Resource
Data Management

Mapping the HVACR Internet of Things

Whitepaper

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The Internet of Things

Around the world and across a variety of industries, more and more HVACR devices are coming 'online'.

With the right control and monitoring technology, by properly connecting these devices, and appropriately collecting and analysing the data that they produce, both service providers and end-user organisations will have the opportunity to deliver better performance, cut energy costs and increase profitability.

This whitepaper:

- Outlines the scale of the opportunity for UK-based and indeed international organisations who both buy and sell HVACR related goods and services;
- Introduces the technology that enables you to take control of HVACR energy use;
- Gives examples showing how the RDM system works and what it can deliver.

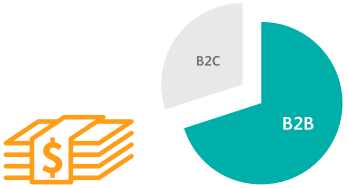
Market Overview

Organisations are more and more frequently moving away from the 'set and forget' models of energy infrastructure that have dominated in the HVACR industries for decades.

Energy conscious enterprises are choosing to do so because of the rise and availability of data-driven decision making tools (physical controls and monitoring software), where energy-consuming infrastructure is providing continuous measurements that can be utilised to broader effect. However, it is also because the Internet of Things can enable organisations to get far more from their physical HVACR assets. Sensory information will be able to not only improve the performance of infrastructure, but also increase its life span through optimisation.

HVACR (heating, ventilation, air conditioning and refrigeration) is the technology used to provide environmental thermal comfort and acceptable temperatures for different organisational requirements.

The Internet of Things (IoT) is broadly defined (by the Global Standards Initiative and Harvard Business Review) as the internetworking and intelligence-enabling of the physical devices which provide function in our everyday lives.[1]



Almost 70% of all potential IoT value will be generated in business-to-business environments.

Such devices should be able to communicate freely, sharing data from their designated role and consuming environmental information[2].

The Carbon Trust states that energy saving is one of the most simple ways to reduce costs/ increase profits[3] and with demand for HVACR infrastructure to keep growing in line with rising population and increased spending in developing nations, there is a significant opportunity to provide organisations with smarter products and associated services.

Did you know?

Resource Data Management supplied and installed in the **first fully IP networked** retail refrigeration system in 2001?

This paper focusses on the commercial HVACR industry and opportunities (e.g. retail environments, offices, and factories). This paper excludes consumer applications and this is because nearly 70% of all potential IoT value will be generated in business-to-business (B2B) environments[2].

New and existing HVACR businesses may find that they need to adapt their business model(s) to accommodate the shift in selling capital goods to selling services as the sheer amount of raw data created expands, but this in itself will create opportunities for partnerships and growth.

Scale of the HVACR IoT Opportunity

The Internet of Things has become a global buzz-phrase for aspiring technology companies, and even still, Gartner place the number of connected 'things' in use in 2016 at 6.4 billion – up 30 percent from 2015[4] – and McKinsey and Company believe that the hype may actually understate the full potential.

6.4 billion: The number of connected 'things' in 2016.

30% higher than 2015 and set to grow.

99% of the IoT opportunity is still unexploited.

Most of the data from IoT connected devices is currently, however, known to not be examined or used at all to any great effect which means there is a significant amount of data being wasted. For example, Oil Rigs across the world collect a large amount of sensory data and yet only one percent is actually mined into useful information and examined[2]. This shows, that in some industry environments, there is as much as 99% of the IoT opportunity left to be exploited.

The HVAC industry (excluding refrigeration) is estimated to be worth **$68 billion**[5] (including consumer markets) by 2022.

In comparison, the potential economic impact of the Internet of Things is estimated to be worth as much as **$11.1 trillion**[2] by 2025 across all market sectors (including consumer markets).

In offices worldwide, McKinsey estimate that IoT installations could cut energy usage by up to 20% - a **global economic impact of between $70 billion and $150 billion** per year by 2025. Whilst this is a massive saving for any organisation (a 20% reduction in energy costs could deliver the same bottom line benefit as a 5% increase in sales revenue[3]) there are added benefits like improved conditions for office and mobile workers which could lead to enhanced productivity - up to 30% for air conditioning![6]

IoT in the Office could save up to 20% of energy

That's between $70 billion and $150 billion, per year, by 2025.

The size of the IoT opportunity in retail environments is estimated to be between **$410 billion and $1.2 trillion**[2]. Anywhere that individuals engage in commerce; stores, banks, restaurants, arenas, etc. are opportune areas for IoT investment due to the large amount of potential sensory data and unique needs and requirements of those businesses. The environment of a retail store can easily influence potential customer's intention to purchase through its effect on their physiological, emotional or cognitive comfort[7].

The retail IoT opportunity is estimated to be between $410 billion and $1.2 trillion.

40% of potential benefits require the adoption of open or interoperable standards.

