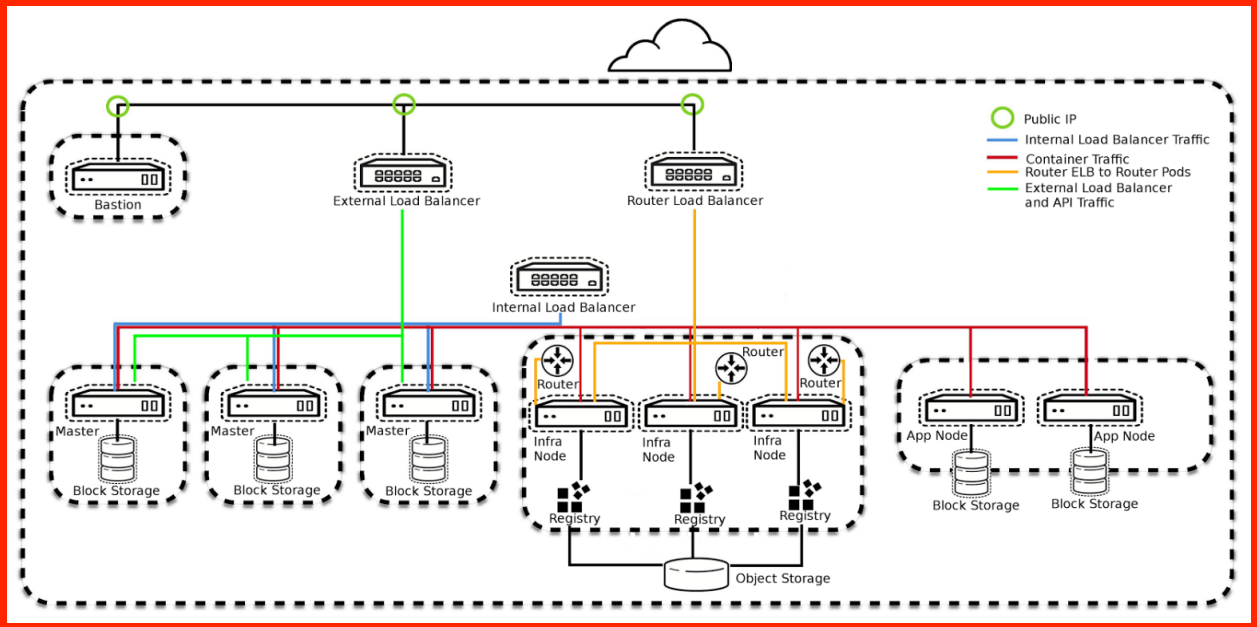
OpenShift Hybrid Windows and Linux



Glenn West, Principle Engineer

Version 1 – April 23 2018

Challenges/Questions

- How to deploy Windows nodes in a OpenShift Cluster?
- What is needed to do this?
- How to make it Simple.
- Is the Microsoft Doc good enough?
- What are the issues?

Infrastructure

- Cluster Deployed Directly On Azure
- 3 Masters – 3 Infrastructure VM's – 1 Rhel Node – 2 Windows Node
- Standard Windows 2016 Datacenter Server Edition (No Patches)
- RHEL 7.4 with latest patches (Auto Applied)

Azure Portal of OCP Hybrid Cluster

NAME	TYPE	LOCATION
bastion	Virtual machine	South Central US
infranode1	Virtual machine	South Central US
infranode2	Virtual machine	South Central US
infranode3	Virtual machine	South Central US
master1	Virtual machine	South Central US
master2	Virtual machine	South Central US
master3	Virtual machine	South Central US
node01	Virtual machine	South Central US
winnode01	Virtual machine	South Central US
winnode02	Virtual machine	South Central US

