

# Connecting the dots of Enterprise's data goldmine

Unlocking business advantage  
from connected people  
and things



Virtually every business is already collecting data.

But are they collecting the right data?

And more importantly, do they have the resources to leverage it with a view to improving operations?

## Data – A disruptive force

Uber, the world's largest taxi company, owns no vehicles. Alibaba, the most valuable retailer, has no inventory. And Airbnb, the world's largest accommodation provider, owns no real estate. Physical assets barely contribute to the multi-billion pound stock valuations of these young companies. Instead, their various business models and strategies are built around the sets of data they collect, analyze and put to work.

**T**hese companies' respective data-driven business stories are astounding in terms of their speed and scope. But they represent mere headlines to a deep and far-reaching transformative narrative affecting companies, economies and lives across the world. Change is being propelled by mobile communication advances, cloud technology and the decreasing cost and increasing availability of information technologies and services – including sensors, data storage and analytics.

Investment in innovations is making it easier to record, track and monitor the world we live in, and fill some of the most critical data gaps. Of course, not every organisation will be able to create industry-disrupting changes in the manner of an Airbnb or Uber.

But collecting and analysing data in a structured and strategic fashion can allow businesses to significantly disrupt their own processes. For example, by remodelling office layouts based on footfall to improve access to resources. Or allowing smart machinery to proactively manage its own maintenance cycles, avoiding total system failure. When the intelligent use of data is extended throughout the supply chain, the foundations of an enterprise, and perhaps even a whole industry, can be reformed.

More near-term and straightforward ambitions are immediately accessible. These could simply be to reduce operational costs and drive energy efficiencies – for example by managing power based on actual usage, or using

environmental data to automate heating and ventilation. It can also drive significant savings.

Drawing on the experiences of retailers and enterprises, this book explores how businesses can begin leveraging big data principles – by using existing information streams and systems, even the smallest of first steps can bring immediate then long-term results. Connected clouds are powering change – and creating opportunities for businesses to turn the internet of things and big data hype into reality.



# A smarter way to work

It's the new normal for businesses to focus on driving efficiencies and protecting the bottom line. This requires the continual analysis and rationalisation of operations, which in turn requires data about practices and processes. Virtually every business is already collecting data. But are they collecting the right data? And more importantly, do they have the resources to leverage it with a view to improving operations?



**T**he need for data has led to an explosion in the number of connected devices across enterprises. Virtually every item of industrial equipment has a Wi-Fi connection option. There has been a concurrent rise in the number of employees connected to the network through their mobile devices – with trends such as BYOD and the phasing out of desktop machines contributing to the Wi-Fi traffic. In the space of a few years, Wi-Fi has become an essential component of corporate IT infrastructure.

But the Wi-Fi network can itself become a source of valuable data based around how those resources are being used. If every device

in the organisation is connected and can be interrogated, a virtually unlimited pool of data generated by internal processes can yield huge business value. A purchase of a commodity suddenly becomes a strategic investment, with a return in the form of operational insight.

## The where, what and why

By monitoring signals from network-attached devices, such as smartphones or IoT wearable technology, businesses are able to track the movement of people as they pass through connected areas. 'Zoning' allows for more granular analysis of where people are going,

what they are doing and even insight into the 'why?' of each movement. For example, a retailer might make some quick gains by analysing patterns of customer movement in, around and outside a store - identifying what displays seem to be attracting interest at what times. And from here, retailers can unlock deeper business insight that will better inform their strategy when it comes to factors such as where to staff, capacity planning, opening times or even store location.

