Deploy and scale Microsoft Azure Cloud Native infrastructures and applications with Red Hat Ansible Automation

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STUART KIRK

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- Cloud Native / Open Source Technical Specialist
- Home: Ann Arbor, Michigan, Originally from Canada
- Entirety of Career in Open Source: Dell, Cisco, Red Hat
- Joined Microsoft in 2016; First RHCA at Microsoft
- Enjoys: Watching hockey, Cruising (Disney), Target Shooting

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ZIM KALINOWSKI

Senior Software Engineer
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- Used to live in Shanghai, China, now in exile in Europe
- Currently making Ansible the ultimate tool to deploy resources on Azure. Passionate about Azure REST API.
- Before joining Microsoft worked for Nokia, Opera Software, Qualcomm and created own startup.
- Also likes American craft beer and all kinds of BBQ

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JOHN YOKIM

Director, Azure Solutions Business
Microsoft Corporation

- Born, Raised and Live in Pittsburgh, PA
- Joined Microsoft in 2000
- Working on all things related to Azure since 2013
- Enjoys: Anything Outdoors – Skiing, Fly Fishing, Hiking, Biking, etc…

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JULES OUELLETTE

Senior Cloud Solutions Architect
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- Lives in Saskatoon, Saskatchewan, Canada
- Helping customers deploy solutions to Azure.
- Have done a little bit of everything over 20 years in IT. Networking, integration, application development, infrastructure design, analytics.
- Part of a local "maker" community, have built 7 different 3d printers from scratch using a variety of materials (including recycled shelving!)
- Enjoys: Weightlifting in my garage, making things.

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Connecting To Your Lab

OBTAINING YOUR LAB DESKTOP

- Your lab VM is provided using a content delivery environment from Spektra Systems
- To obtain your Linux desktop you will need to register on the Spektra website
- You can access your lab VM by VNC to obtain a GUI console, or via SSH

Deploy & scale Microsoft Azure Cloud Native Infrastructures & applications with Red Hat Ansible
By: Microsoft

Welcome to **Deploy & scale Microsoft Azure Cloud Native Infrastructures & Applications with Red Hat Ansible!**

The lab content provided is in a hands-on lab format in the spirit of a formal "Hackathon". You will learn how to connect Ansible to Microsoft Azure and the concepts of third party application connectivity including the notion of service principals. You will deploy IaaS, PaaS and other Cloud Native workloads to the various different Azure solutions offerings shown below and subsequently be able to explore and manipulate the applications once they are live. As part of this lab, you will use the example playbooks found in the lab GitHub that provide the building blocks to extend your existing enterprise Ansible deployment to Azure.

The lab content will include deployment of the following Azure technologies:
- Application Gateway
- Azure Red Hat OpenShift
- Container Registry (ACR)
- CosmosDB
- Database for MySQL
- Functions (Serverless Computing)

Register Now
First Name*

Last Name*

Email*

Organization*

Country*

Country

Microsoft or training providers may use your contact information to provide updates and special offers about Microsoft Azure and other Microsoft products and services. You can unsubscribe at any time. To learn more you can read the Privacy Policy.

SUBMIT

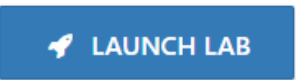https://aka.ms/ansiblefestlab

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OBTAINING YOUR LAB DESKTOP

- The login credential information for your lab will be available immediately
- Click the "LAUNCH LAB" button as shown:

OBTAINING YOUR LAB DESKTOP WITH VNC

- Your VNCSERVERURL should produce a login page similar to the illustration below
- All VNC & account passwords are **Microsoft**
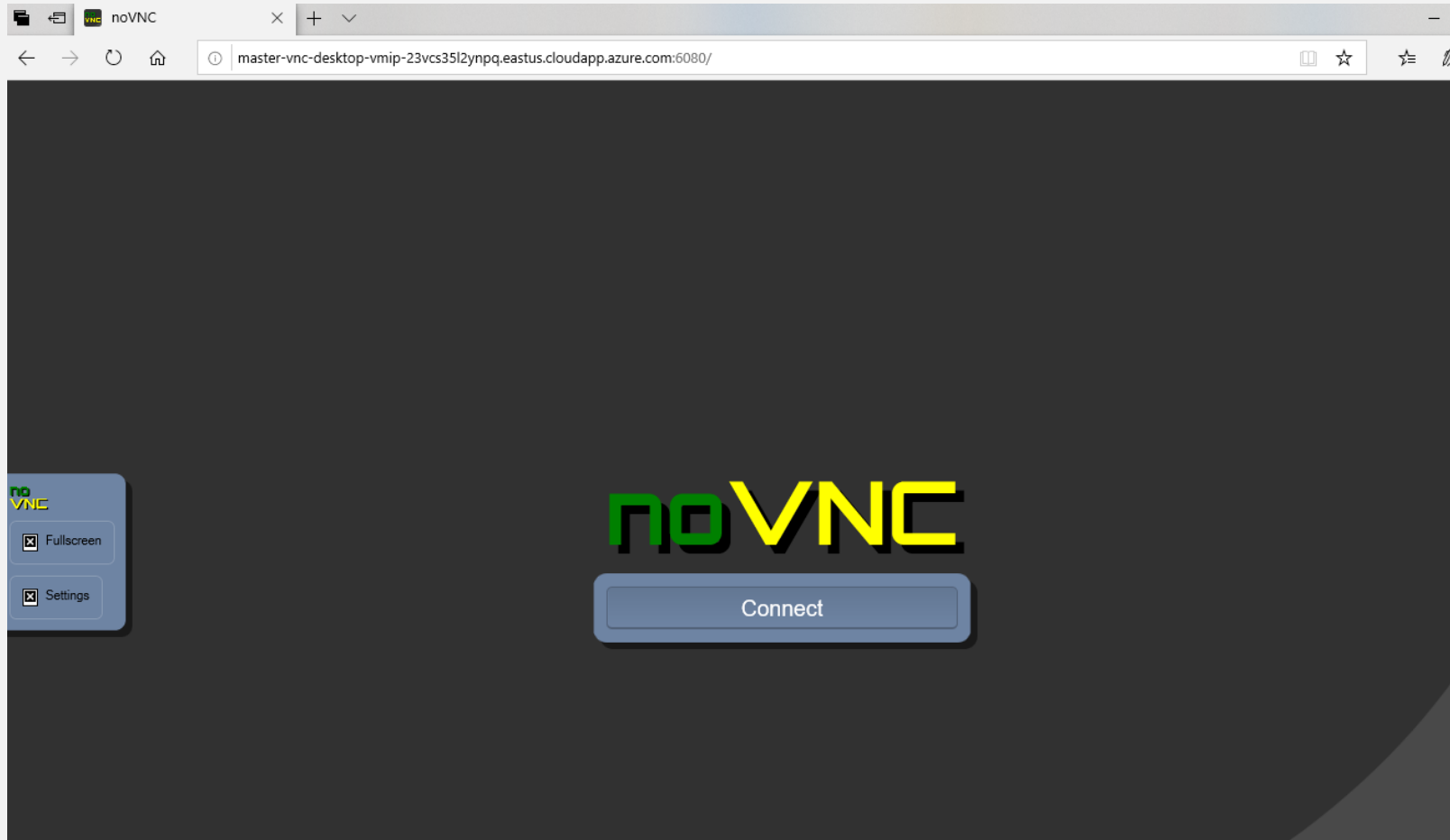
OBTAINING YOUR LAB DESKTOP WITH VNC

