KIRK DAHL
McKesson   **Assignment 05**   Deep Azure

Handed out: 11/09/2017   Due by 11:59 PM, midnight (CST) on Thursday, 11/16/2017

You can do this assignment on your PC, Mac, Linux on Windows or Linux VM. Tell us
which environment you are using. Implementation of this assignment will require some
light reading of Azure literature on the Internet. Test of the assignment refers to CLI. You
are welcome to use Power Shell if that is more convenient for you.

Problem 01. Using Azure CLI deploy provided Azure Resource Manager (ARM)
template `azuredeploy.json` to an existing resource group. Verify that the deployment
took place. Do not delete the resource group, yet.
(20%)

CREATE RESOURCE GROUP: RG-KIRK
DEPLOY TEMPLATE

```
Kirks-MacBook-Pro:Downloads el5vgxz$ az group create -n rg-kirk -l westus
{
  "id": "/subscriptions/d5f65876-4dec-4a2e-afe1-b61e713a8612/resourceGroups/rg-
kirk",
  "location": "westus",
  "managedBy": null,
  "name": "rg-kirk",
  "properties": {
    "provisioningState": "Succeeded"
  },
  "tags": null
}
Kirks-MacBook-Pro:Downloads el5vgxz$ az group deployment create --resource-group rg-
kirk --template-file ./azuredeploy.json
{
  "id": "/subscriptions/d5f65876-4dec-4a2e-afe1-b61e713a8612/resourceGroups/rg-
kirk/providers/Microsoft.Resources/deployments/azuredeploy",
  "name": "azuredeploy",
  "properties": {
    "correlationId": "e8d78b07-b08e-463e-9b87-4de58d0a23d5",
    "debugSetting": null,
    "dependencies": [],
    "mode": "Incremental",
    "outputs": {},
    "parameters": {
      "storageNamePrefix": {
        "type": "String",
        "value": "storage"
      },
      "storageSKU": {
        "type": "String",
        "value": "Standard_LRS"
      }
    },
    "parametersLink": null,
    "providers": [
      {
        "id": null,
        "namespace": "Microsoft.Storage",
        "registrationState": null,
```

```
      "resourceTypes": [
        {
          "aliases": null,
          "apiVersions": null,
          "locations": [
            "westus"
          ],
          "properties": null,
          "resourceType": "storageAccounts"
        }
      ]
    }
  ],
  "provisioningState": "Succeeded",
  "template": null,
  "templateLink": null,
  "timestamp": "2017-11-14T17:39:56.545455+00:00"
},
"resourceGroup": "rg-kirk"
}
Kirks-MacBook-Pro:Downloads el5vgxz$
```

VALIDATION THAT DEPLOYMENT RAN

▥ Delete　◯ Cancel　⟦↧⟧ Redeploy　⤓ View template　◷ Refresh

🔍 Search for deployments by name...

DEPLOYMENT NAME	↑↓	STATUS	↑↓	TIMESTAMP	↑↓	DURATION	↑↓	
azuredeploy		✅ Succeeded		11/14/2017, 10:39:56 AM		52 seconds		Related events

Problem 02. Again, consider attached template `azuredeploy.json`. Use Visual Studio Code tool to add tags to resources contained in this deployment template. The most appropriate tags would be ones that identify you as the owner of the resource. Similarly, add locks to you resources so that they could not be deleted by accident. While experimenting with Visual Studio Code demonstrate for use its power to autocomplete.

Deploy modified template to a new resource group. Verify that deployment took place. (20%)

SHOWING OWNER TAG WITH MY NAME

```
35          "apiVersion": "2016-01-01",
36          "sku": {
37            "name": "[parameters('storageSKU')]"
38          },
39          "kind": "Storage",
40          "location": "[resourceGroup().location]",
41          "tags": {
42            "Owner": "Kirk Dahl"
43          },
44          "properties": {
45            "encryption":{
46              "services":{
47                "blob":{
48                  "enabled":true
49                }
50              },
51              "keySource":"Microsoft.Storage"
52            }
53          }
```

HERE I CREATE NAME OF LOCK WITH STORAGENAME AND /MICROSOFT.AUTHORIZATION/ AND MYLOCK. Remove other members not used by locks from original json

```
  "resources": [
    {
      "name": "[concat(variables('storageName'),
'/Microsoft.Authorization/myLock')]",
      "type": "Microsoft.Storage/storageAccounts/providers/locks",
      "apiVersion": "2015-01-01",
      "properties": {
        "level": "CannotDelete"
      },
      "sku": {
        "name": "[parameters('storageSKU')]"
      },
      "kind": "Storage"
    }
  ],
  "outputs": {  }
}
```

