

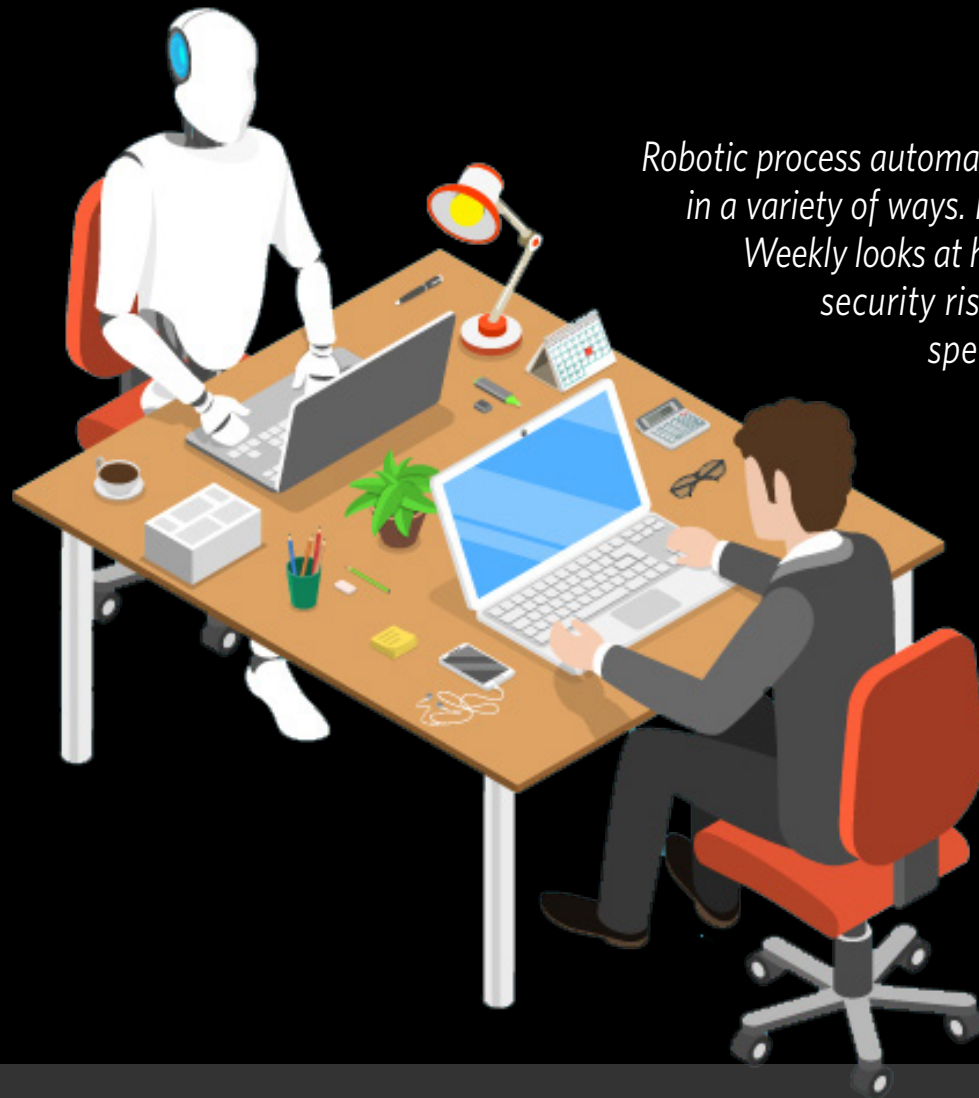
A COMPUTER WEEKLY BUYER'S GUIDE TO ROBOTIC PROCESS AUTOMATION

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The bots turning businesses into digital transformers
We assess how the robotic process automation market is evolving

Integrating security with robotic process automation
Firms must secure human-mimicking robotic automation to avoid security failures

Inside the robots: how automated RPA gets smart
We look at how RPA can support a company's digital transformation strategy



Robotic process automation is making its business value known in a variety of ways. In this 15-page buyer's guide, Computer Weekly looks at how the market is ever-evolving, the security risks to guard against, and how RPA can spearhead a firm's digital transformation

THE BOTS TURNING BUSINESSES INTO DIGITAL TRANSFORMERS

Companies are increasingly turning to robotic process automation to accelerate digital transformation. Cliff Saran takes a look at how the market is evolving



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Analyst Forrester defines [robotic process automation](#) (RPA) as a technology that provisions software agents – bots – that can mimic human interactions with software systems.

