

The Value of IT Automation

Issue 1

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Introduction

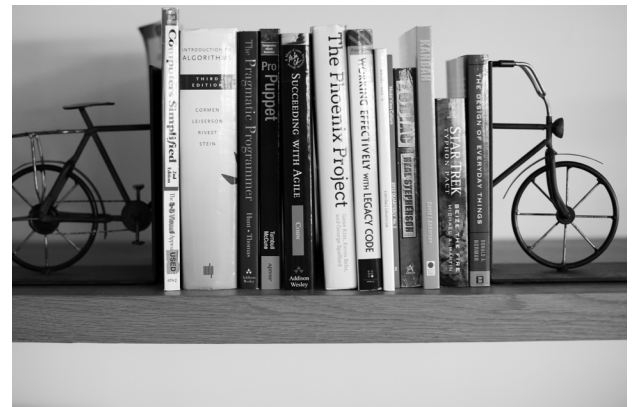
IT Automation: The lynchpin for organizational transformation in a DevOps world

As a reformed sysadmin who has worked in a lot of large-scale and complex environments, and now as the CIO of Puppet Labs, I've been around configuration management, IT automation and what is often now referred to as "DevOps" for much of the last two decades.

Here at Puppet Labs, we've been investigating the state of DevOps practices for the last four years as part of our general approach to helping IT organizations transform and achieve higher levels of efficiency. We've learned a lot about the impact of these practices from tens of thousands of practitioners, and I've also been fortunate enough to spend much of my time meeting one-on-one with many companies around the globe who are at varying stages of IT automation maturity.

A few things have become apparent over the years:

1. DevOps practices have moved from theory to implementation for more and more organizations, particularly



traditional enterprise businesses. This adoption is only accelerating, and we are increasingly seeing large enterprises make significant strides in terms of automation maturity.

2. There are a host of myths surrounding DevOps applicability in enterprise environments that block DevOps adoption in many organizations. These are often views held by technical managers and executives rather than the grassroots practitioners. In general these myths coalesce around beliefs that these practices are not applicable to legacy environments, traditional enterprises, hierarchical organizations and highly regulated environments.

3. While it's undeniably true that DevOps still refers to a loose collection of technical and cultural practices, we've seen a common set of practices that lead to successful DevOps transformations in enterprise environments. These are the use of version control for code and artifacts; cross-team automation tools such as

continuous delivery and automated testing; and underpinning it all, a robust IT automation platform that enables an infrastructure-as-code approach.

Recently we got the chance to talk to Martin Jackson of Walmart to hear how he has helped his company

adopt DevOps practices across nearly 50,000 servers. Here's what he had to say about how Puppet Enterprise's continuous configuration capabilities help Walmart's IT team deliver value to the business.

Source: Nigel Kersten, CIO, Puppet Labs

Walmart DevOps Profile



Recently we got that chance to talk to Martin Jackson of Walmart to hear how he has helped his company adopt DevOps-like practices across nearly 50,000 servers. Here's what he had to say about how Puppet Enterprise's continuous configuration capabilities help IT at Walmart deliver value to their business.

Thanks for talking with us. Can you tell us a little about yourself?

My name is Martin Jackson. I've been a Walmart Associate for over 16 years. I've spent all of that time working in the information systems division.

How does IT fit into Walmart's corporate vision?

Walmart's corporate motto is, "Save money. Live better." And as an IT associate, I help Walmart achieve that goal by always working on ways to do things better, faster, more consistently, more transparently. We've achieved some level of success by focusing on customer service. And for us, Puppet helps enable our customer service functions because Puppet enables us to do more with less, to be more efficient, to be more consistent, and to be more transparent in the delivery of our IT services.

Why is Walmart using Puppet?

We adopted Puppet for the particular purpose of controlling drift in a large legacy brownfield environment, and it's doing that job fantastically well across multiple OS platforms, across huge geographic distances. Stores thousands of miles away are using the same infrastructure and it's all working – and it's working well.

What excited you about automation?

In a large IT organization like ours, there are a lot of projects that never quite see the light of day. They get worked on ... eventually the project gets shut down, kind of put out of its misery ... one of our server engineers named Wade turned to one of our Puppet coders and said, "So, how's that Puppet thing going?" There was an implied challenge: "Are you ever going to get into production?" Because we'd been working on it for a few months already.

One of our Puppet coders looked him right in the eye and said, "We're going to change lives." We all realized that it was true. The work that we were doing was going to change the way that people interact with the server build process forever, no matter what else happens.

How has your work changed since automating your infrastructure?

Before Puppet, it would take us some time between four weeks to never to achieve major changes across our infrastructure organization and our legacy fleet ... Now with Puppet we can do those changes in a week, or a couple of days, or in the case of straightforward changes, just a couple of hours. We are making change in our infrastructure environments a lot more rapidly and with a lot more confidence than has been the case in the past.

How does Puppet support Walmart's DevOps initiative?

