

Azure CLI



About me

- Justin VanWinkle
- Very early hire of Switchboard Live
 - o https://switchboard.live
 - Theoretical Title: Doer of What Needs to be Done
 - Actual Titles:
 - **■** Software Developer
 - Interim Infrastructure Lead
- Lover of containerization



Switchboard & Azure

- Joined Switchboard when infrastructure was very young
 - All apps on Azure App Services
 - Great for early stages!
 - Our specific needs required something more

- Set up our automations
 - Builds
 - Deployments
 Azure CLI simplifies
 - Tasksthese steps

- Revamped critical parts of infrastructure
 - Dynamic Scalability
 - Self healing
 - Regional redundancies & failovers

- Made possible
 - by Azure
- <-

Overview

- Azure CLI
 - How to navigate
 - Deploying singletons
 - Deploying entire infrastructure
 - Azure Resource Manager Templates
 - Template Deployments
 - Post-deployment configuration with Cloud-Init
- Using Make for sanity
- Demo Docker Swarm on Azure

Azure CLI

- **Great tool for managing resources on Azure.**
- Performs actions via Azure APIs.
- **Contains functionality Azure Portal lacks.**

Availability:

- Windows, MacOS, Linux
- Docker
- **Azure Cloud Shell**



Welcome to the cool new Azure CLI! Here are the base commands: account : Manage Azure subscription information. : Manage Azure Container Registries : Manage Azure Container Services. : Manage Azure Active Directory Graph entities needed for Role Based Access advisor : Manage Azure Advisor. : Manage Azure Kubernetes Services. appservice : Manage App Service plans. : Commands to manage Azure Backups. : Manage Azure Batch. batch hatchai * Ratch AT. billing : Manage Azure Billing. : Manage Azure Content Delivery Networks (CDNs). : Manage registered Azure clouds. cognitiveservices: Manage Azure Cognitive Services accounts. configure : Display and manage the Azure CLI 2.0 configuration. This command is : Manage consumption of Azure resources. consumption container : (PREVIEW) Manage Azure Container Instances. : Manage Azure Cosmos DB database accounts. : Manage Azure Managed Disks. : (PREVIEW) Manage Data Lake Analytics accounts, jobs, and catalogs. : (PREVIEW) Manage Data Lake Store accounts and filesystems eventgrid : Manage Azure Event Grid topics and subscriptions : Manage Azure Event Hubs namespaces, eventhubs, consumergroups and geo eventhubs recovery configurations - Alias. extension : Manage and update CLI extensions. feature : Manage resource provider features. feedback : Loving or hating the CLI? Let us know! : Find Azure CLI commands. functionapp : Manage function apps. : Manage resource groups and template deployments. identity : Managed Service Identities.

image : Manage custom virtual machine images. : Start interactive mode

: (PREVIEW) Manage Internet of Things (IoT) assets.

: Safeguard and maintain control of keys, secrets, and certificates. keyvault.

: Manage Azure DevTest Labs. lock : Manage Azure locks. login : Log in to Azure.

: Log out to remove access to Azure subscriptions.

: Manage template solutions provided and maintained by Independent Software managedapp

: Manage the Azure Monitor Service.

: Manage Azure Database for MySOL servers. mysal : Manage Azure Network resources.

policy : Manage resource policies

: Manage Azure Database for PostgreSQL servers.

: Manage resource providers. : Access to a secure, dedicated Redis cache for your Azure applications.

reservations : Manage Azure Reservations

resource : Manage Azure resources.

: Manage user roles for access control with Azure Active Directory and service servicebus : Manage Azure Service Bus namespaces, queues, topics, subscriptions, rules and

geo-disaster recovery configuration alias. : Manage and administer Azure Service Fabric clusters.

snapshot

: Manage point-in-time copies of managed disks, native blobs, or other

: Manage Azure SOL Databases and Data Warehouses. sal storage : Manage Azure Cloud Storage resources. : Manage resource tags.

: Provision Linux or Windows virtual machines. : Manage groupings of virtual machines in an Azure Virtual Machine Scale Set

: Manage web apps.

Azure CLI - Jam Packed!

feedback : Loving or hating the CLI? Let us know! find : Find Azure CLI commands.

How often do you see these in a CLI tool?

