KPMG

Demystifying Digital Labor

The layman's guide to the spectrum of robotics and automation

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How many different monikers does it have? Could you make the terminology any more confusing? We may also want to steer clear of the technical description—which might sound something like: "It is a cognitive autonomic, data-analytic, neurally-heuristic knowledge engine." While it may not sound like something you need, chances are it is going to change the way you do business in ways even the pundits are still figuring out.

It is a common problem among CxOs—there is game-changing technology out there, camouflaged by overly complicated terminology, and no one can explain it in English. Such is the problem when you start a conversation on Robotic Process Automation—one of the hotter topics in today's business circles. The first question you are likely to get back is "Are we talking about R2-D2 type of robots?" The answer to that question would be "No."

This paper puts some of the terminology aside for a minute and describes the field of digital labor in general—a capability that encompasses the more commonly used term "Robotic Process Automation" (RPA). We will provide insight as to why digital labor is likely to be important to your business, tone down the hype, and debunk some of the RPA myths along the way.

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Introduction and background

Call it what you want, digital labor is no longer a consideration, but now a mandate. It is no longer about "if," but about "where, how, and how fast."

In the marketplace, multiple terms such as Robotic Process Automation and digitalization have been used to capture the concept that KPMG refers to as Digital Labor – the automation of labor by leveraging digital technologies to augment, or automate the tasks undertaken by knowledge workers in your business.

This does not sound so new—after all, you have been leveraging technology for years to augment how you do business. In some ways this is true, but in many other ways, this time it is different. The concept: *software robots*; the impact: staggering—with studies showing as much as 45 percent of the activities individuals currently perform in the workplace can be automated using already demonstrated technologies—representing about $2 trillion in annual wages in the United States alone.[1]

Creating part of the confusion in the market is the simple fact that the spectrum of this digital labor is very broad—ranging from automating simple swivel-chair activities such as cutting and pasting content from one system to another, right up through cognitive solutions (software that can think and reason) performing activities (e.g, business, medical,[2] legal) previously performed exclusively by humans—and often performing these activities far better than their human predecessors. In this paper, we will break this spectrum of automation into three distinct categories to help better differentiate the types of digital labor automation.

[1] "Four Fundamentals of Workplace Automation" – McKinsey Quarterly (November 2015)

[2] "Watson's next feat? Taking on cancer. IBM's computer brain is training alongside doctors to do what they can't," *Washington Post* June 27, 2015, http://www.washingtonpost.com/sf/national/2015/06/27/watsons-next-feat-taking-on-cancer/

Let us be clear—this is not just the latest wrench for tightening the next dime out of your operations—there are more than dollars at stake. The compelling case for moving from human labor to digital labor is multifaceted and includes several key benefits as follows:

Productivity/Performance – Software robots work 24/7, and 365 days a year; do not take vacations, get sick, suffer from work/life balance issues; and perform tasks at digital speeds.

Employee Satisfaction – Eliminating the mundane repetitive tasks allows employees to focus on strategic initiatives, thereby impacting the business in a more profound way and experiencing more job satisfaction.

Scalability – Software robots scale instantaneously at digital speeds to respond to fluctuating workloads. There is also no overtime, no hiring challenges, no training, and no severance.

Consistency/Predictability – Software robots do not make inconsistent decisions or elect to "turn right" one day and "left" the next. They are configured to solve a problem the same way every time.

Quality/Reliability – Software robots always do what you tell them to do—when properly configured they do not make mistakes and thereby eliminate human error. Having said that, when not properly configured and/or maintained, a robot will fail, and fail at digital speeds.

Auditability – Software robots keep the perfect audit trail—the software log—a file built by the software that documents every action it took and the corresponding resulting outcome.

Cost Efficiency – Estimates thus far show a software robot is approximately one-third the price of an offshore full-time employee (FTE), and about one-fifth the cost of an onshore FTE.[3] Digital labor savings are estimated to be between three and ten times the cost of implementing the automation.[4]

As is indicated by the list of benefits above, digital labor is not just about direct cost savings. That being said, when it comes down to it, in most organizations the numbers need to work.

[3] "Can Robots Replace People?" – Business Standard, April 27, 2015

[4] "Four Fundamentals of Workplace Automation" – McKinsey Quarterly (November 2015)

