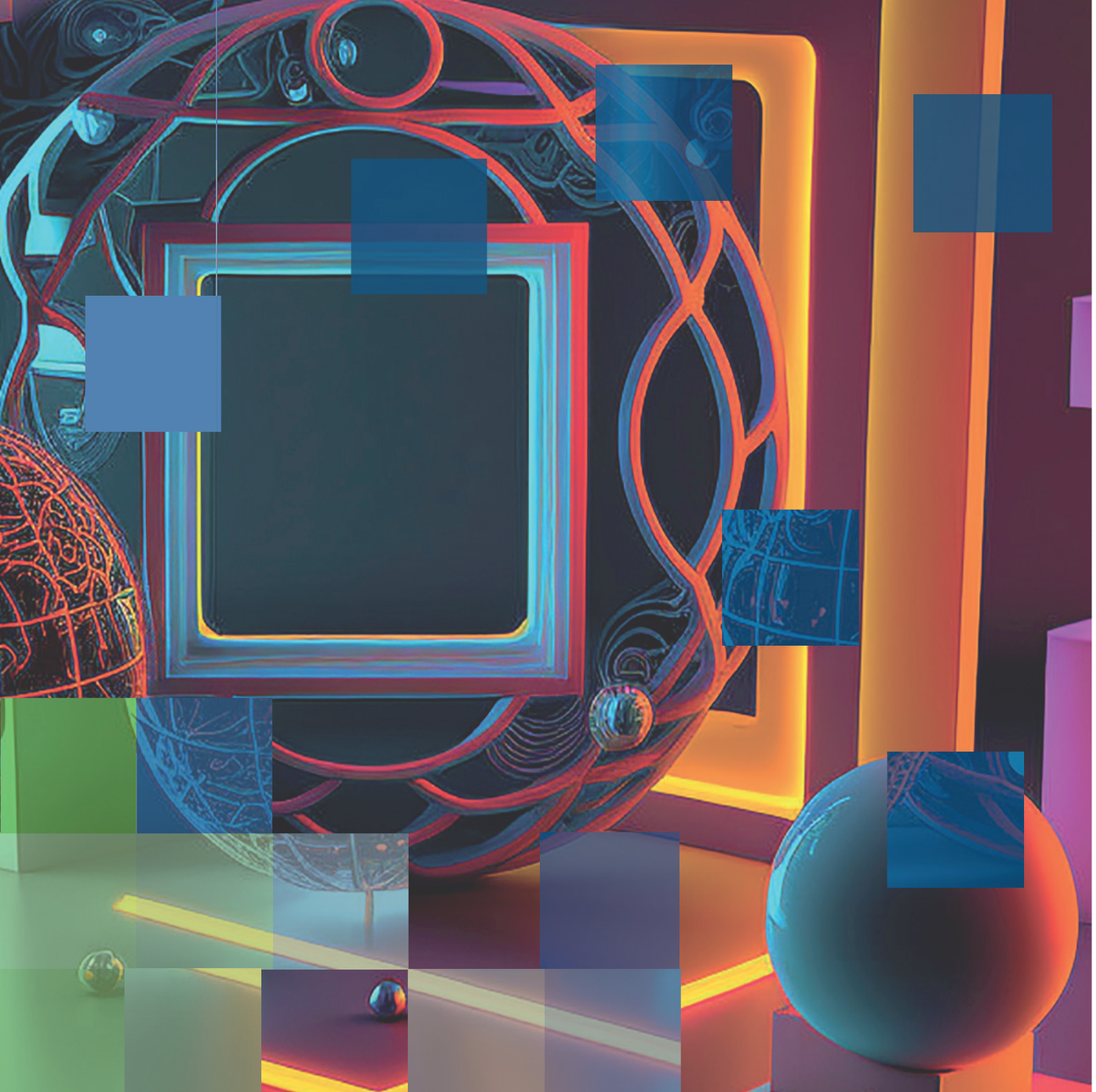
CircularIT event - White paper



Innovative IT in the Circular Economy

– Jason Fazackerley, tegosgroup.

This white paper is based on the **CircularIT** event organised by **tegos**group and the discussions that took place.
The conference involved senior-level speakers and delegates from IT and recycling and waste sectors.

Introduction

CircularIT was an open forum that was designed to allow ideas to flow. Delegates were encouraged to have the time to outwardly focus, as many of them would be inward focused
in their day-job – dealing with IT implementation, performance etc.