- Your lab environment will be delivered from a RHEL 8.2, GNOME3-classic-based host
- All credential information is stored in the credentials.txt file
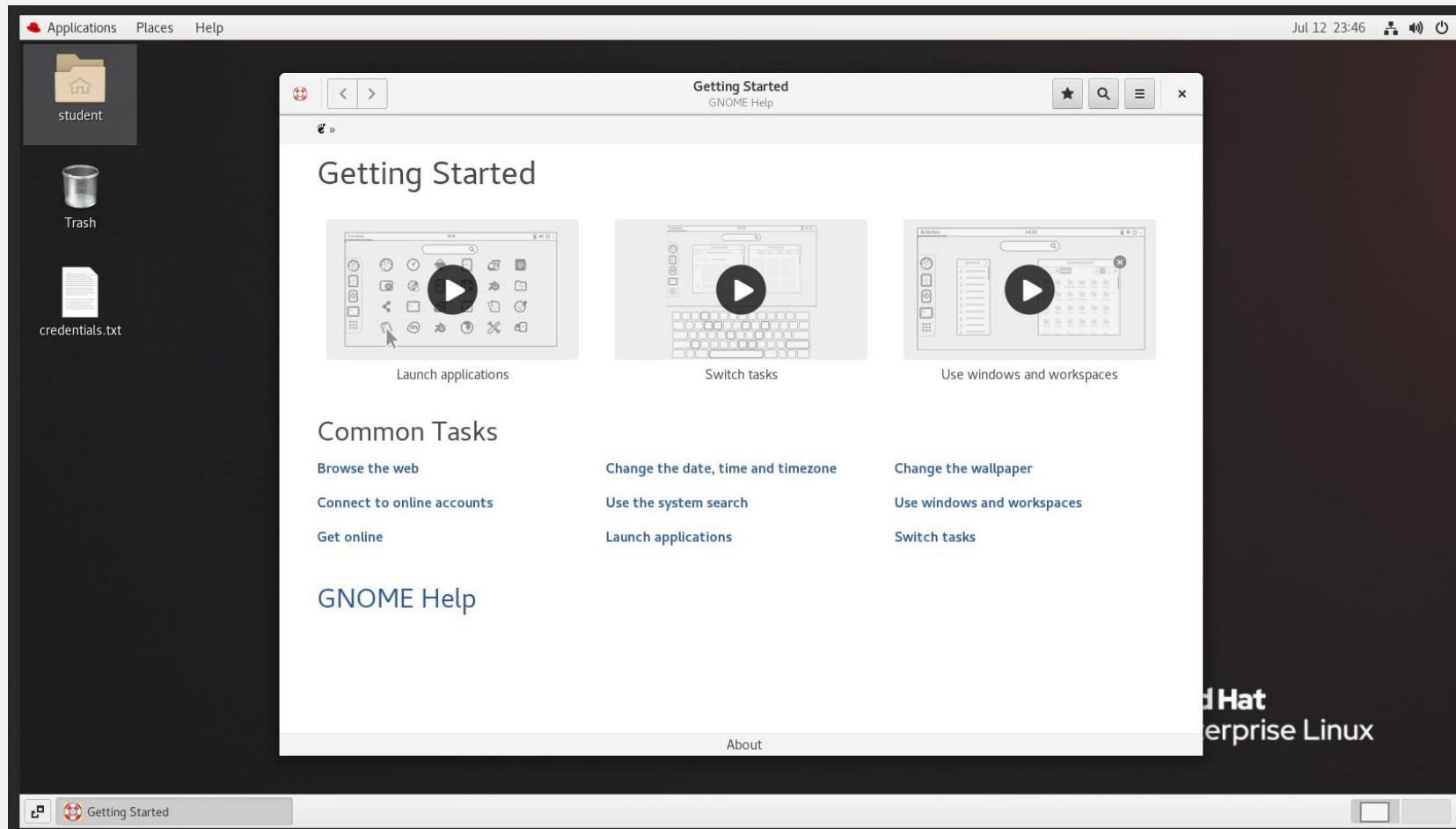
OBTAINING YOUR LAB DESKTOP WITH SSH

