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# Automation & Orchestration Backgrounder Datalink Experience, Market Dynamics, and Media Questions

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## Observations on automation projects

Automation and orchestration engagements streamline information technology management operations and improve business-facing services delivered through IT. These are engagements where IT organizations have specific processes, workflows, or procedures they wish to optimize and automate beyond rudimentary scripting and batch processing. There are a number of key success factors linked to automation and IT-as-a-Service (ITaaS) initiatives.

### Definitions

Before exploring these elements, some definitions are in order, as the terms “automation” and “orchestration” are often conflated. In the context of this paper, automation is the use of control systems to make machinery, processes, or infrastructure become self-acting or self-regulating. Orchestration is the automated coordination, arrangement, or management of complex systems. Simply put, automation is concerned with the technology; taking a single task and making it self-acting or combining many simple tasks into a more sophisticated, complex automation workflow. Orchestration is concerned with the integration of personnel, technology, and the guiding processes. Orchestration makes automation more efficient, not just “faster.”

It is the combination of automation with orchestration that enables IT organizations to move closer to the IT-as-a-Service model that is typically desired. Independently, both efforts deliver substantial benefits to the enterprise. Together, they act as a force-multiplier of sorts. The benefit of automating common, repeatable tasks is generally taken as axiomatic. To explore a realistic but fictional scenario that engages orchestration effectively, refer to the book, “The Phoenix Project: A Novel About IT, DevOps, and Helping Your Business Win.”<sup>1</sup>

## Motivations

Companies generally have one or more of three different ambitions when embarking on a project of this nature. In no particular order:

### ✓ They are attempting to rationalize their toolsets

Organizations need a product to enable some A&O ambition, and the marketplace is littered with options. Products vary in functionality and complexity from out-of-the-box to custom built to open source tooling. All other things being equal, IT departments are looking for products that are easy to use and interact with all of their current infrastructure: network, compute, storage, and hypervisor. The leading products today are:

- Cisco UCS Director
- VMware vRealize Automation
- NetApp WFA
- Microsoft Azure Pack and SCCM
- Red Hat Cloudforms

This is by no means an exhaustive or comprehensive list, but it does reflect the tendency of companies to extend the lifetime of the axiom, "Nobody ever got fired for buying IBM."

### ✓ They are attempting to bring order to existing automation routines

Organizations have been automating for a decade or more, using tools like Windows PowerShell, Java, BASH, shell scripting and other scripting languages like PowerCLI. This type of skunkworks has traditionally been a reaction to a lack of formal tooling strategy or functionality gaps in the legacy products available.

Companies are moving to a structured automation and orchestration approach that starts with a tooling strategy (above). This brings business outcomes to the forefront and organizes scripts in a manner of automating an entire delivery process. They are looking for a way to bring organization to the chaos. Articulating the tasks, processes, features, and functionality first allows them to select a suite of tools that they can then use to standardize all future automation and orchestration development. After which, they can eliminate many of the duplicative code, scripts, and disparate approaches under a common methodology that they hope will simplify day-to-day management.

### ✓ They are reacting to organizational change pressure

Many IT departments, and the infrastructure teams specifically, are being asked to do more work with fewer resources. This comes from both budget pressure and the desire to show the business that IT is embracing ITaaS concepts, regardless of efficacy.

This is to say that siloes of capabilities in IT are breaking down, making it more likely that the "Jack of all Trades" IT resource will be increasingly the norm. The emphasis will move from "experience" to "skill" in IT hiring and decision-making. With a broad mandate and area of responsibility, it is essential that the skilled architect or engineer be able to solve a problem once, then document or automate its solution before moving on to the next challenge.

To this end, organizations normally start their automation projects using easier-to-define Infrastructure-as-a-Service use cases. This gives them a lower complexity point of discussion with their business partners. This is typically done under the aegis of the business itself because the need for Infrastructure-as-a-Service mainly derives from the business wanting to deploy new products and services faster, prove out new platforms, and reduce time to market.



## Business outcomes

All of this, though, speaks primarily to the benefit IT derives from automation; the outcomes the business might want to achieve must also be considered. First, the business does not care about the product or products used for automation. End-user experience is the critical success factor for the business. The business wants a smooth and intuitive user experience, fast delivery times, flexibility for expansion, and easy scalability.

