BT

Innovation in action: automation in the Internet of Things

How automation releases the full value of IoT technologies

Without automation, IoT transformation may stall

Organisations of all sizes across multiple industries are adopting Internet of Things (IoT) solutions to generate data that drives smarter decision-making to transform how they operate. These IoT technologies open up new ways to manage, monitor and measure assets and their performance, uncovering valuable insights that would otherwise have remained hidden.

However, success breeds complexity. As IoT use grows, the number and type of connected devices rises, and the management burden increases – often needing experts to configure and manage the IoT solutions.

It's essential that the effort of 'enabling' effective IoT technology doesn't reach the point where it outweighs the benefits the technologies bring.

This is why we've been investigating ways to mitigate any potential scalability bottlenecks, so that organisations can easily access the limitless possibilities that come from sharing and maximising the potential of IoT data. It's important to address these issues now because IoT technologies are going to become pervasive and then ubiquitous.

They're going to breakout from individual organisations or business ecosystems into city-level deployments, where masses of connected devices and vast amounts of data gathering become the enablers for happier, healthier and more sustainable environments.

To make this a viable reality, we're working on an evolutionary step to allow enterprises, business ecosystems and smart cities to release the full value of their investment in sensor data and IoT technologies - without increasing complexity for human teams.

Our goal with IoT autonomics is to reduce the complexity of managing IoT functionality. It shifts work from the human team to the IoT system by building in automatic capabilities of self-configuration, self-healing, self-protection, self-optimisation and self-adaptation. This autonomy can also support the analysis and management of richer data unlocked by changes in IoT architecture.

Autonomics form a defining moment in IoT evolution, maximising the value of IoT, opening up new potential uses and simplifying management complexity - despite the massive increase in devices.

An IoT infrastructure change is essential for autonomics to work

The structure of dedicated sensor-to-application links isn't sustainable as IoT adoption ramps up; the complexity of the webs of links and the burden of managing them will hold back the level of insight organisations can get from their IoT solutions. For example, if your temperature sensors and liquid level sensors are only connected to their specific apps, your teams have to make time to monitor both of them – and also can't draw quick inferences about what their combined data sets reveals.
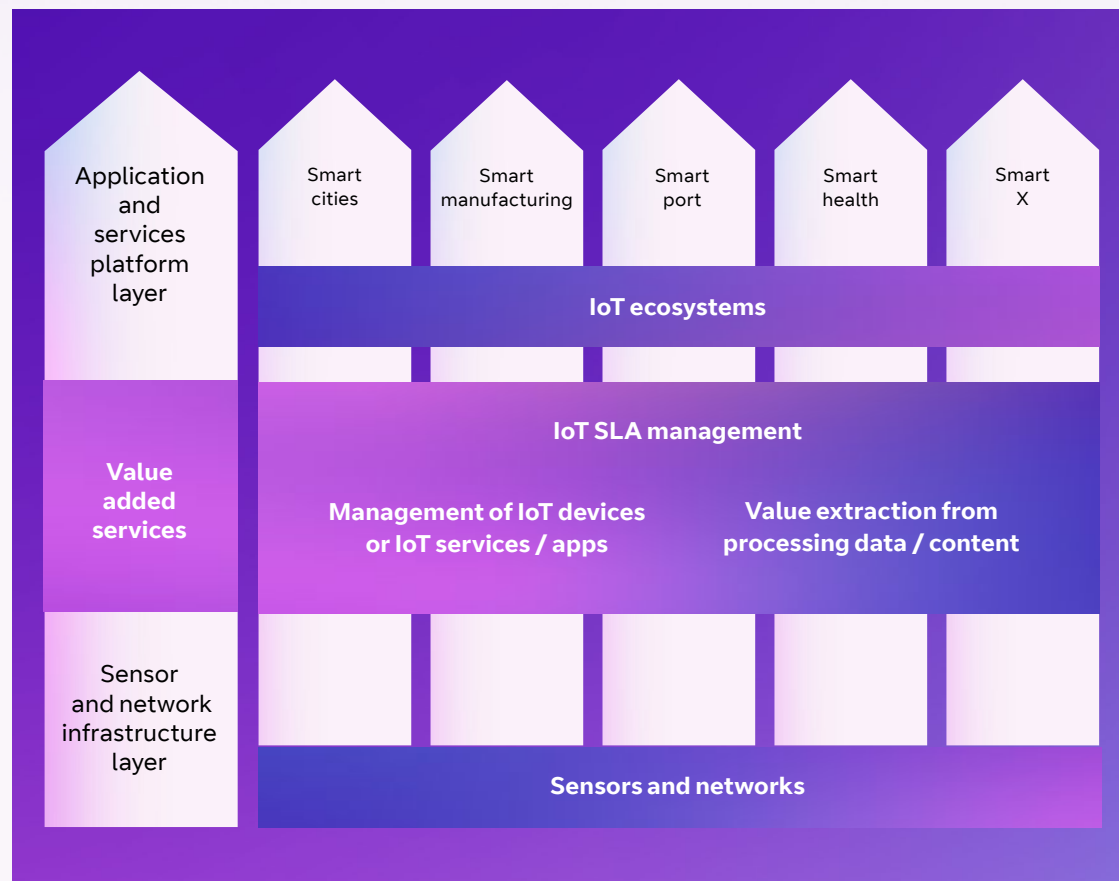
How to break the sensor-to-application link

