a retro fit kit to Soilmec machines. This enables customers to use one system for their entire fleet.

| | Manufacturer | End user |
|---|---|---|
| **Benefits** | – Increased market reach due to the ability to provide telematics services to customers who use equipment provided by third party manufacturers.<br>– The DMS system provides Soilmec with an additional revenue stream and as they are front runner in the market it enables them to sell more piling equipment. | – Fast access to production data and consumption via the DMS PC.<br>– Machines remote connection to real time visualization of DMS on board.<br>– Cost savings as equipment malfunctions can be solved remotely through logging in to the DMS onboard. |
| **Focus areas** | – There is a dependency on the current IT infrastructure of the customer as the customer has to make changes to the settings of the firewall to successfully receive data from the drilling equipment. | – Drilling equipment is sometimes used in "exotic" places where there is not in all cases coverage of a 3G or 4G network, which limits real time data transmission. |

"With the option to log in remotely on a customer's drilling mate system, we can faster and more efficient serve our customer."

**Craig Anderson**
DMS Technical Support

**For more information**
Please visit the Soilmec DMS website:
http://www.soilmec.com/en/products/controls/drilling-mate-system

# Selecta's Coffee Management Telematics

Selecta is a Swiss operator of vending and coffee machines with assets located in private corporate offices as well as public places such as train and gas stations. Telematics are currently available on 10% of their installed base, a number that is growing year over year.

## Collected data

**Usage**
Tracks levels of milk and powder in the reservoirs, signals the merchandiser when cups, coffee or consumables should be restocked and counts the total number of drinks produced.

**Malfunctions**
Monitors door opening status and reservoir fullness as well as other technical errors to inform technicians of machine malfunctions.

**Payment**
Tracks payment methods used and signals the merchandiser to empty the coin reservoir when required.

## Application IoT information loop for connected assets

All Selecta machines are equipped with sensors at the point of production. An onboard computer called the Multidrop Buss (MDB) collects the data generated by each sensor. The data is transferred from the MDB to an online database via a SIM card-equipped telemetry device. Once entered into the database, the data from each machine is then accessible via a portal to Selecta members and a small group of customers. The telematics unit and portal are produced in cooperation with Mikrolab, Nayax and Televend. The coffee machine SIM card is a multi SIM card, which means that it always uses the strongest connection available. Selecta machines can make use of the 3G/GPRS networks of KPN, Vodafone and T-Mobile. If a machine is unable to connect to a wireless network, Selecta can extract the data manually via a telephone with Bluetooth connection. The extracted data will be transmitted to the database when the telephone is reconnected to the network.

## Offering

Access to the portal is not commercially "sold" to end users through a subscription, but used by Selecta primarily for product development purposes in order to better meet the needs of end users. On request of the end user, Selecta can share utilization rates of the machines. This enables companies to swap machines with "excess" usage with machines that are underutilized. For machines that are located in public places, Selecta can use the portal's data to trigger promotional campaigns targeting areas in which machines have lower usage rates. Fault codes exist for malfunctions ranging from minor cup jams to major breakdowns that require servicing of a technician. Although Selecta is increasingly equipping its installed base with telematics, end users must still manually call in to alert the company to machine malfunctions.

| | Manufacturer | End user |
|---|---|---|
| **Benefits** | – Simplifies pay-per-use invoicing<br>– Notifications ensure machines are only restocked and refilled when truly necessary, saving time and resources.<br>– Sensor data allows technicians to more effectively identify machine malfunctions.<br>– Easy to monitor promotional campaign results and incremental sales.<br>– Usage data enables proper fleet management of coffee and vending machines (machines that are under-utilized can be traded for machines that are over-utilized). | – Coffee and vending machines are more likely to remain stocked and in service.<br>– More effective machine management allows for lower coffee prices. |
| **Focus areas** | – Not all extracted data is currently used for product development purposes, but that is expected to improve in the coming years as Selecta builds experience with telematics.<br>– Only 10% of the installed base is currently equipped with telematics.<br>– Service requests must be called in manually and sensors do not allow for automated repairs. | |

"By using telemetry, Selecta enables their customers to immediately gauge the effectiveness of promotions and their impact on sales in the blink of an eye"

**André Bal**
Selecta Business Analyst

# Technogym's Mywellness Cloud

Technogym is the global market leader in fitness and wellness solutions. Their cloud-based customer relationship management (CRM) solution, mywellness cloud, allows gym members to track their own fitness status, gym managers and trainers to remotely oversee the progress of members and gym owners to monitor the performance of individual machines on the floor. The recent release of the android-based UNITY display console further sets Technogym apart as a leader in the digitization for both cardio and strength equipment.