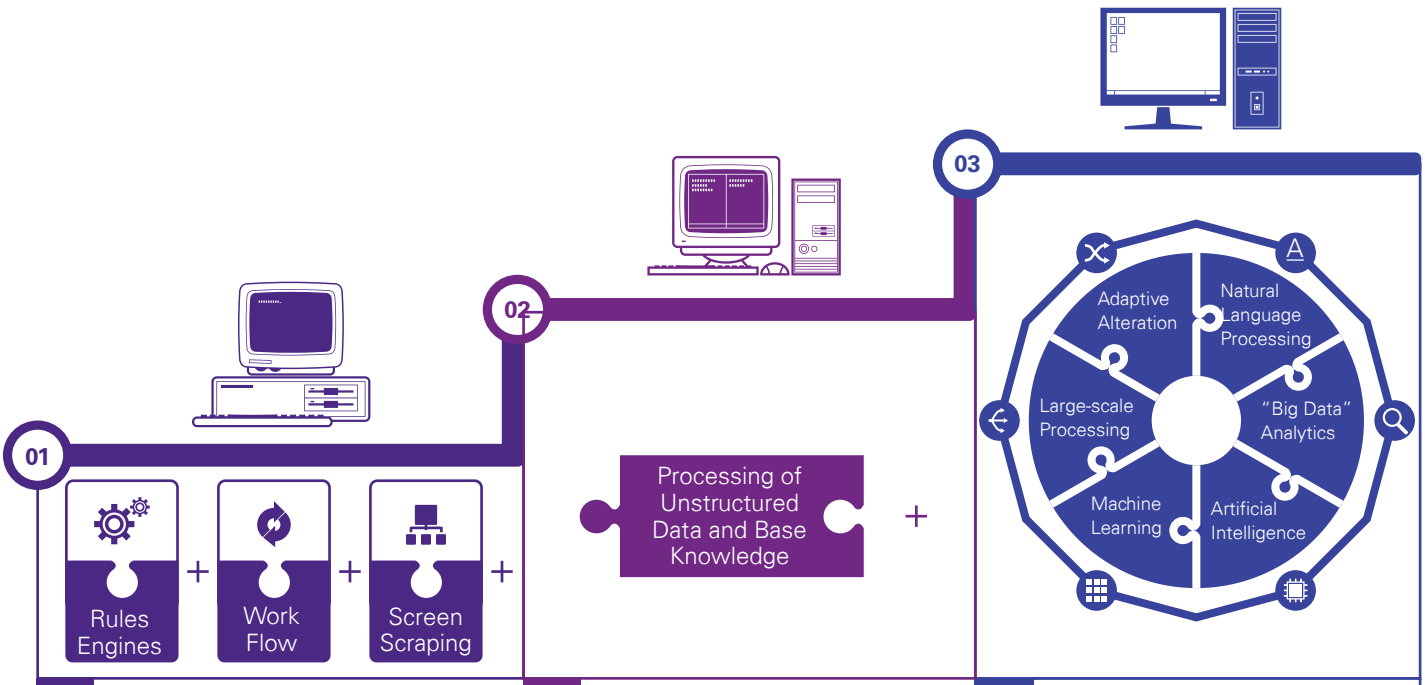
The spectrum of digital labor

There is currently no industry-accepted terminology when discussing digital labor. To add to the confusion, there is a very robust difference between the tool capabilities and approaches leveraged when implementing this type of process automation. As a result, it can get very confusing when one person is talking about automating swivel-chair activities such as cutting and pasting information from one system to another, and the other person is thinking of cognitive tools with capabilities intelligent enough to identify merger and acquisition targets for a company looking for inorganic growth opportunities—both of which are types of digital labor automation.

A common cause of confusion often results from the term "robotic" in Robotic Process Automation; and the question that is often verbalized is, "Why call it 'robotic' if the automation isn't actually using physical robots?" The short answer to this question is to first consider the term robotic as a descriptor to the underlying process and not to the automation. In other words, we are automating a process that is robotic by its very nature – it is done the exact same way over and over, such as copying content from field A and pasting it into field B." Hence, in the end, we are automating a very manual robotic process by applying automation technologies – and the resulting automation solution is therefore thought of as a software robot. Note, however, that the term Robotic Process Automation is not typically used when referring to the Autonomic/Cognitive Process Automation category, as described below, as these processes involve activities that are far more complicated than these 'robotic' activities.

From both a strategic perspective, as well as to simplify these kinds of communication challenges, we have divided the spectrum of digital labor into three categories (as depicted in the graphic on next page). This is not a perfect science, and as such, an automation tool may very well have characteristics in multiple categories and/or sit on the boundary between two categories. This is not to be confused with a maturity model as tools in each category shown below have specific capabilities that address a specific type of automation opportunity. In other words, each of these categories addresses real-world issues and provides the appropriate level of capabilities for solving those specific issues at the right cost/performance trade-off (e.g., you really do not want to use a cognitive platform to perform cut and paste activities).

