IT Speed: The Crisis And The Savior Of The Enterprise

Key Lessons From The Fortune 1000 — Achieve Extreme Business Speed, Agility, And Quality With IT Automation And DevOps

October 2013
Table Of Contents

Executive Summary: Enterprise IT Is Too Slow For Business, But Hope Is Within Reach ...................................................... 2
The Need For Speed Is Clear ................................................................................................................................................................. 3
You Must Also Execute With More Accuracy ................................................................................................................................... 5
Automate As Much As You Can — And Achieve Unprecedented Speed.................................................................................... 8
Evolving IT Automation Is Fueling A DevOps Movement ........................................................................................................... 13
An Automated IT Industrial Revolution Is Altering IT Roles And Jobs .................................................................................... 18
Key Recommendations: Heed the need for speed, and you will succeed .................................................................................... 20
Appendix A: Methodology................................................................................................................................................................... 21
Appendix B: Supplemental Material .................................................................................................................................................. 21
Appendix D: Endnotes.......................................................................................................................................................................... 22

© 2013, Forrester Research, Inc. All rights reserved. Unauthorized reproduction is strictly prohibited. Information is based on best available resources. Opinions reflect judgment at the time and are subject to change. Forrester®, Technographics®, Forrester Wave, RoleView, TechRadar, and Total Economic Impact are trademarks of Forrester Research, Inc. All other trademarks are the property of their respective companies. For additional information, go to www.forrester.com. [1-MOGC5W]
Executive Summary: Enterprise IT Is Too Slow For Business, But Hope Is Within Reach

Business leaders are driving the speed of execution and adaptation to astonishing levels because customers demand such performance. Competitors are fueling an escalating innovation arms race to deliver the value and speed customers require. Forrester’s research shows how IT — responsible for much of this acceleration — cannot maintain the same pace. While 36% of enterprise IT leaders highlight faster delivery of IT services as their top priority and a full 58% place it in the top three priorities, only 17% can deliver fast enough. Furthermore, only 12% can do so with high quality. Demand has irreversibly exceeded the capacity of traditional IT.

No collection of brilliant people can solve the accelerating demands without assistance. You need to rescue IT’s role in the future by properly applying automation technologies and the related process refinements to your developmental and operational challenges. A future vision of IT without extreme automation is a myth. The pressures are just too excessive to believe such an illusion is possible.

In August 2013, Opscode commissioned Forrester Consulting to evaluate the state of automation and its impact on the speed and quality of service delivery in enterprise IT. Forrester tested the hypotheses that automation is growing rapidly and that skills gaps and behaviors impede this growth. A related hypothesis proposes a new DevOps movement as bringing hope to the long-standing and destructive conflict between application development and IT operations.

In conducting in-depth surveys with 155 senior IT professionals from Fortune 1000 companies, Forrester found that these companies are making good progress toward automating tasks and processes, including encouraging advancement in pursuit of DevOps. All hypotheses were confirmed, but a few surprises and warning signs are evidence that this field remains in its early stages.

Key Findings
Forrester’s study yielded four key findings:

- **IT must act fast to accelerate execution.** Survival of the entire enterprise depends on executing and adapting at high speed. Leaders express intense urgency for IT to rapidly achieve this goal. However, data shows IT is woefully sluggish today. The window to adapt is short. Act quickly and aggressively on automation, processes, and people.

- **Inability to change is a pervasive affliction needing a quick cure.** Arguably, the biggest problem with IT is the slow and flawed execution of changes. Change management process refinement tried to fix these issues, but these efforts have not borne out the promises. Manual execution remains, and process discipline is overbearing. Remove the roadblocks and as much manual effort as possible. Change can be simultaneously quick and trustworthy.

- **Automation is a solution; implementation is nascent but accelerating.** Infrastructure automation tools and platforms are popular. The attention is now shifting to more comprehensive process automation and applications, manifest in the exciting new DevOps movement. Act now on a pragmatic plan to automate every function you can.
• **Entrenched behaviors are hampering the ability for IT to accelerate the speed of delivery.** Technology solutions are now profoundly valuable, but they are useless unless the people are prepared to exploit their capabilities. Behavioral inertia causes IT practices to change too slowly. Inspire IT staff to change behaviors with a concerted effort that embraces automation and the new skills this automated world requires.

### The Need For Speed Is Clear

Look all around, and everything you see is moving more quickly. The pace of business is accelerating, but the pace of enterprise IT execution is lagging. The pressure to accelerate the rate at which IT must enable speed in the business is forcing a rapid and disruptive evolution in how IT works. Forrester boldly suggests it is a revolution, not an evolution.

This *IT Industrial Revolution* is a dramatic departure from traditional IT. Heavy dependence on laborious and faulty manual process execution is history. Heavy dependence on a guild of intelligent technologists to overcome countless obstacles is also history. The high priests of IT cannot solve the accelerating demands. These demands are already beyond the capacity of this obsolete model of IT.