## Collected data

**Member profiles**
Tracks user-specific data such as completed mileage, burned calories and elapsed time.

**Technical data**
Sends alerts when preventative maintenance is required and reports on the downtime of machines.

**Malfunctions**
Tracks and responds to equipment fault codes, reducing machine downtime.

**Usage**
Monitors the usage of equipment, allowing over utilized equipment to be traded for underutilized equipment when needed.

## Application IoT information loop for connected assets

In order for gym owners to remotely monitor their fleet with the mywellness cloud dashboard, each machine must be equipped with a UNITY console, an onboard computer that displays information about the machine in which it resides. Data is transmitted from individual machines to the database via cable or Wi-Fi connection. Once extracted, the data can be displayed on a variety of devices such as tablets, phones and computers, as well as on the equipment itself. Software updates to both the cloud solution and the fitness equipment can be completed via an internet connection. Technogym rents server capacity in the United Kingdom to store data, including profiles and workouts of gym members as well as machine-specific data. All machines use a basic wired LAN network or wireless connection that enables machines to share information and enables gym members to compete with one another.

## Offering

Mywellness is accessible to gym members whenever and wherever they want, providing real-time information about their results from each logged session. Mywellness users can choose to focus on Profiling, Prescription or Motivation within the app. Costs for the solution include the one-time purchase of the UNITY consoles and a yearly license fee to access the mywellness cloud platform, available for one-, three- or five-year terms. Future editions of Mywellness will gather additional personal health data to complement the fitness data currently being collected.

| | Manufacturer | End user |
|---|---|---|
| **Benefits** | – Added revenue stream of cloud services.<br>– Competitive edge due to the maturity of Technogym's solution as compared to competitors.<br>– Machine data can be used for product development purposes. | – Gym staff can provide support based on real-time member data.<br>– Less machine downtime as malfunctions can be detected early and resolved accordingly.<br>– Gym owners are informed when machines require preventative maintenance, decreasing malfunctions and overall downtime of machines. |
| **Focus areas** | – Analyzing information and transforming raw data into customer-friendly graphs remains difficult. While information is reported in a clear and orderly manner, translating that information into something relevant and easy for the end user to understand is still evolving.<br>– Since data transfer speeds are dependent on local network capacities, Technogym cannot guarantee upload times. Furthermore, the wireless connection of gyms is sometimes unstable, often causing connection problems. | – Customers and gym members must be educated to understand the advantages of mywellness cloud. |

"With the cloud solution, gym staff members can determine who requires support based on real-time progress reports rather than intuition."

**Rene Schenkel**
Technogym Network Manager

**For more information**
Please visit the Technogym website:
http://www.technogym.com/gb/business-solution/mywellness-2

# Agrometius' Geobas Soil Monitoring Device

Agrometius is part of the Royal Reesink NV and a reseller of Trimble, Veris and Pessl branded products. Since 2010, Agrometius has also developed its own products and solutions for precision agriculture technology for farmers and greenhouse keepers in the Dutch market. Agrometius products and solutions focus on efficient farming through connected devices and include agricultural GPS systems, yield measurement devices and soil monitoring sensors. This case focusses on the Agrometius GeoBas soil monitoring solution.

## Collected data

**Precipitation**
To measure how much rain has fallen on a particular field.

**Soil moisture levels**
To monitor moisture levels of the soil and optimize irrigation activities.

**Water uptake**
To measure the rate at which crops extract water from the soil and determine when the farmer has to start sprinkling.

**Soil temperature**
To measure soil temperatures and optimize crop growth.

## Application IoT information loop for connected assets

The GeoBas soil monitoring device is solar powered and equipped with sensors and a modem. Data collected by the sensors is transmitted via a SIM network to the Pessl database, which plots the information into the FieldClimate portal, translating raw data into user-friendly tables and graphics. It is equipped with a standalone GPRS modem which sends the data to the Pessl database. If end users make use of third-party portals, Agrometius is able to link the varying portals to one another through APIs to prevent end users from having to access multiple portals. In addition to the FieldClimate desktop portal, there is also an app for Android and IOS to plot the data on a mobile device.