Figure 1: Classes of automation



1 Basic Robotic Process Automation (RPA)

- Macro-based applets
- Screen scrapping data collection
- Work flow
- Vision-type building blocks
- Process mapping
- Business process management (BPM)

2 Enhanced Process Automation

- Built-in knowledge repository
- Learning capabilities (e.g., 'learning assist' by watching and recording)
- Ability to work with unstructured data
- Pattern recognition
- Reading source data manuals (e.g. Natural Language Processing (NLP)

3 Cognitive Automation

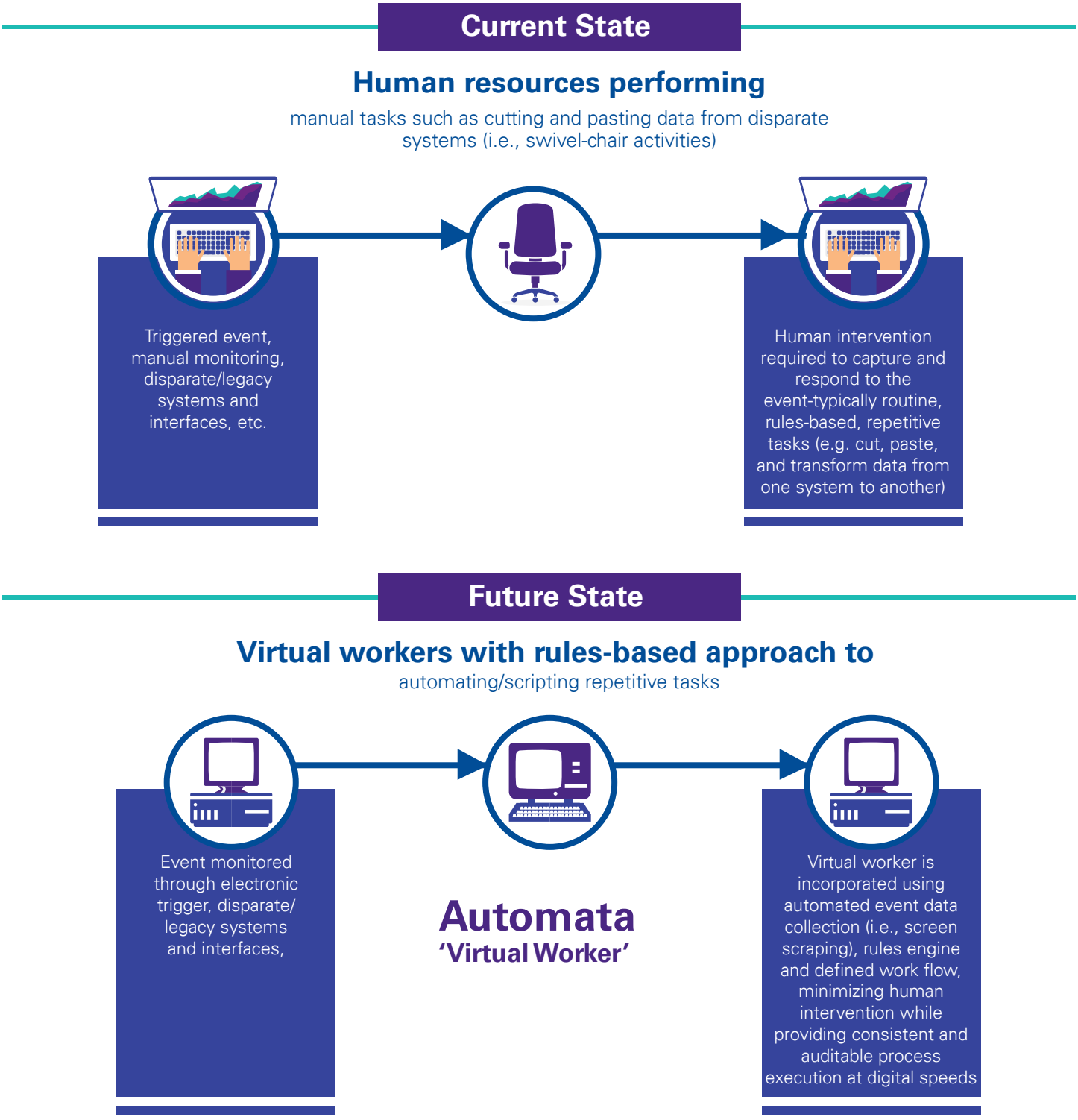
- Artificial intelligence
- Teaching versus Programming
- Natural language recognition and processing
- Self-optimization/self-learning
- Digestion of super data sets
- Predictive analytics
- Hypothesis generation
- Evidence-based learning

Basic robotic process automation

Class 1, which we refer to as "Basic Robotic Process Automation" (and what most people are referring to with the term RPA), leverages several tried and true technologies to automate very rudimentary swivel–chair processes—found in almost all organizations today. The swivel-chair processes are typically repetitive in nature, involve multiple systems, and follow very explicit steps such as when a human is capturing (cutting) information from one system (e.g., the order number out of a legacy mainframe system), possibly reformatting that data, and then entering (pasting) it into another system (e.g., an Excel spreadsheet running on a server). These tools leverage capabilities such as work flow, rules engines, and screen scraping to automate existing manual processes. They often sit on the desktop and run at the user level (i.e., they look to the environment to be a human user and have credentials to log on to systems as a user would).

In general, these tools can be thought of as quick-hit technologies and allow for a very piecemeal approach to automation. They often return immediate benefits upon implementation of the very first process automation. They also deliver incremental benefits with every subsequent process or subprocess you automate. Organizations can see meaningful benefits in a matter of weeks, but more typically in a couple of months.

