

# Deploy and Version Your Application in the Cloud

## PROFILE



**Industry**  
Software and technology services

**Corporate Headquarters**  
Alameda, California

**Solution**  
Version management software

**Web Site**  
<http://www.perforce.com/>

## THE NUMBERS

- Perforce fast, scalable version management software has been chosen by more than 5,500 companies having more than 450,000 users.
- Perforce has consistently won high rankings from industry analysts for:
  - Overall performance
  - Quality of support
  - Technology innovation
  - Customer satisfaction

## IN BRIEF

### Objective

To allow customers to use Perforce's fast, reliable, and highly scalable version management products in a cloud setting.

### Solution

The Perforce trial copy solution for their version management software is powered by the VMware® virtualization and cloud computing platform in a manner that provides for expansion and growth.

### Business Impact

- Delivers a virtualized, centrally managed, and flexible version management software solution conveniently to a wide variety of users and industries.
- Reduces the cost of an on-premises solution in a manner that increases energy efficiency and uses less hardware.

## Perforce Optimizes Delivery of SaaS Offerings with VMware Technology

*"For Perforce, it's important that our customers enjoy a fast, reliable, and scalable experience when working with our products. In fact, the OpSource™ 100 percent availability guarantee was a key reason for their selection as our hosting provider. That guarantee is powered by VMware vSphere® and its vMotion® technology as the foundation of the OpSource solution.*

*Choosing a VMware-based cloud provider that supports a REST API gave us the automation we needed to provide Perforce customers with trial environments at their convenience, rather than at ours."*

— Tony Smith, European Technical Director, Perforce Software, Incorporated

When you decide to move your application to a cloud implementation, you must address these challenges:

- How can you rapidly deploy and configure your application in the cloud?
- How will you know which version of the software is deployed and running?
- How do you change the software or update it to the latest release of your application code with confidence?

This success story describes how Perforce provided their version management software to customers using a Software-as-a-Service (SaaS) solution that was delivered via a service provider's implementation of the VMware virtualization and cloud computing platform.

### Introduction

Perforce Software, a key VMware partner well known for its highly scalable version management products, wanted to allow customers to use a trial copy of their products in a cloud setting. Perforce successfully used a public cloud provider OpSource™, a Dimension Data company, and Perforce version management tools to create the service on a public cloud.

This success story describes the architecture and tools that Perforce engineers constructed, and the best practices they used, to enable this solution. This information can prove useful to any engineering team that is working on their application in a cloud context.

# Deploy and Version Your Application in the Cloud

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*"Each group typically has its own unique requirements and development methodologies. Because it is flexible, and it is easily customizable using scripts, Perforce versioning software readily accommodates each group's development style. The system's open architecture has turned out to be a value for us."*

— National Instruments

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## Perforce with VMware

Perforce enterprise version management software is used by a wide variety of companies – from startups to many of the largest software and digital asset development companies worldwide. The company serves customers that are as widely diverse as hardware manufacturers, enterprise application developers, stock exchanges, animation studios, and computer games developers. The Perforce P4D Versioning Engine has been rigorously tested and validated on VMware vSphere for some time, and it is fully supported in a VMware environment. For more information, go to: <http://www.vmware.com/resources/techresources/10291>

## Cloud Requirements

Perforce engineers needed to create an architecture that would provide a robust cloud solution. For example, Perforce did not want to get into the business of rebooting a customer's implementation because a provider needed to administer a host server.

A key decision for this implementation was that it reside on virtual machines that could be moved in a server maintenance scenario, without interrupting the application service. Virtual machines also allowed for the rapid provisioning of the service with the application for a new customer. It was essential that this process had to be a speedy one.

In addition, the cloud provider had to supply a rich Application Programming Interface (API) that would allow Perforce engineers to build their own provisioning portal for instances of its software. Perforce did not want the customer to see the linkages to the cloud provider's systems when requesting access to the application.

## Initial Steps

At the outset of the project in early 2010, the initial step was to provide a "for-free" implementation. Perforce chose one of the main public cloud providers, and created the appropriate images on the public cloud to provide this service. Perforce asked a customer wanting to use its software on a trial basis to declare the region where the image was to be deployed. From there, the customer was allowed to directly access the service provider's site.

After 14 days of use, the image was deleted from the system. The original Perforce provisioning user interface was built using the cloud provider's API. The next challenge for the Perforce engineering team was to enable a "for-revenue" solution that was available globally.