DEPLOY MY TEMPLATE

```
Kirks-MacBook-Pro:Downloads el5vgxz$ az group deployment create --resource-group rg-
kirk2 --template-file ./azuredeploy_lock.json
{
  "id": "/subscriptions/d5f65876-4dec-4a2e-afe1-b61e713a8612/resourceGroups/rg-
kirk2/providers/Microsoft.Resources/deployments/azuredeploy_lock",
```

```
  "name": "azuredeploy_lock",
  "properties": {
    "correlationId": "c4ba28d6-0403-4223-b8b6-f1a6c7ff6306",
    "debugSetting": null,
    "dependencies": [],
    "mode": "Incremental",
    "outputs": {},
    "parameters": {
      "storageNamePrefix": {
        "type": "String",
        "value": "storage"
      },
      "storageSKU": {
        "type": "String",
        "value": "Standard_LRS"
      }
    },
    "parametersLink": null,
    "providers": [
      {
        "id": null,
        "namespace": "Microsoft.Storage",
        "registrationState": null,
        "resourceTypes": [
          {
            "aliases": null,
            "apiVersions": null,
            "locations": [
              null
            ],
            "properties": null,
            "resourceType": "storageAccounts/providers/locks"
          }
        ]
      }
    ],
    "provisioningState": "Succeeded",
    "template": null,
    "templateLink": null,
    "timestamp": "2017-11-14T20:49:37.133033+00:00"
  },
  "resourceGroup": "rg-kirk2"
}
```

VALIDATE LOCK TEMPLATE DEPLOYED

DEPLOYMENT NAME	STATUS	TIMESTAMP	DURATION	
azuredeploy_lock	✓ Succeeded	11/14/2017, 1:49:37 PM	5 seconds	Related events
azuredeploy	✓ Succeeded	11/14/2017, 1:31:10 PM	57 seconds	Related events

SHOWING MYLOCK
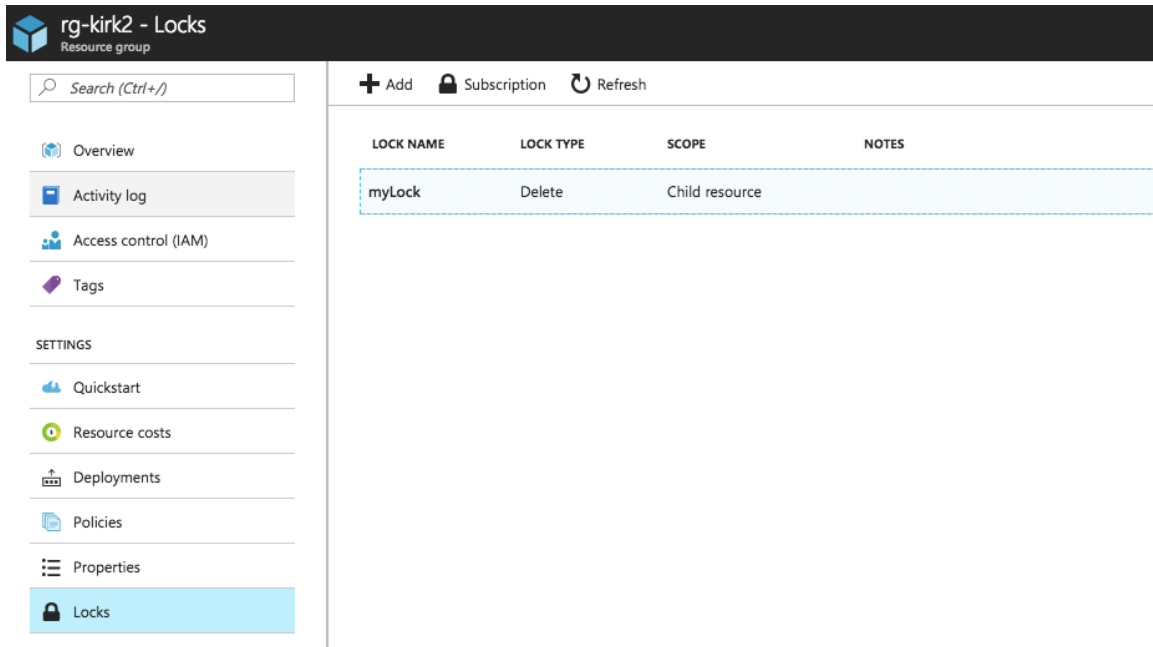
EXAMPLE OF AUTO_FILL


```
"name": "[variables('storageName')]",
"type": "Microsoft.Storage/storageAccounts/providers/locks",
"apiVersion": "2016-01-01",
"
"  🔧 comments
   🔧 condition
}  🔧 copy
"  🔧 dependsOn
"location": "[resourceGroup().location]",
```