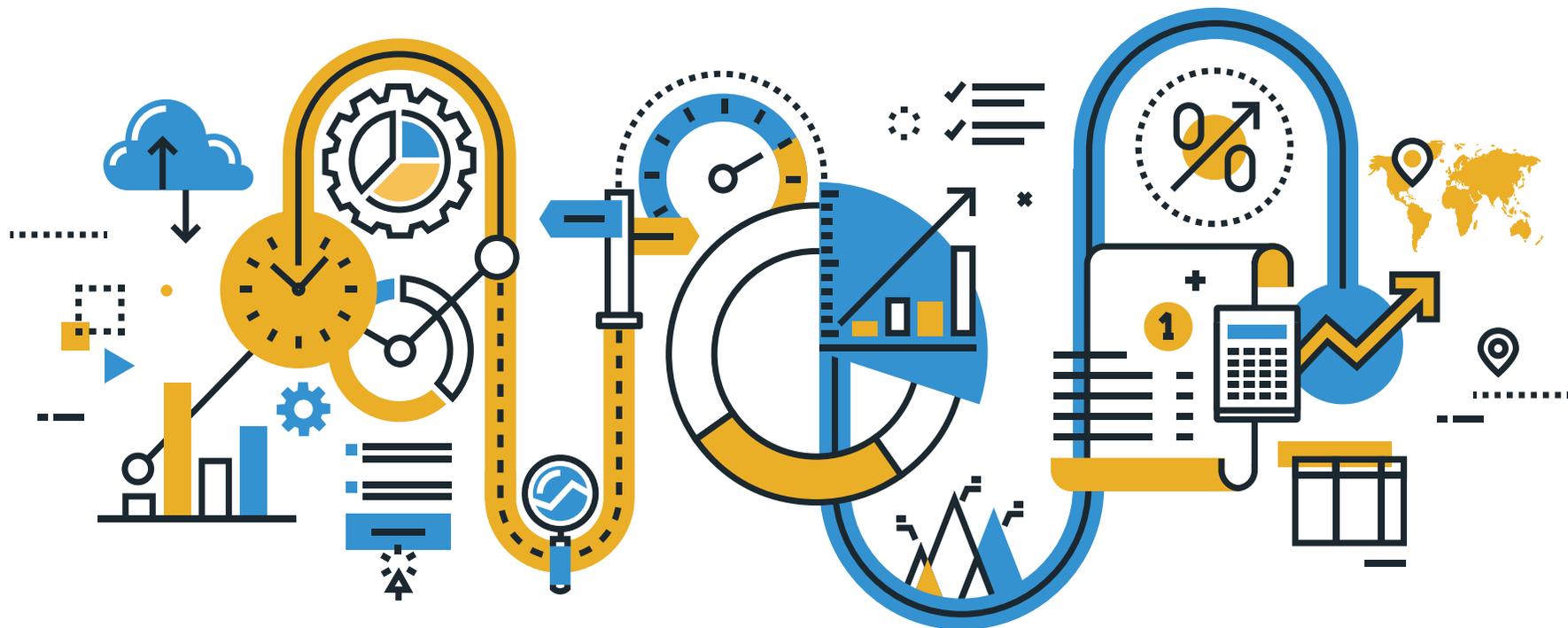
Such data can then be added to the analytics mix, revealing new, actionable insights into the behaviour of customers, employees or visitors. But all too often data collected by businesses – whether relating to stock management, customer preferences or warehouse operations – is considered in silos, leading to business-wide insights being missed.

The true value of a dataset can only be fully exploited by cross-referencing it with other

sets of data. For example, manufacturers can analyse factory-machine usage data with other sets of data relating to incidences of machine breakdowns. This can help anticipate maintenance issues and better protect their machines and employees. Businesses already have a range of data stored in all of their applications and data clouds – they just need a way to connect and query them. This can unearth endless patterns and insights.

## Data – a strategic enabler

Every operation can be improved given the right insights. And intelligent Wi-Fi provides a potentially cost effective and fast means to collect the all-important, insight-delivering raw data. The differing utilisation of Wi-Fi tracking in two distinct areas of business – retail and enterprise – provides insight into its potential.



## The connected retail experience

The retail sector has been an early adopter of Wi-Fi tracking technologies. In the face of stiff competition from online outlets, bricks-and-mortar retailers need to collect and analyse as much data as possible to improve the customer experience and find new value-adding services.