Second, business users are also conditioned from their personal lives. Business users have become accustomed to their smartphones and mobile devices where applications are disposable, and service delivery is achieved almost immediately. They bring these expectations to work. Third, the business actually wants to be engaged by IT, or at least involved more closely with the development of services in the catalog as the market or consumers of the service. Traditionally, business users had become accustomed to approaching IT for keys to the ignition and getting the resources they need. Services were delivered at best effort or maybe they could speed to the front of the line if they brought in donuts on Tuesday. Today, the IT department is engaging with them, is in lockstep with their demands, and sets up the business for success by enabling favorable outcomes.

## Getting there: two approaches

Knowing what organizations of all shapes and sizes want to get out of automation and orchestration is one thing, but how should the initiatives be executed? Most automation efforts express in one of two ways: tactical projects or strategic programs. Tactical engagements focus on specific processes IT or the business wishes to automate and proofs of concept where the enterprise is preparing for a larger strategic effort. They are intended to make the day-to-day lives of the IT infrastructure team easier and improve cycle times to obtain quick wins with their own internal customers. Tactical engagements usually start small and involve IT decision-makers and stakeholders to enable success. These engagements are short in duration and intend to prove out an automation platform and set a foundation for future automation efforts.

However, tactical engagements show only limited long-term benefits if they are not followed up by a strategic A&O engagement. Strategic efforts explore specific use case definitions and the development of a structured service catalog. These involve not only IT stakeholders, but also business consumers and decision-makers. A strategic program requires some time to standardize process flows and optimize them up front before automating many workflows to satisfy a wide range of use cases and IT services. This allows for architecting more flexible technology platforms driven by robust catalogs with several types of services (IaaS, PaaS, SaaS, XaaS). The most ambitious programs build on federated orchestration platforms such as ServiceNow or Cisco ONE Enterprise Cloud Suite.<sup>2</sup>

The goal of the strategic initiative is to provide long-term benefits with enhanced service delivery, improved customer experience, and scalability to set IT and the business up for continuous improvement. Keep in mind that IT departments are competing with Amazon Web Services and Microsoft Azure in many cases. Even if the business is unable to leverage these public cloud providers due to legal/regulatory concerns, the competition is in the perception that "this should be much easier." With that, the commoditization of IT services drives the need for IT to put itself in the position as the broker of cloud services and provide the governance and oversight that the business needs, regardless of who owns the underpinning contracts and infrastructure.

## Getting there: pitfalls to avoid

There are a number of risks unique to automation projects. Avoiding them will greatly increase the probability of a successful approach, whether strategic or tactical.

### ✓ Keeping imagination in check

Smart companies build out the automation platform with a handful of quick-win use cases to prove the approach and gain support from IT and business management. Additionally, they quantify the return on investment achieved through automation, as it strengthens their case with executives. Some projects suffer from an overly ambitious “first attempt” combined with a set of use cases that looks more like a science project than a program with an end goal and measurable benefits in mind. Big failures follow overly complicated efforts and attempts to include a lengthy wish list into the teaser.

### ✓ Do not automate poor process and controls

The natural approach is to automate the process IT uses today in a manual world. This will almost always make the task more difficult to complete and maintain in the future. This is because manual processes tend to be bad candidates for automated execution unless they are already efficient. The process is often bad; automation here accelerates failure.

Some activities should NOT be automated. For example, it may not be beneficial to automate an arduous refresh process that is manual, time intensive, dependent on specific skills, and must remain that way due to internal policy. A bad process is still a bad process whether it is automated or not; it is better to repair the approach. Best practice calls for optimizing the process first and then automating it.

This is automation and orchestration together and not automation or orchestration.

### ✓ Again...Keep ambitions in check

Organizations should not attempt to “boil the ocean” on their automation and orchestration efforts out of the gate. Automating a few use cases (say 3-5, definitely less than 10) can prove out the benefits to an IT organization and also to put momentum on IT’s side. Quick wins are key to establishing credibility and concentrating on building workflows correctly and efficiently. Companies that try to move too quickly tend not to give certain use cases and processes the attention they deserve, and the optimization of the processes will be less than ideal. Concentrating on a few key use cases allows organizations to both optimize and automate in an efficient manner to achieve maximum benefits. Also, those tricky integration elements will become more obvious.

### ✓ Don't lose sight of the business requirements

The actual business requirements may be poorly-defined goals like speeding up time to market, scaling out test environments, or moving to a dev-ops approach. These are more guiding themes for any automation and orchestration efforts regardless of the tools used or how many steps are in workflows. They need definition and success criteria to become achievable. Companies can adjust the toolset or the methodology used to build the workflow as long as the end goal is the same and they are delivering to measurable business goals. For example, whether an organization chooses to use Cisco UCS Director, VMware vRA or MS Azure Pack,<sup>3</sup> it is possible to achieve favorable outcomes with all of them. Using a business-aligned approach and decoupling business process from IT process can help build credibility for IT with the business by showing it can enable business outcomes through technology and automation. Deriving KPIs and metrics from ambiguous goals demonstrates the ability to understand the business drivers at their core. This builds trust.