Problem 03. Using Azure CLI demonstrate that you find and display properties of resources based on their tag value.
(20%)

DISPLAY ALL RESOURCES WITH TAG Owner=Kirk

```
Kirks-MacBook-Pro:Downloads el5vgxz$ az resource list --tag Owner=Kirk
[
  {
    "id": "/subscriptions/d5f65876-4dec-4a2e-afe1-b61e713a8612/resourceGroups/rg-
kirk/providers/Microsoft.Storage/storageAccounts/storagevrd2eglg7g6da",
    "identity": null,
    "kind": "Storage",
    "location": "westus",
    "managedBy": null,
    "name": "storagevrd2eglg7g6da",
    "plan": null,
    "properties": null,
    "resourceGroup": "rg-kirk",
    "sku": {
      "capacity": null,
      "family": null,EX
```

```
      "model": null,
      "name": "Standard_LRS",
      "size": null,
      "tier": "Standard"
    },
    "tags": null,
    "type": "Microsoft.Storage/storageAccounts"
  }
]
```

Problem 04. Remove all resource groups created in this assignment using Azure CLI.
Please use CLI to show that you have no resources left.
(5%)

REMOVE RESOURCE GROUP 1 WITHOUT PROBLEM
```
Kirks-MacBook-Pro:Downloads el5vgxz$ az group delete -n rg-kirk
Are you sure you want to perform this operation? (y/n): y
```

UNABLE TO REMOVE RESOURCE GROUP 2, WITH LOCK
```
Kirks-MacBook-Pro:Downloads el5vgxz$ az group delete -n rg-kirk2
Are you sure you want to perform this operation? (y/n): y
The scope '/subscriptions/d5f65876-4dec-4a2e-afe1-b61e713a8612/resourcegroups/rg-
kirk2' cannot perform delete operation because following scope(s) are locked:
'/subscriptions/d5f65876-4dec-4a2e-afe1-b61e713a8612/resourcegroups/rg-
kirk2/providers/Microsoft.Storage/storageAccounts/storageqylubd4jbjomc'. Please
remove the lock and try again.
Kirks-MacBook-Pro:Downloads el5vgxz$
```

DELETE LOCK
```
Kirks-MacBook-Pro:Downloads el5vgxz$ az lock delete -n myLock -g rg-kirk2
Kirks-MacBook-Pro:Downloads el5vgxz$
```

ALL RESOURCES REMOVED
```
Kirks-MacBook-Pro:Downloads el5vgxz$ az resource list
[]
Kirks-MacBook-Pro:Downloads el5vgxz$
```

Problem 05. Implement a Docker container running a Tomcat server and displaying a
single HTML page with your name and the current date. Demonstrate that you can see
that Web page on port 9090 of the running Tomcat container. Describe the process of
building the container fully. Please upload your new image into the Docker Hub. Remove
your local container and the local copy of the image and demonstrate that you could
instantiate new container by pulling your image from the hub. Demonstrate that on that
new container instantiated after the pull from the hub you can still see your Web page.
 (35%)

EXAMPLE TOMCAT RUNNING – Created a directory and a Dockerfile with:
```
Kirks-MacBook-Pro:ztomcat el5vgxz$ more Dockerfile
FROM tomcat:jre8
```

```
MAINTAINER "Zoran<zdjordj@fas.harvard.edu>"
ADD index.html /usr/local/tomcat/webapps/examples/
```

THEN BUILD DOCKER FILE

```
Kirks-MacBook-Pro:ztomcat el5vgxz$ docker build . -t skertz/ztomcat
Sending build context to Docker daemon  3.072kB
Step 1/3 : FROM tomcat:jre8
jre8: Pulling from library/tomcat
Digest: sha256:421cfa05c7fca991bebebbef6791fe437c33b7fc9c5139cf45915c3ea52e2bf6
Status: Downloaded newer image for tomcat:jre8
 ---> 11df4b40749f
Step 2/3 : MAINTAINER "Zoran<zdjordj@fas.harvard.edu>"
 ---> Running in b4759d6f62af
 ---> e95520335bfe
Removing intermediate container b4759d6f62af
Step 3/3 : ADD index.html /usr/local/tomcat/webapps/examples/
 ---> f9745c4e0b91
Successfully built f9745c4e0b91
Successfully tagged skertz/ztomcat:latest
```