In many ways, Puppet enforces that DevOps mentality that says, "This is the configuration that you're going to have on this system." Puppet forces you to get into the room and to have that conversation with people and say, "This is what the kernel tunings

are going to look like. This is what the CIS controls are going to be. This is what the ulimits are going to be set to." You can't set it this way and then set it this way somewhere else. You have to plan in advance and layer what your configuration is going to look like.

And the end result is that, generally, everybody is really happy with the result. It leads to a single model and a single deliverable, which is the server's desired configuration state. And that server's desired configuration state is by definition what we said it was going to be.

What would you say to someone who isn't using IT automation?

I would say, "What is it that your server engineers find themselves doing on a day-to-day basis? And really what is it that they're actually

spending their time on? Are they spending their time delivering better, more efficient, and more suitable servers for the applications teams, or are they sitting there banging away at NTP configuration files and hoping that no one else changes the NTP configuration file while they're not looking? Are you worried about the difference between the server that Jill builds and the server that Bob builds? Because if you're worried about any of those things, you should really take a look at what Puppet can do for you."

What's next for IT at Walmart?

I want to be able to deliver frictionless value to our partners. I want our partners to be happy to come to IT and say, "This is what I need," and for us to be able to give it to them.

Source: Puppet Labs



Innovation Insight for Continuous Configuration Automation Tools

Continuous configuration automation tools are foundational support for DevOps initiatives, but also provide I&O leaders with an opportunity to increase operational agility with low-cost tools across IT operations.

Key Findings

- Continuous configuration automation (CCA) tools enable DevOps initiatives by providing a flexible, programmatic platform for deploying and managing the configuration of infrastructure and application resources.
- CCA tools' ongoing value is as dependent on user community-contributed content and support as it is on the commercial maturity and performance of the automation tooling.
- CCA tools can be used to transform the way configuration management is performed across IT operations, but not without strategic investments in skills.

Recommendations

- Select and implement CCA tooling to support DevOps initiatives.
- Use CCA tooling to supplement or replace server automation tooling to potentially lower licensing costs.
- Strategically invest in skills, support and an automation content strategy to ensure maximum value from CCA tool investments.

Analysis

Embodying lean, agile and collaborative concepts core to DevOps initiatives, CCA tools bring a newly found level of precision, efficiency and flexibility to the challenges of infrastructure and application configuration management. They do so through a programmable framework on which configuration and provisioning tasks can be codified, versioned and managed like any other piece of application code – frequently known as “infrastructure as code.” This approach naturally appeals to application developers, but also to a growing number of system administrators who increasingly rely on scripting skills to manage constantly growing and changing provisioning and configuration requirements. In addition to use in DevOps and traditional IT operations for production control, CCA tools are used in most Web-scale IT infrastructures for configuration management.

Definition

CCA tools enable infrastructure (system, server and cloud) administrators and developers to automate the deployment and configuration of settings and software for physical and virtual infrastructure in a programmatic way. They enable the description of configuration states, customization of settings, software binaries deployment and configuration data reporting. These tools are part

of the “automation” minisuite of IT operations management tools (see “Choose IT Operations Management Tools Based on Your Requirements”).

Description

Product architectures vary among vendors, but CCA tools generally consist of one or more management servers (depending on scale requirements) that manage the execution of configuration tasks distributed to agents or directly to targeted resources. CCA tools provide a repository to store and manage configuration content, but can be integrated with or use (code) revision control systems in use by application development teams. Each CCA vendor has different names for the artifacts it uses to describe and package configuration tasks (modules/manifests, recipes/cookbooks, modules/playbooks, etc.), but the task content is generally equivalent across the tools.

The content artifacts contain code that describes desired configuration variables, commands and references to other resources and artifacts. Although CCA tools have originated as open-source projects, their value is equally, if not more, dependent on the engagement of its content-generating, supporting community than on its automation prowess. This is in recognition that infrastructure and application configuration diversity continues to accelerate, a trend better served by more contributors

(the community) than fewer (just vendors). The content generated by the community can range from support for specific platforms to prebuilt combinations of tasks to support a specific use case or workflow. CCA tool vendors also contribute content back to the community and provide quality guidelines, and in some cases tools, for content certification. This certification process then enables the tool vendor to provide support for both vendor-sourced and community-sourced content.

CCA tools vary in their use of pull versus push (i.e., how much activity is literally performed by the management application versus the target node either via agent or directly) approaches to monitoring configuration states and task execution. Client experience does not yet indicate a meaningful difference in performance because of approach; however, when used as an auditing data source for configuration policy compliance or in supporting extreme scale, consider further evaluation and comparison.

Benefits and Uses

CCA tools (see Representative Providers section) are the commercial evolution of open-source configuration tools that emerged in the mid-1990s. New entrants continue to arrive as specific investments in DevOps initiatives grow. Enterprises that have long used the license-free, community versions of these open-source tools in pockets of their environments look to take advantage of paid support and/or commercial versions and products as they scale their implementations. These paid options provide vendor

relationship benefits (enhanced support, enterprise features, access to training, etc.) with the benefit of potential rapid evolution and enhancement due to community involvement. This is often done at a lower cost than traditional, closed-source commercial server automation products (see Continuous Configuration Automation Alternatives section).