### ✓ Companies shouldn't rest on their laurels

Companies should not stop developing for the business just because they have achieved the first order desired outcomes. With dev-ops and automation and orchestration, an agile methodology is key to helping IT change with the business and get better over time. The focus may move from “automation” to “service catalog development” because they are interrelated, but automation and orchestration will inevitably follow closely behind. Business requirements will continue to evolve, so this kind of dev-ops approach is imperative for IT to stay in sync with the business. As organizations move forward in their automation and orchestration and ITaaS efforts, they should plan on continuous improvement and evolution. These are not programs with a finish line to cross.



## The current market dynamics

The current state of demand and development around automation and orchestration technologies is driven by a number of loosely defined applications or use cases, not to be confused with business cases or business drivers. Some of these technologies are more or less focused on the automation of repetitive IT and end user tasks. A few of the more relevant applications are highlighted below:

### Software-defined infrastructure

As OEMs attempt to extend their portfolio's relevance in an increasingly virtualized infrastructure landscape, software-defined resources are increasingly the focus of investment. SDx platforms are included here because, while most provide only limited automation capabilities, all of them enable more advanced automation and orchestration through APIs and interoperability with other automation engines. Software-defined networking (SDN) was not the first target of automation, orchestration, or abstraction, but it is one of the more commonly understood as VMware and Cisco heavily market their enterprise commercial products:

"Software-defined networking is an approach to computer networking that allows network administrators to manage network services through abstraction of higher-level functionality."<sup>4</sup>

This is a confusing way of explaining that a software layer controls the network hardware directly by either or both managing configuration files and commands (automated configuration) or by treating the physical network hardware as a shared pool, much like a hypervisor does with shared compute resources, managing route, switch, and firewall profiles entirely through the software. Software-defined storage in at least rudimentary form has been the norm for over a decade and potentially more, since it can be argued that any Network Attached Storage "array" with a filer front-ending disk shelves or other arrays is technically a software solution with a dedicated hardware platform to host it. Object storage is, by some definitions and implementations, software defined from the start.

Development has accelerated of late, offering more mature solutions for software-defined networking, storage, and even the poorly defined "Software Defined Data Center." Market research suggests that software-defined infrastructure products will continue to proliferate and evolve apace for at least the next five years.<sup>5</sup> As that development unfolds, OEMs and software developers may improve standardization, API support, and interoperability. Many believe that interoperability and API standardization between SDx products is a key technical hurdle to overcome for these tools.



## IT process automation

IT process automation tools try to solve one or both of two core challenges: run book automation and workflow automation. Some products attempt to address both, with widely divergent results.

Run book automation is implemented at varying levels of sophistication. At its least elegant, tools simply centralize existing procedural documentation. The other extreme sees tools that actually execute management commands and affect changes to the environment. Both methods rely on an existing run book, which aims to make consistent the business of oft repeated tasks.<sup>6</sup>

Workflow automation is more accurately described as orchestration, rather than automation, as those workflows define the interaction between people, process, and technology in the environment. Workflow automation is driven from a set of defined processes. These tools act as a trigger for the human IT resources to act as a documentation library for reference, as a ticketing or record-keeping system to track those actions, and potentially as a front end to the run book automation or other infrastructure management tools.

Gartner tracks the market landscape for IT process automation in its report, "Market Guide for IT Process Automation."<sup>7</sup>

## Infrastructure automation tools

For the purposes of this paper, infrastructure is inclusive of the compute, storage, network, facilities, and hypervisor layers. The tools in this category are almost exclusively focused on run book automation, or programmatically provisioning and configuring common infrastructure resources.

The products supplied by hardware OEMs naturally work best with their own hardware platforms, but most, if not all, enable third-party support either natively, through package add-ons, or through an API. Open source tools and those without a vendor OEM channel offer broader support, particularly for common APIs, but largely rely on the end user community and private development efforts to realize their full potential.

No matter what tool is employed for run book-type automation, some external scripting and/or software development is typical for advanced integration with other tools and technology. For example, this could be integration between two different engines (e.g., a storage OEM automation engine linked to a network virtualization or automation engine), enabling tasks that are not included "out of the box," but are trivially implemented with scripts, or integration with an orchestration layer for normalized monitoring and reporting.