1. Get more from data
Organisations can extract more data and apply automated analysis to it. They can position sensors wherever they wish, collect rich information and then push it to the data layer in the cloud. Here, all data from all sensors will be amalgamated, adding context to the resulting information and making data smarter. Applying automated analysis will refine data dashboards and help humans effectively analyse an ocean of data.

2. Reducing human input
The data layer can support automated management functions, a critical ability if organisations are to manage the complexity that comes with scaling up this architecture to support larger initiatives like smart cities. The reality is that the architecture needs to take greater management responsibility for itself if IoT solutions are to fulfil their potential. The architecture also needs to be able to flex to meet the management needs and shifting requirements of multiple tenants.

3. Supporting wider communities
Taking a more holistic approach to using IoT data systems means building in the capacity to differentiate services by client. The data layer facilitates multi-management, allowing different service level agreements (SLAs) to be met without service disruption.

How IoT autonomics delivers value today

Incorporating autonomics into IoT infrastructure is already making an impact in seven main areas – although we believe this is just the beginning of the functionality autonomics will unlock as we evolve towards smart cities and ecosystems.

1. Easy device onboarding

The issue
Connecting and locating the sensor / device on the network, configuring it, and checking actions with relevant provisioning policies is a time-consuming and intensely manual process.

The solution
Automate the complete process of onboarding sensors and devices in the field onto the IoT management platform.

The result
• Human-free provisioning and onboarding.
• Automatic selection of relevant policies and configurations.
• A rapid and reliable approach that's the best option for scalable networks.

2. Remote attestation of IoT devices

The issue
As the number of devices grows, so does the possibility that hacker activity goes undetected, increasing security vulnerabilities.

The solution
Use automation to rapidly check the authenticity and integrity of IoT sensors connecting to the network using device characteristics that can't be replicated.

The result
• Robust detection of devices running malware, faking identity, and bad actors connecting to a network port.
• Constant vigilance over all devices, delivering Zero Trust security.

3. Privacy protection

The issue
Surveillance and monitoring can be intrusive, compromising an individual's right to privacy.

The solution
Automated video anonymisation tools to protect privacy, plus the ability to go back and remove the anonymisation with the correct permissions.

The result
• Sophisticated anonymisation tailored to the individual feed, blanking faces or text as required.
• Advanced encryption and analytics that meet GDPR compliance requirements.
• Reassurance that can access re-identification under controlled circumstances.

4. Health and safety analytics

The issue
Constant monitoring of video feeds of dangerous environments is essential, but human assessment is labour intensive, and responses to issues can be slow.

The solution
Rapid, automated video analytics detect and alert health and safety issues, potentially faster than a human could.

The results
• Fast, efficient detection of falls, vehicle-related dangers, or penetration into geo-fenced areas.
• More robust and responsive health and safety monitoring.

How IoT autonomics delivers value today

5. Video feed exchange

The issue
It's difficult for organisations to securely store increasing amounts of video in the cloud and / or at the edge. Plus, the inability to cache at the edge close to viewers slows down play speed.

The solution
Automated, secure video data storage, analytics and delivery – available on demand.

The results
- Flexibility to choose where to store - on a central platform or at the edge.
- High availability to cope with large amounts of video data.
- Comprehensive storage, able to store video stream data and metadata.
- Easy to integrate into other solutions.

6. Self-healing IoT networks

The issue
Devices get infected with malware or there's an intrusion, and this impacts all other devices as well as the LAN and WAN.