These bots run predictable tasks, and act either in concert with humans (attended RPA) or mostly autonomously (unattended RPA). Increasingly, RPA is adding [artificial intelligence](#) (AI)-based capabilities, such as reading unstructured data.

IT research firm Computer Economics says in its April 2019 *Technology trends* report that bots are typically taught by human example to respond to various triggers. For example, when an employee submits a change of address form to the human resources (HR) department, the bot could then be used to trigger an update to the records in payroll, benefits systems, expense reporting and accounts payable, just as a human clerical worker might do.

Since the process operates at the user interface level, such an approach may be easier than attempting to integrate systems at the [application programming interface](#) (API) level.

“The bot simply mimics the keystrokes and mouse clicks that a human worker would perform, freeing the worker to focus on higher-value activities. The machine learns by observing the actions of humans doing the existing job,” says the research firm.

INTEGRATING SYSTEMS

This suggests that RPA provides a relatively easy way to integrate different systems. It is often deployed to make a business process at least seem fully joined up, even if the underlying IT systems are not directly connected.

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While the results are not as tightly connected as a full enterprise application integration project, studies such as that carried out by Computer Economics have reported that investing in RPA does pay back and the return on investment is far quicker than traditional enterprise application integration (EAI).

As part of the report, a survey of 249 IT organisations worldwide conducted between September and December 2018 found that RPA is low risk, but offers high rewards.

Commenting on the survey, David Wagner, vice-president for research at Computer Economics, says: "This is the first year RPA has penetrated deeply enough into the market to warrant being included in the full study designed to allow computers to do what they do best: repetitive tasks requiring accuracy but little creativity, while freeing up humans to do higher-order tasks. We expect RPA to grow rapidly, because of the success of early adopters."

MARKET GROWTH

Analyst Gartner reported in June that the RPA software market grew by 63.1% in 2018 to \$846m, making it the fastest-growing segment of the global enterprise software market. Gartner forecasts that RPA software revenue will reach \$1.3bn in 2019.

Gartner research vice-president Fabrizio Biscotti says the growth is being driven by organisations which need to integrate legacy systems.

"Although RPA software can be found in all industries, the biggest adopters are banks, insurance companies, telcos and utility companies," he says.

These organisations traditionally have many [legacy systems](#) and choose RPA to ensure integration functionality. The ability to integrate legacy systems is the key driver for RPA projects.

Biscotti says RPA enables organisations to accelerate their digital transformation initiatives, while unlocking the value associated with past technology investments.

Writing in the *Forrester tech tide: AI, automation and robotics for customers and employees, Q2 2019* report, Forrester analyst JP Gowdner warns: "Companies that fail to invest in RPA are missing automation opportunities. The automation of repetitive tasks can make human employees more productive."

However, he feels there is also quite a lot of industry hype. "As more and more technologies enter the market, it's tempting to dive right into the excitement, but be conscientious when curating your tech portfolio," says Gowdner. "Ensure your investments are put towards solutions and strategies that will meet your firm's specific business needs."

[Automation Anywhere](#), [Blue Prism](#) and [UiPath](#) are the three big RPA companies, according to Gartner's analysis. What is most interesting about its assessment of the RPA market is that the major enterprise IT providers - IBM, Microsoft, SAP and Oracle - are missing. Gartner

**"ENSURE YOUR INVESTMENTS ARE
PUT TOWARDS STRATEGIES THAT MEET
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believes that over the next few years, the mega-suppliers will either snap up RPA businesses or build out their existing business process management portfolio to incorporate RPA.

In a recent blog post, John O'Brien, research director at IDC, wrote that Automation Anywhere and UiPath have poured vast sums into aggressive customer expansion programmes, creating large partner ecosystems, free product versions, cloud delivery, and free access to the product to build presence and scale.

"This arguably caught Blue Prism off-guard, and UiPath in particular has seen its valuation skyrocket to \$7bn from \$3bn last September," he says. "Blue Prism, by contrast, is valued at \$1.16bn."