### Figure 1

**IT Leaders Seek More Speed And Quality**

“Looking ahead over the next two years, what are the top three IT initiatives that will be the focus of your CIO?”

<table>
<thead>
<tr>
<th>Initiative</th>
<th>First Initiative</th>
<th>Second Initiative</th>
<th>Third Initiative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deliver IT services faster</td>
<td>36%</td>
<td>12%</td>
<td>10%</td>
</tr>
<tr>
<td>Increase quality of IT services</td>
<td>16%</td>
<td>22%</td>
<td>12%</td>
</tr>
<tr>
<td>Reduce costs</td>
<td>11%</td>
<td>12%</td>
<td>10%</td>
</tr>
<tr>
<td>Improve IT staff productivity</td>
<td>13%</td>
<td>16%</td>
<td>11%</td>
</tr>
<tr>
<td>Make our business more competitive against rivals</td>
<td>13%</td>
<td>10%</td>
<td>13%</td>
</tr>
<tr>
<td>More quickly adapt to changes in business demands</td>
<td>5%</td>
<td>10%</td>
<td>18%</td>
</tr>
<tr>
<td>Improve the reputation of IT as a business enabler</td>
<td>6%</td>
<td>13%</td>
<td>14%</td>
</tr>
<tr>
<td>Shift IT work from routine functions to strategic functions</td>
<td>5%</td>
<td>5%</td>
<td></td>
</tr>
</tbody>
</table>

Base: 155 senior IT decision-makers from Fortune 1000 companies

Source: A commissioned study conducted by Forrester Consulting on behalf of Opscode, August 2013

The industrialized model welcomes the new pressures, and the initiatives reflect this industrialized approach. Among the top initiatives for Fortune 1000 CIOs, faster delivery of IT services is at the top of the list (see Figure 1). As the first choice, it is a runaway leader, with 36% making it No. 1. Speed and quality — the top two initiatives — are classic goals of any industrialized movement. They naturally lead to improvements in every other objective on the list.
Fortunately, infrastructure technologies are continuing their march to ever-more dynamic capabilities. Developments such as virtualization, converged infrastructure, and cloud computing are now main priorities, so the basic building blocks are falling into place to respond to accelerated business demands. These new technologies also pose a threat to service stability, however. They cause complexity to explode in a nonlinear fashion.

Complexity growth is natural in technology. Every day seems to present a new innovation. These innovations always package prior technologies in a new form, so the underlying complexity keeps expanding. Moore’s Law and Kurzweil’s Law of Accelerating Returns are two prime examples of how complexity is growing — not linearly, but exponentially.¹

Humans cannot keep pace with this exponential growth. Even the smartest technologists fall behind. Figure 2 shows how this explosion has already overwhelmed manual execution. The years shown may not apply to you, but your complexity almost certainly has already crossed the manual ability line. Beyond this point, manual operations are doomed. The gap will keep expanding forever, so a new approach is needed to address this capability chasm.

**Figure 2**

Complexity Is Accelerating Out Of Control

![Complexity Is Accelerating Out Of Control](image)

In fact, real complexity is growing faster than theory would suggest. Accelerant technologies keep arriving that cause a disruption in the smooth progression. Evolutions in technology happen suddenly and result in rapid irreversible changes in how we approach business technology. Complexity grows even faster after these events.

IT is no doubt improving its manual capabilities through improved processes and expanded skills among the people. The manual ability line is climbing, but not quickly enough to manage the complexity. The race isn’t even close, as
Figure 2 shows. IT leaders recognize these improvements in execution speed, but they know they need to do much better (see Figure 3). This same graphic shows how service quality is in a nearly identical state. The parity between the two is no real surprise. The same hurdles impeding our speed (mainly related to the slow pace of manual work) are impeding our quality (mostly related to human error).

**Figure 3**
IT Execution Speed And Service Quality Are Good But Not Good Enough

![Graph showing IT execution speed and service quality](image)

*Base: 155 senior IT decision-makers from Fortune 1000 companies (percentages may not total 100 because of rounding)*

This demand to execute faster is in part fueled by a desire to reign in so-called *shadow IT* groups that have become disillusioned with IT’s slow pace and take matters into their own hands. This is understandable, since they need to do their jobs and IT cannot slow them down. Such shadow IT is usually done with weak conformance to good governance, thus exposing the enterprise to unnecessary risk. If you can execute with more agility, the motivations that favor shadow IT are diminished. Those who need to move fast will choose internal IT if IT can fulfill their need for speed!