With speakers from Microsoft, Akamai, Recycling Insights, What3Words and **tegos**group, it gave the opportunity for delegates to engage with experts involved in sustainability, automation, security, the industrial metaverse, data science and location services.

This white paper investigates these topics and is based on the presentations and discussions that occurred at the conference in late November 2022.

Microsoft

Akamai

data courage

Topics

- Sustainability
- Automation
- Security
- Industrial Metaverse
- Data Science
- Location Services
- Conclusions

Sustainability

We are collectively facing something humanity has never faced before. Every organisation needs to drastically reduce its carbon emissions. At the same time, we have got to address water scarcity and minimise waste.

This means that organisations need to fundamentally transform their common practices in order to ensure they meet their climate and sustainability goals.

There is growing demand from investors for companies to meet sustainability goals. Indeed, 73% say environmental, social and corporate governance (ESG) policy contributes to the investment decisions they make.

With 62% of consumers also saying they are willing to change purchasing habits, and pay a premium for environmentally-friendly products, it is vital for businesses to meet their ESG goals and act sustainability.

Emissions from businesses can be measured in 3 scopes. These are:

- Direct – emissions from trucks etc
- Indirect – production of electricity and heating plants
- Indirect – everything from materials used in building, business travel, electricity end customers may use when using your products etc.

Therefore, companies must figure out how to understand their complete environmental footprint.

With up to 90% of an organisations' footprint occurring outside of the value chain, most don't have data to understand this and know the full impact of their carbon footprint. As we cannot solve problems we can't measure, it is imperative that all parts of the value chain come together to measure these Scope 3 criteria.

According to Microsoft architect Edd Peggs, his company has focused attention on where technology can have the biggest impact on carbon, waste water and ecological systems.

Microsoft is committed to becoming carbon negative by 2030. From 2030 to 2050, it will then zero out carbon emissions. But it also wants to go further and will go back in time to remove carbon from atmosphere directly and indirectly emitted since the company was founded in 1975.

Sustainability is at the core of Microsoft's business. Their focus on optimising operations and data driven approach led them to develop new technologies to reduce emissions. Data helps them make the business case to invest in renewable energy to power its data centres – these will be 100% renewable by 2025.

Microsoft has also discovered that reducing its energy and water bills is good for business, as is sustainable technological solutions on sustainability for their customers. For example, moving to Microsoft Cloud has internally helped reduce emissions between 72 and 98%.

The company also uses a metric called PUE – Power, Use, Equivalent. This means they measures whether each watt of power going into a data centre is used to compute rather than given off as heat. This has help it to evolve data centre efficiency. Microsoft used to have 2 watts in and 1 watt of CPU process, which meant 1 watt was wasted as heat. As a result, it has tried container-based computing, and to submerge a data centre in the sea. Soon it will be submerging a data centre that combines capsules into the sea and reduces PUE to 1.7.

Microsoft's customers have also benefitted from implementing its technology. For example, Waverton Investment Management reduced emissions from using Azure by 60% rather than servers on premises. It is now on course for 90% from further efficiencies.

Automation

Humans are good at certain tasks, but not good at repetitive tasks. Get a computer to do that.

Edd Peggs reported that 37% of companies are still using paper to manage critical business processes. However, more than 25% of processes could be automated by 2024.

Automation has not been around a long time. We had robotic automation in early 2000s, but we already approaching hyper-automation.

Microsoft has a low code philosophy – an IT department doesn't have to build out the process, but your business teams can. This comes out of the idea of citizen developers, where the workforce of companies can build their own process solutions, rather than having to invest in IT support services to do it.

Most automation offered by Microsoft comes under its Power Platform umbrella. This includes:

Power BI – business analytics
Power Apps – application development
Power Automate - workflow automation
Power Virtual Agents – intelligent virtual agents.

Underpinning this are complementary tools such as AI builder – this uses artificial intelligence to optimise business processors.
Microsoft has a stable of hundreds of different connectors to other Microsoft tools, but can also connect to third party connectors too - enabling businesses to automate processes that involve other software providers.

Under its low code automation philosophy, the following are used:

- Robotic Process Automation (RPA)
- AI
- Digital Process Automation (DPA)
- Business Process Automation (BPA)
- Task/Process mining – where system suggests automation

Robotic Process Automation - a legacy application for apps that can't be automated any other way.
It automates through a robot carrying out your activities. As an example, you can automate to carry out repetitive tasks. To do this, you record actions or use click-based actions to automate those actions.