**T**he ultimate aim is to attract loyal customers who make their purchases there and then, rather than browsing and ordering products online. Even simple information such as the customer's route around the store can help identify improvements to point-of-sale displays to boost average transaction value.

To offer the best shopping experience, and to maximise sales, a 360° view is required of each customer – one that extends across all points of presence, on and offline. In-store Wi-Fi is central to this omnichannel approach.

Encouraging customers to sign up for connection to in-store Wi-Fi networks provides marketers

with all-important contact information for use in later campaigns. But it also provides a relatively simple way to monitor exactly how shoppers move around their stores, collecting information about how they spend their time. Wi-Fi monitoring systems allow retailers to calculate how long is spent looking at a display (linger time) and its effectiveness. Areas of the store that experience relatively low footfall can also be pinpointed, informing future redesigns of shop layout. Systems can even monitor the effect long queues at the checkout have on customer behaviour – for example, whether more customers are leaving stores without purchasing. Wi-Fi is emerging as the cheapest and most effective way to collect such data, negating the need to install expensive physical sensors and hardware around stores.



### Retail – the current state of play

The use of engagement, monitoring and analytics over Wi-Fi in stores is constantly changing. To gain insights into what the future might hold, here is some hands-on experience from some leading industry experts.





# Andrea Calcagno

*CEO and Co-Founder, Cloud4Wi*

Cloud4Wi is an award-winning Guest Wi-Fi provider | [cloud4wi.com](http://cloud4wi.com)

Digital retailers have enjoyed the benefits of combining market information with customer behaviour data and analytics for years. But it's been far more difficult for physical stores to enjoy the benefits of a close relationship with customers – to find out all about them and improve their experience.

Now it's becoming much easier to engage with customers through modern Wi-Fi infrastructures. We've found that people who use Wi-Fi in stores are generally over 15 and under 45. They want to go online to, for example, check details about items, compare prices and read reviews. They also might want to speak to friends on their social network about clothes they like, and send status updates from stores.

All this information can be gathered to help retailers improve the customer experience. Obviously, customer behaviour and purchase

decisions can then be influenced. At the same time, retailers can increase customer loyalty and expand their presence on social networks.

Combining market information with customer data such as age, gender, devices being used, as well as real-time behaviours such as location and online conversations, allows retailers to design customer interactions in line with their business strategies, for example using proximity marketing, sending relevant coupons or personalised discounts.

The flow of customer traffic around the store at specific times can also be monitored and compared with data to influence business strategies. A rounded operational and business perspective can be gained, which further improves the customer or visitor experience, then leads to more sales.

“

Now it's becoming much easier to engage with customers through modern Wi-Fi infrastructures.



## Miya Knights

*Principal Analyst, Planet Retail*

A leading provider of global retail forecasting, trend analysis, shopper insights and market information | [planetretail.net](http://planetretail.net)

The more connected the consumer has become, the more data has become available to retailers to use in their business intelligence programmes. Really businesses need to be getting to grips with analytics and big data right now. Early adopters such as Tesco already have a huge head start over non-adopters. But, in our opinion, Internet of Things maturity in the retail space is still some time away, so there's still an opportunity to get the necessary analytics, networking and integration frameworks in place.

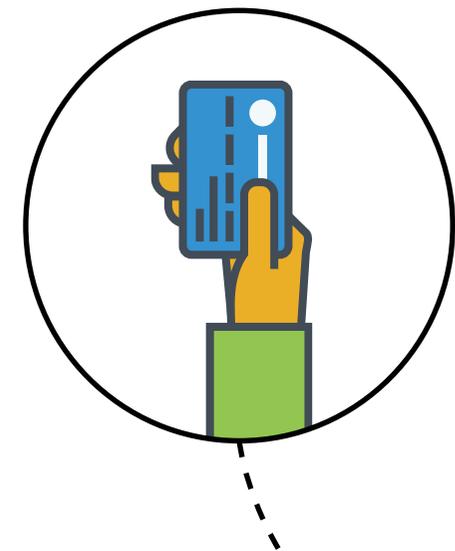
It won't be easy though. Business intelligence produces insights that can be actioned in real time. But most retailers simply do not have the level of integration required to access the

necessary data from all of their systems. An inability to link existing systems is a significant handicap.