**You Must Also Execute With More Accuracy**

Fast and nimble execution is no good if it is not accurate. In fact, doing the wrong things more quickly will lead to catastrophe. The typical IT situation here is even worse than the speed issue. Execution accuracy can be assessed by examining some key change management performance indicators. After all, execution in any form is changing the state of something. In the case of IT, those changes are made to infrastructure, applications, and other contributing elements of business services.
In a world that is changing more than ever, we clearly need to change how we change! Figure 4 shows that the state of change management accuracy is unacceptable. Half (52%) of IT organizations exhibit unacceptable change success, and only 12% can be considered good. The data actually shows an improvement from the past, as change management has gotten much more attention. Senior leaders recognize how change success modulates the entire organization’s reputation, so they have been focusing on improving the process. When changes are made improperly, service quality suffers — often seriously — and the reputation of IT drops even further. Apparently, most organizations have a lot more work ahead in their change management practices.²

Figure 4
Change Success Is Good But Not Good Enough

```
<table>
<thead>
<tr>
<th></th>
<th>Success Rate</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greater than 95%</td>
<td>Good</td>
<td>12%</td>
</tr>
<tr>
<td>80% to 95%</td>
<td></td>
<td>37%</td>
</tr>
<tr>
<td>60% to 79%</td>
<td></td>
<td>37%</td>
</tr>
<tr>
<td>30% to 59%</td>
<td></td>
<td>9%</td>
</tr>
<tr>
<td>10% to 29%</td>
<td></td>
<td>3%</td>
</tr>
<tr>
<td>Less than 10%</td>
<td></td>
<td>0%</td>
</tr>
<tr>
<td>Don’t know</td>
<td></td>
<td>3%</td>
</tr>
</tbody>
</table>
```

Base: 155 senior IT decision-makers from Fortune 1000 companies
(percentages do not total 100 because of rounding)

Source: A commissioned study conducted by Forrester Consulting on behalf of Opscode, August 2013

Change success can be difficult to determine. The symptoms of a change may only surface long after it was made. These symptomatic events usually come in the form of incidents. If you can correlate incidents to change events, you can use the percent of incidents caused by change as another metric to measure your change accuracy. Figure 5 shows another pessimistic view of change accuracy as viewed through this additional lens.
Figure 5
A High Rate Of Change-Related Incidents Indicates Poor Change Management

Only 23% are good (less than 10% of incidents caused by change), but the truly disturbing number is the 31% who don't know. Even the 6% who fall into the worst category are in better shape because they at least know their situation and can improve. The 31% in the “don’t know” group truly don’t know what they don’t know, and that is a very dangerous position.

The reason most organizations suffer from change phobia is because of this awful track record. Changes have proven risky and painful, so we tend to avoid them or we procrastinate to defer the pain until some future time. To soften the blow, regular intervals were instituted to cluster changes and control them so that they only occurred at a time of reduced risk.

The two factors that govern change speed are the time in the change pipeline and the execution intervals. Process improvements, process automation, and a better balance to the level of discipline can help reduce the pipeline time. The issue of intervals requires different thinking and improved trust in change execution. These goals are loftier because they demand more far-reaching cultural changes.

The common change management process requires that change requests be entered in a controlled fashion. Those changes are then evaluated by a change advisory board (CAB) and if approved by the CAB, they are then executed at the designated time. These are the times when risk is perceived to be lower, and they usually occur during the night on a weekend. There are several problems with these time slots for change. They are inconvenient for everyone involved, there is less likelihood that these times are actually off-peak in a global always-on economy, and the intervals themselves are a major impediment to nimble business execution. Business leaders and other technology consumers can’t wait weeks for a change. They need it now.
The intervals are a huge issue, making the change frequency as poor as the accuracy situation. Figure 6 shows how the overwhelming majority (69%) of change intervals are one week or longer. Such intervals were fine when business conditions could tolerate changes every week or month. The accelerated demands of continuous delivery, virtualization, private cloud, and other dynamic movements have rendered these intervals intolerable.

**Figure 6**
Change Intervals Are Too Long

<table>
<thead>
<tr>
<th>&quot;How frequently are you able to make changes to your infrastructure (e.g., new server, application update)?&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Don't know</td>
</tr>
<tr>
<td>As frequently as needed</td>
</tr>
<tr>
<td>Daily</td>
</tr>
<tr>
<td>Less than one-week intervals but more than daily</td>
</tr>
<tr>
<td>One-week but less than two-week intervals</td>
</tr>
<tr>
<td>Two-week or longer intervals</td>
</tr>
</tbody>
</table>

Base: 155 senior IT decision-makers from Fortune 1000 companies
(percentages do not total 100 because of rounding)

Source: A commissioned study conducted by Forrester Consulting on behalf of Opscode, August 2013

**Automate As Much As You Can — And Achieve Unprecedented Speed**

Automation is an obvious solution to the velocity challenge. This is an indelible lesson from the Industrial Revolution. Regardless of your business function, properly automating that function will be much faster. Any businessperson knows this fact well. Technology can perform human work at a rate that is likely to be impossible for humans.