These tools originally focused on Unix/Linux platforms; however, Windows capabilities have recently improved because Microsoft is providing the enabling technologies needed in Windows Server. CCA tools are also used, in some cases, to manage Mac OSX client configurations. This is common when incumbent management tools have insufficient OSX capabilities and purpose-built OSX management tools are too expensive or otherwise impractical.

By enabling infrastructure administrators and developers to automate the deployment and configuration of settings and software for physical and virtual infrastructure in a programmatic way, organizations across all vertical markets stand to realize:

- Agility and productivity gains – via faster deployment and configuration of infrastructure in response to changing market demands
- Cost reduction – via a significant reduction of required manual interactions by high-skills and high-cost staff. Licensing cost reductions may also be achieved through the use of free, community versions of product and content.

- Risk mitigation – via the consistent use of standardized, documented processes and configurations across physical and virtual infrastructure, resulting in fewer issues due to human error.

CCA tools can drive efficiencies into existing operational configuration management, as well as provide a flexible framework for managing the infrastructure of DevOps initiatives, by natively integrating with other DevOps toolchain components – notably continuous integration and application release automation in support of continuous delivery.

Adoption Rate

Adoption of CCA tools remains closely connected to growing DevOps projects, infrastructure-as-code use in production environments and Web-scale IT investment patterns, with similar factors hindering and accelerating adoption.

Adoption of these tools is hindered by:

- A dearth of needed scripting skills among system administrators and IT generalists
- A historical lack of functional parity between commercially supported content and the larger pool of community-generated automation content
- An evolving go-to-market, pricing and packaging models
- A historical lack of enabling technology provided in Windows server OS (PowerShell and DSC)

By contrast, adoption of these tools is growing in line with investment in DevOps and Web-scale IT initiatives due to:

- Programmatic appeal to application developers
- Ease of experimentation, extensibility and access to active communities
- Potentially lower total cost of ownership for significant configuration management capability due to lower licensing costs
- Windows server OS refresh efforts to versions including PowerShell and DSC

Risks

Due in large part to their extremely low barrier to entry, CCA tool investments are often numerous and scattered across enterprise organizations. In larger organizations multiple CCA tools are often used on a project-by-project basis. This creates an organic skills base, but limits their strategic potential because redundant and disparate automation content is likely to result in equally disparate and diverse configuration states across the infrastructure. Inherent in this struggle is the challenge of maintaining the pace of innovation while still driving for consistency.

Without a concerted and coordinated effort to strategically invest in the skills (in particular scripting), automation content management and support to take full advantage of the tools, enterprises at best run the risk of suboptimally performing tooling. At worst, enterprises run the risk of putting themselves in a position where they have tools that no one can use.

CCA tools can be incorrectly perceived as tools best-suited to solve all configuration management needs including patch and auditing, across all platforms, infrastructure types and devices. In fact, CCA tools are best-suited for (and clearly positioned) to manage primarily data center and cloud-based infrastructure – most recently being associated with software defined networking (see “Mainstream Organizations Should Prepare for SDN Now” and “Target Networking for Successful Cloud Deployments”). Even within the infrastructure sphere platform (OS) and infrastructure type (server, storage, networking) support varies widely among vendors.

CCA tool vendors are acquisition targets for vendors operating in adjacent IT operations management (ITOM) spaces. An acquisition could reduce community support and result in CCA capabilities that are oriented to the acquiring vendor’s ITOM strategy.

Alternatively, enterprises that do not invest in CCA tooling run the risk of overpaying for core infrastructure configuration management capabilities. As a result, it will indirectly impede the delivery of new applications and features, and challenge recruiting talent looking to work with the latest technology.

Evaluation Factors

When strategically evaluating CCA tools and vendors, pay specific attention to:

- **Skills and training required not just to implement, but to maintain and enhance, the tool.** Assess the existing skills base of system administrators and DevOps teams because languages and semantics can vary significantly from tool to tool, requiring similarly variable expertise.
- **Platform and Infrastructure content and support.** Evaluate all platform content for required scenarios as this can vary significantly – especially for Windows where content and capability are still emerging.
- **Delivery method and licensing flexibility.** Pricing may be similar for per-node use, but multiyear and enterprise pricing will vary greatly by vendor.

- **Method for interacting with managed systems (agent-based/agentless, push/pull).** Define and evaluate requirements beyond basic configuration tasks (e.g., audit/compliance) to determine which approach provides necessary capability and visibility.
- **Current and historical community size and engagement, in particular contribution rates.** Ensure that content matches your platform and application environments.
- **Support and training availability and costs.** This is often overlooked beyond initial purchases and implementations. Include and evaluate support and training requirements on an ongoing basis, taking into account future use-case support and adoption by new users.