The same problem will affect the additional information generated by automated Wi-Fi tracking – without a way to cross-reference Wi-Fi data with other data sources, the true value will remain unrealised.

There is also the lack of standards to consider. How is the data collected? How can the datasets be linked? Are there proprietary systems that need to be mined? Retailers have plenty of data, but without a way to properly manage and analyse it, they are drowning.

Retailers also need to invest in their IT infrastructure now, so that it is ready for use with emerging technologies. Not only for collecting and storing information, but to support automated actions based on real-time analytics that enhance the customer's shopping



experience. Ultimately I could see retailers looking to some form of automated execution engine that can act on insights autonomously, adjusting prices based on localised demand, for instance.

In the meantime, technologies like in-store Wi-Fi tracking provide a mechanism to become acquainted with real-time analytics. Like a test run for big data that still yields valuable, actionable insights around store, merchandise, assortment planning, for example.

In our experience, beacons and push can work – at least 35% of customers want this level of interaction with stores. All of the shoppers we have surveyed realise the benefits of technology for improving their experience. Retailers need to deliver these benefits.

In-store technology works both ways. Retailers are also deploying mobile devices to their workers so that they also use real-time insights to improve the customer's experience. Because ultimately, data is the trigger for everything that is focused on the customer's experience.

“ Retailers have plenty of data, but without a way to properly manage and analyse it, they are drowning.





## Craig Crawford

*Founder of Crawford IT and Former VP IT Strategy, Architecture & Relationships at Burberry*

---

Crawford IT provides digital transformation and connected living strategies that drive brand momentum and growth | [crawfordit.cc](http://crawfordit.cc)

Increasingly savvy customers with a tendency to shop around for the best deals are causing severe problems for retailers. These customers rarely have to buy a particular item from a particular retailer – they enter into a contract because they want to. This realisation underscores the importance of properly understanding each customer, new or old, and building services that elevate their experience and lay the groundwork for an ongoing relationship.

Retailers need to decide the kind of relationship they want with their customers as a priority. All future business intelligence and IT developments will then need to be built to support and nurture that relationship. Retailers already struggle to maintain relationships with customers they do know. Technology will be key to maintaining these relationships and building new relationships with new customers.

When it comes to in-store Wi-Fi and data collection, retailers often approach the challenge from the wrong angle. Wi-Fi is an IT issue, so logically the IT team appears to be best placed to deploy the necessary in-store infrastructure. But the security-first approach favoured by IT policymakers is often at odds with customer expectations of instant gratification.

Designing an in-store Wi-Fi network in line with internal IT policy can be slow, time-consuming and expensive. Retailers need to access Wi-Fi insights now if they are to create new competitive advantages, preferably using systems that require little or no management, and which are geared towards customer enablement first. “Easy” is the winning choice for customers and retailers.

“

When it comes to in-store Wi-Fi and data collection, retailers often approach the challenge from the wrong angle.

A Wi-Fi deployment driven by IT departments could also see valuable Wi-Fi tracking data collected in silos, rather than made accessible via the cloud. There's a risk of IT departments not "getting" context and analysis – instead seeing in-store Wi-Fi as a basic technical challenge.

The modern shopper values convenience. So data needs to be collected, analysed and acted upon quickly. Stores need to invest in systems that yield the necessary raw data for customer profile creation efficiently, and with minimum manual intervention. The data collected from Wi-Fi and other touch points can then be used to cultivate long-term customer relationships.

Moving forward, retailers need to empower all of their staff with more real-time data to act in line with the overarching data strategy. Shop

workers would then have the power to rapidly apply local insights such as heat maps and footfall metrics to adjust individual stores to match their clients' needs.