Figure 2: Basic robotic process automation before and after



Enhanced process automation

Class 2, which we refer to as "Enhanced Process Automation," leverages additional capabilities to those discussed in Class 1 to address process automation of processes that fail to meet the criteria discussed above. Tools/platforms in this category have additional capabilities such as built-in capabilities to solve problems and/or perform work activities (often referred to as out-of-the-box knowledge); the ability to understand natural language (Natural Language Processing (NLP)) and thereby the ability to interpret unstructured data such as e-mails and social media content; and/or an ability to learn new knowledge by either watching a human solve problems or by consuming additional data.

With the abilities described above, tools in this category are able to deal with processes that may involve a high number of complex transactions and require deeper level of analytics involving both structured (e.g., a database) and unstructured (e.g., an e-mail) data, while leveraging years of experience gained across multiple organizations all executing these same processes (e.g., in Finance) and captured in the out-of-the-box knowledge.

In general, these tools are not quite the quick-hit kind of tools defined in Class 1. They typically require a longer period of time for integration into the environment, do not sit on the desktop and may require connections to most or all of the existing infrastructure to gain the maximum benefits. Results in this category are often seen in months and not years. However, unlike Class 1 automations, which are focused on executing the same explicit steps in an automated fashion, these Class 2 tools have the potential to result in widespread back-office process evolution that will change the way you administer your business. They will be truly transformative, primarily due to their ability to deal with unstructured data and to automate the learning process itself—this is a game changer.