Continuous Configuration Automation Alternatives

Server (life cycle) automation (SA) tools (e.g., BMC BladeLogic Server Automation and HP Server Automation) also offer configuration capability and are often used for operational production control. However, SA tools provide mature capability for other automation requirements (e.g., patch management and templated configuration assessment). These tools often support multiplatform environments with a mature GUI for consolidated reporting across multiple functions. SA tooling can be used in place of or in conjunction with CCA tools to provide provisioning and other configuration management functions, but do so in a less structured way and without the benefit of community content. CCA tools provide more granular configuration capability. Some I&O organizations have implemented both SA and CCA tools, but the burden of integration and coordination (using SA to push CCA agents and manage CCA policies) falls to the system administrator.

Recommendations

- Select and implement CCA tooling to support DevOps initiatives.
- Use CCA tooling to supplement or replace server automation tooling to potentially lower licensing costs.
- Strategically invest in skills, support and an automation content strategy to ensure maximum value from CCA tool investments.

Representative Providers

- Ansible
- CFEngine
- Chef
- Puppet Labs
- SaltStack

Evidence

Data for this research was drawn from approximately 300 client inquiries taken over the past 18 months.

Gartner Research, G00279903, Colin Fletcher, Terrence Cosgrove, 26 August 2015

Staples: Enabling DevOps & Self-Service Cloud Provisioning with Puppet Enterprise

About Staples

Staples Inc. is the world's largest office products company and one of the biggest internet retailers. The company opened its first store in 1986, began offering its stock publicly in 1989, began selling online in 1998, and has grown to \$22.5 billion in annual revenue.

Top outcomes of using Puppet Enterprise

- Fast provisioning of cloud resources for internal application development teams.
- Automated systems management makes IT ops teams faster & more efficient.
- Increased stability and reliability.

Starting environment

- A private cloud service for the company's development teams consisting of thousands of virtual machines in multiple data centers.
- Private cloud runs on Red Hat Enterprise Linux.
- Additional technology includes Red Hat Satellite, Apache, Tomcat, NodeJS, MongoDB, Oracle and Redis.

Why Puppet Enterprise?

Staples needed to automate its private cloud spanning multiple data centers. The company also wanted to enable self-service provisioning for

application development teams to free up IT Operations from having to provision developer environments so they can focus on activities that add more value to the business.

“Puppet is a key enabler in helping us realize the vision that all things will and must be automated to deliver at the velocity of our business,” said Scott Johnson, vice president of technical operations and architecture at Staples.

Cloud Automation

Managing and making optimal use of Staples' private cloud was the primary motivation behind finding a good configuration management tool, said Tom Sabin, IT manager for cloud and automation, and Jeff Quaintance, senior cloud and automation engineer at Staples.

The private cloud was set up as a service for Staples' internal application development teams, to give them the flexibility to quickly acquire the development and test environments they need. The private cloud runs on Red Hat Enterprise Linux, and RHEL environments are managed with Red Hat Satellite. Other technologies used within the private cloud include Apache, Tomcat, NodeJS, MongoDB, Redis and Oracle.

Companies turn to cloud to speed up application delivery. The hope is that cloud will deliver VMs quickly and efficiently, so developers can

focus on developing business value. Automation helps realize this value, as Staples has found.

“Staples had just a limited number of people with a set of very specialized skills who could automate,” said Jeff. “We had a lot of development teams just chomping at the bit to start expanding the number of tools that they used in house. They wanted that automated.”

The answer was to find a configuration management system that would be accessible for developers, platform engineers and others – not just sysadmins. “We needed to be able to say, ‘Here's a configuration management tool; we don't expect you be experts in it, but if you can get started in your own sandbox or development environment, and contribute back to us, that would help us build and scale out our configuration management capabilities,” said Jeff. “That's where Puppet came in.”

Today, with configuration managed by Puppet Enterprise, Staples' IT team has created a user interface that allows colleagues on other teams to order new VMs equipped so they can start working right away.

“We're not just handing out servers; we're handing out servers with middleware or database on top of it, moving up the stack,” said Jeff. “Puppet has really helped us get to that point.”

Choosing the Right Configuration Management Platform

When Jeff and other Staples teams started analyzing several open source configuration management tools, they found an application development team at Staples that had already deployed Open Source Puppet to manage application code, and that was a strong advocate for the technology.

There were several factors that made Puppet highly attractive to the Staples IT team, including:

- Puppet has a strong community of users producing modules, patterns and ideas that the Staples team could learn from and build on. “Other tools really didn’t have that,” Jeff said.
- It was easier for people to quickly get to at least an intermediate level with Puppet. “In the past, other automation tools ended up being so complex that other groups couldn’t consume them without a dedicated person, and staffing for those skill sets is a significant challenge,” Jeff said. “We needed to identify a configuration management tool that other people in the organization who aren’t necessarily advanced experts could consume, use and become part of the automation community at Staples.”
- The Puppet skill set was not difficult to hire for, particularly people who had experience with Open Source Puppet.

“Puppet is a key enabler in helping us realize the vision that all things will and must be automated to deliver at the velocity of our business.”

Scott Johnson, vice president of technical operations and architecture at Staples

The application team used Open Source Puppet on a couple of different application stacks, hosted both internally and with a public cloud service. The application engineers opened requests, and platform engineers provisioned servers with Open Source Puppet and helped the developers manage their configurations.