Many businesses assume that analysis needs to be performed centrally, simply because that's what most big data users do. But the reality is that employees on the shop floor are often best placed to assess local data, drawing their own actionable insights and observations. With iPads becoming commonplace on the shop-floor, the key to unlocking a premium experience for local shoppers is making local data available fast.

Finally, most shoppers think 'I'm not worthy of a personal shopper', and most retailers are unlikely to offer such a service to anyone but the very biggest spenders. But emerging technology

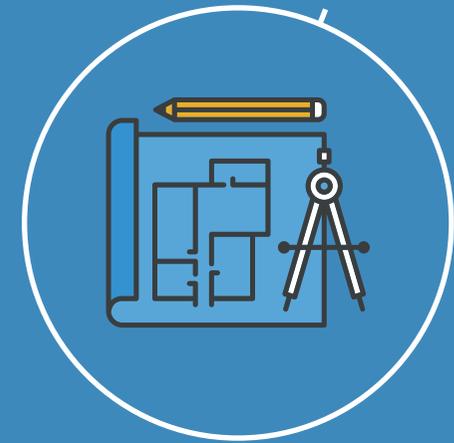
offers a virtual equivalent. Using smartphone apps, and the detailed shopper's profile built using Wi-Fi tracking and other data from the connected cloud, it is possible to make highly targeted, relevant offers and recommendations every time the shopper walks through the door.



“ Stores need to invest in systems that yield the necessary raw data for customer profile creation efficiently, and with minimum manual intervention.

# What does this mean for the Enterprise?

Tracking within a retail context is primarily focused on observing what customers do, using data gathered from in-store Wi-Fi coverage. The same techniques can be employed by any business in any industry. But instead of monitoring shoppers, companies can focus on their own workforce and assets to improve productivity and thereby the service it provides to the employee.



S

mart monitoring provides a constant flow of time-and-motion data, supporting long-term analysis of

business processes. For example, subtle delays in a distribution warehouse could be highlighted by tracking the movements of both vehicles and products, avoiding serious losses over time. Further insights could allow the same warehouse to better allocate stock layout to reduce picking and packing time.

Smart monitoring captures insights based on real working patterns. Monitoring the movement of people throughout a campus can also be used for resource and equipment planning, ensuring that facilities are made available where employees need them most. Smart monitoring can also help organisations properly observe and improve the allocation of under-used offices and desks, giving them the option to sell

off the surplus. Some reports suggest savings of up to 30% can be achieved.

On a wider scale, heat maps and travel data can be applied to an entire campus, allowing for redesign of building and public spaces to improve traffic flow, or to ensure that resources are properly located for maximum efficiency.

Highly accurate data provides the basis for long-term, effective business improvements that reduce operating costs. Meanwhile, smart monitoring can help businesses meet environmental commitments, build their internal and external brand, comply with regulations, reduce risk of accidents – the list goes on and will keep expanding as more people and objects develop more enduring connections to Wi-Fi systems.

“

Highly accurate data provides the basis for long-term, effective business improvements that reduce operating costs.

Business intelligence is fundamentally about using various subsets of data to implement small, incremental changes to streamline or automate specific functions. This creates savings that gradually mount up.

Over time, this data can increasingly be applied to more wide-ranging issues, such as resourcing plans, the physical layout of buildings or the acquisition of future places of work. Insights from data can improve service and operations with a long-term view to increasing turnover and profitability.

### At The Edge of Office Intelligence

Deloitte's Amsterdam office, The Edge, uses intelligent Wi-Fi and sensors connected via the "digital ceiling" using light over Ethernet developed with Philips, to assist with facilities management and proactive maintenance. Each lighting panel throughout the building is equipped with sensors to monitor bulb lifespans, carbon dioxide levels, temperature and humidity.

This information can then be used to plan and allocate resources. Sensors detect whether a room has been used during the day, and

whether it actually requires cleaning – reducing wasted time and effort. Even the hand towel machines are Wi-Fi connected, alerting the facilities management team so that they can refill the dispenser intelligently, rather than visiting each unit in the building every day 'just in case'.