RUN IMAGE

```
Kirks-MacBook-Pro:ztomcat el5vgxz$ docker run -it -p 9090:8080 skertz/ztomcat
Using CATALINA_BASE:   /usr/local/tomcat
Using CATALINA_HOME:   /usr/local/tomcat
Using CATALINA_TMPDIR: /usr/local/tomcat/temp
Using JRE_HOME:        /docker-java-home/jre
Using CLASSPATH:       /usr/local/tomcat/bin/bootstrap.jar:/usr/local/tomcat/bin/tomcat-
juli.jar
15-Nov-2017 00:02:13.391 INFO [main] org.apache.catalina.startup.VersionLoggerListener.log
Server version:        Apache Tomcat/8.5.23
15-Nov-2017 00:02:13.393 INFO [main] org.apache.catalina.startup.VersionLoggerListener.log
Server built:          Sep 28 2017 10:30:11 UTC
15-Nov-2017 00:02:13.393 INFO [main] org.apache.catalina.startup.VersionLoggerListener.log
Server number:         8.5.23.0
15-Nov-2017 00:02:13.393 INFO [main] org.apache.catalina.startup.VersionLoggerListener.log OS
Name:                  Linux
```

LOCALHOST:9090
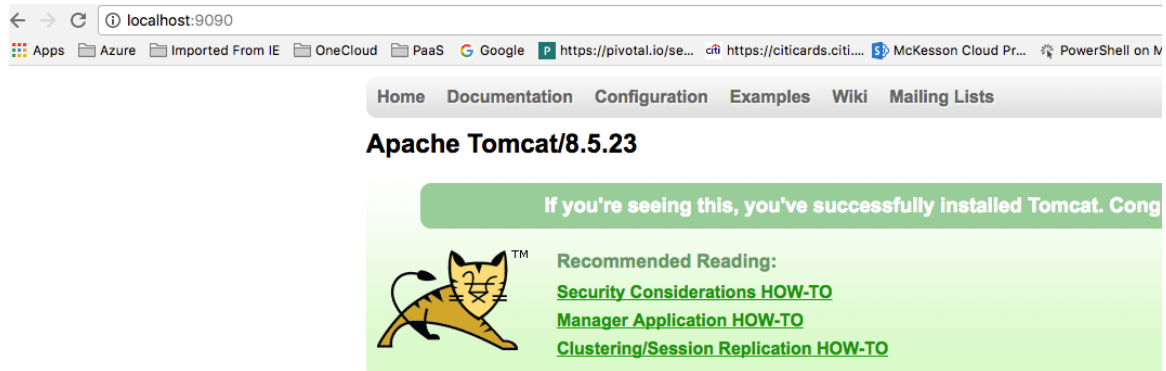
However, I needed to change my index.html to /usr/local/tomcat/webapps/ROOT and update my index.html

localhost:9090/index.html

::: Apps 📁 Azure 📁 Imported From IE 📁 OneCloud 📁 PaaS **G** Google
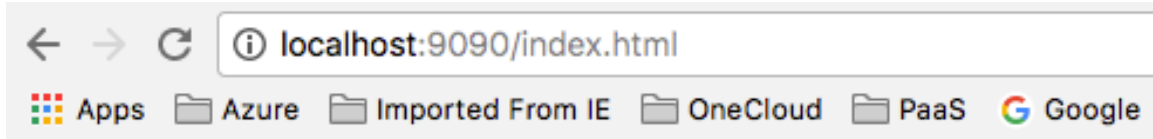
Hi

This is Kirk Dahl on 11-14-2017.

DOCKER LOGIN AND PUSH IMAGE

```
Kirks-MacBook-Pro:ztomcat el5vgxz$ docker login
Login with your Docker ID to push and pull images from Docker Hub. If you don't have a Docker
ID, head over to https://hub.docker.com to create one.
Username: skertz
Password:
Login Succeeded
Kirks-MacBook-Pro:ztomcat el5vgxz$ docker push skertz/ztomcat
The push refers to a repository [docker.io/skertz/ztomcat]
53007f372440: Pushed
0476c5cf9a2b: Pushed
4713522035cf: Pushed
98ce8f4bf4df: Pushed
0c1f1eccf6eb: Pushed
7fd9d3232811: Pushed
7c6d06027fc6: Pushed
```