AI – AI Builder capabilities include recognising objects, optical character recognition and extracting information from documents. This can be used by feeding it examples of data that need to be extracted from documents and it then learns how to do it. Similarly, a Power Virtual Agent is a chatbot that responds with personalised conversations with natural language. It is possible this might be able to speak

to customers using **tegos**group' Enwis for example.

Digital Process Automation – within the cloud tenant, you have access to all services within the stable. This is based in the cloud, making it easy to link up applications in a few clicks. If your ERP system is in the cloud, it is possible to link to it with Dynamics365, so it knows to send notifications to Excel, Teams etc and create workflows. The system uses events, which creates actions for your organisation.

Business Process Automation has standard workflows. For example, a legal firm might work through processes on a case. This could be any process that has a start, a finish and processes in between. Under this, you can assign to different people to orchestrate processes for a consistent approach across business.

Data mining – a common question is how do they know what to automate? A process mining tool allows individual users to come up with opportunities. It observes things that happen in an organisation, suggests it, and then allows creation of automation within that automation.

Companies such as Schlumberger have taken to a low code approach. It has developed 650 applications within its business, enabling it to automate everything that it might want to carry out. London Air Ambulance is another example of an organisation using low code tools to optimise processes.

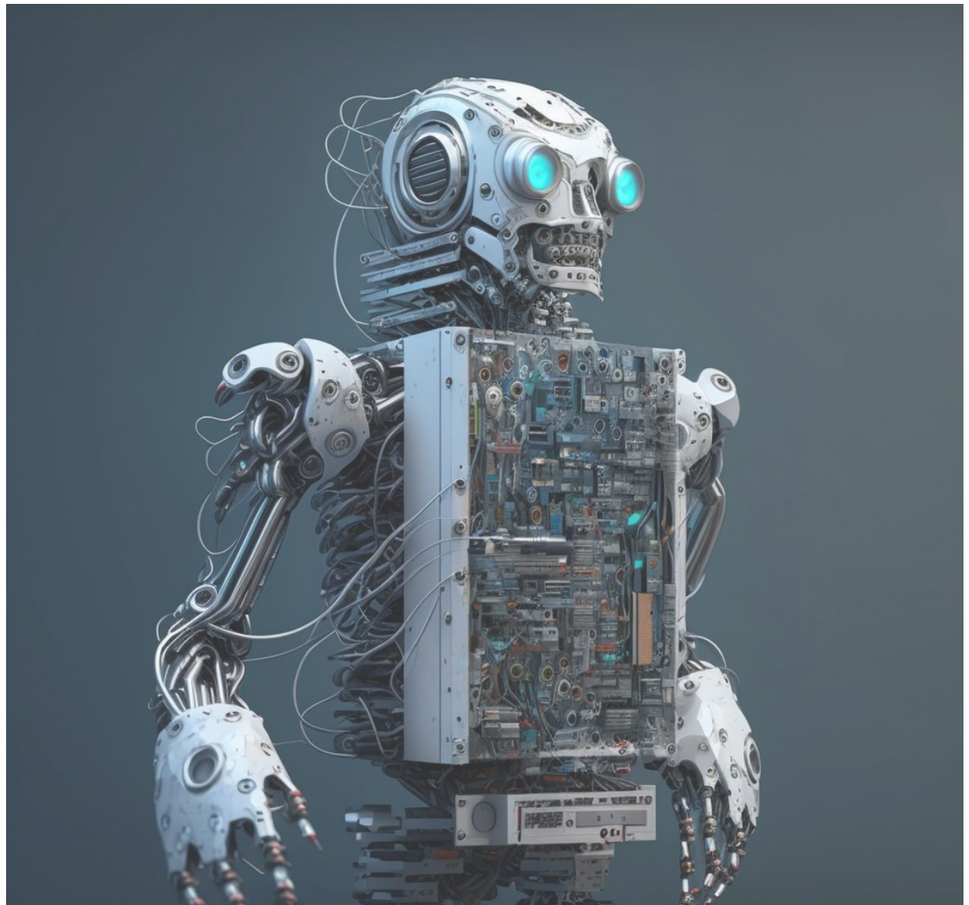
How can this be used now?

