



Express Linux Automation and Networking

Ansible and Scripting for z/VM

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Agenda

- ELAN in z/VM ESI
 - Ansible playbooks
 - Web interface and integrated tools
- What can be automated?
 - z/VM Guest deployment/management
 - z/VM System deployment
- Other works in progress
 - Packer/Terraform demo



ELAN in z/VM ESI



Express Linux Automation and Networking (ELAN)

- RHOCAP support
 - HAProxy (load balancer)
 - BIND (DNS)
 - Squid (HTTP proxy)
 - Container Registry
- General Linux+z/VM support
 - Grafana Loki (console/VMEVENT)
 - HTTP server
 - NFS server
- Web interface
 - Automation
 - Monitoring
 - RACF/CF (RACF Manager)
 - Password Reset tool
 - LDAP ID manager
 - Launchers for
 - Cockpit (RHEL interface)
 - HAProxy statistics
 - Performance Toolkit
 - Grafana



Express Linux Automation and Networking (ELAN)

- "ESI Group" support
 - Aggregate Grafana data
- Extensability
 - ESI "module" support
 - Upload modules
 - Serve modules across ESI Group
 - Automation support for modules
- Helper scripts
 - Wrapper scripts for SMAPI APIs
 - lsvm, lsvmipl, lszvmdisks...
- Coming soon:
 - Forgejo (GitHub workalike)
 - with pre-configured Runner
 - Automation support for ESI Group
 - Options to change RHOCPC deployment, e.g. distribute nodes across LPARs
 - Manage ICIC deployment



What can be automated?



- No official z/VM support
- Watch Jay Brenneman's work
 - zvm_ansible_collection
https://github.com/IBM/zvm_ansible_collection
 - Uses zthin from Feilong
 - Relies on SMAPI

Ansible

- Ansible supports external commands
 - Modules “shell” and “command”
 - Call out to smcli or other tool
 - No idempotence!
 - Watch out for race/dependency conditions
- A lot is possible even with this...



z/VM ESI ELAN automation

- RHOCP installation
 - Creates guests
 - Generates RHOCP Ignition files
 - Configures DNS/HAProxy/Apache/more
 - Logs on/IPLs guests (via SMAPI)
 - Checks progress
 - Reconfigures cluster for LDAP authentication and replacement TLS certificate
 - Example playbooks at <https://github.com/viccross/ocp-z-ansible-sample>
 - Subset of the full function in ESI



z/VM ESI ELAN automation

- ICIC deployment
 - Combination of shell scripting and Ansible
 - Script to create guests, Ansible to install ICIC
 - Ansible does post-install LDAP authentication and TLS certificate replacement



What about deploying z/VM itself?

- z/VM ESI automatic installation enables this
 - Ansible playbook:
 - Create the Partition (DPM only: use existing LPAR if Classic IO DF)
 - Create the ESI CSV file from a template
 - Load the Partition/LPAR (DPM, or Classic IO DF z16 or greater)
 - Wait for install to complete, then re-IPL
 - Watch this space, coming to a GitHub near you!



Works in progress



Terraform

- Uses ICIC to support its OpenStack provider
 - Terraform doesn't know z/VM
- OpenStack provider does a lot!
 - Guest (VM) creation/deletion
 - Network/subnet management
 - More?
- Packer is similar
 - Supports z/VM using OpenStack via ICIC
- Native provider for z/VM?
 - SMAPI (maybe via Feilong)
 - Some OpenStack concepts don't map directly to z/VM concepts
 - "Availability Group"



Terraform with ICIC

- Example use case combining Packer, Terraform, and Ansible
 - Use known base image to create two customized images
 - “Web app” with Apache HTTP Server, PHP-FPM, and a phpinfo page
 - HAProxy (load balancer)
 - Deploy web application serving infrastructure
 - Three HTTP server VMs
 - One load balancer
 - All automatically (and programmatically) deployed



Introduction to the tools

- Ansible
 - Cross/multi platform configuration management
 - “Idempotence”
 - Make no change unless necessary
 - Ideal for post-deployment customization
 - Commercial product: Ansible Automation Platform





Introduction to the tools

Terraform

- “Infrastructure-as-Code”
- Manages state of resources
- “Providers” for wide variety of cloud and infra installations
- Commercial: Terraform Enterprise

Terraform

Enterprise-ready from day one
Adopt turnkey solutions with enterprise support so you can focus on improving your business outcomes, not IT operations.

Simplify complex IaC workflows
Reuse infrastructure components and automatically enforce security to limit risk and maintain efficiency.

Lifecycle management at scale
Put a system in place to programmatically scale infrastructure, enable self-service, and monitor health over time.

Code
Infrastructure, policies

Output
Infrastructure state, audit logs

HCL

Providers

Cloud | Private datacenter | Service

Infrastructure

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VM Workshop

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Introduction to the tools

Packer

- Build images
- Consistency in deployment
- “Sources”
 - similar to Terraform providers