DOCKER STOP AND REMOVE ALL

```
Kirks-MacBook-Pro:ztomcat el5vgxz$ docker stop $(docker ps -a -q)
cbd833c038b8
6b2a121552a2
478cba7766ec
e8336fa7638f
16cc60989d23
cae89a5b4ebb
3f326e7604f6
e567ca8629c2
d63cebfcc3c8
461ea2069400
166b4227b02d
f49149687ce0
Kirks-MacBook-Pro:ztomcat el5vgxz$ docker rm $(docker ps -a -q)
cbd833c038b8
6b2a121552a2
478cba7766ec
e8336fa7638f
16cc60989d23
cae89a5b4ebb
3f326e7604f6
e567ca8629c2
```

```
d63cebfcc3c8
461ea2069400
166b4227b02d
f49149687ce0
Kirks-MacBook-Pro:ztomcat el5vgxz$ docker ps -a
CONTAINER
ID          IMAGE             COMMAND          CREATED          STATUS          PORTS
            NAMES
Kirks-MacBook-Pro:ztomcat el5vgxz$
```

REMOVE IMAGE

```
Kirks-MacBook-Pro:ztomcat el5vgxz$ docker rmi skertz/ztomcat
Untagged: skertz/ztomcat:latest
Untagged:
skertz/ztomcat@sha256:c977e0ad1e2b2046fc241d2c1c6591a0b073a1eab4975d6f0e0304119fefacd5
Deleted: sha256:99694963fbee1ed855a80197854f67c00b20c82767d490a4183ba9f4eaed2562
Deleted: sha256:5bc98d0fe26dd14a834a6aa1fbdf7acd7960938503d873dc7ff9052ece8cacd1
Deleted: sha256:0b6a0838a87e604301a1e05d4539fee64c0d666950978610fb35aeedccdfb537
Deleted: sha256:fe6ad50550d218743f031b7ac6739e4405480f651a298285d73276a5062ef9b1
```

DOCKER RUN skertz/ztomcat

```
Kirks-MacBook-Pro:ztomcat el5vgxz$ docker run -it -p 9090:8080 skertz/ztomcat
Unable to find image 'skertz/ztomcat:latest' locally
latest: Pulling from skertz/ztomcat
3e17c6eae66c: Already exists
fdfb54153de7: Already exists
a4ca6e73242a: Already exists
5161d2a139e2: Already exists
7659b327f9ec: Already exists
ce47e69f11ad: Already exists
7d946df3a3d8: Already exists
a57cba73d797: Already exists
7e6f56cdb523: Already exists
06e4787b3ca5: Already exists
c760cb7e43cb: Already exists
ad6d0815df5c: Already exists
d7e1da09fc22: Already exists
73d784127468: Pull complete
700588a0c31c: Pull complete
Digest: sha256:c977e0ad1e2b2046fc241d2c1c6591a0b073a1eab4975d6f0e0304119fefacd5
Status: Downloaded newer image for skertz/ztomcat:latest
Using CATALINA_BASE:   /usr/local/tomcat
Using CATALINA_HOME:   /usr/local/tomcat
Using CATALINA_TMPDIR: /usr/local/tomcat/temp
Using JRE_HOME:        /docker-java-home/jre
Using CLASSPATH:       /usr/local/tomcat/bin/bootstrap.jar:/usr/local/tomcat/bin/tomcat-
juli.jar
15-Nov-2017 00:20:07.348 INFO [main] org.apache.catalina.startup.VersionLoggerListener.log
Server version:        Apache Tomcat/8.5.23
15-Nov-2017 00:20:07.349 INFO [main] org.apache.catalina.startup.VersionLoggerListener.log
Server built:          Sep 28 2017 10:30:11 UTC
15-Nov-2017 00:20:07.350 INFO [main] org.apache.catalina.startup.VersionLoggerListener.log
Server number:         8.5.23.0
15-Nov-2017 00:20:07.350 INFO [main] org.apache.catalina.startup.VersionLoggerListener.log OS
Name:                  Linux
15-Nov-2017 00:20:07.350 INFO [main] org.apache.catalina.startup.VersionLoggerListener.log OS
Version:               4.9.49-moby
15-Nov-2017 00:20:07.350 INFO [main] org.apache.catalina.startup.VersionLoggerListener.log
Architecture:
```

SUBMISSION INSTRUCTIONS:

Your main submission should be a MS Word or PDF document containing descriptions of your action while configuring Azure services. If your MS Word document is larger than 1 MB, save it as a MINIMIZED PDF. Please be merciful and capture small JPGs. Describe the purpose of every action and the significance of the results. Start with the text of this homework assignment as the template. Please add any other files that you might have used or generated. Please write your solution as if you are writing a tutorial for your colleagues. Please make your text readable. Make sure that your fonts, especially in captured images are not unreadable. Please do not provide ZIP or RAR or any other archives. Canvas cannot open those archives and they turn into a nuisance for us.