The same sensors also provide valuable information to workers in the office via a dedicated smartphone app. For example, they can control the environmental conditions in their workspace, adjusting lighting and temperature for comfort. This can result in small gains to productivity.

The network of sensors acts like a beacon, helping visitors and employees navigate the building to meet with a colleague, or find their way to a particular resource. In an era of hot-desking employees, this tracking system significantly reduces the time required to find a specific person in a large building.

### Enterprise – the current state of play

How is the enterprise using Wi-Fi tracking? And what does the future hold? The experiences of some leading industry experts provides insight.

### Small changes, big savings

The retail experience also shows how Wi-Fi-enabled smart buildings can be used to personalise the work experience of employees. Data about an individual's position can be used, for example, to change out-of-office status automatically when out of the building. This could be further extended to powering down monitors and other electrical appliances at the user's desk.

A single desk or small office managed in this way may result in negligible savings, but applied to a multi-building campus, or even a cloud-connected multinational, the reductions start to become significant. Factor in improved control of heating and air conditioning controls based on intelligent use mapping, and the savings increase exponentially.



## Stephen Ward

*Partner, Deloitte Digital*

A design and development agency offering development suggestions and digital strategy | [deloitte.digital.com/eu](https://deloitte.digital.com/eu)

Sensors themselves are neither new nor rare. Every car has a unit that detects when the vehicle is running low on oil and displays a notification. When the light comes on, you top up.

The problem is that the process is still mostly manual – you, or a mechanic, have to top up the oil. And the same is true of many sensor deployments that don't 'close the loop'.

Sensor data is only of value when insights can be turned into automated action. Closing the

loop might involve a connected car acting on the oil sensor data automatically, booking an on-site service and freeing the owner to get on with other, more productive activities. This is 'small data' in action.

Innovation happens at the edge of the organisation, where workers at the coalface need to come up with solutions to new challenges that arise every day. But for maximum value, developments need to be integrated into the core – as quickly as possible.

Collecting data from sensors is one thing, but enabling intelligent, automated action based on that data is crucial to realising its true value.



“ Sensor data is only of value when insights can be turned into automated action.



## Rick Hartwig

*Sector Head - Built Environment, The Institution of Engineering and Technology*

**A global body for the engineering and technology community. The Built Environment Sector focuses on opportunities to improve physical environments including offices, homes, services and open spaces using engineering and technology | [theiet.org](http://theiet.org)**

Data is incredibly important for driving business change, but first there needs to be a cultural change to ensure that data is collected and used properly. Too often 'old' mindsets mean that organisations miss the true value of their data. Facilities managers often focus on a very small subset of metrics because that's all they have ever needed.

That is not to say that every item of raw data is inherently useful. Data must be manipulated before it can become useful. At the beginning of any Wi-Fi tracking project stakeholders need to decide what it is they want to achieve, and how they are going to do it. Do you need to include legacy data in your analysis, or just the new information to meet those goals?

And most importantly of all, how will you turn raw data into actionable insights? Because if you don't use all of the available data effectively, your business will not survive. It's that simple.

“ Too often 'old' mindsets mean that organisations miss the true value of their data.





## Adnan Erriade

*Director of Retail Industry and Mobility Solutions UK&I SAP*

---

One of the global leaders in enterprise software used to manage business operations and customer relations | [go.sap.com](http://go.sap.com)

Becoming a connected enterprise is key to achieving digital transformation – doing business differently and remaining competitive in an unpredictable market. To make these changes, businesses need to be able to collect and analyse data about their operations so they can make informed strategic decisions.

The modern enterprise has mostly overcome the first barrier to digital transformation by figuring

out how to capture data from every aspect of their operations. They now need to decide how to analyse and use it effectively.

There will always be questions about establishing the business case for deploying Wi-Fi tracking and connected enterprise technologies, but ultimately those organisations who don't get on board will not survive.

To defend against disruptive start-ups, established businesses will need to improve their internal operations to stay competitive. They will also need deeper insight into processes if they are to develop the disruptive tendencies required to compete in the modern marketplace.