## Offering

Agrometius offers GeoBas Basic, Advanced, Pro and Expert configurations, determined by the number of sensors installed on the asset and the data that can be extracted. Additionally, customers can opt to add a weather station or an insect trap to their GeoBas moisture device. These add-ons can also be connected to the FieldClimate portal via a SIM network to provide real-time information about climate parameters and insect presence.

| | Manufacturer | End user |
|---|---|---|
| **Benefits** | – Enhanced customer retention and incremental revenue and as end users pay a subscription fee to gain access to the FieldClimate portal and sensors are replaced every 5 years.<br>– Stimulates cross-selling of additional modules, such as the GeoBas, weather station and insect trap, for a complete Agrometius IoT solution. | – Adapt quickly to changing weather and soil conditions by having access to real-time data.<br>– Improve yields and save water, fuel and time by only irrigating where and when necessary rather than watering the entire field through a "standard" irrigating schedule.<br>– GeoBas moisture devices, weather stations and insect sensors can all operate independently from one another, allowing farmers to purchase each module when it is right for them.<br>– Enables farmers to take action based on reliable sensor data rather than their intuition or memory.<br>– No connection required to the electricity network due to the presence of the built-in solar panel. |
| **Focus areas** | – Because of the slow degree of technological acceptance in the agricultural sector, farmers need convincing arguments to see the value add of Agrometius products.<br>– Farmers have a "do it yourself" attitude with regards to installation of the GeoBas device, but frequently end up requesting Agrometius' support when installation proves more difficult than they expected. | – Not every agricultural asset type can be connected to the FieldClimate portal (e.g. tractors).<br>– Farms located close to national borders can be hindered in their connectivity as some telecom providers only provide country-specific coverage; farms located in bad connectivity areas may have no coverage at all. |

"Farmers used to put a shovel in their fields to determine whether to irrigate their crops. Nowadays farmers can oversee soil moisture levels of their fields with one click of a button."

**Maarten van Kampen**
Agrometius Marketing Manager

**For more information**
Please visit the Agrometius GeoBas website:
http://www.agrometius.nl/producten/geobas-bodemvochtsensor/

# Netafim's Crop Management Technologies

Netafim is the global leader in smart irrigation systems and crop management technologies. With over 50 years of experience in drip irrigation, the company offers comprehensive open-field and greenhouse solutions for farmers of all sizes. Leveraging advanced technological know-how, Netafim has created a specialized department, Crop Management Technologies (CMT), to integrate its crop management technologies with its leading drip irrigation solutions.

## Collected data

**Soil moisture data**
Monitoring soil moisture levels and optimizing irrigation activities.

**Crop-growing pattern data**
Continuously measuring the crop's life cycle, and anticipating the final harvest's growth, quality and quantity.

**Environmental data**
Analyzing historical data to identify patterns and predict air temperature, wind speed, and rain gauge in order to oversee external impacts on the crop and anticipate irrigation scheduling adjustments.

**Operational and hydraulic data**
Monitoring water levels, fertilizer levels, and valve and pump status to constantly oversee the irrigation process and make intelligent crop management decisions.

## Application IoT information loop for connected assets

Netafim offers a wide range of in-field sensors to provide end users with vast amounts of real-time field and equipment data. Each sensor gathers crop management data, which is then sent via a cellular, BLE (Bluetooth Low Energy) or Wi-Fi connection to a Netafim database where it is plotted in the company's uManage™ portal. Even if the area has poor connectivity, it is possible to extract data manually offline and send it to users once they are in an area with better connectivity. The portal not only gathers data and generates reports, but also enables end users to oversee the entire irrigation system, including identifying trends across their plots.

## Offering

Netafim works closely with end users to find the best solution for managing open-field or greenhouse irrigation. By enabling the company's agronomists and irrigation specialists to analyze data together with end users, Netafim's unique, cost-effective Internet of Things (IoT) offering involves only a one-time investment in equipment and an annual subscription to its value add monitoring services. Netafim recognized that developments in technology and irrigation solutions have created demand for not only irrigation equipment, but a complete crop management solution. Today, the company offers an expanded product portfolio that includes remote water control and field monitoring systems. In the next stage, the company will offer complete irrigation management solutions, enabling crop monitoring, optimization and automation based on gathered in-field and environmental data.