While Open Source Puppet was working out well for this particular application team, Jeff and Tom knew they would need to expand quickly to other teams, and also from Linux-only to both Linux and AIX. That made Puppet Enterprise the best choice. Plus, getting bootstrapping help from Puppet Labs professional services engineers, and knowing there would be ongoing professional support, made the choice easy.

“It was the knowledge transfer [from professional services engineers] that really set us on the right track, and got us up and going a lot faster than if we’d been doing it on our own,” Jeff said.

The new private cloud service was a big priority, so getting it launched with good processes and practices mattered, and as quickly as possible. Puppet Labs professional services engineers showed the Staples engineers how to write Puppet code that was portable and reusable across applications, to make it faster and easier to scale beyond the original application development team’s specific needs.

Puppet Training

Puppet Labs’ public and onsite private training helped get Staples engineers quickly comfortable with Puppet Enterprise. A few Staples engineers were naturals, though, and picked up Puppet quickly. “I know the Learning VM on the Puppet website has been quite helpful for people as well,” said Tom. “Some people used that [and other Puppet Labs resources] to learn Puppet on their own, and there are quite a number who have been successful.”

Jeff was one of those who dived in and learned Puppet independently, but he advocates for training. “One thing to watch out for with self-training are gaps where you skipped some core things while learning on your own,” he observed.

Building Credibility for the IT Ops Team

Staples’ IT team is now using Puppet Enterprise to manage the VMs in its private cloud, which runs on Linux. While system engineers are certainly saving a lot of time on routine tasks, the biggest benefit is the vastly increased speed of getting a package developed and installed.

“If we have the package already developed, what took days before now takes literally minutes,” Jeff said. “For a new capability – say a new application server container we need to install – what took several weeks is now down to a week.”

That huge change has made a big change in the perception of IT Operations and its role within Staples. “We can turn this stuff around really, really fast, because we’ve done a good job with building the configurations within Puppet,” Jeff said. “People are amazed at how quickly we’re turning things around. We’re doing a good job of keeping pace with our development teams as they try to roll out new functionality for our business, and that’s helped me and my team build credibility within the global technology organization here at Staples.”

DevOps and Infrastructure as Code

Engineers have always automated with scripts, but everyone does it differently. Where sysadmins might favor shell scripts or Perl, developers might write scripts in Python. The problems in delivering quality automation arises not just from these technical differences, but also from differences between people’s individual scripting styles, even when using the same language.

Puppet has brought consistency to how Staples engineers in different departments automate. It’s made it possible for more people with different skill sets and jobs – application developers, system engineers, testing engineers – to automate work, spreading the responsibility to a much larger group.

Just as important, it’s now possible to put automation code, whether for applications or the systems that support it, into a source control tool. “With a centralized center of excellence around Puppet, it allows us to put that governance in place, allows us to put

a process in place, so we have the right level of review prior to anything going out to production,” Tom said.

This shared responsibility for delivering code that moves the business forward is, of course, what DevOps is about. “I look at it as bringing operations and development closer together to solve business problems, regardless of whether that’s a software release or you have a priority incident to address,” Tom said.

Puppet has helped Staples improve its flow of code through each stage, from development through to production. The team uses r10k to manage distribution of Puppet code across all Puppet masters in Staples’ multiple data centers. Code is stored in a repository, and then after code review and approval, it’s merged. Here’s where r10k comes into play again, pushing approved, merged code to development and QA environments. Once testing is complete, a separate process is used to push code that’s passed tests into production.

“I really do see Puppet as a DevOps tool, because it helps bridge that gap between development and operations, and it really level-sets,” Tom said. “Anybody can contribute Puppet code, whereas in a legacy environment, you might actually need to have root access to be able to do certain configurations or install certain software packages. Puppet allows you to abstract that away, and provides enablement for our development teams to do some work that otherwise they’d be restricted from, from an access standpoint.”

Staples development teams have become interested in Puppet. “We’ve had some adoption; recently, we’ve had some teams going out and trying to do some things in Puppet on their own, and we’re working with them,” Tom said.

“What we’ve pushed on is, if you have something net new, where there was no standard beforehand, and we’re doing it for the first time in Puppet, let’s push to get as much managed by Puppet as we possibly can. Now there are a couple of examples out there, where it’s almost just click and go – they can build out an entire cluster with some piece of middleware on it, and Puppet is literally managing all aspects of that configuration. As they add new servers to the cluster, Puppet is automatically picking that up and making everyone else in the cluster aware of that.”

Once people see a few of these “shining examples,” as Tom calls them, “people see that and say, ‘Okay, I get it.’”

Self-Service Provisioning for Application Developers

When people talk about implementing DevOps, one improvement they’re often looking for is self-service provisioning for developers. “At the end of the day, we want to get something like a PaaS [Platform as a Service] offering,” Tom said. “I don’t necessarily mean an actual PaaS offering, just complete infrastructure as code, so that when developers deploy, they don’t have to think about [infrastructure]; they don’t have to worry about what’s being configured. They can literally just deploy their code,” and the infrastructure needed to support it will be deployed correctly and automatically.

