

# SMART AUTOMATION: ALLOWING THE MODERN ENTERPRISE TO SURVIVE AND THRIVE



**EOIN WOODS**  
CTO ENDAVA

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# INTRODUCTION

Enterprise IT has always been the business of automation, whether that be eliminating repetitive tasks such as book keeping, or providing entirely automated processes such as those found in web-based commerce or financial trading.

The positive impact of enterprise IT is obvious when the level of automation in a modern organisation is considered. It is safe to say that many organisations simply couldn't operate their businesses without the automation that they have already achieved.

However, the world is changing quickly and yesterday's automation technology is becoming today's legacy problem which does not meet the needs of the agile, connected digital organisation. Today's companies need to be able to respond rapidly to clients who are used to information and services on-demand from organisations like Amazon, Google, Uber and Netflix.

Much of what today's organisations know about automation is valuable and many key skills carry over from the previous era into today's automation work, but new technology is creating new opportunities and enterprise IT organisations need to adapt, reskill and rethink how they approach automation in today's environment.

To avoid being overtaken by new entrants to their markets, modern organisations need to identify how to renovate the technology they have, modernise what isn't suitable for the new world and reinvest to take them forward into the next era of enterprise automation.

The key is to focus on the outcomes that they need, rather than on specific technologies, and to pragmatically blend existing and emerging technology to create a practical solution to automation problems. We call the blend of automation technology in the service of a business outcome "smart automation".



# WHY SMART AUTOMATION?

The benefits that organisations can gain from a thoughtful application of smart automation include:

- Increased scalability of the business;
- An efficiency which can't be gained from manually intensive processes;
- Transparency of operation due to the ability to monitor automated processes accurately;
- New insights about their business and customers using the data available from automated processes;
- Reduced time to market, the ability to focus on value discovery and delivery;
- The ability to focus on value delivery rather than day-to-day execution problems caused by manual processes;
- Increased reliability due to the repeatability and consistency that automation brings.

**In this whitepaper we explore how recent and emerging technology trends provide organisations with an opportunity to rethink their approach to automation in order to thrive in fast moving markets.**



A man with a beard and glasses, wearing a light blue button-down shirt, is working in a laboratory. He is holding a red probe and looking at a complex electronic circuit board. The board is filled with various components, including resistors, capacitors, and integrated circuits. He is also holding a pen and looking at a document on a table. The background shows other laboratory equipment and a wooden cabinet.

# Automation: The Unfulfilled Promise

In many organisations, the difficulty of changing legacy automation has become the limiting factor in how quickly they can evolve and can become a survival risk when nimbler competitors emerge.

Historically “automation” meant creating large monolithic applications for a business process such as claims processing, or a business area like purchasing. These applications slowly evolved as the organisation changed. Business Process Management (BPM) was added to allow automation of more complex processes, like providing price quotes, that involved interaction with more than one system and integration products like ESBs and ETL were used to share data between applications.

This created a complicated environment that combined a number of applications to automate the organisation’s processes.

This style of automation creates an effective, but complicated and slow moving, organisational automation. Changing these environments is usually a painstaking process of specification, design, implementation and long periods of manual testing, with occasional, high-risk, manual releases to production.

These environments were a hindrance to change in yesterday’s business environment and simply cannot support the high-speed, scalable processes needed to support today’s digital workloads, the adaptability needed to support rapidly changing agile businesses or the need to deal with new challenges like unstructured text and image data we find today in a digital business.



# Emerging Technology

API-based microservice systems (systems made up of many small network-connected services) have emerged in recent years as an alternative to monolithic applications. One of the benefits of microservice-based systems is the flexibility provided by their ability to combine, recombine and extend the services in the system as the organisation's processes change.

In parallel with microservice-based applications, cloud-computing, and in particular treating "infrastructure as code" has allowed a similar, dynamic approach to deploying and operating IT infrastructure, to meet the demands of fast moving applications.

Flexible applications can be changed continually, which is a huge opportunity for the organisation, but a significant risk and burden for a traditional IT development group using manual software deployment and change management processes. This pressure led to the welcome development of continuous delivery, to automate the entire software build, validation and release process, so allowing our applications and cloud environment to be continually changed through regular, small, automated releases, rather than occasional, high-risk, manual processes.

When delivering a constant stream of change, testing becomes crucial to catch problems early, and the process moves too quickly to use widespread manual testing. While automated testing is not a new idea, until recently it was often only used for fine-grained developer oriented testing ("unit testing") and even when used for functional testing, often involved the use of unwieldy, fragile UI automation tools. Today we have sophisticated automated testing frameworks that allow us to perform end-to-end scenario tests using APIs, messaging or browser interfaces. These are much more functional and robust than older "screen scraping" tools. Automated testing allows a high degree of validation in the release pipeline, providing the confidence needed to release change quickly.

A practical problem many organisations encounter is the need for systems to provide APIs to allow automation. Many older monolithic systems don't have external APIs and so, until recently, could not

be easily integrated into this new faster moving world. While the long-term solution is almost always a re-engineering project to modernise those applications, an effective short-term solution can be Robotic Process Automation (RPA), a new technology that allows applications to be automated through their user interfaces, by simulating a human interacting with them.