In July, Blue Prism acquired [Thoughtonomy](#) for £80m, which IDC believes could help it remain competitive against its two

nearest rivals. Thoughtonomy provides a software-as-a-service (SaaS)-based RPA product for small and medium-sized enterprises.

"On balance, we are optimistic about the merger, because the capabilities of the combined businesses should generate significant new upside opportunities for both," says O'Brien. "There are, of course, risks in integrating its first acquisition and a mountain for Blue Prism to climb to reach UiPath's valuation. But in terms of pure delivery capability for the customer, this deal certainly gives the company a big boost."

ROBOTS IN THE PUBLIC SECTOR

RPA appears to be a technology well suited to the public sector. In 2017, the Department for Work and Pensions (DWP) demonstrated how RPA could overcome a backlog of new pension



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claims. The process was heavily manual, which led to a backlog of more than 30,000 claims.

At the time, Shaun Williamson, senior product manager at DWP, estimated that the department would have needed to employ thousands of people and taken several thousand hours to catch up.

Instead, DWP's Intelligent Automation Garage deployed 12 UiPath robots to handle 2,500 claims per week. This cleared the entire backlog in just two weeks.

In July, Chelsea and Westminster Hospital NHS Foundation Trust went live with a set of bots, using Automation Anywhere to provide automation in the finance department.

The trust established a centre of excellence for RPA, and people from across the business were invited to participate in workshops focused on their business areas.

Sandra Easton, chief financial officer at the trust, says the outputs of these workshops are used to identify areas of work to automate.

"We run a workshop to identify which processes will we automate and prioritise our pipeline of development," she says. "In the finance workshop, we identified 38 processes. We have now done a second workshop for finance and will be adding a further 30 processes on our automation roadmap."

One of the first bots developed for finance tackled the manual task the accounts team needed to do at the end of each month to reconcile accounts.

While the trust is on target to attain its goal to automate some 40 processes over the coming year, Easton wants the

business to own the automation agenda. "I want people to feel they have the freedom to create the bots as and when they need," she says.

At the start of the RPA initiative, people were concerned bots would make them redundant, but Easton says: "Once you understand RPA, it opens your eyes.

"I have a lot of experienced people. We are not getting the best out of them because they are spending a lot of time doing things that can be automated. We need to strive for efficiency and keep costs as low as possible. I want our team to be able to add value to the business."

For Easton, an indirect benefit of RPA is that it enables the trust to free up funding to invest in clinical services. "We can invest in frontline care, which improves the patient experience," she says.

However, Easton also sees opportunities for it to be deployed in a way that directly improves the patient experience, such as in the outpatient department or to improve operating theatre scheduling.

REDUCING MANUAL PROCESSES

There are plenty of examples of how RPA can be used to streamline business processes by providing an easy way to integrate between different IT systems quickly and reducing unnecessary manual data rekeying.

For instance, Cooperative Bank has used Blue Prism to automate 10 processes, including direct debit cancellation, account closures, Chaps payments, foreign payments, audit reports, internet applications, and card and PIN pulls.

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Since these business processes required a high level of manual intervention and personnel, Cooperative Bank felt there was a strong business case to automate them, as Joanne Masters, business systems manager at the bank, explains.

"We exceeded our FTE [full-time employee] savings target by 25%," she says. "We've been able to release staff as each process went live. The project has let us move a significant number of FTEs away from manual roles and into customer-facing positions."