IT automation tools have become very popular. The main reasons are related to the need for speed (see Figure 7). By far, the strongest motivation is the need to adapt more quickly to business changes. Every one of the top five factors driving automation is directly related to execution speed.

Cost reduction is a speed issue because slow execution is costly. Forrester data shows that 47% of the IT budget is spent on people.³ Nearly three-quarters of that (72%) is spent on ongoing operations — work that is now overwhelmingly
manual in most organizations. This means that almost exactly one-third (33.8%) of your budget goes to functions that are probably too slow.

This same economic argument applies to productivity, also a speed issue. You can do more with less when you accelerate the rate at which people perform their work. Automation has proven to improve productivity substantially through the past two centuries or so. The Industrial Revolution demonstrated how machines can replace tedious manual labor. In the case of IT work, this manual labor is in the form of administrative work that is now being performed by software.

**Figure 7**
Automation Is Driven By The Need For Speed

<table>
<thead>
<tr>
<th>Focus on speed</th>
<th>“What are the top three factors driving the need for more automated execution of IT functions within your organization?”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adapt IT services more quickly to business changes</td>
<td>32%</td>
</tr>
<tr>
<td>Cloud computing (public, private, or hybrid)</td>
<td>16%</td>
</tr>
<tr>
<td>Improve IT staff productivity</td>
<td>5%</td>
</tr>
<tr>
<td>Reduce costs</td>
<td>9%</td>
</tr>
<tr>
<td>Agile application development</td>
<td>0%</td>
</tr>
<tr>
<td>Improve service quality</td>
<td>6%</td>
</tr>
<tr>
<td>Free up staff for more strategic work</td>
<td>7%</td>
</tr>
<tr>
<td>Mobility</td>
<td>3%</td>
</tr>
<tr>
<td>Improve service governance</td>
<td>3%</td>
</tr>
<tr>
<td>Decrease routine IT work</td>
<td>6%</td>
</tr>
<tr>
<td>Converged infrastructure</td>
<td>5%</td>
</tr>
<tr>
<td>Virtual infrastructure</td>
<td>4%</td>
</tr>
</tbody>
</table>

Base: 155 senior IT decision-makers from Fortune 1000 companies

Source: A commissioned study conducted by Forrester Consulting on behalf of Opscode, August 2013

Automation tools come in many forms that can be classified into one or more of three functional categories:

- **Task execution.** This is the collection of products that are usually considered to be automation tools. Common examples are server provisioning, patch management, and other administrative utilities. Simply put, a task execution tool automatically performs a task that would otherwise require manual action.

- **Process flow.** Tasks are connected in a logical sequence with various branches taken depending on decision criteria along the way. Process flow tools codify processes and govern their execution. Examples include workload automation and run-book automation (RBA). IT process automation (ITPA) is the general term.4

- **Decision trigger.** Decisions must be made with sufficient intelligence to ensure that adaptations make sense. Decision trigger tools help determine when to take action, whereas the other two focus on how to act. The new battleground for decision triggers is around analytics.
Figure 8 shows the relationships between the three categories, as depicted in Forrester’s automation-wheel graphic. Actual tools on the market may span more than one category. Some suites claim to cover the entire gamut of capabilities. While most of these offer good value (usually at a commensurately high price), be aware that you will almost certainly need to augment the suites with other tools.

The service information system (SIS) is at the center, the core source of information necessary to drive automation tools. The SIS is a more evolved form of the configuration management database (CMDB) that has largely proven to be a failure. While the obsolete notion of CMDB is not viable, the SIS is not only viable but also necessary. The original vision of CMDB was sound and profound. The delivery was not. The SIS is a model that is finally proving to be useful because all good automation software is driven by software models of some sort, whether they are object models of desired states or some other type of software code.

The earliest IT automation tools were task execution utilities. Initially, they were in the form of scripts written by administrators to perform repetitive tasks, usually in a command-line language like Unix shell or Windows PowerShell. Eventually, a wide variety of commercial products appeared to replace the homegrown scripts. The commercial tools are now almost always preferred, but scripting will always remain an important element.

Task execution tools are not yet pervasive, but ubiquity is near. Figure 9 shows how task execution will expand over the next two years. This is good news for the evolution of your IT automation because task execution is the foundation upon which your broader automation will be based. Every ambitious journey is done in small steps. Task execution represents those early first steps. You will implement these first and then unify them with process flow technologies and eventually add decision triggers to bring more intelligence to your overall automation portfolio.
Automation technologies have been commercially available for years and have indeed fueled a marketplace that has grown well. Still, one would expect automation to be more widespread in 2013. Impediments to broader adoption of automation technologies and the whole concept of automation remain entrenched. Economic forces are already overpowering this resistance, but the resistance will indeed hinder quicker expansion. Some of these reasons are valid concerns, and some are irrational obstruction. Figure 10 shows which sentiments are delaying adoption. The main issues lie with economics and technology immaturity; both are rational but have undercurrents of irrational fear.
The top resistance force is the economic imbalance. Many automation solutions are indeed very expensive, but more economical options are now available. The overall impact on the market is a gradual decline in costs. Extrapolating this over the next few years presents a point where the costs become palatable. This is when automation adoption will experience an inflection upward. Some can realistically argue that this inflection has already happened. It depends on how comprehensive you wish to be with your automation. Utilities and platforms have become cheap enough to offer economic value. Comprehensive suites (e.g., full cloud automation) are not... yet.