Will Bannerman-Jones, a consultant at **tegos**group, explained that before beginning the process of introducing automation, it was good to go through these points:

- Why automate? Define goals, benchmarks, targets and vision
- Where to automate? Establish bottlenecks, pains points, areas of improvement
- Prioritise business Objectives & Issues – prioritise, start slow and accelerate when ready
- Then think about how to automate.

As an example, he looked at a typical business problem: a company isn't getting cash paid quickly enough from its customers.
By using process automation, it allows invoicing as soon as possible, enables analysis of invoice queries, notification of selected customer of its upcoming collections, and offers selected customers the ability to respond to an upcoming collection

ERP development is currently unlikely to be low-code or no-code, but in the next two years it is expected to jump from 2% to 65%. The movement is predominantly towards the cloud-based Power Platform from Microsoft.



Security

According to Richard Meeus, director of security and strategy, Akamai it is not a question of if, but when you are going to get breached. How do we therefore make that breach a minimal event?

Akamai protects data centres, web assets and consumers etc.

Most companies will get attacked and will get breached – data shows this. Bringing IT and the Internet of Things overlap means the potential for more companies to get attacked from cybercriminals. For example, trucks and drivers have mobile devices, then weighbridges, employees working from home, and the number of automated nodes is growing too. This increases attack surfaces so that attackers can get into your data.

Before the Covid pandemic people worked in the office and it was easier to keep secure. Then everyone went home and were sharing networks with kids, smart TVs and other devices with varying degrees of security. Smart devices may not even have a single layer of security. Cyber-criminals may only need to get into one machine, and then could potentially access a whole corporate network.

But most breaches are from Remote Desktop Protocol solutions, even with a Virtual Private Network, because people are bad at creating passwords that cannot be guessed.

Around 44% of organisations have acknowledged that they have been breached as a result of home working.

Companies are also using a lot more IT in other locations. For example, field engineers need simple and secure information and are using mobile devices that increase the security risk.

Modern fleets have also changed a lot in the last few years. They are connected to the internet for various reasons such as fleet optimisation, preventative information etc via sensors, and use telemetry over mobile data. How good is security on a sensor? Minimal.

There has been an increase in attacks in 2022 compared to 2021 as a result of cybercriminals getting better at finding a bridgehead to get into a system.

Additionally, phishing attacks are getting more sophisticated, using Vietnamese characters and others that are very hard to notice.

There is also phishing as a service enabling bypass of Multi-Factor Authorisation (MFA). This allows criminals to access push MFA part (two step automation) through phishing sites. Criminals gained access into Uber through push MFA fatigue for example.

Conti was a Russian business that had a step-by-step guide on how to hack another business. It had a CEO and franchise model.

The UK was the best place for Conti to attack followed by Germany, Italy and France in Europe. Manufacturing was the sector they most successfully attacked. Financial services, energy and healthcare were well protected, but manufacturing was not as far down the security journey as other sectors. Manufacturing has a lot of legacy kit and leaves lots of gaps when bridging IT and old technology. The majority of successful attacks were in companies sized from $0 to $50 million as these had more of the gaps.

Akamai work on the principle that we are breached. It means it can look at it from a more positive perspective. If you have a breach, like a submarine when its hull gets breached, lots of submariners close all the bulkheads. They contain the breach to the smallest possible area.

The Akamai principle is if we get breached, how do we make it trivial?

What next for security?

- Mobile and IoT protection – private APN for all devices
- Employee Access protection
- Website protection
- DDoS protection
- Phishing protection
- Phish-proof MFA
- Ransomware protection.

The Industrial Metaverse

Edd Peggs from Microsoft shared how it believes there are elements for now, and for the future.

Companies are using the Industrial Metaverse to improve production processes, design cars and other products, reduce emissions and waste in processes, and to investigate automation opportunities.

Three separate areas:

- Consumer metaverse–immersive experiences such as through Xbox
- Commercial metaverse – same kinds of immersive experiences and bringing them into world of work – collaboration for design with mixe reality capabilities will help generatenew ideas faster than before
- Industrial metaverse–use sensors to understand processes, or model processes to drive efficiencies through digital twins.

The idea of a digital twin is building a virtual model of what you want to build. It could be a factory or chemical plant. You could model it in the Metaverse, can look at each part, break it down, and leverage efficiencies. It is a partnership of humans and AI to design and operate physical processes for something that can be used

It means you can build quicker, reduce time to market, and profile a lifecycle from beginning to end. This means designing a car can be done in a virtual environment, put through a virtual wind tunnel to see how the car would perform in a real-life situation, and simulate all the tests it would need to go through. This means that faults can be rectified before it gets to the prototype stage.