Software Components

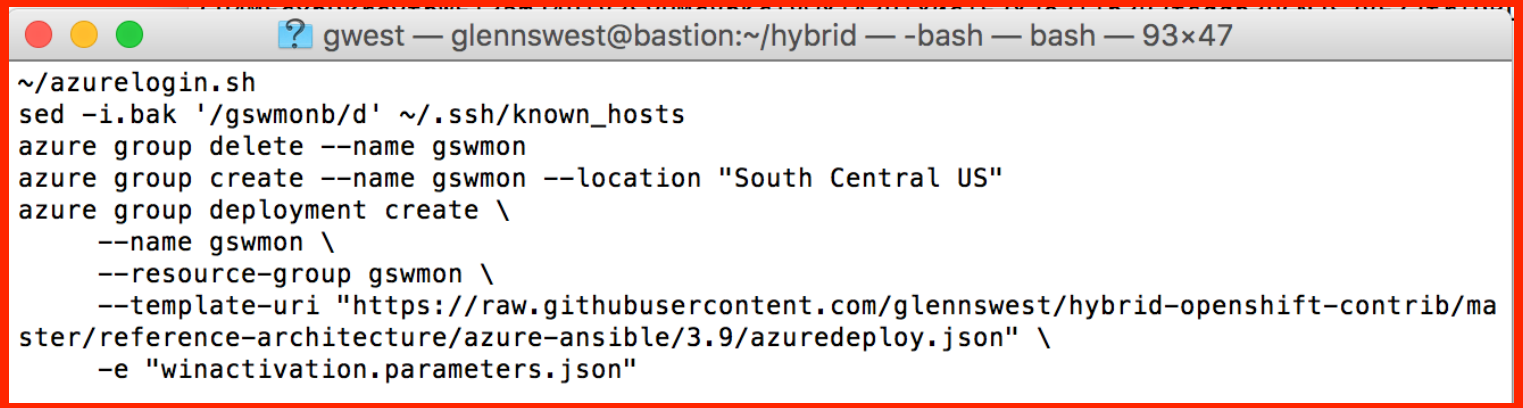
- A Bash script to deploy a cluster.
- A Container based repo for 3.9 puddles of ocp.
- A ARM based(Azure Resoure Manager) script to deploy all virtual infrastructure on Azure including Linux and Windows nodes
- A Bash/Ansible Script that fully installs ocp 3.9 HA cluster with AV Sets, Load Balancers, 1-32 linux compute,
- A Separate Ansible script that installs 1-32 windows nodes
- Simple script to tunnel to Windows nodes via bastion for RDP
- Various Powershell scripts

Interesting Parts

- No Code Changes to OpenShift
- No Code Changes in Openshift Ansible Installer
- No Special Version of OCP 3.9 – Standard Puddle – Expect GA Bits to be fine
- Few additional RPM's to support Ansible to Windows nodes
- Just add rdp client to work on windows nodes via ssh to bastion host
- Existing security and firewall all match existing ref arch best practice
- Begin to end of deploy estimate 45 minutes for full HA multi-node cluster

How hard is it to repeat

- Need a proper Azure account with good resources available
  - Mark Heslin controls this access
- Run a simple script (Assuming the Azure CLI Is installed)
- Forked from 3.6/3.7 Ref arch – Formal doc and theory is same



Walk thru of changes - Baseline

- Forked Azure ref arch from existing 3.7 work (Official)
  - Removed all unrelated files/sub projects
- Did a container based repo of puddles using Nginx for 3.9 OCP
- Upgraded the exisitng ref arch to handle 3.9 differences.
- Added new varibles to ref arch to support Windows Node Count
- Added new sub-arm script for windows node deployment
- Debugged 3.9 setup and make sure cluster comes up

Windows Specific using Ansible – Part 1

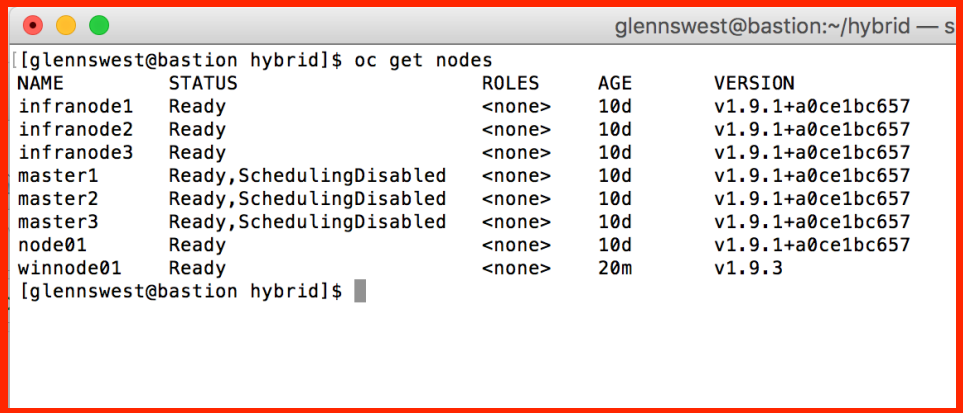
- Added a new ansible group for Windows
- Added ansible config file (Group-vars) to allow ansible to control windows nodes
- Developed a new Ansible Script to Setup the Windows Nodes
- Original Microsoft uses a bootstrap token, we use a pre-generation of all certs/config files instead. The bootstrap token is not recommended even upstream till 3.10 at soonest, tbd on ocp
- Implemented the pre-generation and deployment of configs and nodes

Windows Specific using Ansible – Part 2

- Install Kubernetes on windows - No Package management ☹
- No ETC – So create directory structure (c:\k) and setup enviornment variables (Powershell in ansible)
- Download and install cni – No Package Management ☹
- Donwload and install windows package manager
- Download and install git
- Gnerate OCP Config files on Master
- Pull configs to bastion
- Push config to each Node
- Start Kublet on Windows (Currently done manually)