Industry Retail

Challenge

- Automate private cloud used by application development teams
- Create self-service provisioning for developers
- Speed deployment cycles.

Solution

- Puppet Enterprise to automate cloud management & create a PaaS-like provisioning service.
- Automation of common IT operations tasks to provide consistency.
- Free IT team to innovate.

Results

- Deployment cycles went from weeks to hours, from days to minutes.
- Developers can provision their own environments as needed.

Full automation of application code and infrastructure code together is not far off. “We’re working on getting to the point where the development team can literally just inject a Hiera file,” said Jeff. “It will completely configure that stack for them, so they can just deploy that configuration right along with their application artifacts on new builds.”

Infrastructure Automation for Consistency, Stability & Efficiency

Achieving the faster deployments enabled by DevOps is terrific. But on a more basic level, most system administration teams adopt Puppet Enterprise simply to save time on common IT operations tasks.

The Staples team uses Puppet for automating configurations across Linux servers. “That’s kind of an important one, because Puppet is a great way to check the box back to management and say, ‘Yes, that configuration is up and running on all of our servers,’” Tom said.

While launching new processes with Puppet Enterprise has been fairly straightforward, retrofitting Puppet Enterprise to servers with existing middleware has been a challenge, yet has yielded significant savings in time and bother.

“Take the example of installing an agent,” Jeff said. “Before Puppet, you could look at 50 servers, and somehow [the sysadmins] figured out how to install the agent probably 29 different ways. We puppetized the agent install, and now for all of our cloud systems it’s very consistent – just an email, and an hour later it’s done. You just classify the server and walk away, let the Puppet agent run. This is a big improvement over the inevitable delays coordinating across multiple teams with various tickets.”

Another great outcome for the team is stability. “Everyone wants to have stability while still being fast; that’s one of the main objectives we have for configuration management,” Tom said. “Puppet as an automation tool helps us to get to that point, so we can quickly build and configure systems that are standardized – and when you become standardized, you become more stable.”

The Future of Puppet Enterprise at Staples

Eventually, Tom would like to expand Puppet to all systems at Staples, whether they’re running Linux, AIX or Windows. “The private cloud was a greenfield project, and could be carefully planned from scratch but it’s a whole different ballgame when you’re applying Puppet to existing running systems that have been built under a different set of standards,” Tom said. “We’re working on trying to retrofit and build up as much momentum behind the rest of our enterprise as we have with our private cloud.”

The team is eager to roll out several time-sensitive tools across the enterprise. Puppet Enterprise is installed, and nearly ready to automate rollout of one of these tools. Others will be rolled out in the same fashion once the process has been proven on the first tool.

Adopting Red Hat’s Satellite management system is another project now in the planning stage, and this too will rely on Puppet Enterprise. “The PuppetDB backend and exporter resources really enable us to have a lot more power and granularity over the configuration management,” Jeff said.

Beyond these projects, Jeff would like to manage network devices with Puppet Enterprise. “Puppet creates a lot of automation opportunities that we will look to leverage in the future,” he said.

Tom Sabin is the IT manager for cloud and automation at Staples. Jeff Quaintance is a senior cloud and automation engineer at the retailer.

Source: Puppet Labs

Ambit Energy's Competitive Advantage? It's Really a DevOps Software Company

About Ambit Energy

Ambit Energy provides gas and electric service to retail customers in more than 50 U.S. markets. The company has more than \$1 billion in annual revenue, and in 2010 was named the **fastest growing company in the United States** by Inc. Magazine – and has been in the top 5,000 fastest growing ever since.

Top outcomes of using Puppet Enterprise

- The team deploys 30 to 40 applications to production per day, up from monthly or quarterly releases as the common practice.
- Changes made to production environments so quickly that no maintenance windows necessary. Before Puppet Enterprise, multi-hour maintenance windows were a regular necessity.
- The IT team is able to manage over 500 application servers in multiple environments, up from around 30 before Puppet, with the same size team.
- Puppet's resource-oriented DSL lets Ambit's IT staff think about the state of their resources; they don't have to think like developers in order to make infrastructure changes.

Investing in IT yields fast growth to \$1B – and beyond

“I credit a lot of our growth to our investment in IT systems, which is as much as a software company would invest – and in some ways, that's what we really are,” says Robert Rudduck, Ambit Energy's director of architecture and DevOps. The company's IT staff of more than 100 people write the software applications that run the business, using Puppet Enterprise to deploy that software and manage Ambit's IT infrastructure.

Fast growth brings its own problems

Ambit Energy started up in 2006 as a direct selling company, using a network of consultants to sell gas and electric services to retail customers. The company has grown to more than \$1 billion in annual revenue, and serves more than 50 U.S. markets.

