With CFEngine, Locaweb automates its entire IT-infrastructure from bare-metal installation to middleware to end-user/customer application deployments

“The beauty of becoming highly automated with CFEngine is that it allows us to have full control of the whole stack and move very fast. The perceived quality of Locaweb is judged by our IT Operations. To ensure the highest level of quality, we rely on consistent and full control, which is what CFEngine gives us”

Sal Jamil, CTO, Locaweb

As a leading hosting and infrastructure services provider in Brazil and Latin America, Locaweb has grown rapidly and steadily since its inception. Today, Locaweb has approximately 250K customers and roughly 30% of the Brazilian hosting market, with both growing at a rapid pace. As a result, the company turned to CFEngine to scale and automate its infrastructure throughout its entire lifecycle – from build and deploy to continuous operations to decommissioning.

The Challenge

Locaweb operates one of the largest IT infrastructure deployments in South America to provide IaaS and PaaS services to end customers. Locaweb has grown exponentially since its inception 15 years ago. Today, Locaweb has approximately 250K customers and roughly 30% of the hosting market. Locaweb houses in excess of 30,000 servers. It provides services on heterogeneous platforms ranging from Windows to Linux running on both physical servers as well as virtual (VMware, KVM, Xen) machines. A total of 3 datacenters manage tens of thousands of physical servers and virtual machines and provide 60 distinct types of services. Supporting this environment presented the IT infrastructure operations team at Locaweb with unique challenges:

Automating IT-infrastructure lifecycle: With a complex environment of over 30K physical and virtual servers with multiple flavors of operating systems Locaweb needed a tool that could provide consistent and fast infrastructure lifecycle automation – from bare-metal to installation to decommissioning.

Increasing service delivery agility: With 250K customers, Locaweb contends with a demanding customer base. A wide array of services that differ in detail from customer to
“As a cloud provider, IT Operations are core to the success of Locaweb. Using CFEngine to automate our IT Operations has become a critical and inevitable piece to ensure competitiveness in the face of rapid technology advancements and competition that relies on economies of scale”

Sal Jamil, CTO, Locaweb

customer needs to be provided very quickly to remain competitive. Using traditional tools and processes would take several weeks for any service setup – detrimental to remaining competitive in today’s landscape.

Maintaining quality and consistency at scale: With usage and customer base growing rapidly Locaweb needed to make changes consistently, at scale and ensure a QoS that would become a competitive leverage.

Gaining real-time insights: In order to operate in a highly automated environment, insight into the actual state of the systems is a prerequisite.

Integrating with existing tools and processes: Locaweb needed their automation system to be extensible and integrate easily with many home grown tools and processes for inventory management, version control and event management.

The Solution

In the face of these mounting challenges, Locaweb chose CFEngine to automate their infrastructure configuration and lifecycle management by enforcing intended system state for compliance. Unlike other platforms based on Ruby, Python or Perl, CFEngine has provided Locaweb with a lightweight, secure and stable solution based on ‘C’ with minimal dependencies that can easily scale to thousands of machines. CFEngine controls virtually everything in production including setting up new servers from bare metal, all OS configurations, software updates, and is used by Locaweb operations personnel to keep control of their heterogeneous environment.

The Results

Building and managing a large-scale IaaS cloud

CFEngine provides Locaweb with a fully-automated provisioning process that can bring a new machine into production within minutes, so they can easily add hundreds of new machines and provision countless services in production. Whether a new bare-metal Linux or Windows server needs to be provisioned, CFEngine automates all changes from the very beginning. All of Locaweb’s servers are virtualized with VMware, KVM and Xen.

By having CFEngine installed on the bare-metal all other services on top are automatically managed by CFEngine – from VMs, middleware to end customer application and service deployments.
“Locaweb’s monitoring solution Leela in conjunction with CFEngine allows for automated and granular insights. The solution gives insight into the state of 400K services by analyzing all the data generated.”