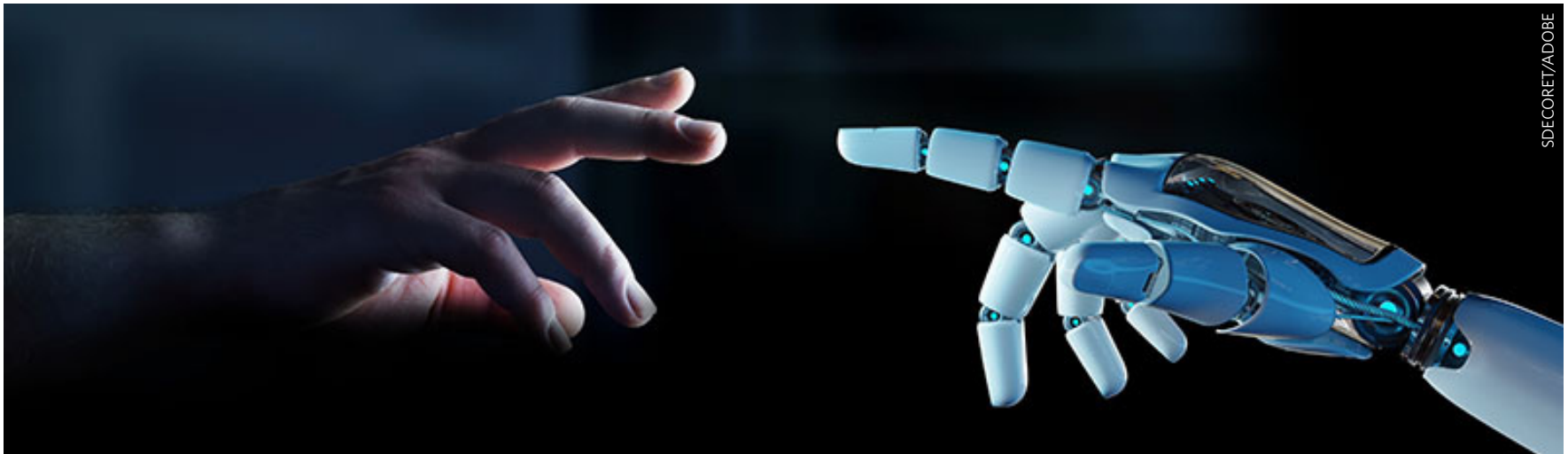
RPA DOES NOT SOLVE ENTERPRISE INTEGRATION

However, while RPA can indeed help organisations link disconnected business processes, it does not tackle the underlying problems CIOs face in trying to modernise the disparate IT systems that keep enterprises running.

Loosely linked systems, connected using RPA, may give the impression of a joined-up business process, but the underlying processes remain disjointed. Fixing them is far harder than using automation to paste over the gaps.

Gartner warns CIOs that businesspeople now believe they can develop their own automations without having to rely on IT developers. "RPA tools appeal due to the apparent speed to value," it says. "This is especially the case when compared with other, slower options, such as developing effective APIs or replacing those legacy applications."

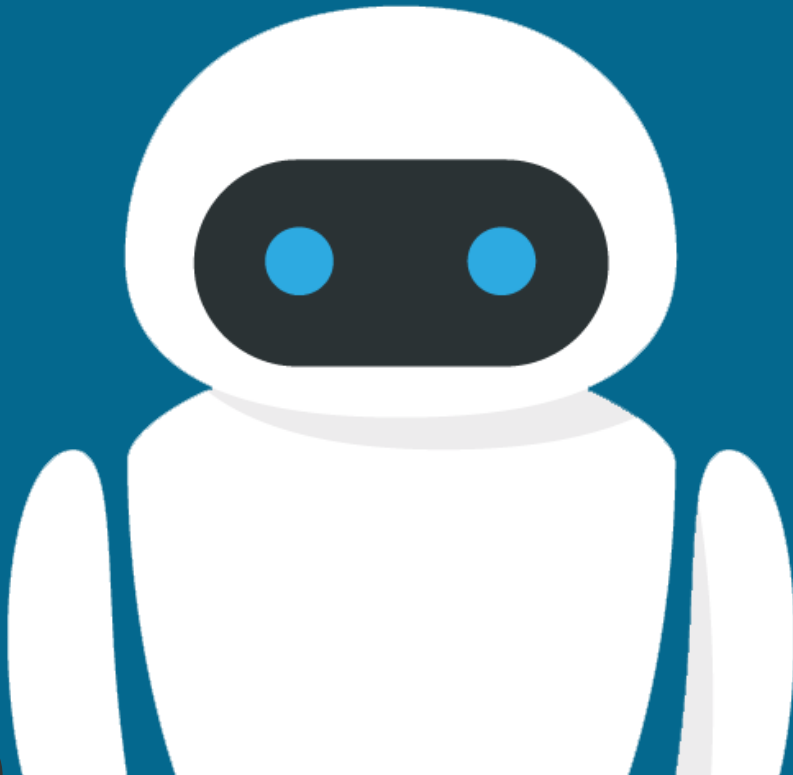
However, without proper governance, Gartner believes the ease with which robotic process automation can be used to link systems together will drive a wave of shadow IT, likely creating as many problems as it solves. ■



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INTEGRATING SECURITY WITH ROBOTIC PROCESS AUTOMATION

RPA's power is that it can mimic human behaviour. Enterprises must secure robotic automation with this principle in mind to avoid security failures. [Dionisio Zumerle](#) and [Cathy Tornbohm](#) report



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Robotic process automation (RPA) tools can handle sensitive enterprise data. This may involve copying and pasting account numbers and amounts from invoices to payment systems.