Operating in so many markets, Ambit needs to take account of varying regulations and market rules in many different competitive energy markets. The company also has to integrate with different incumbent utilities that own the power lines and generation plants; each of these has its own rules for managing customers. To compete effectively, Ambit has to adapt to frequent changes throughout its markets, and maintain accurate billing to keep its retail customers satisfied.

Ambit runs its infrastructure and applications primarily on Windows and .NET. Before introducing Puppet Enterprise in November 2013, the IT team performed all software deployments by hand, and was able to manage about 30 application servers (compared to more than 500 in various environments since the team has been managing app servers with Puppet). CIO John Burke felt it was taking too long to develop and deploy applications with one-off scripts and manual deployment, and asked the team to find a solution.

In order to continue growing rapidly and sustainably in a highly regulated and competitive industry, Ambit needed automation so the company could respond quickly and with agility to ever-changing market conditions and its own business needs.

Automation gives you speed and quality

“Our mantra is ‘automate everything,’” Robert says. That includes automating the entire lifecycle



of virtual machines, from provisioning to end-of-life, Ambit's internally built web services framework and messaging framework, and more.

Most of Ambit's tools are built internally, other than Microsoft Team Foundation Server and Puppet Enterprise. The integration of these tools has given Ambit a fast-moving continuous delivery platform that now allows the company to release code continuously throughout the day, up from a handful of quarterly or monthly releases, all while achieving ever-higher quality standards. Roll-forward is now a true option, and deployment-related rework is near zero.

Enabling DevOps with tools the entire team can use

In addition to delivering new features and updates more frequently, and with fewer bugs, Ambit's IT team now benefits from the enhanced collaboration that DevOps practices and tools provide. Everyone can use Puppet, not just developers or admins.

"Our DevOps guys are not developers who code in Ruby – that's not how they solve problems," Robert said. "With Chef you have to write a ton of Ruby code, and you have to have the dev mindset. Because of Puppet's resource-oriented DSL, you don't have to think like a developer; you can just think about the state of your resources. Puppet is great for us; I can't think of any other way we would have gone."

Robert Rudduck is the director of architecture and DevOps at Ambit Energy, a Dallas-based retail energy provider. Robert's experience of bringing innovative development practices to healthcare, government services, and utilities has been instrumental in Ambit's transition from running legacy IT systems to running continuous delivery in a highly scalable environment based on micro-services.

Industry Retail energy provider

Challenge

Ambit Energy couldn't deploy fast enough to support its rapidly growing business without considerable pain.

Solution

Puppet Enterprise automates everything from infrastructure setup & management to application deployment.

Results

- Deployments up to 1,200 times more frequent.
- IT team can manage 500 servers, up from 30 before Puppet.
- No maintenance windows needed.
- IT team can be more strategic.

Source: Puppet Labs

Continuous Integration at Infusionsoft with Puppet Enterprise

About Infusionsoft

Infusionsoft develops and sells CRM systems for small business. It's been named one of the fastest growing private companies in Arizona, employing more than 650 people. The company has received more than \$125 million in funding, including \$54 million in venture capital from Goldman Sachs in early 2013.

Top outcomes of using Puppet Enterprise

- Able to implement continuous integration workflow.
- Ops team manages 250 servers, double the prior number (mostly VMs).
- Ops has time to upgrade and improve infrastructure, and plan for further scaling.
- Improved insight into infrastructure, plus accurate auditing for PCI compliance.
- Automated monitoring and alerts.

Starting environment

- 125 Linux servers, mostly physical

Why Puppet Enterprise?

- Easy for new people and colleagues outside ops to learn.
- Prebuilt modules and integrations for a wide range of technologies and data center equipment.
- As an integral component of standard continuous integration process, Puppet Enterprise provides ability to achieve continuous delivery of infrastructure.
- Because Puppet is the industry standard for IT automation, it's easy to hire people with Puppet skills and knowledge as the company grows.

Scaling for today's growth, planning for tomorrow's growth

Infusionsoft has experienced the pleasures of fast growth, along with many of the typical pains. Rapid addition of new customers and new employees meant that infrastructure had to grow quickly, too.

The operations team, charged with providing development and test environments for a number of different software development teams, built its own automation systems to deploy and manage both physical and virtual servers. But homegrown automation presented new problems, and didn't fully solve old ones. Server provisioning took hours; server deployments were highly manual and often failed. And it was difficult to get new employees up and running on the homegrown automation system.

Infusionsoft began to look at server automation solutions, and after considering Chef, landed on Puppet. The operations team had some prior experience with Open Source Puppet, and chose to adopt Puppet Enterprise because it was easier and more efficient, due to tested integration of important services. With Infusionsoft experiencing rapid growth, the ability to scale infrastructure management effectively with Puppet Enterprise was key. The team would be able to automate provisioning and management of VMware virtual

Using PuppetDB, we can query, and provide information that helps with capacity planning – what we are running right now, how much we've grown recently, and what we'll need to grow in the future. We can also push out any new security configurations we need to adhere to, and show what we've changed with the reporting.

Ben Hainline, Production Operations Engineer at Infusionsoft

machines, enabled by Puppet's tight integration with VMware products such as vSphere Enterprise. Puppet Enterprise also provides fully supported, pre-built modules for many common system administration tasks, ending the need to write many in-house scripts.