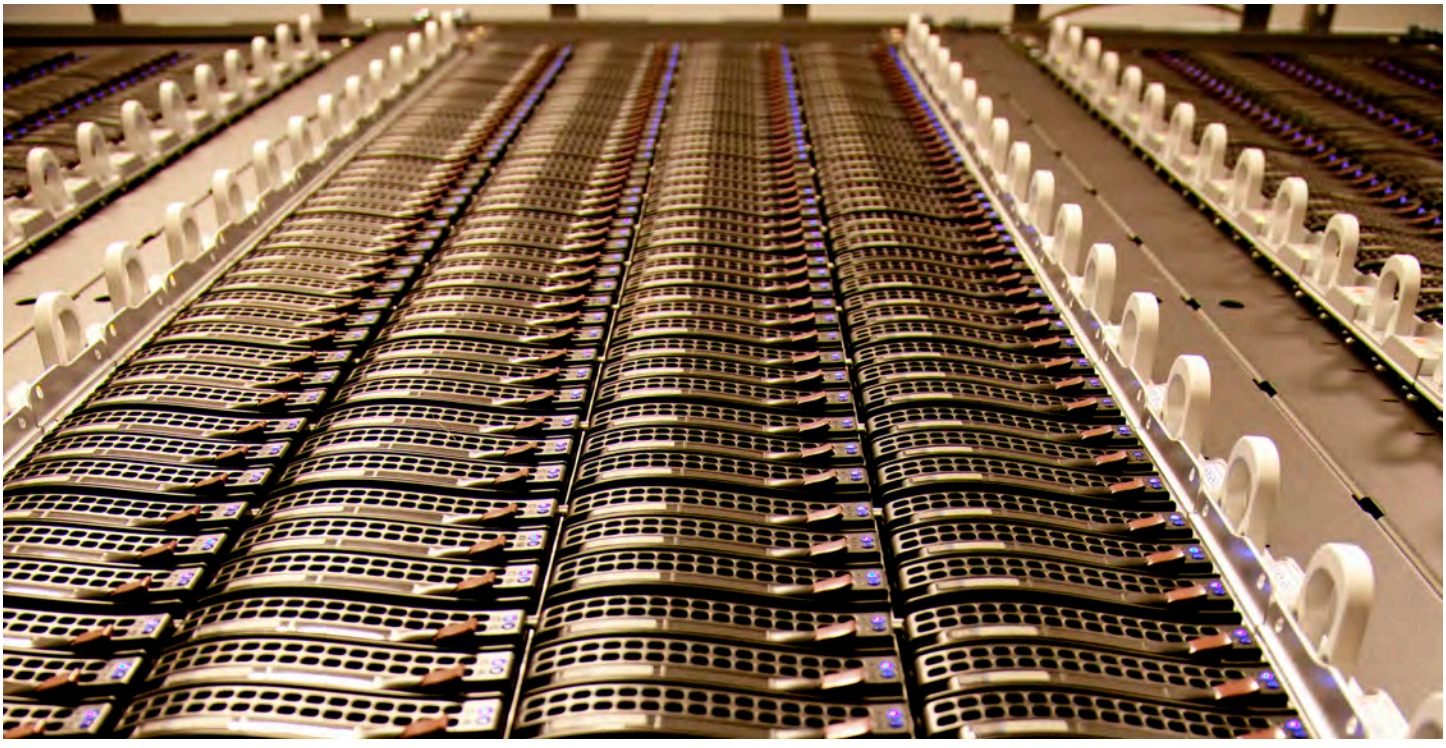
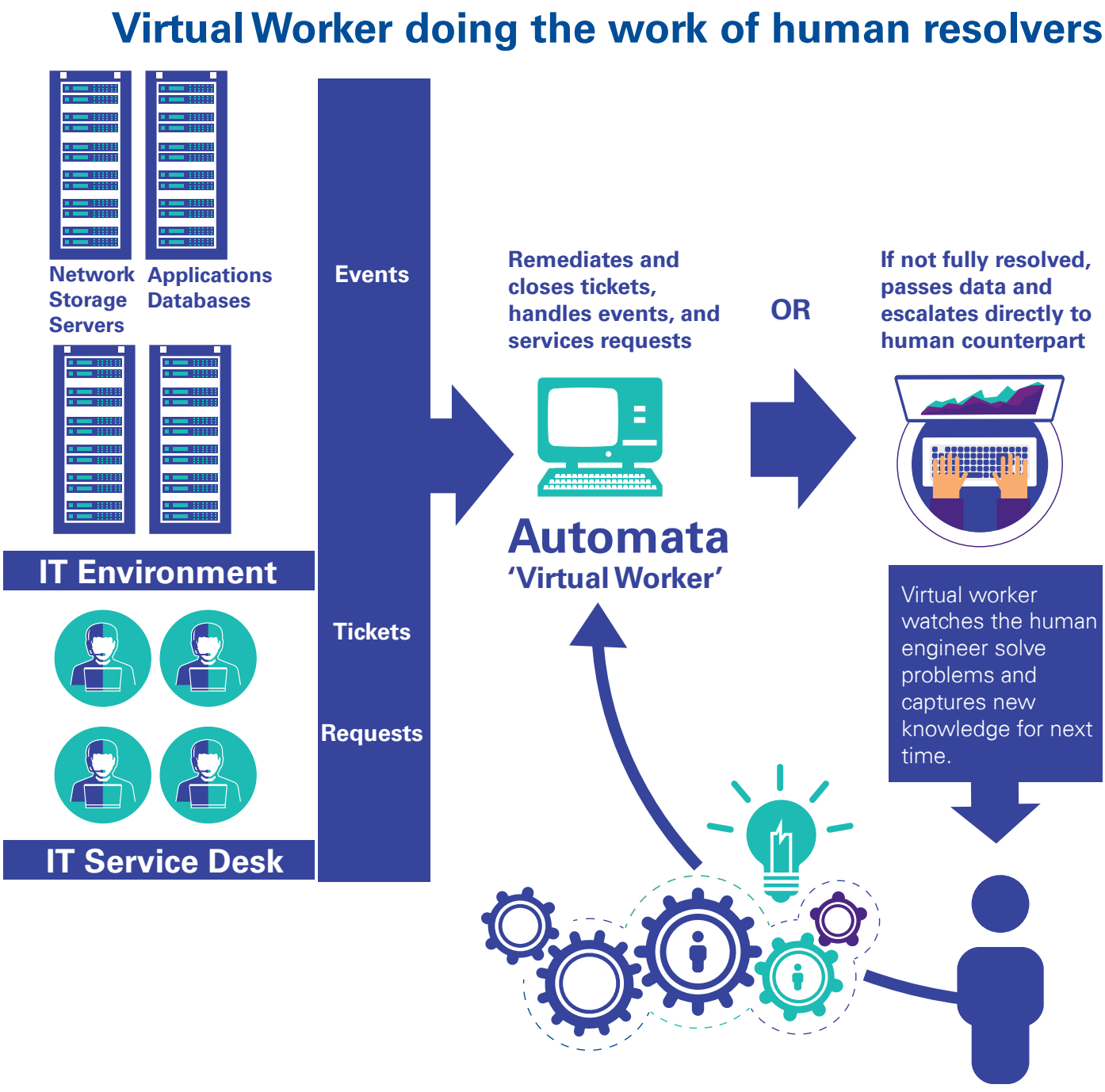


Figure 3: Enhanced process automation on the job



Cognitive automation

Class 3, which we refer to as "Autonomic/Cognitive Automation," is the category that probably has the most confusion and hype surrounding it. In addition, it requires the largest investment in time and dollars and, not unexpectedly, probably has the greatest potential as a differentiator from business as usual.

What exactly is cognitive automation? Cognitive software mimics human activities such as perceiving, inferring, gathering evidence, hypothesizing, and reasoning. And just like humans, cognitive software solutions are taught rather than the traditional approach of programming. In other words, while we program explicit steps into a traditional computer to solve a problem, in a cognitive solution, we would teach it the area of interest—call this the "domain." Once the base domain knowledge is established, the cognitive solution typically continues to learn and solve problems within that domain—generally all on its own. The real power of cognitive computing is the ability to ingest massive amounts of data on which to formulate hypotheses, which the human brain could never handle, nor would there be enough time to do so. For this reason, it is critical that such systems have feedback loops (to help understand success of failure) and/or access to additional information related to the domain. And when these cognitive solutions are combined with advanced automation, these systems can be trained to execute judgment-intensive tasks.