Objectives Accomplished

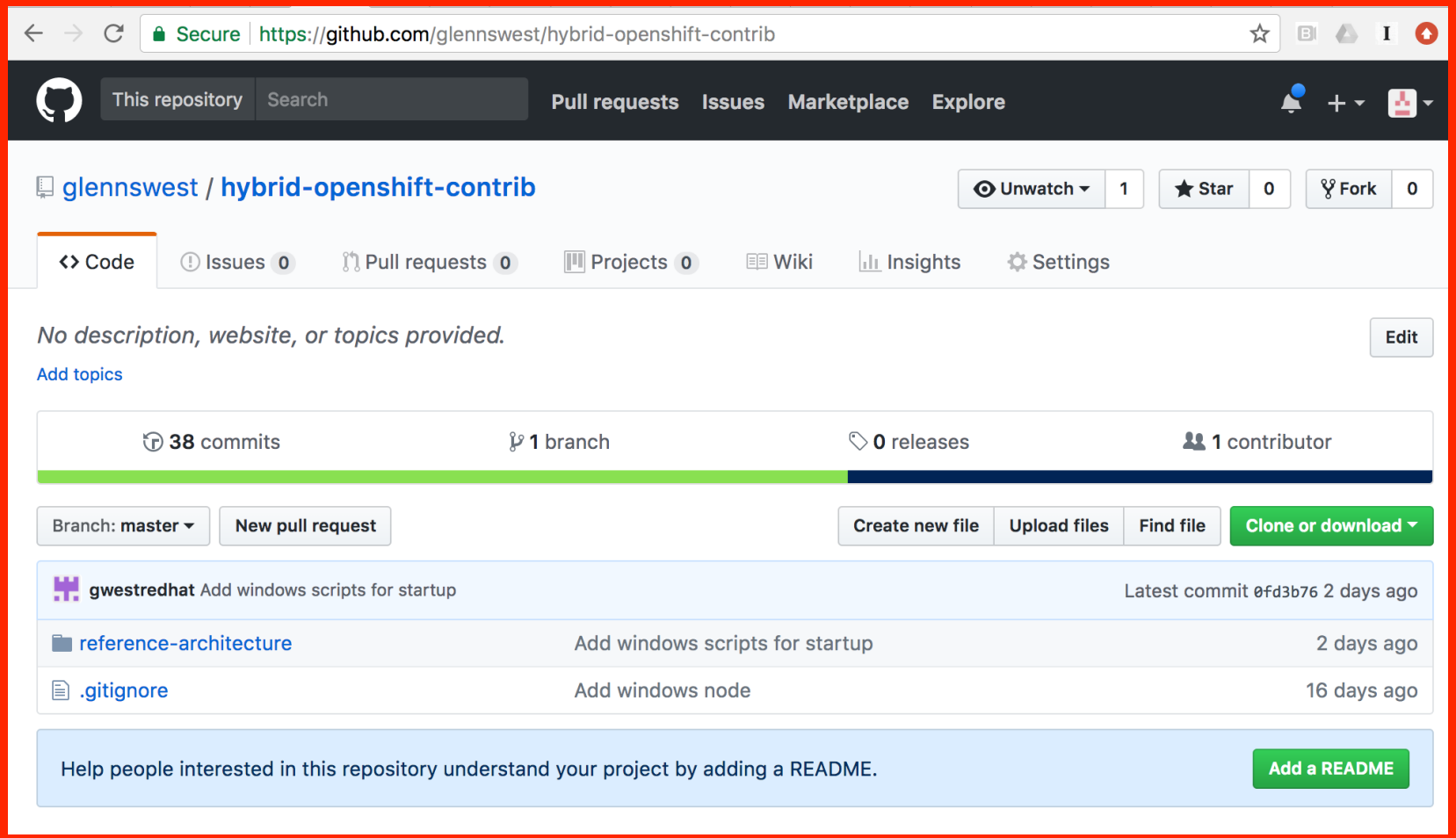
- Allow fully automated – repeatable install of Linux and Windows VM ready for OCP
- Installs OCP 3.9 puddles using a local container based repo on the bastion (No breaks)
- Windows nodes part of OCP (Kubernetes is installed enough to function and report to Cluster and stays up