Although it is clear that there is a significant amount of opportunity for businesses along the value chain, it should be noted that at least 40% of potential benefits cannot be realised without there being an adoption of open or interoperable standards or by developing shared communication platforms. For full potential, IoT partners must look for open standards and forward thinking organisations.

Securing the Internet of Things

Whilst the benefits and size of the opportunity of the Internet of Things is undoubted, there are understandable concerns regarding the security of the devices that will make up its backbone.

This hardware is at risk of attack from a range of different sources, including physical tampering or hacking via the network, cloud or server level. Devices may also be compromised via other connected devices and/or software platforms.

Resource Data Management devices are built with security in mind and can be secured at the physical device level – by pin, passcode, or other methods available – and at the software level through user credentials – user name/code and password. Devices that can be configured or managed over a network can be setup to a varying degree of security depending on an individual organisation's needs/requirement.

An additional method of security that we employ ensures the integrity of software updates to our devices. Software updates are only available for download/install by trusted parties and/or Resource Data Management technical support staff.

We also offer free, in-depth, training regarding our devices, as we believe that this makes clear to end-users what the full functionality and intended use of the device is, reducing the risk of incorrect deployment or installation.

Of course, we also advise that network infrastructure (appropriate routing/switching/firewall) security best practice (in addition to physical security) is followed at all times as our products will often function as a part of an organisation's overall network.

Taking Control with RDM

At Resource Data Management, our products are built on a number of ideals for the best long-term value

These include:

Free training and support

With the possibility to save more energy than ever before, we want to train your staff and help support them to achieve your goals. Our training and support teams cater for companies all over the world.

Open and accessible protocols

RDM pioneered the addition of IP Ethernet at the control level and continue to enable the free transfer of data and information between hardware devices and software platforms.

A 5 year warranty

Unmatched in our industry, the commitment to a 5 year warranty ensures that our products last the length of time required to make a meaningful impact in your energy and IoT strategies.

The Latest Technology

Often at the centre of RDM hardware projects is the DMTouch, our control and monitoring front-end and user interface.

DMTouch effortlessly connects and communicates with a wide range of control and monitoring hardware and peripherals across a number of different networking and communication protocols including fibre optics. It gathers and processes millions of items of data and presents it – in real time – in an accessible and user-friendly form; processed information can then be passed to our software tools for further analysis.

An additional option is our Intuitive TDB Controller – the flagship controller in the Intuitive range – which can be used alongside the DMTouch or as a central control unit. Intuitive TDB has an impressive array of inputs and outputs which, when coupled with our programmable logic control software TDB, enable it to communicate with and facilitate the most demanding HVACR (heating, ventilation, air conditioning, refrigeration) and BEMS (building energy management system) applications.

At RDM, we supply the complete control and monitoring solution, which is why we offer complimentary software tools to get the most from your energy data.

Our proven system uses a standard internet browser to display, monitor and control energy-using equipment in a building, store, office, or across a nationwide estate. It gives organisations, HVACR contractors or facilities management companies, an immediate real-time view of everything that is happening in a single location or estate, from a desktop PC, tablet or smartphone.

Because the system is simple to use and transparent, it gives complete control of the energy being used by a business. It enables users to remotely monitor and manage all the lighting, heating, ventilating, air conditioning and refrigeration in an organisation, plus security and other building management systems, at any time, from any pc, anywhere.

It operates at any scale of resolution – enabling a user to monitor and control everything from a single component on an item consuming energy (say, a heating element in a boiler), to building-wide energy use, up to a national estate that includes thousands of locations and even more devices across the world.

The simplicity and power comes from our ActiveFM™ and Kw^{h}eb systems, developed by Resource Data Management (RDM) as internet-based (cloud) platforms.

ActiveFM™ enables many makes, models and types of control and monitoring equipment to be linked up in a single system, overcoming the different electronic communications protocols that have been an obstacle to high level, integrated control and monitoring for many years. The software can also talk to and integrate with existing building management infrastructure a customer may have, providing seamless connectivity and unmatched control.

Kw^{h}eb, our energy monitoring dashboard software, takes a fresh approach to energy and building management, enabling users to track your consumption to an even finer level of detail than ever before and utilise the in-built analytics to quickly build a picture of your energy consumption. With Kw^{h}eb, an organisation has the power to manage to reduce energy consumption, increase profit and meet sustainability objectives.

Case Study HVAC IoT: Ardent Leisure

Ardent Leisure identified that their HVAC systems across multiple sites were not operating efficiently and found that upgrading to an RDM control and monitoring system could save them money and time.

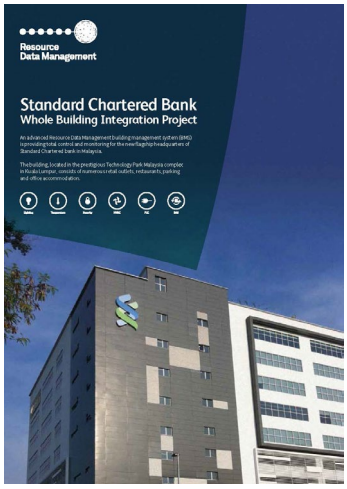
Maintenance was a challenge as the existing control system was proprietary, requiring specialist technicians to program and maintain it. Replacement parts were also extremely expensive as they often needed to be replaced and backed by limited, short-term warranties.