Beyond application architecture, traditional software development has well-known limitations when it meets problems involving unstructured data (like documents), images or situations where judgement (like probabilistic decision making) are required. These problems, which are more and more common as processes become digitised, are part of the reason for the recent interest in artificial intelligence techniques like machine learning, that can perform sophisticated classification and matching processes, automating many recognition, classification and heuristic decision-making tasks that take considerable human effort today.

Finally, another emerging area is natural language user interfaces, harnessing technologies like bots, natural language processing and voice recognition. By allowing people to interact with systems via simple, but natural, voice or textual interactions, we open up a whole new set of possibilities for automating our important organisational processes.

Although much of this emerging technology is new, as we said earlier, many of the fundamental skills needed to automate businesses successfully are shared with existing approaches. The most important underlying ability for successful automation is good software engineering practice. And this has become even more important as more sophisticated approaches are used for automation. When combining technologies like microservices, cloud, continuous delivery, automated testing, machine learning and natural language interfaces, the core engineering capabilities of architecture, development, testing and application and infrastructure management are just as important to create reliable, sustainable automation solutions.

The limitations of traditional automation have triggered a number of important developments in how we go about organisational automation.



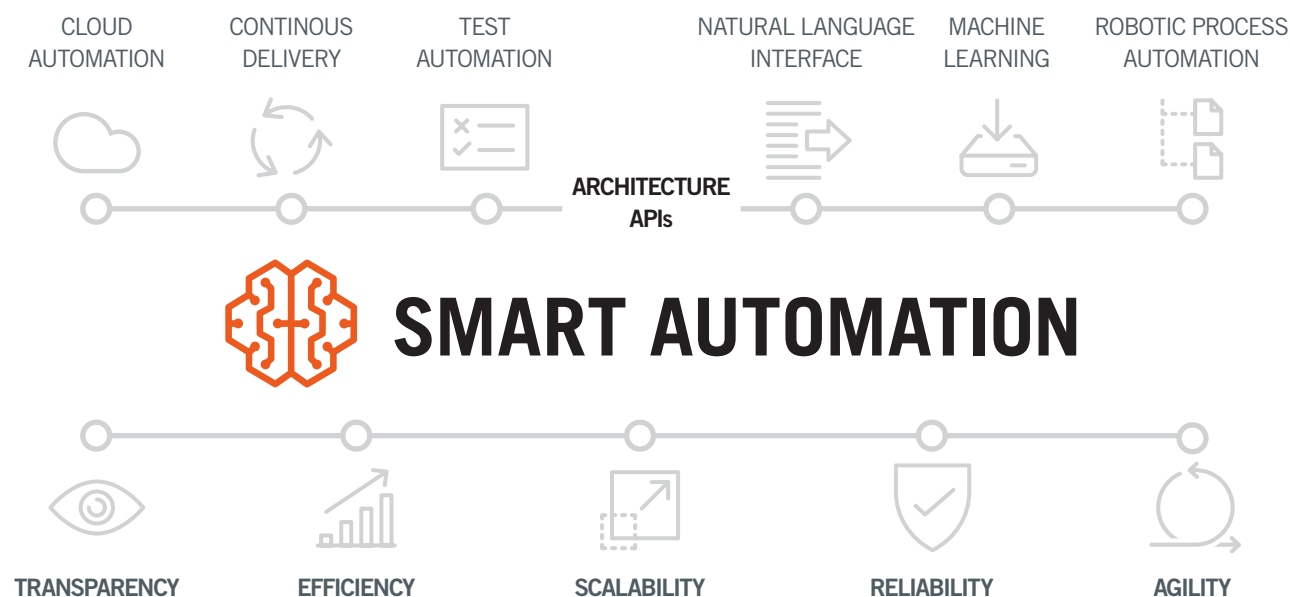
# Automation: The New Enabler

These emerging technology trends create the potential to transform automation from being a barrier to innovation and change, to being a key enabler for the modern digital and agile organisation.

We refer to choosing the right mix of automation technology for an organisation as “**smart automation**” and it includes both automating ourselves as a technology organisation and automating our customers, the business users.

These benefits can help an organisation to become ready for a truly digital future, and provide a foundation for the agility that a modern organisation requires.

image source: unsplash.com



**When we talk about automating ourselves, this can include:**

- Cloud automation which allows us to remove the traditional barriers to change caused by manual infrastructure provisioning and change control.
- Continuous delivery that revolutionises the application delivery process by removing the manual effort and hand-offs required to get application code to production, so eliminating the delays, and much of the risk, of a manual release process.
- Test automation to ensure consistency, repeatability and efficiency of the testing process, to allow us to test frequently and repeatedly whenever we change our software.