As a result, a bot has privileged access to enterprise systems and resources. Sensitive data can be exposed to attackers, and especially insiders, unless proper security measures are in place.

For example, RPA bot credentials or customer data that the bot handles could be exposed. In the case of fraud risks, insiders could take advantage of the RPA access rights to insert fraudulent actions into the RPA scripts that are run. So proper governance, including security, is essential.

Security leaders need to treat RPA as an approach to [automating business processes](#), not just a recorder and launcher of scripts. Once deployed, RPA becomes an integral part of the enterprise infrastructure, and its security should also be integrated into enterprise security.

PRICE AND FUNCTIONALITY

Organisations do not select RPA tools based on [security features](#), but rather on price and functionality. Only after the selection process and during implementation do organisations ensure basic security is in place, such as the encryption for the data the tool handles.

Gartner recommends an assessment of the RPA tool from a testing supplier should be a requirement in the selection process. RPA tools often provide assurance that they have been tested for vulnerabilities from an application security testing supplier.

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This assessment report should be required. If proper security vetting of the RPA tool is not performed, it can leave security holes in the implementation. Whenever there is an RPA security failure, the security team will need to review the log files.

FULL AUDIT TRAIL

Certain security features in RPA implementations cannot and should not be provided via third-party tools. While third-party auditing tools can be used, ideally the RPA tool should generate the log itself, since it has full visibility of the actions it has taken in the applications it has accessed.

Other enterprise tools could leave gaps where they do not have visibility or compatibility with applications.

The log, or audit trail, of RPA activity is paramount to ensure [nonrepudiation](#). Without it, it is not possible to conduct an investigation. The RPA tool must be able to provide a complete, system-generated and immutable log of its activity.

Enterprises typically feed RPA logging to a separate system where the logs are stored securely and are forensically sound, such as a central [log management](#). The log must be complete, as gaps would hinder any investigation, or make the security team miss important alerts.

The log should be system-generated and must also be integrity-protected to ensure it is immutable. One way to do this is by signing the log. To ensure script integrity, the log should

also take into account changes made to scripts by developers or other parties.

DO NOT RE-USE HUMAN CREDENTIALS WITH BOTS

Bot operators are employees responsible for launching RPA scripts and dealing with exceptions.

Sometimes, in the rush to deploy RPA and see immediate results, enterprises will not distinguish between the bot operators and the bot identities. The bots are run using human operator credentials.

This configuration makes it unclear when a bot conducted a scripted operation versus when a human operator took an action. It becomes impossible to univocally attribute actions, mistakes and, most importantly, attacks or fraudulent actions.

The other issue that arises from re-using human operator credentials with bots is that administrators will tend to keep password complexity and frequency of rotation to a minimum.

Administrators are limited to what is reasonable human user experience, rather than what a bot can handle. This eases brute force attacks and consequent data leakages.

Instead, Gartner recommends assigning a unique identity to each RPA bot. Bots should have dedicated identification credentials whenever possible.

Identity naming standards should also distinguish between human and bot identities wherever possible. There is not one single right way to implement this in practice. One example

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could be assigning B-123 as an identity for the bot operated by an employee with the identity E-123.

Ultimately, audit trails (logs) should provide the information that user E-123 asked bot B-123 to carry out task X.

An exception to this rule is constituted by some use cases (such as call centre operations) where human users leverage robotic automation technology on their computer to automate specific operations that are part of larger manual process.

This is sometimes called [robotic desktop automation](#) (RDA). In those cases, it may prove difficult to avoid reusing user credentials.

TIGHTENING RPA DATA ACCESS

Some organisations have expressed concerns about allowing RPA to modify databases directly. This could lead to data tampering, but most importantly to data corruption.

Where a user interface is available for database access, it should be leveraged, even though it may slow down the bot. Alternatively, tools such as database activity monitoring in front of the databases will provide monitoring.