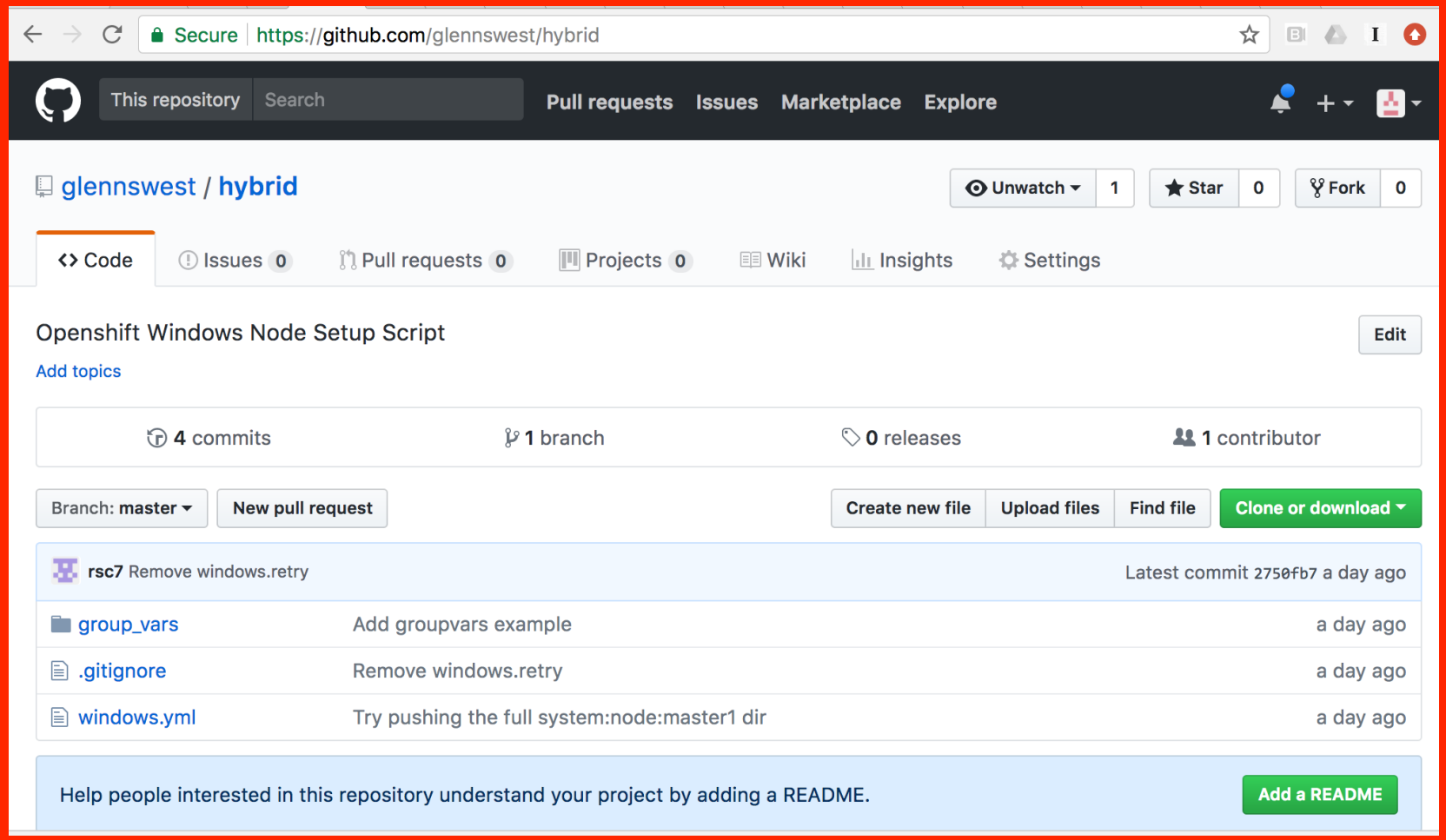
To Be done:

- 1 Day – Make sure everything has been captured and is repeatable
- 2 Days +/- Add Networking Setup and Validation
- 1 Day +/- Applciation Validation
- Demo Day (This slide deck will expand)

OCP Hybrid Repo (ARM/Bash/Ansible)



Hybrid Script – Windows Node Setup



Findings

- Microsoft Doc is not usable by typical RedHatter or Customer (Even advanced
  - The bootstrap token / certs alone invalidates the Document
- The lack of package management is really lacking in polish
  - Consider RedHat Packaging into Chocolaty to get consistant Windows nodes working with OCP
- Recommend we take the “Hybrid” script functionality and build directy into Ansible Installer (Prepped for that)
- Consider a “Ref Arch” for OCP Hybrid (Baiscally this work upgraded to GA/Tech Preview Bits and a fork of the Ref Arch Doc
- Technology Side does appear to work – lots more testing is needed

Going Forward

- Complete the networking and basic app test (It's already in my trello card) – 5 days +/-
- Checkout how Persistant Volumes work
- Trial and Feed back this as a POC
- Do the DOC and productise the bits/package to Tech Preview Status
- Test it and Push it to Supportable
- Consider supporting multiple network types (Quite a few coming)
- Consider multiple cloud providers (Beyond Azure)