An RDM Control System was used to expand the visibility and control of the assets and to allow for more efficient operation. The system utilised RDM's Intuitive range of programmable logic controllers using their free license TDB (The Data Builder) software to create complex, bespoke control solutions. RDM's TDB Software also allowed for the fine tuning of site assets based on external and internal parameters, ensuring the most efficient operation without compromising comfort levels. At the heart of the solution a DMTouch, RDM's touch screen front end, gathered all of the data making it available in real-time. The DMTouch facilitated the advanced features of the solution, including remote access using a friendly graphical interface without the need for proprietary software.

The sophisticated control solution, incorporating all HVAC plant, delivered more efficient economy cycles, time schedule flexibility, and remote access for interrogation. Additional peace of mind and reduced maintenance costs were another additional benefit as all purchased products were backed by a five year warranty.

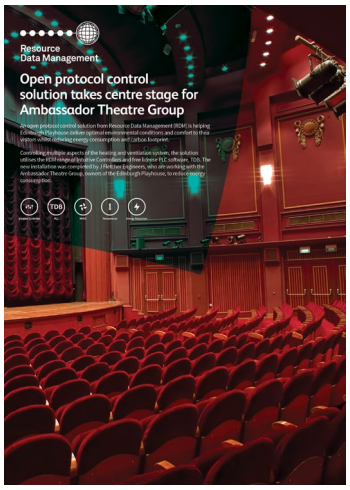
Other HVACR Success Stories

Full versions of our case studies/success stories are available on the Resource Data Management website (www.resourcedm.com).



BMS for Standard Chartered

Total control and monitoring for the new flagship headquarters of Standard Chartered bank in Malaysia.



Open Control for Theatre Group

Helping Edinburgh Playhouse deliver optimal environmental conditions and comfort to their visitors.

Bespoke Solution for SeeWoo

A completely custom installation for SeeWoo Group that utilised RDM controls and plc software TDB.

Energy Control for Budgens

State-of-the-art energy monitoring and control from RDM for refrigeration, air confitioning, lighting and more.

Sources

1. INTERNET OF THINGS: SCIENCE FICTION OR BUSINESS FACT?, Harvard Business Review, https://hbr.org/resources/pdfs/comm/verizon/18980_HBR_Verizon_IoT_Nov_14.pdf

2. Unlocking the potential of the Internet of Things, McKinsey & Company, http://www.mckinsey.com/business-functions/digital-mckinsey/our-insights/the-internet-of-things-the-value-of-digitizing-the-physical-world

3. Retail Sector Overview - CTV 001 - Carbon Trust (https://www.carbontrust.com/media/39228/ctv001_retail.pdf)

4. Gartner Says 6.4 Billion Connected “Things” Will Be in Use in 2016, Up 30 Percent From 2015, Gartner, http://www.gartner.com/newsroom/id/3165317

5. Global Heating, Ventilation and Air Conditioning (HVAC) Market Report 2016 Forecast & Analysis to 2022 for the $68 Billion Industry, PR News Wire, http://www.prnewswire.com/news-releases/global-heating-ventilation-and-air-conditioning-hvac-market-report-2016-forecast--analysis-to-2022-for-the-68-billion-industry-300219547.html

6. How Air Conditioning Improved Employee Productivity by 30%, Noobpreneur, http://www.noobpreneur.com/2014/07/15/air-conditioning-improved-employee-productivity-30/

7. Shun Yin Lam (2001) ,”The Effects of Store Environment on Shopping Behaviors: a Critical Review”, in NA - Advances in Consumer Research Volume 28, eds. Mary C. Gilly and Joan Meyers-Levy, Valdosta, GA : Association for Consumer Research, Pages: 190-197. http://www.acrwebsite.org/search/view-conference-proceedings.aspx?Id=8468

8. Internet of Things Global Standards Initiative, ITU, http://www.itu.int/en/ITU-T/gsi/iot/Pages/default.aspx

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RDM Group Head Office
80 Johnstone Avenue
Hillington Industrial Estate
Glasgow, Scotland G52 4NZ
UK

Tel: +44(0)141 810 2828
Email: hello@resourcedm.com

RDM Inc
100 North Sixth Street
Suite 630B
Minneapolis, MN 55403
USA

Tel: +1 612 354 3923
Email: usasales@resourcedm.com

RDM Asia
Sky Park at One City
Jalan USJ 25/1, 47650 Subang Jaya
Selangor
Malaysia

Tel: (+60) 3 5115 0061
Email: info@rdmasia.com.my

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