"With Open Source Puppet, you have to stick things together manually by yourself," said Ben Hainline, a production operations engineer at Infusionsoft. "With Puppet Enterprise, you can create a multi-node structure right out of the box. Having a scalable structure right away was huge for us." The fact that Puppet Enterprise provides support for so many different types of hardware and software also made it easy to extend automation further throughout Infusionsoft's technical operations.

It's easier to hire and onboard new employees when you're using an industry-standard solution, Ben said. "There are people out there with Puppet skills, sysadmins who have experience in DevOps."

Greater efficiency, plus time to make things better

Since adopting Puppet Enterprise, a number of things have changed for the better. Where it used to take hours to provision a server, it now takes about 20 minutes, and the process is almost entirely automated. "With Puppet Enterprise, we basically just kick it off, and can trust completely that it will complete," Ben said.

Infusionsoft has been able to more than double its infrastructure and manage it effectively with the same number of sysadmins. "One person can manage 200 servers with Puppet Enterprise," Ben said.

Just as important, the ops team can now make improvements it didn't have time for before Puppet Enterprise. "We can make upgrades, push them out, and go work on things that improve and uplift the environment," Ben said. For example, the team has been able to scale its user authentication scheme to all servers, and is upgrading database servers to newer technology. Puppet has also been useful for upgrading and updating VMware environments more efficiently.

Building a continuous integration workflow

Infusionsoft, like many other companies, has been working to speed its software development cycles and deliver code more frequently. Ben's team provides the development and test servers for all the software teams at Infusionsoft, and is charged with assuring that environments at each stage of the software development cycle align with production.

"We're providing about half virtual machines, half physical," Ben said. "Our database machines are physical, but web services and noncritical services are virtualized. Virtualization lets us get more utilization out of our physical hardware, and it's faster and easier to automate virtualized servers and make network changes."

Puppet Enterprise, of course, can be used to provision and make changes seamlessly on both physical and virtual machines.

Ben's team checks all its Puppet code into Git, putting it through test and integration before pushing to production, and plans to implement Jenkins for automated test and integration. This is one of the most common continuous integration workflows in IT today. The Infusionsoft team looks forward to using r10k, packaged with Puppet Enterprise, to automate promotion of code from stage to stage.

Easier reporting, more insight

Another major benefit of Puppet Enterprise is the insight it provides into the state of infrastructure, and the ease of reporting. "You can see the changes, count on them being made fast, and you can audit any changes you put into the environment," Ben said. The team plans to integrate Puppet with Splunk to get alerts with Puppet-generated data.

"Recently, leadership has asked us questions about what's in our environments," Ben said. "Using PuppetDB, we can query, and provide information that helps with capacity planning – what we are running right now, how much we've grown recently, and what we'll need to grow in the future."

Infusionsoft must comply with PCI standards, and Puppet reporting is very helpful here, too. “We can use Puppet to control who has access to specific systems, and we can add and remove control quickly,” Ben said. “We can also push out any new security configurations we need to adhere to, and show what we’ve changed with the reporting.”

The future of Puppet at Infusionsoft

It’s so much easier to make changes with Puppet, and it’s so easy to write modules for new capabilities, that management can now count on being able to scale the business economically. Infusionsoft is making good progress with its continuous delivery initiative, and can count on delivering changes more quickly, enabling the company to introduce innovative new services to its small business clientele.

Ben Hainline is a production operations engineer at Infusionsoft, where he’s responsible for general day-to-day infrastructure tasks and end-to-end systems automation. Ben is an avid Linux enthusiast and enjoys working with all things open source.

Source: Puppet Labs



Industry

Business software Challenge

- Manual server provisioning was slow & failure-prone.
- Homegrown automation was inefficient.
- Continuous integration impossible with manual process.
- Needed to prove PCI compliance.

Solution

- Infrastructure automation for fast change, reliability, visibility.
- Dashboard for visibility into infrastructure + reporting.
- Integration with VMware
- Enable continuous integration & continuous delivery.

Results

- Sysadmin team is efficient & productive.
- Infusionsoft positioned to scale quickly for growth.
- Continuous integration established & replicable.
- Easy reporting to management & auditors.

About Puppet Labs



Puppet Labs is the leader in IT automation. Our software helps sysadmins automate configuration and management of machines and the software running on them. With our software, businesses can make rapid, repeatable changes and automatically enforce the consistency of systems and devices, across physical and virtual machines, on prem or in the cloud.

We help tens of thousands of the world's leading companies manage millions of machines and devices. Companies like Bank of America, Cisco, NYSE, and salesforce.com rely on our software to deploy their own software faster, be more productive, and gain insight into infrastructure configurations and operation.

Based in Portland, Oregon, Puppet Labs employs more than 400 people. We've raised \$86 million from our investors: Cisco, Google Ventures, Kleiner Perkins Caufield & Byers, Radar Partners, Triangle Peak Partners, True Ventures and VMware.

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