**When we talk about automating our business customers, this can include:**

- RPA allows us to integrate applications without APIs into our automated processes, giving us time to modernise them or providing options for systems where there isn't a strong business case for modernisation.
- Artificial intelligence technologies, such as machine learning, allows automation of processes that involve matching, classifying and extracting information from unstructured or semi-structured data which are not amenable to traditional automation approaches.
- Natural Language Interfaces allow users to interact with automated systems in a natural and fluid way, allowing their use in situations where traditional desktop or mobile device user interfaces are too restrictive or unavailable.

And to support both types of automation, it is valuable to consider microservice architectures and APIs, to decompose applications into small, reusable, separately evolvable pieces that allow a constant flow of valuable small changes to be released to production.

The correct blend of these new and emerging technologies allows a smart solution to be designed to address the limitations of traditional application, allowing it to fulfil its real promise to remove friction from the organisation and become the enabler needed by today's digital and agile organisations.

**Combining the right blend of technologies to create an effective modern automation solution can bring considerable business benefits.**

- Reliability of key processes can be improved through the consistency, error handling and repeatability that good automation provides.
- Efficiency and scalability of the organisation can be improved by removing repetitive work from humans and allowing them to focus on the complex, judgement based parts of the task, while the repetitive parts are performed more quickly by machine.
- Transparency and control can be improved because automated processes allow reliable, fine-grained monitoring, which can be visualised and analysed to show progress, spot problems, identify opportunities for improvement and predict future workloads.



# The Implementation Challenge



The possibilities opened up by modern automation technology are an exciting opportunity for IT and the wider organisation alike, but can also be a significant challenge for traditional technology groups.

This sort of modern, agile and adaptive automation does not need very large numbers of low-skilled programmers making small changes, but needs highly capable software engineers who understand the entire system and its value, and can adapt to work with fast moving, complex technology, in a way that delivers robust solutions for the organisation.

The services partners needed by a modern organisation must be able to deliver robust and well-engineered solutions, using responsive agile approaches. This requires a high level of core software engineering capability, strong understanding of agile and lean working, and the ability to identify, adopt and apply emerging technologies in order to keep their clients at the forefront of the opportunities offered by modern automation technology.



# Getting Started on the Automation Journey

The key goal is to deliver something useful quickly, to validate your ideas and build confidence in the approach. Some of the principles that can maximise your chances of success are:

- **Involve the Business:** there is often a tendency to view automation as an IT concern, but any large automation programme involves a lot of domain knowledge, changes how people work and needs a lot of goodwill to be successful. So start with the business people if possible and involve the affected groups across the organisation early.
- **The Problem not the Technology:** modern automation projects often involve selecting and implementing new, unfamiliar technologies and there is a real danger that we get distracted by new technical things to learn and lose our focus on the problem being solved. This situation usually leads to a lot of interesting technical work with very limited business impact and inevitable disappointment in the wider-organisation, so reverse this trend by starting with the key business processes. What does a value stream analysis reveal about them? Where are the obvious automation targets?
- **Incremental Delivery:** a large automation project can last for several years before all of its goals are met, but this is no reason to deliver all of the value at the end. Aim for a flow of small changes and improvements right through the project, something that basing your project on an initial value stream analysis can help with.
- **Significant but not Critical Initial Project:** when starting a new automation programme there is a temptation to find something insignificant to start with, in case there are problems, or to find the most critical pain point to maximise visibility and impact. Neither of these are good starting points. Find a project that is significant and visible so that it will deliver real benefit, but expect things to go wrong during the learning process and don't pick something that will shut the organisation down if there is a problem.
- **Architecture Led:** a very common mistake is to see automation as a tool or technology implementation project. The tools in use are just one part of the puzzle and without considering process impact, the data needed, the integration into the existing environment and often the need for custom interfaces and features, a tool-led project is likely to quickly become an isolated irrelevance. Make sure that automation projects have the same level of architectural design as custom build or complex package implementation projects.
- **Measure to Improve:** a large automation project is a continual learning exercise and often the successful result isn't what was envisaged at the start. To measure the impact of your automation work, build the metrics you need into the implementation, take baseline measurements before you start, and measure regularly to focus on the most promising areas.

image source: unsplash.com

Now that emerging technologies have been proven by the early adopters, this is a great time to start an automation initiative that can have a real business impact.

Given the opportunities available and the adoption of new automation technology across many industries, it is not too dramatic to say that in many cases, effective automation is now a survival skill for the modern digital enterprise.

Modern automation has huge potential to enable organisations to become modern digital enterprises and can deliver important benefits including efficiency, transparency and reliability. Automation has always been an important part of IT delivery and has had a huge impact over time, but a changing, digitising environment means that we need to reevaluate our existing automation approaches and in many cases harness new automation technology to make automation the enabler of the digital business, rather than a legacy that threatens its existence.





## ABOUT ENDAVA

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**Endava** is a privately-owned, technology company, with over 17 years of experience working with some of the world's leading Finance, Insurance, Telecommunications, Media, Technology, and Retail companies. Through our Digital Evolution, Agile Transformation and Automation solutions, we help our clients become more engaging, responsive, and efficient.

Find out more about the Automation solutions we can deliver.

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