The concerns about technology shortcomings are also valid, to an extent. Comprehensive automation is still out of reach for many enterprises, but plenty of trustworthy task execution utilities are already available. They are even now assembling into robust mini-suites and platforms that can do a lot with little effort.

Objections about capability can be countered with examples of companies that epitomize advanced automation. Popular web brands are already automating at a level that seems like science fiction. Many established brands in retail, finance, and other industries are quickly adapting. Nimble execution — rooted in sophisticated automation — has become a core capability needed to thrive in a new competitive landscape. The rapid evolution of tools will soon ensure a rich portfolio of solutions for everyone at reasonable cost.

The bottom line of every impediment to automation is the issue of trust. Technology is indeed available and getting better all the time. The humans who depend on this technology are not evolving as quickly. Indeed, the whole automation field is more an evolution of trust than it is an evolution of technology!
Evolving IT Automation Is Fueling A DevOps Movement

Most automation has been applied to infrastructure. Automation is at the heart of virtualization and infrastructure-as-a-service (IaaS) cloud computing, and other domains have followed. The instrumentation now built into infrastructure makes this possible. The drudgery of managing infrastructure manually is another reason for this infrastructure focus.

It is time to elevate automation to the application domain. Much of the infrastructure task execution is now in place or at least available. The new pain threshold lies with applications. The application development community is the primary driver pushing this expansion. Application build and test automation have been growing for years. The expansion from the application side and the aforementioned expansion on the infrastructure side are now primed to meet in the middle. The junction point is release management, although there is much more to this convergence.

Figure 11 captures this attention shift well. Most of the top focus so far has indeed been on infrastructure, but the focus over the next two years will clearly be on expanding application-level automation. IT process automation remains high, because additional evolution of process flow automation will be necessary indefinitely. Extra task execution and smarter decision trigger automation will keep driving more development of process flows with no real end in sight.

**Figure 11**
Automation Is Now Focused On Infrastructure, But The Application Is The New Frontier

```
<table>
<thead>
<tr>
<th>Task</th>
<th>2013</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virtual server</td>
<td>51%</td>
<td>21%</td>
</tr>
<tr>
<td>IT processes</td>
<td>48%</td>
<td>25%</td>
</tr>
<tr>
<td>Database</td>
<td>43%</td>
<td>23%</td>
</tr>
<tr>
<td>Storage</td>
<td>42%</td>
<td>23%</td>
</tr>
<tr>
<td>Network</td>
<td>41%</td>
<td>21%</td>
</tr>
<tr>
<td>Physical server</td>
<td>36%</td>
<td>14%</td>
</tr>
<tr>
<td>Web server</td>
<td>35%</td>
<td>25%</td>
</tr>
<tr>
<td>Application server</td>
<td>27%</td>
<td>27%</td>
</tr>
<tr>
<td>Application deployment</td>
<td>20%</td>
<td>27%</td>
</tr>
<tr>
<td>None of the above</td>
<td>11%</td>
<td>16%</td>
</tr>
<tr>
<td>Other</td>
<td>0%</td>
<td>1%</td>
</tr>
</tbody>
</table>
```

Source: A commissioned study conducted by Forrester Consulting on behalf of Opscode, August 2013
The application layer is a logical next step in the evolution of automation technology. If the goal is to provide business technology solutions, the applications must be included. Infrastructure alone offers little real business value. What can be done for infrastructure can be done for applications. It is all a matter of trust, and trust comes more slowly when applications are involved. Business customers have tangible exposure to applications, whereas the infrastructure is hidden. Also, the inner complexity of applications is not packaged as neatly, so application defects can be more difficult to isolate and resolve. Agile development is changing some of this, but applications remain a more sensitive area.

Application deployment is now the hottest area in application automation. The release of applications into production is a painful function for many reasons. The manual process used in most organizations is too slow and too careless. Human speed limitations and human error make releases even more frightening than general changes. Release management suffers from many of the same issues as change management, especially in the area of intervals. Figure 12 paints a picture of release intervals that looks even worse than the change interval distribution in Figure 6.