| | Manufacturer | End user |
| --- | --- | --- |
| **Benefits** | – Distilling insights – Aggregation and analysis of the non-private data collected by customers allows Netafim to better serve and advise its clients, providing farmers with data-based best practices and expertise.<br>– Enhanced customer service – Access to data from individual customers allows the Netafim team to provide client-specific solutions and guidance tailored to individual situations, enhancing the level of service and support it provides and increasing customer trust and loyalty. | – Higher yields, less resources – Leveraging real-time crop data allows farmers to increase yields while using fewer resources.<br>– Best practice sharing – End users can share expertise and best practices with other growers through Netafim's end user communities, and eventually directly through their irrigation management platform.<br>– Flexible connectivity – End users located in rural areas with poor connectivity can work offline; data is stored and sent when a connection becomes available. |
| **Focus areas** | – While it is more feasible than ever to fully automate irrigation (automatically initiating watering when sensors indicate it is needed), many farmers still challenge its validity and prefer to maintain control over the irrigation process (i.e. semi-automated irrigation). | |

"Netafim, with the huge amount of agronomic knowhow, its technological proven experience and its wide global customer base; is now taking a step forward in developing the leading IoT Precise Irrigation platform, which will be a game changer and will leverage Netafim's position as the true market leader."

**Izhar Gilad**
Netafim Product Management,
Crop Management Technologies

**For more information**
Please visit the Netafim's crop management technologies website:
https://www.netafim.com/irrigation-systems-products

# **Checklist** how to get started with the Internet of Things

## Determine the relevance for your organization

**Check out the competition -** Assess whether you are the first in the industry to develop an IoT solution or if you can learn from your competitors.

**Think disruptive -** Organize a creative session to discover new insights about how to combine asset data into meaningful knowledge.

**Fully commit -** Realize that investments are required and IoT is not developed instantly. Is your organization ready to make the long term commitment?

## Create a value proposition

**Determine value -** Map whether the data enables you to better serve your customers and if you can "sell" the data as a service. Don't forget to ask "what's in it for you?"

**Develop a product offering -** Determine how you will offer your IoT solution to your customer. Will your product offering consists of different service packages or a one-size-fits-all solution?

**Go to market -** Decide how you will sell, service, and further develop your IoT solution. Does it require organizational changes?

**Reassess opportunities -** Regularly reassess the opportunities in the rapidly changing IoT world.

## Develop capabilities

**Decide on connectivity -** Choose the connection option (cellular or Wi-Fi) that makes sense based on assets you have, how they are used and where they are located.

**Build partnerships -** Embrace the role of third party hardware, service and software suppliers in developing your IoT solution. Who do you need to supply the hardware, service, software and connectivity?

**Develop user interface -** Build and customize a portal that allows the user to monitor and manage their fleet of assets, operators or crops.

# Conclusion

With an estimated total value of 1.7 trillion dollars and an estimated business implementation grade of 76% by 2020[4], IoT is booming business, sure to permanently change virtually every industry in existence. Although frequently positioned as a future market trend, IoT is happening now.

Circuits, sensors and batteries are decreasing in size and becoming increasingly energy efficient. The ability to connect devices to the Internet expands daily and businesses and consumers can now cheaply access scalable data storage and cloud solutions. This combination will undoubtedly disrupt how products are offered and used.

No longer solely providers of hardware, IoT positions manufacturers to become increasingly involved in all services and software needed for their operation. Sensors, on-board computers, communication modules, databases and portals are the building blocks of an IoT solution. Particularly in cases where assets are critical to the business of the end user, IoT can open up new revenue streams for manufacturers by "selling" (asset) data as a service. In any case, manufacturers can use the data to improve product design and better serve their customers.

As not all the components of an IoT solution can be produced by manufacturers themselves, they should embrace third party experts to co-develop or even outsource some of their development activities.

Although participants in these case studies already have an IoT or telematics solution in place, many manufacturers have not even started or are still in the process of developing their solution.

4.  Brenneis, E. (2016, July). Vodafone IoT barometer. Retrieved from http://www.vodafone.com/iot

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DLL is highly aware of the future impact of IoT. We are very keen to understand the opportunities Internet of Things can bring to the leasing industry and our customers. To further develop our knowledge on the IoT topic, DLL became a partner of the Startupbootcamp IoT Connected Devices (www.startupbootcamp.org), a global network of industry focused startup accelerators. Our financial solutions may include telematics services provided by our manufacturing partners. This enables manufacturers, dealers, end users and DLL to extract more value from the quality of the assets.

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