## Choice of Cloud Service Provider

After the first trial period, Perforce investigated more than 20 different providers before deciding to utilize the public cloud provider, OpSource, for their cloud infrastructure. During this process, Perforce engineers found that cloud providers can be broadly organized into two groups:

- Providers that serve an IT department that outsources part of its work to an outside party.
- Providers that serve a developer community, but not necessarily one that is concerned with outsourcing IT functionality.

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The Perforce team wanted a provider that supported a rich API. It was essential to have a web interface for provisioning new instances on the provider's infrastructure. For this reason, Perforce needed a cloud provider that could serve a developer community, as described above. They also needed production-level robustness and service level agreements (SLAs). After a thorough search, the team chose OpSource principally for their enterprise capabilities and support, as well as their API, as noted below.

## The Provisioning Workflow

One key aspect of the new system design was that the image or virtual machine is provisioned in-place at the cloud provider's site. This ensured that gigabytes of data making up the virtual machine contents were not copied across the network, causing delay.

An outline of the provisioning workflow is described below:

1. A base virtual machine that has the Ubuntu<sup>®</sup> operating system loaded is extracted from the cloud provider's library.
2. A Secure Shell (SSH) connection is made to the virtual machine and a port is forwarded over the encrypted connection.
3. The Perforce Client software is downloaded to the guest operating system within the virtual machine.
4. All required files to support the application, including the P4 Server itself, are synchronized from a remote Perforce P4 Server running elsewhere in the data center.
5. The connection to the virtual machine is closed.
6. The virtual machine is "shrink-wrapped" or converted into an Open Virtualization Format (OVF) image.
7. The OVF image can then be imported into a suitable vCenter setup and booted up on behalf of the customer.
8. The user is presented with a web page containing the necessary IP address, username, and password for connecting to the Perforce instance.

Several of the steps above were enabled using the OpSource REST (REpresentational State Transfer) API, which is based on the VMware vCloud API. Overall, this process allowed the branch of the repository that contains the desired image of the Perforce software to be synchronized to the virtual machine that is made available to the user. In this case, about 100 MB of data was customized on the new virtual machine image.

When an update occurs later in time, the synchronization process can be repeated, or a new virtual machine can be provisioned quickly to serve the users' needs.

## Using a Custom Enablement Tool

In order to make the move to the public cloud easier, Perforce built a tool that automatically constructs virtual machines. The tool was originally developed for a major cloud provider and it now supports VMware and OpSource. OpSource application images are contained in VMware virtual machine images, but constructed remotely on OpSource infrastructure.

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This tool can simultaneously generate 32-bit and 64-bit images for multiple geographical regions. The images contained the Perforce Server, the Perforce Proxy Server, and Perforce Commons.

For the VMware images, the Perforce provisioning process used VMware's API to drive VMware vCenter to start the base virtual machine. Then remote logon to the virtual machine using SSH is used to customize and populate the guest operating system with the application software, followed by an export of that virtual machine from vCenter to an OVF file set.

## Lessons Learned

Through the year-long experience of deploying Perforce software in trial mode on virtual machines at OpSource facilities, the following lessons were learned:

1. Ensure that your cloud provider allows the virtual machines to be backed up and protected independent of the application being used. This helps to protect the application vendor's brand if unforeseen events occur in one of the cloud provider's data centers.
2. Every change to the users' files on the application virtual machine is submitted to a Perforce repository, which provides a second level of protection. The user can revert to any version of their work, as needed. Similarly, the application vendor, in this case Perforce itself, can version control their trial software on the virtual machine.

## Conclusion

Perforce succeeded in using the public cloud to enable both free trials and for-revenue usage of their P4 versioning software. This was accomplished by using OpSource cloud provider services. OpSource enabled Perforce to fulfill their SLA requirements.

OpSource provided a rich cloud API for virtual machine and application provisioning that utilized VMware vSphere technology. The OpSource API enabled Perforce to build a transparent provisioning process for end-users. End-users did not have to interact with the cloud provider directly.

The Perforce solution allowed the end-user to use version management on their work and have it backed up in a secure manner. Overall, the solution met Perforce's critical needs for an application deployment in the cloud. The solution is now being utilized for production work by a number of Perforce customers in the application development space.

### IMPLEMENTATION OVERVIEW

#### VMware Products and Technologies:

- VMware vSphere® 4.1 Enterprise Plus Edition™
- VMware vSphere® 5
- VMware® vCenter Server™ 4.1
- VMware® vCenter Server™ 5
- VMware® vCenter™ Site Recovery Manager™
- VMware® ESXi® 5

#### Perforce Applications:

Perforce Version Management software

#### Perforce Services:

- Consulting services
- Managed services
- Support services