**Figure 12**
Like Changes, Releases Occur Too Infrequently

![Release Intervals Chart](chart)

\[Base: 155 senior IT decision-makers from Fortune 1000 companies\]

\[Source: A commissioned study conducted by Forrester Consulting on behalf of Opscode, August 2013\]

Continuous delivery of applications and Agile development practices demand new code introductions at a rate that cannot be handled by existing release management process execution. Furthermore, releases need to be performed accurately. Reversing out of a flawed release is a brutal and error-prone exercise. Automation can help by packaging up releases, possibly enforcing compliance with governance policies, and then executing the release at lightning speed. The result is high speed and high accuracy.

Examination of release management exposes a serious organizational conflict that must be addressed — that conflict being the philosophical chasm between enterprise development teams (Dev) and IT operations teams (Ops). They have
battled each other for years, and the impact on organizational agility is woeful. The absurdity of this ongoing warfare fueled a grass-roots movement to streamline the cooperation between Dev and Ops. This movement called itself DevOps, and IT organizations worldwide are aggressively seeking to establish DevOps practices and philosophies. DevOps is now one of the fastest-growing developments in enterprise technology.

Every new movement in business or technology is greeted with skepticism, even cynicism. DevOps is no different, nor should it be. Careful analysis and critique of anything new is healthy. The general consensus about DevOps is positive, since much of this vetting of the concepts has matured the whole movement to near-mainstream thinking. Figure 13 lists some varied opinions of DevOps and the distribution of sentiment across study participants. DevOps is being embraced by IT organizations more openly than many prior movements surrounded by such massive hyperbole. An impressive 73% of respondents portrayed a favorable opinion of DevOps for their organization.

Figure 13
DevOps Is Maturing Rapidly Into Reality

Despite a cacophony in the software market that taints DevOps as a purely technical issue, IT leaders are now accepting that DevOps is truly more of a people issue than a technology issue. Discord between the Dev and Ops teams causes serious problems in developing and delivering new technology capabilities to help the business. The natural solution of course is to improve relations between the two factions. This is an essential first step toward better release execution and better performance across the entire application or service life cycle. Any investment in automation technology or process refinement is subdued if the people can’t get along.

Figure 14 indicates the cooperation level between Dev and Ops teams. Though not stellar, the positive relationship may surprise you. It might even suggest that the friction between the groups is urban legend. Rest assured that poor relations are very real, but leaders have admirably attacked this problem, with much of the improvement taking place only in the
past year or two. Among all of the depressing news (whether factual or fabricated) about IT, this DevOps data is evidence of an encouraging future for IT as a valued organizational entity.

An organization that is addressing the collaboration issues is well positioned to capitalize on the full benefits of DevOps. Figure 15 lists the various aspects of DevOps in order of their popularity. They fall into three groups that align well with the progression phases of DevOps. This logical progression is a practical way to evolve your DevOps practices. Respondents line up well with this progression, clearly indicating that DevOps is a work in progress — not yet pervasive, but advancing pragmatically and effectively.

The first phase is to set the stage for DevOps. This involves establishing the collaboration and thus building application life cycle management as an institutionalized practice. To streamline the full life cycle, Dev and Ops must work together. Just fewer than half of respondents (47%) say that strong collaboration is now in place. This correlates with Figure 14, although some explanation is necessary to resolve what may appear to be a data conflict. All of the 20% in the “excellent” group of Figure 14 are presumably included. The “good” group might indicate the total in Figure 15 should be 80%, but there are varying degrees of “good” included in Figure 14. Consider the 80% to be strong or almost strong in the context of Figure 15. This means that the 47% in Figure 15 should grow quickly to 80% over the coming year or two.

**Figure 14**
Enterprises Are Ready For DevOps

“Which of the following best characterizes the relationship between your application development and operations teams?”

- Excellent — they collaborate as a unified team 20%
- Good — communication is good, but better collaboration is needed 60%
- Fair — animosity is largely gone, but communication and collaboration remain weak 15%
- Poor — they accept each other as necessary, but distrust remains 3%
- Terrible — each hates the other and blames them for problems 1%
- Don’t know 1%

Base: 155 senior IT decision-makers from Fortune 1000 companies

Source: A commissioned study conducted by Forrester Consulting on behalf of Opcode, August 2013
Once the setup phase is under way, you can embark upon execution. This phase is where you begin to accelerate your life cycle processes dramatically, through automation of testing and application releases and eventually yielding cloud service orchestration. Agile development is a catalyst for DevOps. While it could be viewed as setup, it is actually an execution issue.

All of these noble actions to get started on DevOps may be for naught if additional actions are not taken to sustain the momentum. The automation is likely going to be irreversible. Once tasks and processes are automated, they almost never revert back to manual methods. The other aspects — especially those involving human behaviors — can be tenuous and return to a detrimental state if not properly managed.