## More perspective: Peter Kraatz's InfoWorld interview questions

Recently, InfoWorld<sup>8</sup> sent Peter Kraatz a list of questions to precede a more formal interview that will be published later this year. Below you will find those questions and his unannotated (and somewhat informal) responses. Notice how some of the questions were phrased, which suggest an ongoing confusion about the nature of orchestration versus automation. For example, IT processes nearly always involve people and absolutely always involve process, which should have some kind of continuous improvement feedback loop incorporated. We cannot automate a process. We can automate the tasks which support the process. However, the process itself is an abstract concept which, again, relies on people to approve, review, trigger, file, or otherwise engage one another.

That point is not just pedantry, as we have observed above a key failure point for automation projects is the lack of a good process foundation on which to base the work.

### What is the best example on how process automation can advance IT business partnerships?

Process automation can remove seemingly unnecessary bureaucracy from interactions between IT and the business by moving the application or enforcement of policy and controls to the background. Automating process also removes the arbitrary feeling of applied rules or procedures, making engagement with the business feel more like interpersonal communication and less like a trip to the DMV.

The policy and controls are still in place; they are just:

- Hidden from view (removed from the interaction at a human level)
- Converted to an action:reaction (e.g., when I ask for X, Y "just happens")
- Applied consistently, each and every time (they aren't picking on ME!)

The preceding applies equally to IT process, as well as to procedural or task automation, though the business rarely sees the actual task execution. The same three core principles apply; let's look at a simple server provisioning task that has been automated based on some straightforward inputs (CPU, memory, networks, storage, O/S...the kind of data that is needed for any provisioning request):

- Hidden from view? Yes. Tasks like "creating a host name based on the department and workload type" can be completely removed from the administrator's purview through automation, allowing the administrator to focus on more complex operations.
- Things "just happen?" Yes. If my process/procedure calls for notifying people or opening tickets, those can be added into the workflow automation.
- Applied consistently? You bet. That's the nice thing about automating a task. Every time you initiate the automated workflow, it can only complete successfully the same way, every time.



## How can automation help to accomplish business goals?

All types of automation offer the same key benefits, but those benefits depend on the specific goals the business has in mind.

- ✓ **Speed/agility/time to market**  
At this point nothing changes. The process and methodology to build an effective disaster recovery program is the same.
- ✓ **Controls/Policy enforcement**  
Automated configurations, paperwork recording, or CMDB updates all minimize the risk that some new or critical rule set will be missed along the way to service fulfillment.
- ✓ **Maximizing IT resource value**  
Nobody wants to spend their time in drudgery and tedium. The lowest value tasks are the ones that consume the most time and keep our sharpest minds from solving more difficult (and interesting!) problems for the business.

The list could go on...

## What is the easiest way for an IT department to execute a process automation project?

Start slow. The inclination from many of our clients has been to jump in, head first, and automate anything and everything. A better idea would be to tease out the value by testing toolsets, modeling a simple process or two, then build a plan of attack based on the findings. Shops that swing for the fences out of the gate usually end up with a broken science experiment.

Also, focus on the business' goals, aspirations, and needs. Larger efforts will garner more support if the business knows what you're doing and has some input for the roll-out, even if they aren't the primary benefactors.

Finally: Why isn't the business the primary benefactor? Go back to the start and pick a different process.

## What advice can you offer to get process automation projects off the ground?

See #3. The key here is to build on success, not recover from a failed experiment. Understand that automation doesn't mean simply automating everything in the same way it has always been done. Inefficient process and unwieldy controls will still be inefficient and unwieldy when automated, if they can be automated at all. You may need to redesign some of your workflows to be successful.



Automation and orchestration engagements streamline information technology management operations and improve business-facing services delivered through IT.

## References

- 1: Gene Kim, et al, The Phoenix Project: A Novel about IT, DevOps, and Helping Your Business Win (IT Revolution Press; Reprint edition; October, 2014)
- 2: These are only two examples of many; this is not an endorsement of any particular solution set.
- 3: Again, these are just examples and not an endorsement
- 4: [https://en.wikipedia.org/wiki/Software-defined\\_networking](https://en.wikipedia.org/wiki/Software-defined_networking)
- 5: Michael Warrilow, Emerging Technology Analysis: Software-Defined Infrastructure (Gartner: Document G00280379)
- 6: <http://searchnetworking.techtarget.com/definition/run-book>
- 7: Robert Naegle, document G00277001
- 8: <http://www.infoworld.com>



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