Azure CLI - Find

A powerful tool

- Returns relevant commands
- Great descriptions

justin@justin-sb >

- `az batchai cluster auto-scale` Set auto-scale parameters for a cluster.
- `az aks scale` Scale the node pool in a managed Kubernetes cluster.
- az vmss create`
 Create an Azure Virtual Machine Scale Set.
 For an end-to-end tutorial, see
 https://docs.microsoft.com/azure/virtual-machine-scale sets/virtual-machine-scale-sets-linux-create-cli.
- `az acs scale` Change the private agent count of a container service.
- `az vmss scale` Change the number of VMs within a VMSS.
- `az batch pool autoscale disable` Disables automatic scaling for a pool.
- az vmss delete`
 Deletes a VM scale set.
- `az monitor autoscale rule` Manage autoscale scaling rules.
 - For more information on autoscaling, visit: https://docs.microsoft.com/en-us/azure/monitoring-anddiagnostics/monitoring-understanding-autoscale-settings
- `az monitor autoscale rule create` Add a new autoscale rule.
 - For more information on autoscaling, visit: https://docs.microsoft.com/en-us/azure/monitoring-anddiagnostics/monitoring-understanding-autoscale-settings
- az redis update` Scale or update settings of a Redis cache.

Azure CLI - Deploying a Resource

Deploying a resource is simple:

```
justin@justin-sb

) az vm create -n MyLinuxVM -g MyResourceGroup --image UbuntuLTS
```

Great for quick one-off deployments.

Azure CLI - Deploying Multiple Resources

Problem: "az create ..."

- Creates 1 item at a time
- Configuration commonly required after deploy

Solution: "az group deployment create ..."

- Deploy entire infrastructure in single command
- Post-deploy configuration not necessary

```
az group deployment create \
    --template-file ../templates/cluster.json \
    --parameters @parameters/cluster.json \
    --resource-group $(RESOURCE_GROUP) \
    --name cli-$(LOCATION) \
    --output table \
```

Azure CLI - Templates

- Version Controllable
- Highly Configurable
- Produces consistent duplications of infrastructure

```
{
    "$schema": "http://schema.management.azure.com/schemas/2015-01-01/deploymentTemplate.json#",
    "contentVersion": "",
    "parameters": { },
    "variables": { },
    "resources": [ ],
    "outputs": { }
}
```

Azure CLI - Parameters

- Data that is variable between deployments
- Sensitive data
- Anything you wouldn't want to version
- Dynamically generated
 - I use a python script to generate this
 - There are OSS alternatives

What is "managerCustomData"?

- Base-64 encoded Cloud-Init Config
- Post-Deployment Configuration Script
- Cloud-Init (<u>http://cloud-init.org</u>)

```
"adminUsername": {
    "value": ""
"managerCount": {
    "value": 3
"managerCustomData": {
    "value": ""
"managerSize": {
    "value": "Standard DS2 v2 Promo"
"saType": {
    "value": "Standard LRS"
"environment": {
    "value": "production"
"location": {
    "value": "eastus"
```





Cloud-Init performs post-deploy configuration actions

- You specify configuration
- Azure passes Cloud-Init configs to new VM
- When you scale, each new VM runs Cloud-Init config
- VM is up and ready to serve in minutes identical to the last

http://cloud-init.org

Azure CLI + Make

AZ CLI is Often verbose

Makefiles to the rescue!

- Reduce ceremony
- Use in CI/CD pipeline
- Version Controllable

There are alternatives if you prefer

```
chaos-monkey:
    az vmss list-instances \
        --resource-group $(RESOURCE GROUP) \
        --name $(VMSS NAME) \
        --query [].instanceId \
        --output tsv \
      shuf \
      xargs -I{} az vmss restart \
        --resource-group $(RESOURCE GROUP) \
        --name $(VMSS NAME) \
        --instance-id {} \
        --output table
list-endpoints:
    az network public-ip list \
        --resource-group $(RESOURCE GROUP) \
        --query '[].{dnsSettings:dnsSettings.fqdn}'
        --output table
```

Azure CLI + Make

+1 for Make - Tab autocompletion!

```
justin@justin-sb > ~/w/s/d/p/eastus
                                         master
 ) make
 -- make targets --
build-nginx-proxy
                             deploy-nginx-proxy
                                                           deploy-staging-cloud-api
chaos-monkey
                             deploy-production-accounts
                                                           deploy-staging-dev-api
clean
                             deploy-production-cloud-api
                                                           docker-login
                             deploy-production-dev-api
deploy-cert-distributor
                                                           keys
deploy-cluster
                                                           kill-cert-distributor
                             deploy-resource-group
deploy-monitor
                             deploy-staging-accounts
                                                           kill-monitor
-- make variables --
SSH KEY
                                               SSH KEY FILES
```

Recommendation:



Azure CLI - Demo

- Deploy Application in Docker Swarm on Azure under 10 minutes.
 - Deploy infrastructure
 - Set up Swarm visualizer (A management tool)
 - Deploy replicated application

Based on https://github.com/rcarmo/azure-docker-swarm-cluster

Demo

Questions?

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