Golden Image Creation

CASE STUDY

Pension Funds | Infrastructure as Code | Canada

PLANET OF IT LTD.

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Table of Contents

1 ABOUT THE CLIENT

The client is a large Canadian pension plan that provides retirement benefits to teachers. It is one of the largest pension funds in Canada. The client invests in a diverse range of assets, including public and private equities, fixed income, real estate, and infrastructure. With a long-term investment horizon, the client is committed to sustainability, responsible investing, and strong governance. In addition to its core pension plan business, the client also manages a number of private equity and infrastructure investment funds.

2 PROBLEM STATEMENT

The client required a solution to efficiently build and manage golden images for their Core System. The golden images needed to be integrated into the client's existing CI/CD process for launching virtual machines on multiple platforms including VMware, OpenStack, and Azure. The old manual process for building golden images was time-consuming and prone to errors, causing delays in the deployment of virtual machines. The client sought a solution to automate the process, improve the efficiency and accuracy of image building, and streamline the deployment of virtual machines.

The objectives of the project were to:

- Make the process of building golden images for the client's Core System automatic
- Support Windows 2016/2019 and RHEL 7/8 operating systems
- Make the golden image building process work with the client's existing system for launching virtual machines on OpenStack, VMware ESX, and Azure
- Use Ansible as the main tool for managing the system and consider using Packer and Terraform to build and manage the images and infrastructure
- Speed up and make the process of building golden images more accurate
- Make it easier to launch virtual machines
- Align with the client's current systems and goals and use the idea of "immutable infrastructure"

3 CHALLENGES

Challenges faced by the client with their old process:

- Time-consuming manual process for building golden/master images
- Prone to errors and inconsistencies
- Delays in the deployment of virtual machines
- Lack of standardization and automation in the image building process
- Inefficient use of resources and manpower
- Challenges in keeping up with the rapidly changing technology and market trends.

4 SOLUTION IMPLEMENTED

Project was divided into four core areas:

1. A detailed assessment of existing Golden Images
2. A process to build Golden Images using Packer
3. CI/CD – Deploying Golden Images
4. Knowledge Transfer and Training

4.1 The Assessment

In order to address the challenges faced by the client with their old process, Planet of IT conducted a thorough assessment of the existing golden images. The assessment covered various areas such as system information, processor, memory, OS configuration, BIOS, patches, installed applications, network, event log files, local groups, local user, printer, time zone, processes, services, page file, file system delta, and registry keys delta.

Planet of IT also reviewed the existing process and requirements from the clients to learn the current state of things. From there, a workshop was conducted detailing the process design options for golden image building and deploying. Existing processes were broken down into key documentation required for implementation for each golden image including use cases that would ensure that all stakeholders had a clear understanding of how things worked from start to finish.

The assessment helped Planet of IT gain a clear understanding of the client's existing infrastructure and processes and identify any areas that needed improvement. This information was used to make recommendations and develop a roadmap for the implementation of the solution.

4.2 Build Golden Images using Packer

In phase 2, Planet of IT implemented a process to build golden images for the client's core system.

The implementation involved setting up a development environment with Packer and Terraform tools and building authentication processes to target systems i.e., VMWare, OpenStack, and Azure platforms. Next, base templates were created for Windows and RHEL operating systems and terraform was configured for state files management. Finally, the images were built and tested to make sure everything worked as intended.

4.3 CI/CD – Process of deploying the Golden Images

The client's CI/CD process was streamlined by configuring a file storage for base ISO images and a repository for artifacts produced by builds. Golden Images were built using Packer and

deployed and the builds were tested with various parameters to ensure the required images were produced and deployed.

The phase also included a knowledge transfer and handover, where the Planet of IT handed over the knowledge to the client's IT team and provided documentation for all processes from building the development box to deploying the images.

The deliverables for this phase included a detailed design document, an architecture document of the as-built infrastructure, and as-built documentation.

4.4 Tools and Technologies

The tools and technologies used in this project include:

- **Hashicorp Packer**: a tool for automating the creation of machine images, used for building the golden images.
- **Hashicorp Terraform**: an infrastructure as code tool, used for managing and provisioning infrastructure resources.
- **Ansible**: an open-source automation platform, used as the primary configuration management toolset.
- **Jenkins**: an open-source automation server, used for CI/CD builds to build and deploy golden images.
- **VMWare ESX**: a virtualization platform for infrastructure as a service (IaaS), used as one of the target environments for deploying golden images.
- **OpenStack:** an open-source cloud computing platform, used as one of the target environments for deploying golden images.
- **Microsoft Azure**: a cloud computing platform, used as one of the target environments for deploying golden images.
- **Git**: a distributed version control system, used for version control of Packer and Terraform projects.
- **Windows Server 2016/2019**: the target operating system for the golden images.
- **Red Hat Enterprise Linux (RHEL) 7/8:** the target operating system for the golden images.

4.5 Results

The results of the project were highly beneficial to the client. The implementation of the Golden Image creation process helped the client in several ways:

- **Improved deployment efficiency**: The new process of building Golden Images using Packer and Terraform allowed for faster and more consistent deployment of virtual machines, saving valuable time and resources.

- **Enhanced infrastructure management**: The utilization of Ansible as the primary Configuration Management tool, along with Terraform for Infrastructure as Code, helped the client better manage their infrastructure and streamline their workflows.
- **Improved security**: By automating the process of building Golden Images, the client was able to ensure that all virtual machines were consistently configured with the latest patches and security updates, helping to reduce their security risks.
- **Enhanced supportability**: The implementation of a CI/CD process for deploying the Golden Images allowed the client to easily test and deploy new images, improving the supportability of their infrastructure.

Overall, the project helped the client to improve the efficiency, security, and supportability of their infrastructure, allowing them to better meet their business objectives. The knowledge transfer and handover session ensured that the client's IT team had the necessary information and skills to continue the work, enabling them to continue to mature their processes and technology.

5 ABOUT US

Planet of IT is a Canadian-based IT consulting company that provides technology solutions and services to businesses. They offer a range of services including advisory, cloud computing, digital transformation, DevOps, and site reliability engineering. The company's goal is to help businesses leverage technology to improve efficiency and competitiveness in their respective industries. They work with organizations of all sizes and offer tailored solutions that meet their specific needs.

Their team of experienced professionals provides expert guidance and support to help organizations navigate the complex world of technology. Overall, Planet of IT aims to be a one-stop shop for all technology needs, providing complete end-to-end solutions to help businesses achieve their goals.

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