In years past, when AI systems were constructed, the challenge was making them smart. Expert knowledge bases were built through a very manual process of interviewing an expert and then capturing the resulting knowledge by manually building a knowledge system using languages designed especially for AI. This representation of knowledge was extremely hard to build and almost impossible to maintain,[5] thereby resulting in static knowledge that quickly became outdated—and this is what has changed so significantly.

With the recent advances in Natural Language Processing, computers are now able to read and extract meaningful information out of unstructured data. The significance of this capability is by far the single biggest driver of what will be the explosion of computer-based cognitive intelligence. As much as 80 percent of the world's data is unstructured,[5] and 90 percent of the world's data has been created in the last two years.[6] The ability to leverage this data, meaningfully consume it, and in an automated fashion build the associated knowledge ontology, changes the game entirely.

While tempting us with their tremendous upside as a game changer, Class 3 tools, in general, require a much more significant investment in time and dollars. The contextual learning stage alone can represent an investment measured in years,[7] not months. These are not back–office tools for which we write a script and fire off an automation.

The role of cognitive automation in the business world is still evolving. This is the beginning. Several recent demonstrations of cognitive automation (such as Watson winning Jeopardy and the Google car navigating city streets), have been great springboards for excitement and engagement, but we are in the early days of evolution, and much has to be learned, developed, and tested—and these are not inexpensive endeavors.

[5] "Structure, Models and Meaning: Is "unstructured" data merely unmodeled?" – Intelligent Enterprise, March 1, 2005.

[6] "Big Data, for better or worse: 90% of world's data generated over last two years" – Science Daily, May 22, 2013

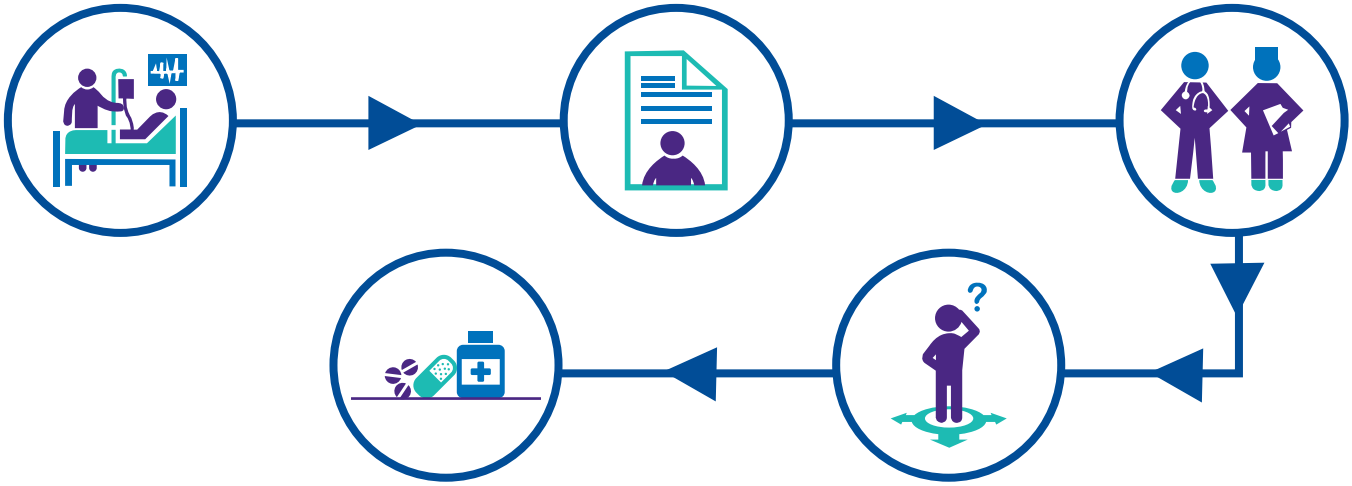
[7] "IBM's Watson computer can now do in a matter of minutes what it takes cancer doctors weeks to perform" – Business Insider, Lauren Friedman and Reuters, May 5, 2015.