- **ssh student@master-vnc-desktop-vmip-xxxxxx.region.cloudapp.azure.com -p 2112**

```
[stkirk@stkirk-fedora ~]$ ssh student@master-vnc-desktop-vmip-3tobr7hzna6ri.southcentralu
Warning: Permanently added '[master-vnc-desktop-vmip-3tobr7hzna6ri.southcentralus.cloudap
list of known hosts.
Password:
Activate the web console with: systemctl enable --now cockpit.socket

This system is not registered to Red Hat Insights. See https://cloud.redhat.com/
To register this system, run: insights-client --register

Last login: Sat Apr 18 15:29:39 2020
[student@master-vnc-desktop ~]$ pip2.7 install --user ansible[azure]
Requirement already satisfied: ansible[azure] in ./.local/lib/python2.7/site-packages
Requirement already satisfied: PyYAML in ./.local/lib/python2.7/site-packages (from ansib
Requirement already satisfied: jinja2 in ./.local/lib/python2.7/site-packages (from ansib
Requirement already satisfied: cryptography in ./.local/lib/python2.7/site-packages (from
Collecting azure-mgmt-storage==3.1.0; extra == "azure" (from ansible[azure])
  Downloading https://files.pythonhosted.org/packages/e8/d9/496b29857a252bc3fcc4bbda069c0
0-py2.py3-none-any.whl (696kB)
    100% |                                        | 706kB 1.6MB/s
Collecting azure-common==1.1.11; extra == "azure" (from ansible[azure])
```

QUICK START

The following commands, as part of the runbook, are a "quick start" to begin working on the labs

- Generate a GitHub personal access token per the instructions in the runbook
- `az login (VNC) --OR--`
- `az login -u odl_user_1234@something.onmicrosoft.com -p Pa$$w0rd!(SSH)`
- `git clone https://github.com/stuartatmicrosoft/Ansiblefest2020`
- `cd Ansiblefest2020/playbooks`

PLEASE VIEW / DOWNLOAD THE RUNBOOK AT THE GITHUB:
https://github.com/stuartatmicrosoft/Ansiblefest2020/blob/main/lab-runbook.pdf

The `lab-build.sh` script will provide you with a unique username for access to Azure Red Hat OpenShift. **Please write this down!**

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TIPS

Overall

- Set the default Azure Linux CLI output type to "`3 – Table`" by using the "`az configure`" command
- The Azure credentials are in the file "`credentials.txt`" on the desktop / in the "Desktop" directory
- DO NOT DELETE any assets in your resource group beginning with `master-vnc-` or you will lose your Linux VM and your lab will be over!
- Lab environments will be available for 3 hours and cannot be re-provisioned after that time
- Some labs take a long period of time to run; Feel free to move on to a second lab and work concurrent

For VNC Users

- It is recommended that you stay entirely within the noVNC environment
- If you need to access a web browser, use the Firefox web browser already loaded on your lab VM host
- Copying and pasting content in/out of the lab VM is very cumbersome

For SSH Users

- Make sure that you connect to your host using port 2112 with the username "student"
- To log in to the Azure Linux CLI you need to use the command: "`az login -u odl_user_1234@something.onmicrosoft.com -p 5om3-cr4zyPa$$w0rd!`".

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Lab Content Overview

THERE ARE TWO WAYS TO RUN OPENSHIFT ON AZURE

OpenShift Container Platform on Virtual Machines

- Deploy through https://cloud.redhat.com/openshift
- Self-managed on infrastructure as a service (IaaS)
- Bring your own license

Azure Red Hat OpenShift

- Deployed through the Azure Linux CLI
- Fully-managed and supported Red Hat OpenShift platform
- Billing integrated in your Azure subscription

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OPENSHIFT CONTAINER PLATFORM ON VMs

Responsibilities

User management	▢
Project and quota management	▢
Application lifecycle	▢
Cluster creation	▢
Cluster management	▢
Monitoring and logging	▢
Network configuration	▢
Software and security updates	▢
Platform support	◼

▢ Customer   ◼ Microsoft and Red Hat

User   App definition

Azure Active Directory

Azure Key Vault

OpenShift API/administration console

App 1   App 2

Azure DNS

Public IP   Public IP   Public IP

Azure Load Balancer (Master)   Azure Load Balancer (Router)