To make the gains of DevOps permanent, cultural change grounded in systems engineering is necessary. These practices of sustained innovation establish and nurture an atmosphere where DevOps principles become the normal way of performing work. Once solidly in place, returning to obsolete methods becomes obviously foolish to everyone.
An Automated IT Industrial Revolution Is Altering IT Roles And Jobs

The biggest lessons learned from the Industrial Revolution center on how the people involved and society itself changed so spectacularly. Entire professions were eliminated while others were created — all in very short time periods. The same dynamics are taking place in IT, as new methods and new technology render old-school IT obsolete. The impact of automation, standardized processes, and standardized building blocks cannot be underestimated. The socioeconomic changes will be every bit as groundbreaking as those of the Industrial Revolution. The IT Industrial Revolution has already gained significant momentum and will grow even stronger over the next few years.

The real question for IT is of course, “Which jobs are threatened by the IT Industrial Revolution, and which are emerging as the new power positions?” The answers may not appear obvious, but the signs should indeed be. The future belongs to those who are inventing it. The past belongs to those who are performing intellectual grunt work that is repetitive and subject to automation.

This may seem oversimplified, but look at the professional skills that are diminishing and those that are growing as this IT Industrial Revolution plays out:

- **Sustainer roles diminish.** Any position that is responsible for maintaining a status quo state is a position that will be minimized or even eliminated by the revolution. Such functions are ideal candidates for automation because this work tends to be repetitive and tedious. Such jobs are highly error-prone and slow, two issues easily addressed by even simple automation.

- **Customer-oriented roles also flourish.** IT is becoming less about the underlying technology details and more about how that technology translates into competitive potency for the business. Soft skills of customer relations and sales-like account management are growing quickly. More IT people must be people-people.

- **Innovator roles prosper.** Those who create the new improved technologies, techniques, and processes will command the future. These people possess an unquenchable desire to explore new territory and try new ideas. They are risk takers, but they balance this risk with practical governance.

IT professionals are widely viewed in society as progressive innovators. In fact, Alvin Toffler’s prescient 1980 literary classic *The Third Wave* highlights information technology as one of the most important forces driving a post-industrial world. After experiencing the revolutionary developments of the decades since, Toffler’s predictions proved correct.

A deep irony exists in some IT organizations, however. These same post-industrial revolutionaries often suffer from a common affliction — a desire to preserve the past. The people responsible for changing the world often lack the desire to change themselves. You see this when behaviors do not evolve along with evolutions in the technology or business practices. A good example is virtual server management. If you manage this newer highly dynamic infrastructure like you did with physical servers, you are in jeopardy. The higher velocity of virtualization requires different approaches.

We posed a question to assess where IT professionals stand on this issue. The role of system administrator was chosen as the example because it is a well-known position that has been prominent in IT for decades. The goal is to determine the consensus view of the role three years into the future. Will these people prove to be innovators or sustainers? The answer is mixed, as Figure 16 reveals.
Figure 16
The Role Of The Administrator Must Change

“Which of the following do you believe will best apply to the role of the system administrator in your organization in three years?”

- Setup, configuration, and maintenance of infrastructure using some technology assistance (virtual infrastructure admin) - 37%
- Setup, configuration, and maintenance of cloud services (cloud admin) - 23%
- Setup, configuration, and maintenance of infrastructure using mostly manual means (traditional system admin) - 15%
- Monitoring, diagnostics, and resolution of incidents (operations staff) - 11%
- A new breed of developer writing the code who performs the installation — and maintenance of infrastructure - 11%
- The role disappears mostly or altogether by then or soon after (extinct) - 3%

Base: 155 senior IT decision-makers from Fortune 1000 companies

Source: A commissioned study conducted by Forrester Consulting on behalf of Opscode, August 2013

Only 14% see this role evolving to a point where it becomes more of an engineering or automation role (the 11% can be called automators) or a point where it becomes mostly extinct due to various evolutionary forces. The future clearly favors the automator, not the automated. The 37% in the top category are using technology assistance to manage their systems. This is a good state of affairs because it signifies a step toward a more fully automated future. This is a common situation for wise virtual server administrators. Whereas the 14% are leaders in the movement, this group can be considered on the threshold of leadership. Grouped together, they represent roughly half (51%) of all organizations.

Another 38% are in trouble. Some of this group (15% of the total) act in terms of traditional system administrators, performing their work in a mostly manual fashion. This model will not work as demands accelerate. This 15% will either be suffering under the increased pressure in three years or will not exist at all. Hopefully, they will react to their pain and change their habits. If they do, they will be fine, maybe even excellent depending on the extent of their revelation and resulting transformation.

Among the laggards is 23% of the total who see the job becoming a cloud administrator role. The initial reaction might be to see them as leaders, not laggards. As you dig into the realities of cloud computing, however, you realize that a position of cloud administrator is fictional. Because true cloud services are totally automated, no person administers it — software does! A common error is to extend the system administrator mode of thinking into cloud services. You cannot control the cloud like you do with traditional infrastructure, which includes virtualized systems. The software takes control. Humans must still design cloud services and establish governance, and even monitor cloud behavior.