As shown by Will Bannerman-Jones, the Industrial Metaverse can help identify overfilled bins, underfilled bins, waste journeys, and contaminated loads for the recycling and waste sector. Smart sensors can be used to read this, including moisture levels and analysis of what is in the bins.

But what if we could tell what material is on the back of a truck, inside a container, or when approaching a weighbridge? We can use AI to identify what is in a truck by training a model to identify patterns.
AI can also identify materials on a conveyor including how confident it is of identifying a material or contaminants.

These technologies can use special awareness to identify cars and humans in a Household Waste Recycling Centre. It can help identify the journey through the site and pick-up patterns to change processes, if necessary, such as on health and safety on-site. But it could also monitor fill levels of containers at HWRC and contamination.

Data Science

Artificial Intelligence can be used to analyse the vast sets of data that businesses increasingly hold, allowing them to create efficiencies and a better understanding of their operations and industry.

Data Courage managing director Kamil Karbowiak showed how data science can be used in areas including:

- Customer Intelligence
- Market Insights
- Predictive Analysis
- Item Performance
- Demand Forecasting.

Machine learning and AI can now be used to analyse strategy and develop it. Companies like Mattel are using AI to create the toys of the future, using image analysis to make predictions on what toy cars should look like for example.

Increasingly, data science can also be used to record a voice, put it into text and analyse that text. As an example, this can be used to take data on what a patient requires in terms of medicines and minerals, and the AI can identify the right pills for them.

Data science is now being put into industrial sectors, and when combined with the Industrial Metaverse allows employees to be shown how to undertake tasks. For example, Toyota uses these technologies on the production line to show its staff exactly which process they need to use and how to do it.

Artificial Intelligence and Machine Learning is now being used in the recycling sector to predict pricing. Recycling Insights, as demonstrated by Paul Sanderson, takes a wide array of historic pricing, economic data and other sources to provide forecasts for certain paper, plastic and metal grades. These can be anywhere between 3-week and 12-month forecasts, and adapt to changing conditions.

Recycling Insights also uses textural analysis to help better understanding of news, and how this will affect markets.

Location services

what3words provides accurate determination of a location by using a unique combination of three words. This means that anywhere in the world within a 3 metre squared space can be identified.

Phoebe Parry-Crooke from what3words said that not all addresses are easy to find. Postcodes cover large areas. Road names can be duplicated. Rural properties can be hard to find. Street addresses aren't generally accurate enough.

For example, only 26% of street addresses in Great Britain lead a driver directly to the correct place. Many parts of the world don't even have an address. Plus, new builds and construction sites don't have an address and may not for 18 months.

By using what3words you can be more precise, even identifying where the bins are located on a site, not just the main postcode address. It is based on GPS co-ordinates, but makes it more human friendly.

It has an app and desktop map site and is free to use.

DHL uses it so that it can deliver to these 3m x 3m square and helps precise delivery for those who have addressing issues.

tegosgroup' Gareth Crawshaw said that integrating what3words into Enwis has allowed more effective route optimisation for drivers based on exact location.

As it pinpoints locations for offices, weighbridges, entrances, on task sites etc, it reduces error and provides more visually appealing and useful information for staff and customers.

what3words is available on all Business Central and Enwis address cards – on customer, vendor, business partner, task site, location.

Gareth gave the example of Center Parcs where it might have five locations within the same address across large area that waste needs to be collected from. Using what3words means these sites can be quickly identified within the site, as the postcode and address cannot give this information.

Conclusions

It was clear from the event that we are at the start of a journey where processes become more secure, more automated, more cloud-based and where IT processes and apps are developed by business specialist teams themselves rather than the IT department.

There is huge potential for the recycling and waste sector to develop and use new IT solutions using the tools that are being built, while identifying ways to keep their operations secure from cyber attacks using technology from Akamai and others.

Companies including Microsoft, Data Courage and what3words are innovating and providing the means for businesses to become more efficient, gain a better understanding of their customers and are better able to make the complex simple.

Within the recycling sector, Recycling Insights is looking at how data science can give more information on markets that will help trade of raw materials within the circular economy.

tegosgroup continues to push boundaries, working with its customers and suppliers such as Microsoft to introduce innovation into recycling and waste businesses.

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