Most RPA tools provide role-based and resource-based access controls to restrict access to RPA functionality. RPA tools can also integrate with [enterprise directory services](#), restricting access to enterprise resources and assigning account privileges correctly.

Gartner urges IT departments to avoid using free versions of RPA tools with production data. Often, free versions of RPA tools are intended only for trials and do not provide security functionality. These versions may render any data used with them public, so they should only be used as trial tools with test data.



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Overall, Gartner recommends that security leaders restrict RPA access to what each bot strictly needs to conduct the assigned task - for example, an RPA script that copies certain values from a database and pastes them into an email.

The bot operating the script should only have read access to the database, rather than write access.

LINE OF BUSINESS

Most RPA initiatives are led by the line of business. IT and security teams are consulted sporadically during development, if at

all. The initiatives are run by the line of business, and later on down the road might be handed over to IT.

We've found that establishing a common language and an ongoing dialogue between the security team and the line-of-business team that leads the RPA initiative is essential.

This may entail establishing a risk framework, whereby each RPA script is evaluated in terms of risk. ■

This article is based on an excerpt of Gartner's Top four security failures in robotic process automation by analysts Dionisio Zumerle and Cathy Tornbohm.



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INSIDE THE ROBOTS: HOW AUTOMATED RPA GETS SMART

Adrian Bridgwater and Cliff Saran investigate how robotic process automation can support an organisation's digital transformation strategy



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The drive to bring [robotic process automation](#) (RPA) techniques forward into contemporary software and data management stacks has been a standout trend this year. Often tagged with an additional lower case 'i' for intelligent, RPA is essentially focused on creating logic models that record, build, run and monitor user and, increasingly, machine behaviour.

[Chris Lloyd-Jones](#), emerging technology, product and engineering lead at [Avanade](#), says RPA's focus has moved from optimising IT to making corporate business functions more efficient. From an Avanade perspective, certain business functions are similar in many organisations, which means businesses can see how RPA can be used effectively in areas such as finance and human resources.

An RPA model classifies, records and subsequently monitors observable behaviour as it travels through workflows that exist inside applications and database operations. It then automates these actions in a predictable way.

The predictable programmability element of RPA allows organisations to connect workflow systems without the need for complex scripting and the use of application programming interfaces (APIs). In fact, RPA can almost be considered a no-code/low-code way to integrate IT systems without actually using APIs.

In terms of deployment inside live production environments, RPA efficiencies are manifesting themselves as [conversational bots](#) that interact with humans, machine-to-machine interfaces and database-to-database interfaces.

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The user remains mostly oblivious of these lower-level RPA connections until the efficiencies created manifest themselves at a higher level, in what is now a more functional, joined-up application or service. As part of a series of posts on the [CW Developer Network blog](#), Computer Weekly asked a number of industry experts about their experiences of using robotic process automation.

AUTOMATING BUSINESS PROCESSES

Jon Theuerkauf, chief customer officer at Blue Prism, describes the key goal of process automation as a [way to deliver longer-term value at scale](#). This means the automation must be underpinned by a clear vision linked to strategic imperatives – with business users driving it, IT supporting it and other key stakeholders championing it.

Theuerkauf recommends that automations are then carefully planned, modelled, designed and centrally pooled for re-use.

“It’s also best to either make processes more efficient, prior to automating, or to redesign them during the design phase. Organisations will then be able to re-imagine processes and organisational structure with a wider range of more innovative, impactful, RPA use cases across the enterprise,” he says.

Theuerkauf believes this approach will ultimately enable organisations to automate more, by expanding on their early efforts more intelligently and strategically with insight, and automate better, by building and running higher-quality process automations faster and more easily for the long term.

For instance, [Costain](#), the smart infrastructure solutions company that built the Channel Tunnel and the Thames Barrier, has transformed its procure-to-pay operation using a combination of technologies from Abbyy and UiPath. By upskilling its finance team, the group was able to automate the process of fetching an invoice and capturing, identifying and extracting the essential data within it. The system uses RPA to post the invoice into its enterprise resource planning (ERP) system.

[Abbyy](#) claims that the system has enabled Costain to reduce the amount of human intervention needed for processing purchase invoices by 80%.