Gleicon Moraes, Manager Systems Engineering, Locaweb

Increasing service agility
Prior to CFEngine, it took 2-3 weeks to provision a new email cluster. Today this process takes less than 20 minutes and the email operations team has gone down from a headcount of 22 to just 4. If a customer orders a service (say backup) all they need to do is mark a checkbox. Behind the scenes, CFEngine is responsible for ensuring that the backup actually works – truly hands-free automation. As Locaweb plans to introduce new software services, IaaS and PaaS offerings, CFEngine will provide the underlying engine to drive these while ensuring Locaweb has full control of the whole stack and can deliver these services in an agile, repeatable and error-free fashion.

Maintaining quality of service
In the highly competitive Cloud space, speed and quality of service are paramount. Customers are entrusting their businesses on the availability of Locaweb’s services. Locaweb has been able to leverage CFEngine to deliver a very high quality of service. Maintaining service quality and availability require staying on top of your game. An automation solution such as CFEngine helps Locaweb achieve this across misconfiguration issues as well as security issues. In one example, a security vulnerability was discovered in one of the operating system flavors. After a short war-room discussion a decision was made to patch all of the affected systems (in the thousands). CFEngine did all the heavy lifting without impacting the operations of any of their customers. All the systems were patched within minutes. Phased rollout of changes is yet another important feature CFEngine has enabled Locaweb to implement because it gives them the confidence to automate operations change management aggressively with the knowledge that it will not break the production environment. As a result, it is now common for Locaweb to push multiple CFEngine-related changes per day.

Granular insight and quick trouble shooting capabilities
For Locaweb, troubleshooting was hard in the past. Procedures were on ‘Confluence’ pages and new products went into production without a robust process to replicate and debug them. Every product goes into production with a ‘promise’ (CFEngine terminology) and all steps are documented inside CFEngine providing an audit trail and simplifying the management and identification of issues. Automated, correct and predictable service configuration is the new normal. Troubleshooting times have been reduced significantly. With CFEngine automating their infrastructure and services running atop the infrastructure, Locaweb IT personnel can focus on more strategic tasks and initiatives focused on improving overall customer satisfaction.

Integrating with existing systems and ensuring team alignment
A highly automated IT-infrastructure calls for tight integration between systems management tools. CFEngine provides various integration points, and has become a pivotal automation hub that complements Locaweb’s version control system (Git) monitoring (Leela), event (Servicenow) and CMDB (homegrown) tools. Not only must the tools work well together, but also enable alignment across the engineering teams. Thanks to CFEngine, the engineering groups now speak the same language across operating systems, as well as tearing down silos for better overall efficiency in their common goal.
“Before CFEngine, I got up to 9 calls a night. Today, there are no such calls and thanks to automation I am working on higher value proactive IT Operations goals.”

Juliano Martinez, Systems Administrator, Locaweb

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<th>The Bottom Line</th>
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<td><strong>Locaweb Challenges</strong></td>
<td><strong>Locaweb Results with CFEngine</strong></td>
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| Faster server provisioning and automated application management | A fully automated provisioning Infrastructure  
Needed to drastically reduce machine and service provisioning times, often from days to hours and minutes. |
| Be able to manage a complex heterogeneous environment | Disparate infrastructure consistently managed  
Needed to efficiently manage IT-infrastructure across multiple OSes, and VMs running a large number of services and applications |
| Improve Quality of Service | Faster response-times  
Needed to remove barriers (time, effort, tool limitations) in providing best-in-class service to customers |
| Reduce Manual Repetitive Tasks | A fully automated IT-infrastructure  
Needed to reduce the time and effort spent on performing repetitive tasks such as configuration changes |
| Improve the Diagnosis and Troubleshooting | Deep Insights in Actual States of the systems  
Production systems issues needed to be faster debugged and understood. |
| Improve Integration between Existing Tooling | Tightened integration using CFEngine as the glue  
Existing tooling and processes across source code repository, ticketing systems, asset management systems and monitoring systems needed to be integrated and automated |
| Improve Personnel efficiency | A trust-base culture speaking a common language  
Needed to separate Windows and Linux islands and remove silos between teams |

CFEngine
About CFEngine
CFEngine is the industry leader of IT automation at WebScale. CFEngine enables some of the largest IT organizations to provision resources and deploy new applications orders of magnitude faster, while ensuring high availability, security and compliance in highly complex environments. CFEngine has users in more than 100 countries, including many of the world's largest financial organizations, websites and Fortune 1000 companies.