There is a great future for cloud engineers and cloud managers, but not necessarily for anybody called a cloud admin.
KEY RECOMMENDATIONS: HEED THE NEED FOR SPEED, AND YOU WILL SUCCEED

Enterprise business demands can no longer tolerate the lethargic pace and brittle quality that characterize too many legacy IT services. The pressure to adapt is growing stronger. The innovators will rule in this future world, and automation will be a key field of innovation that will position people to thrive.

Our research exposes an unambiguous disturbing situation where most enterprise IT organizations are ill-prepared for the revolution, but it also shows a strong commitment to improve. The message is evident — IT is at a crisis point in its evolution where bold action is needed, but there are encouraging signals that the profession is responding.

Some of your peer companies have already created a new high-velocity future, and they are enjoying the competitive advantages now. They are among the venerable enterprises proving that it can be done. They may very well be your competition, so you need to exceed their speed.

To heed the need for speed, enterprise IT must:

• **Become addicted to moving fast.** Patience is not a virtue in business. Things happen at a blistering pace. Our raw technology can easily adapt, but our processes and culture slow us down. Change behaviors to run at high speed. Remove process bottlenecks, change the incentives to encourage the appropriate behaviors, and see every task, action, process, and decision as an opportunity for automation.

• **Embrace automation — you cannot resist.** Future services require extreme speed and accuracy. Automation is a prerequisite. Those who master automated delivery of IT services will reign supreme in their industries. Your strongest competitors are automating everything they can. Business leaders are aware of this and will ensure success — with or without you. Take the lead to drive quality and speed.

• **Be the automator, not the automated.** Valued skills are changing. As automation evolves, it spawns new jobs that create the future while it diminishes other jobs. If you are in a threatened job, don’t fight automation. Embrace it. Own it. Evolve it. Your future will be wonderful and besides, who can better automate your job than you?

• **Pursue DevOps to streamline the whole service life cycle.** Destroy political barriers across the life cycle. People are not only the biggest problem regarding IT success but also the greatest asset. Drive collaboration and all will win. In particular, Dev and Ops teams have an imperative to join forces to streamline their interaction. This transitional phase of the life cycle has long been a contentious one, but the warring factions will make peace or they will both suffer. DevOps principles are proving extremely valuable because they enable speed and accuracy that was once a mere dream. The Forrester report, “The Seven Habits Of Highly Effective DevOps,” Forrester Research, Inc., offers guidance to build a lasting DevOps culture.

• **Alter skills to feed the future, not preserve the past.** Live in the past and there will lie your glory days. Adapt your skills to those needed for the new innovations, and you can anticipate an exciting and rewarding role in the future. Automation, systems engineering, and customer-facing jobs are the rewarding career paths of the future. Skills in technology still matter, but not where this technology-centric work amounts to intellectual grunt work. The new innovations center on software, so the skills need to focus there as well.
Appendix A: Methodology

In this study, Forrester conducted an online survey of 155 senior IT professionals from Fortune 1000 companies within North America. The purpose of the survey was to evaluate the state of automation and its impact on the speed and quality of service delivery in enterprise IT. Respondents were offered a cash incentive as a thank you for time spent on the survey. The study began in August 2013 and was completed in that same month.

Appendix B: Supplemental Material

Related Forrester Research


“Revive Your IT Management Software Portfolio,” Forrester Research, Inc., March 1, 2013


“Reinvent The Obsolete But Necessary CMDB,” Forrester Research, Inc., December 6, 2011


“Prepare For The Industrial Revolution Of I&O,” Forrester Research, Inc., February 7, 2011
Appendix D: Endnotes

1 Intel cofounder Gordon Moore wrote in 1965, “The number of transistors incorporated in a chip will approximately double every 24 months.” This prediction has more or less held true ever since and come to be known as Moore’s Law. Source: (http://www.computerhistory.org/semiconductor/timeline/1965-Moore.html).

Moore’s Law has since been generally applied to most forms of technology evolution. Futurist Ray Kurzweil extrapolated the same type of exponential progression to the broader evolution of technology over the centuries in what he called his Law of Accelerating Returns. Source: Ray Kurzweil, “The Law of Accelerating Returns,” KurzweilAI Network, March 7, 2001 (http://www.kurzweilai.net/the-law-of-accelerating-returns).


3 The April 25, 2013, “Forrsights: IT Budgets And Priorities In 2013,” Forrester Research, Inc., report shows that the average amount of IT budget spent on staff is 47% (29% on full-time IT staff, plus 9% on contractors and 9% on third-party IT services [i.e., outsourcing]). The number is even higher in North America (51%) and Europe (50%). Source: “Forrsights: IT Budgets And Priorities In 2013,” Forrester Research, Inc., April 25, 2013.


6 A web search of DevOps and automation conference presentations will yield numerous examples of IT transformation into the realm of excellence.