MAKING A SOUND INVESTMENT

Although RPA is quick to implement and bring to production, there is still a cost attached to building,

developing and deploying it effectively.

As Itay Reiner, product director for Nice Advanced Process Automation Solutions, points out, if an organisation fails to select the right processes to automate, in terms of attaining a specific

**AUTOMATION MUST BE UNDERPINNED
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return on investment (ROI) target, the project will likely fail and not deliver on its promise.

Reiner cites the example of a large energy company, which had a very complex use for RPA to update financial models according to currency exchange rates.

Reiner says this complex scenario was successfully automated, but failed to provide a return on investment because the task was executed once a month by a single person and within a short time-frame. In other words, the process could be automated, but since

“YOU MUST CHANGE THE WAY YOU THINK ABOUT YOUR PROCESSES BEYOND THE IT DEPARTMENT”

KIT COX, ENATE

it required just one day a month of manpower, there was little value in automating it.

TRANSFORMING BUSINESSES

Along with identifying a process that can not only be automated, but also represents value to the business, RPA also requires a rethink of how job functions and job roles are described.

Kit Cox, CEO of Enate, says: “You must [change the way you think about your processes](#) beyond the IT department. The very



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notion of a 'job' will have to change as tasks are mapped to core skills across a resource pool of human competencies and technology capability."

The experts Computer Weekly contacted regard RPA as a tool to help organisations along their digital transformation strategy. Using bots does not automatically make a business digitally transformed, but it does – at least from a customer-facing perspective – make the organisation look like it is joined up and coherent.

"Where legacy platforms with limited or no API connectivity are prevalent, RPA is an increasingly important element of [enterprise application integration](#) (EAI)," says Sathya Srinivasan, principal solutions architect at Appian.

One example where RPA can be deployed to link a legacy platform is on a medical record checking website, where the user can enter a practitioner's details to find information such as medical licences.

"There is no easy system-to-system API that can execute successful integration," says Srinivasan. "This would be an [ideal use case for robots to mimic human behaviour](#) and extract information."

Rather than replacing old [legacy IT systems](#), RPA acts more like a human worker would, creating a communication bridge between two separate IT systems, according to Niko Lehtonen,

head of training at Digital Workforce. "[A software robot can be taught a simple process in just a few days](#), which means that organisations can realise the benefits of the integration quickly," says Lehtonen.

However, RPA should not be regarded simply as an automatic choice to avoid costly integration work. In Lehtonen's experience, RPA is often limited when it comes to integrating more nuanced and complex systems. This is where an API may be better.

USING BOTS DOES NOT AUTOMATICALLY MAKE A BUSINESS DIGITALLY TRANSFORMED, BUT IT DOES MAKE THE ORGANISATION LOOK LIKE IT IS JOINED UP AND COHERENT

A STEPPING STONE TO TRANSFORMING DIGITALLY

RPA is often discussed alongside [digital transformation](#) initiatives. The RPA effectively provides a way to avoid people having to rekey information from one IT system into another, because the applications are not seamlessly integrated.

As Avanade's Lloyd-Jones points out, while all modern applications

have an API, bots generally replace a piece of work that may traditionally have been undertaken by a human. More often than not, the work is automated by using the bot to fill in the user input the application requires. Strictly speaking, this does not necessarily mean that the underlying business processes have been digitally transformed.

For Lloyd-Jones, where RPA does fit into digitisation is that it becomes an engine that frees up people's time so they can focus

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on adding greater value. And from an IT perspective, using RPA enables IT to document the business process in a way that reflects how it is currently used. This means it can be updated at a later date. "You can move away from keeping the lights on, to focus on modernising," says Lloyd-Jones. "You start with automating a process using a robot then [use an API to call the robot.](#)"

Over time, the legacy code that the RPA connects to can be rewritten as a modern application. The beauty of this approach is that the API used to invoke the bot remains the same, once

the application has been modernised, enabling IT departments to deliver immediate value to the business through RPA, while working on longer-term legacy application modernisation.

RPA engines only ever have a fixed level of logic that they can bring to the table. Organisations need to assess how much of their business processes can be automated by joining them up in a coherent way using RPA, without the need to go into deep integration work. But, as Lloyd-Jones points out, they are a useful stepping stone in the journey towards digital transformation. ■



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