Packer

Better together with Terraform

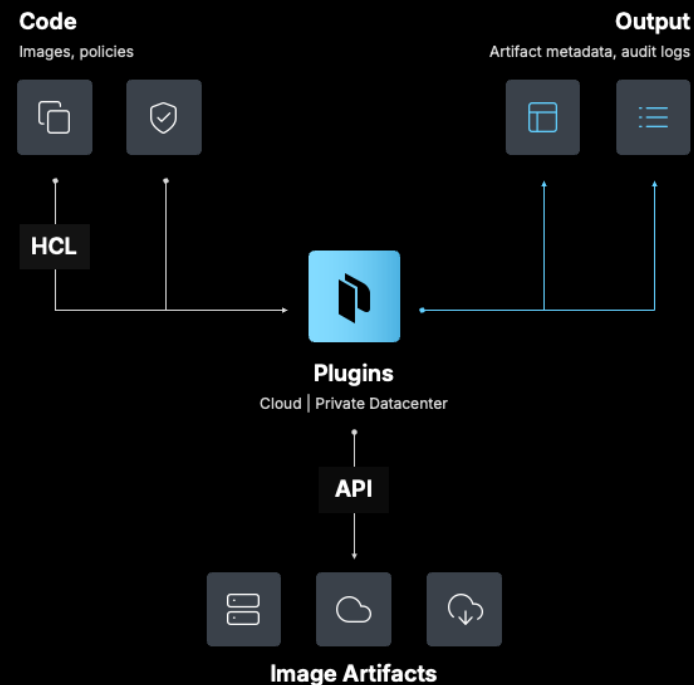
Create a golden image pipeline to unify image and provisioning workflows.

Lifecycle management

Monitor health and standardize revocation to clean up outdated images posing risk and driving up cloud spend.

Security and governance

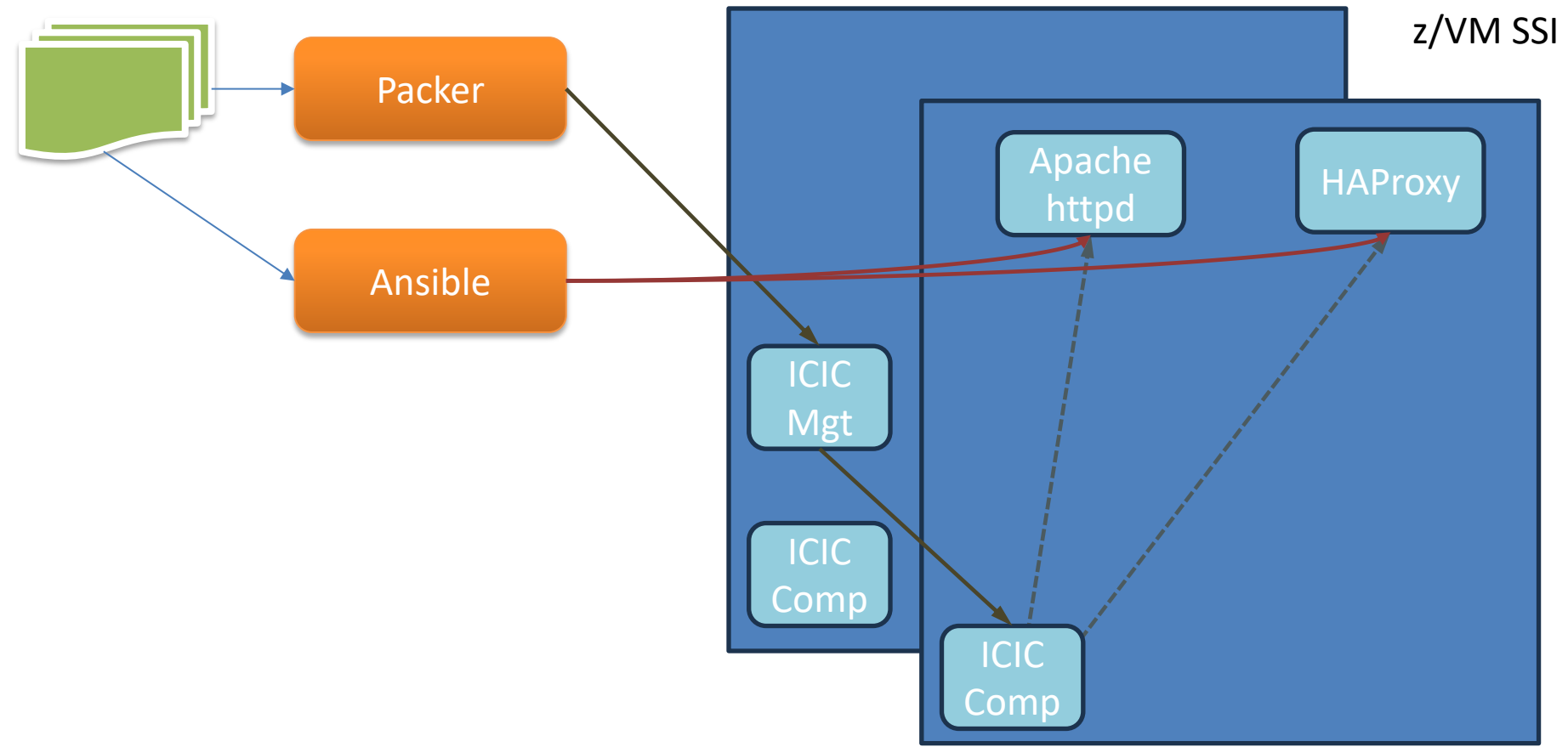
Secure images before deployment to prevent vulnerabilities from occurring in the first place and reduce the window for exploitation.





Terraform with ICIC

(Phase One: image creation with Packer)





Terraform/Packer Demo

Demo videos on “Vic’s VM Videos”

<https://www.youtube.com/@VicsVMVideos>

Try it yourself, if you have ICIC!

Code is at <https://github.com/viccross/icic-packer-terraform-ansible>



Where to next?



Your feedback welcome

- Integration with CI/CD – treat VMs (and z/VMs) like containers
 - IaC Terraform/Packer/Ansible in source control
 - Automatic redeploy when the source changes
- OpenStack via ICIC, or native providers for z/VM?



Thank you!

Vic Cross

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