Figure 4: Cognitive automation 'before and after'

Cognitive automation before and after

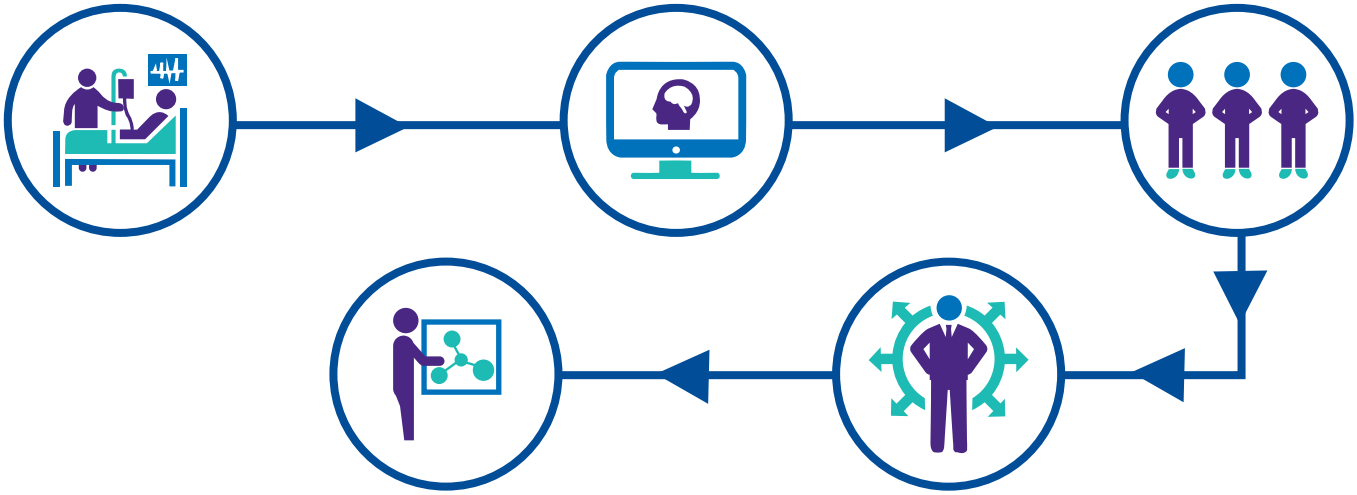
Current State

Doctor examines patient, records, exam results; considers a dozen similar cases he has seen; consults with available peers; considers the couple of dozen treatment protocols he is familiar with; and recommends a treatment plan for the patient,



Future State

Doctor examines patient; submits records & exam results to 'cognitive medical consultant (CMC)'; CMC references thousands of similar cases; CMC evaluates millions of test results; CMC leverages all avilable medical information (e.g. medical journal articles); CMC considers ALL known and experimental treatment protocols; CMC recommends a treatment plan for the patient and the doctor approves.



What this means to my business

What does "digital labor" mean to you if you are a CxO? Given the diverse nature of the toolsets and the confluence of technologies underlying the different categories, it is possible your organization is already using basic RPA-like automation in some form or fashion. It is also likely that if you do not drive the change, it will be forced upon you by internal circumstances within your organization, or by a competitor that moved faster. It is inevitable, so where do you begin?

With digital labor in general, you can start small and move toward more sophisticated toolsets—building upon success. The other key point is that much of this can be accomplished outside of your IT organization, thereby further empowering your business users without distracting core IT resources from enterprise-wide endeavors. The investments are relatively inconsequential, particularly with Class 1, when compared to your ERP investments. Perhaps the most attractive aspect of RPA is that it offers a compelling alternative to offshore labor arbitrage in the event you are looking for new ways to improve performance and reduce the cost of your back-office operation.