“ To defend against disruptive start-ups, established businesses will need to improve their internal operations to stay competitive.

# Unlocking insight and value – your first steps

## Overcoming traditional mindsets

An effective Wi-Fi tracking and analytics rollout must be anchored to a core strategic objective. In the case of retail, this objective might be an improved customer experience. Once an objective is in place, business unit heads can work together to design systems and metrics that support those goals. Stakeholders at every level of the business need to recognise the value that analytics has to the business, and how it will help meet long term strategic goals.

## Delivering and acting on insights

Centralised data is useful for global observations. But it is the employees at the edge of the company that need to act. The connected enterprise will build an analytics system that can be used by workers at all levels of the business, empowering them to make operational adjustments at the local level. These changes can then be fed back to the core of the business for application elsewhere if the outcomes are suitably significant.

## Technical and analytical skills shortages

The analytical skills required to turn raw data into actionable insights are in great demand – hence there is a global shortage. And the longer organisations wait to begin their move towards the connected enterprise, the harder they might find it to hire the right people for their projects.

## Querying data quickly and efficiently

Collecting data from multiple sources is easy. Unlocking insights is more difficult. Even if would-be connected enterprises have found a way to cross reference datasets, they still need to analyse that information quickly and efficiently if they are to create insights that can be actioned in real time.

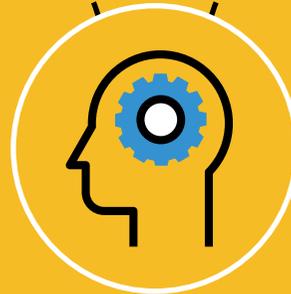


### Unifying data sets

The need to share data between systems and business units is old hat – but there are still businesses out there who have yet to find a way to do it. Without the ability to correlate Wi-Fi tracking information and other datasets, such as a customer CRM system, enterprises risk creating yet another silo of data, the value of which can never be fully exploited.

### Don't stop innovating

Deloitte's development of the connected office is constantly evolving as they look at ways to extract new insights and savings from the information they collect, combining old and new data to observe long-term trends. A culture of constant innovation encourages stakeholders at all levels of the business to drive innovation that helps to further streamline operations and cut costs.



“ The connected enterprise will build an analytics system that can be used by workers at all levels of the business, empowering them to make operational adjustments at the local level.

## The time is now

Looking to the future, the connected enterprise will be able to both collect data from a range of devices – and act on insights in real time. To realise the true value of the connected data, businesses (B2B or B2C) will need to consider:

1. Investigating where data can be collected, to securely classify the data for local or Cloud storage and processing, and opening access to all stakeholders.
2. Defining how data can be used to improve the customer's experience – even if those changes only take place in back-end operations.
3. Connecting and integrating multiple format data systems to unlock insights across the business.
4. Streamlining operations and improving productivity based on these insights.
5. Empowering workers at all levels to innovate how these insights can improve the effectiveness of their contribution to the organisation.

Wi-Fi is a key enabler in helping every organisation better understand day-to-day operations through a real-time overview of employee movements and resource usage. By enabling Wi-Fi tracking technologies, enterprises are able to realise additional value from their existing network infrastructure investments and source additional funding from non-IT budgets to scale and grow this connected intelligence platform.

If an enterprise can monitor a process, it can almost certainly use technology to develop a monitoring process into an actionable insight. Without contextually analysing Wi-Fi data, businesses are missing an opportunity to create competitive advantage, resource optimisation, and an engaged and motivated workforce.



**Stephen Hoy**

*International Business Development  
Manager, Aerohive Networks*

# Contact us

## **Aerohive Networks Europe Ltd**

The Courtyard  
16-18 West Street  
Farnham, Surrey  
GU9 7DR  
United Kingdom

**Phone:** +44 (0)1252 736590

**Email:** UKsales@aerohive.com

## **Aerohive Networks**

330 Gibraltar Drive  
Sunnyvale, CA 94089  
United States

**Phone:** +1 408-510-6100

**Email:** info365@aerohive.com