Virtual network

OpenShift SDN

NSG

Azure VMs (Master) Scale sets

Node 1   Node 2   Node 3

api-server ▢ controller-manager ▢ etcd

Azure Premium SSD Managed Disks

Azure VMs (Infrastructure) Scale sets

Node 1   Node 2   Node 3

registry ▢ router

Azure Premium SSD Managed Disks   Azure Blob Storage

Azure VMs (Application) Scale sets

Node 1 Node 2 Node 3 Node 4 ... Node N

application pods

Azure Premium SSD Managed Disks

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FULLY MANAGED CLUSTERS WITH AZURE RED HAT OPENSHIFT

Responsibilities

User management	⬜
Project and quota management	⬜
Application lifecycle	⬜
Cluster creation	🔷
Cluster management	🔷
Monitoring and logging	🔷
Network configuration	🔷
Software and security updates	🔷
Platform support	🔷

⬜ Customer   🔷 Microsoft and Red Hat

User   App definition → OpenShift API/administration console   App 1   App 2
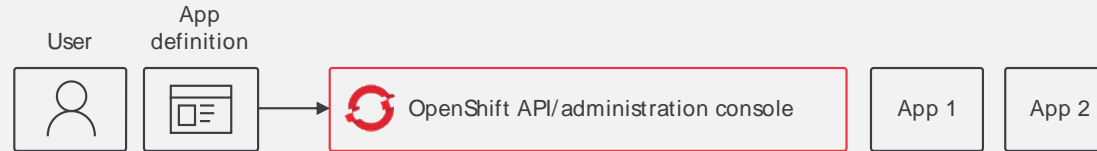
Let Microsoft and Red Hat…

Manage all your clusters   Monitor and operate your VMs

Secure your nodes   Manage environment patches

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LAB OVERVIEW – Azure Red Hat OpenShift

Summary:

Deploy various applications into an existing Azure Red Hat OpenShift cluster

Lab Goals:

- Login and obtain access to Azure Red Hat OpenShift
- Create OpenShift projects (namespaces) for the two applications to be deployed
- Deploy an application using Source-To-Image capabilities of OpenShift and monitor the output logs
- Switch projects to deploy the second application (Microsoft SQL Server 2019)
- Create an OpenShift secret to house the administrator password for the database
- Apply Security Contexts to the SQL Server project (namespace)
- Apply a persistent volume claim & configuration to deploy Microsoft SQL Server 2019

Playbooks:

aro-00-login-namespace.yml (0m12s)

aro-01-deploy-mssql-server.yaml (0m10s)

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LAB OVERVIEW – High Performance Computing

Summary:

Create an Infiniband enabled HPC cluster and test intra-VM latency

Lab Goals:

- Create a master node to serve as an NFS master for the HPC compute nodes
- Create three compute nodes utilizing Azure's Infiniband VM interconnects
- Measure the latency between TCP and DAPL-based connections using Intel MPI

Playbooks:

- hpc-00-cluster-master-deploy.yml (2m59s)
- hpc-01-cluster-master-configure.yml (4m4s)
- hpc-02-cluster-compute-deploy.yml (8m44s)
- hpc-03-cluster-compute-configure.yml (3m34s)

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LAB OVERVIEW – Big Data (HDInsight)

Summary:

Deploy a platform based Big Data solution & Perform various queries

Lab Goals:

- Create an HDInsight Cluster
- Explore the resulting configuration
- Perform several manual queries on the sample data sets

Playbooks:

- hdinsight-40-create-hdinsight.yml (18m38s)

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LAB OVERVIEW – Azure Kubernetes Service (AKS)

Summary:
Deploy an application which uses microservices to provide various earth/climate related details

Lab Goals:
- Create a managed AKS instance in Azure
- Obtain Kubernetes credentials from Azure & merge into ~/.kube
- Create an Azure Container Registry
- Build / Tag / Push containers to Azure Container Registry using Podman
- Deploy the Kubernetes configuration files

Playbooks:
- aks-00-create-aks-cluster.yml (7m47s)
- aks-01-create-acr.yml (0m12s)
- aks-02-build-tag-push.yml (2m40s)
- aks-03-deploy-k8s.yml (0m50s)

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LAB OVERVIEW – Azure Web Apps / NoSQL

Summary:

Modernize a local infrastructure application to a platform-based service

Lab Goals:

- Containerize a NodeJS Application running locally on your desktop
- Use Azure Container Registry to store the container
- Create an Azure CosmosDB (MongoDB)
- Export data from a local MongoDB and import into Azure CosmosDB
- Create an Azure Web Application to consume the containerized application in ACR

Playbooks:

- todo-00-create-acr.yml (0m9s)
- todo-01-create-cosmosdb.yml (4m45s)
- todo-02-create-appservice-plan.yml (0m11s)
- todo-03-create-azure-webapp.yml (0m30s)

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LAB OVERVIEW – Azure Functions (Serverless)

Summary:

Run Ansible as a container-based function app on Azure. Create entire serverless pipeline triggered from GitHub, including static web page to test it using Azure Storage.

Lab Goals:

- Create function app Docker image in Azure Container Registry using ACR task
- Create function app using image from ACR
- Create a static web page utilizing function app using Azure Storage

Playbooks:

- fa-00-create-image.yml
- fa-01-create-function-app-from-acr.yml
- fa-02-create-website.yml

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Replicating Your Lab Environment

REPLICATING YOUR OWN LAB ENVIRONMENT

Replicating this environment in your own subscription is relatively simple and can be done using the Azure Linux CLI:

- **`az group create -n 'rg_name' -l 'eastus'`** (Pick your closest Azure Data Center)

- **`az group deployment create --template-uri https://raw.githubusercontent.com/stuartatmicrosoft/Ansiblefest2020/main/provision-scripts/deploy-01.json --parameters https://raw.githubusercontent.com/stuartatmicrosoft/Ansiblefest2020/main/provision-scripts/deploy-01.parameters.json -g rg_name`**

- **`az vm list -d | grep master-vnc | awk '{print $6}'`**

- You will need to create your own service principal to connect Ansible to Azure

- Connect to this FQDN via http or https on port 6080 or SSH to the VM on port 2112

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Important Links

HOW TO GET HELP!

- Use Q&A to ask questions!
- If your question cannot be answered simply, you will be contacted directly by a moderator
- If the issue requires live interaction you may be asked to use one of the Bluejeans break out rooms. In such case:
  a. The moderator will send you a break out room URL; copy it!
  b. Exit the current Bluejeans session
  c. Open the break out room URL, join the session
  d. Discuss and solve problem there
  e. After you have been helped exit the breakout room session
  f. Return back to the main Primetime session using the original attendee URL.

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10 MINUTE WARNING

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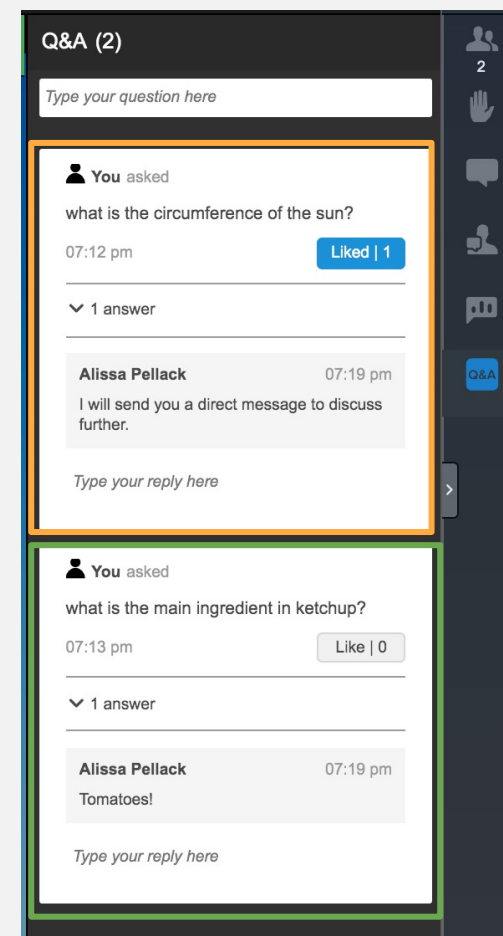
Thank you

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enterprise open source software solutions. Award-
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make
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