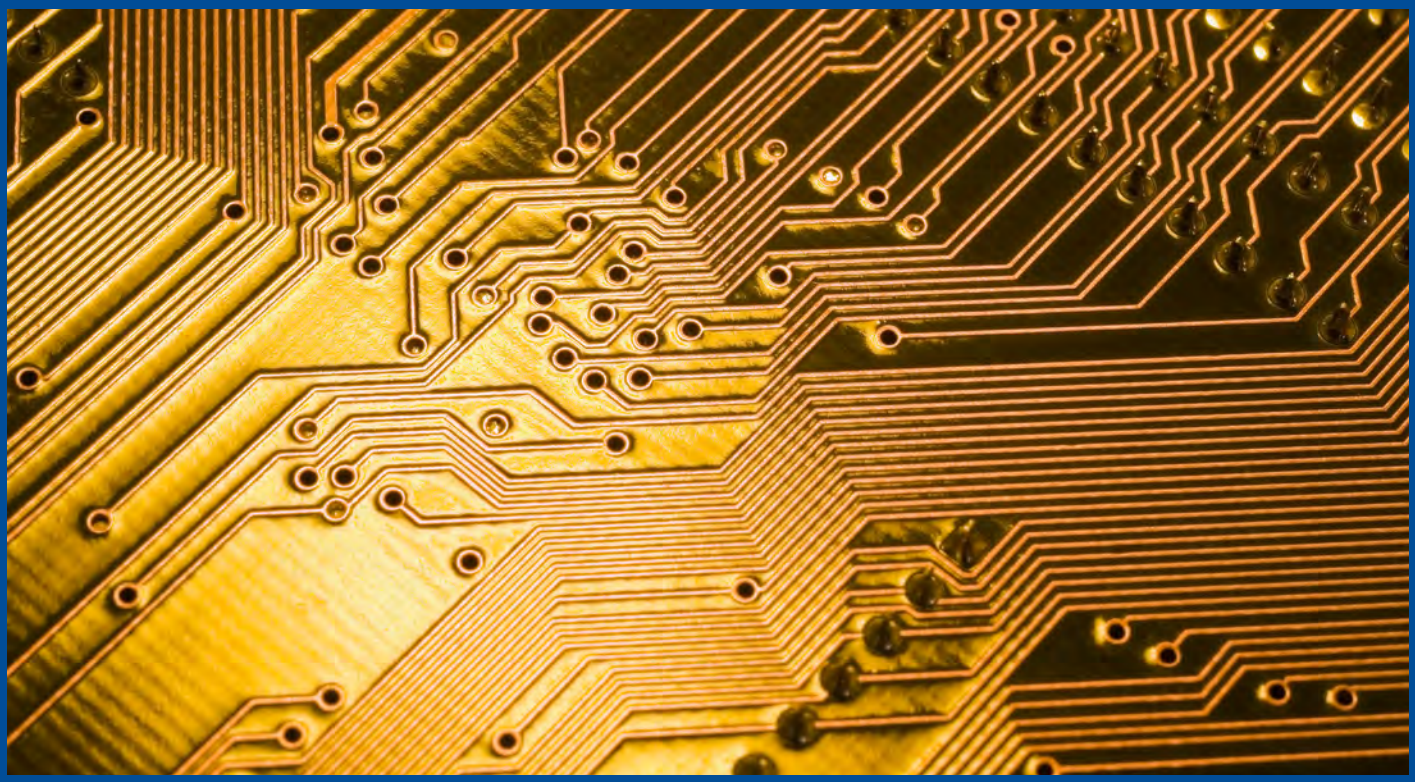
For those who like to take a more pioneering approach within the technology realm, Class 3 is the way to go: It is the classic case of big risk/big potential return. This is likely to be ground-breaking stuff, but at the same time, be prepared to invest big to win big. The integration of big data and Category 3 cognitive automation is the best avenue for you to make a significant positive impact on your market position. It is what will separate you from the pack; it will enable you to capture knowledge about your markets, your competitors, your customers, and quite possibly about how your product is behaving each day, in ways that are currently unheard of. It enables you to bring together massive amounts of diverse, unstructured data, explore almost limitless alternatives and hypotheses, and quickly form cognitive conclusions that humans cannot accomplish in a hundred lifetimes. This is not an incremental step—it is the prototypical quantum leap forward.

The hype will have you believing that 50 percent of your workforce is going away in the next five years. That is unlikely to happen—certainly in most scenarios. What may happen is that your functional workforce (e.g., your accountants) may evolve into automation/process specialists. This is very likely to mean you get a lot more out of that accountant, and that eventually, the nature of that person's work evolves far beyond accounting and becomes more analytical in nature, such that there is far more solutioning and far less reporting. Over time, it is quite possible that the field of accounting itself eventually transforms completely. This is also true for HR, procurement, etc. However, the timing on this is up for debate—with some experts claiming 5 to 10 years and others thinking it will take many decades of evolving digital labor capabilities and knowledge generation.

Final thoughts

There has been a lot of ground covered in this paper on the broad spectrum of digital labor. We have talked a lot about the differentiation of the capabilities and applicability of the various categories of digital labor. While not meant as an attempt at an industry-standard taxonomy, it will hopefully enable a more meaningful conversation and keep people on the same page during that discussion.

These meaningful conversations are a must as these are exciting times with great opportunities right around the corner. Digital labor will likely change the landscape of your back-office functions and most likely your front-office functions as well, but like most technology-based evolutions, it is likely to happen in increments. It is also likely to happen "while you sleep"—with progress that is likely to surprise you. Be prepared to say at some point, "How did we get here and when did all of this happen?" It will be important to embrace it, understand it, get ahead of it, and be an early adopter. Those who do not will certainly be disadvantaged. It is not to be ignored—to do so is to invite material adverse effects to your competitive position in your industry. Be thoughtful and make sure that you engage the best and the brightest in your organization to carry the digital labor initiatives forward. In all likelihood, you will be amazed at what comes out of the lab, and you are likely to be highly encouraged by the returns you will garnish and the insight into your business that you will gain, if done correctly.



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About the author

David Kirk, PhD
Dave has spent the last 30 years helping companies and clients leverage technology to deliver enhanced business solutions. The more recent part of this 30 year road trip has utilized his early-career hands-on experiences to help clients better understand how best to leverage IT technology without being consumed by it. Most recently Dave's focus has been on digital labor (a.k.a. robotic process automation (RPA)) – a technology approach to displacing client knowledge workers with 'virtual workers' – just another method that Dave can use to help clients craft their unique approach to transforming the way they do business. Dave is the digital labor lead for KPMG's Shared Services and Outsourcing Advisory practice, and has spoken at multiple industry conferences on digital labor.

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