The solution
Automated, continuous network health monitoring with rapid network zoning limits the impact of vulnerabilities, and is followed by rapid remediation and testing to make sure the network is back to full health.

The results
- Swift identification of vulnerabilities, followed by device isolation, remediation and return to service.
- Increased network resilience due to flexible, policy-based responses.
- Easy integration with zero-touch operations.

7. IoT SLA management

The issue
Shared IoT ecosystems like smart cities and ports have multiple tenants with different requirements, making efficient management a complex task.

The solution
SLAs guarantee seamless service delivery of contractually committed levels of service. In the IoT world, this is a form of IoT device and content management that provides service differentiation and guarantees of service provision.

The results
- Each ecosystem tenant can have an individualised SLA based on the type and sophistication of their IoT devices, the volume of data used, and the frequency and range of attributes collected.
- Easy, automated management of contradictory priorities such as sustainability and operational efficiency.
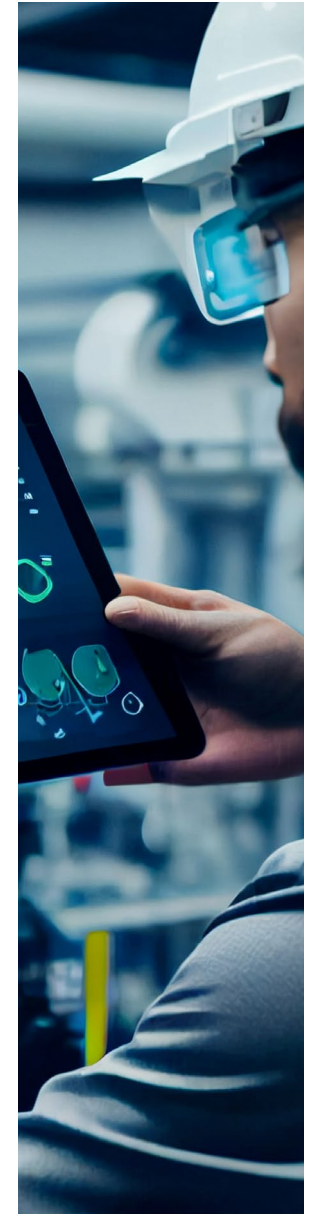
Creating the IoT autonomics you need

Part of our partnership with our customers is anticipating their requirements and innovating to meet them – our aim is to always have the exact services you need ready for your next evolutionary step.

Our innovation teams were part of the initial development of IoT ecosystems, so we've already developed services for the autonomous management of IoT devices and services in the cloud, as well as at the edge. As technology evolves, we continue to develop and innovate. For example, right now, we're looking ahead to how IoT sensors will become mobile as part of an Unmanned Aerial Vehicle (UAV), finding ways for services to follow the device to generate continuous analytics.

Our IoT Value Added Services layer is an enabling overlay of the IoT autonomics capabilities that sits on top of your traditional infrastructure to drive and deliver value. It does this by simplifying complexity to make sure you get optimal use of your IoT infrastructure resources, and that you can extract the highest possible value from advanced insights generated from your IoT content.

Our IoT autonomics solution in action

Ports are effectively smart cities, because they're a rich and vibrant ecosystem of collocated businesses, suppliers, logistics and shipping companies together with members of the public who are visiting from the surrounding area.

We undertook a port digitalisation project to enable its transformation to a smart port. Alongside the deployment of some of our commercial solutions and capabilities such as BT surveillance, Private 5G and Data Exchange, we implemented various Autonomic IoT Value Added Services to showcase how they could help manage the complexity and scale involved with meeting the IoT requirements of a diverse user group.

The result was a platform for innovation without limits where we tested out various use cases for our scalable and flexible IoT environment, including offering our value-add autonomic IoT services as open, fully configurable and dynamically deployed capabilities. In such a diverse operational environment, where the port's IoT infrastructure can be opened up and offered to multiple tenants for use, our platform becomes the go-to environment to effectively deliver differentiated classes of IoT service to a variety of data consumers.

This brings new possibilities for organisations to offer independent use of their IoT ecosystem to different cohorts or tenants, automatically managing and tailoring controls to meet the specific demands of each IoT workload.

Next steps

As a leading innovator in the IoT space, we can help you release the full value of your IoT infrastructure - no matter the scale or the complexity.

Discover how we innovate for a connected world by visiting atadastral.co.uk.

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