Microsoft Cloud Workshop

Azure security and management

Hands-on lab step-by-step

February 2018

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Azure security and management hands-on lab step-by-step

Abstract and learning objectives

The student will deploy and monitor a web application that has been deployed to Azure IaaS in this Hands-on Lab (HOL). Azure security and operations management will be used to manage and monitor the operation performance and security of the underlying infrastructure. Azure Application Insights will be used to monitor performance, application usage and identify the cause of any application issues that emerge.

Overview

FusionTomo (FT) is a multi-national holding company headquartered in Los Angeles, CA that owns 48 manufacturing companies located in North America, Europe and Asia. These companies sell their products primarily to either distributors or large retail organizations around the world. FT, as the parent company, controls the IT systems for the companies that it owns and thus runs their e-commerce based applications. There are about 125 of these e-commerce applications used primarily for business-to-business purchasing by corporate buyers. These apps provide the bulk of FT's 15 billion dollars in revenue per year, so they are mission critical.

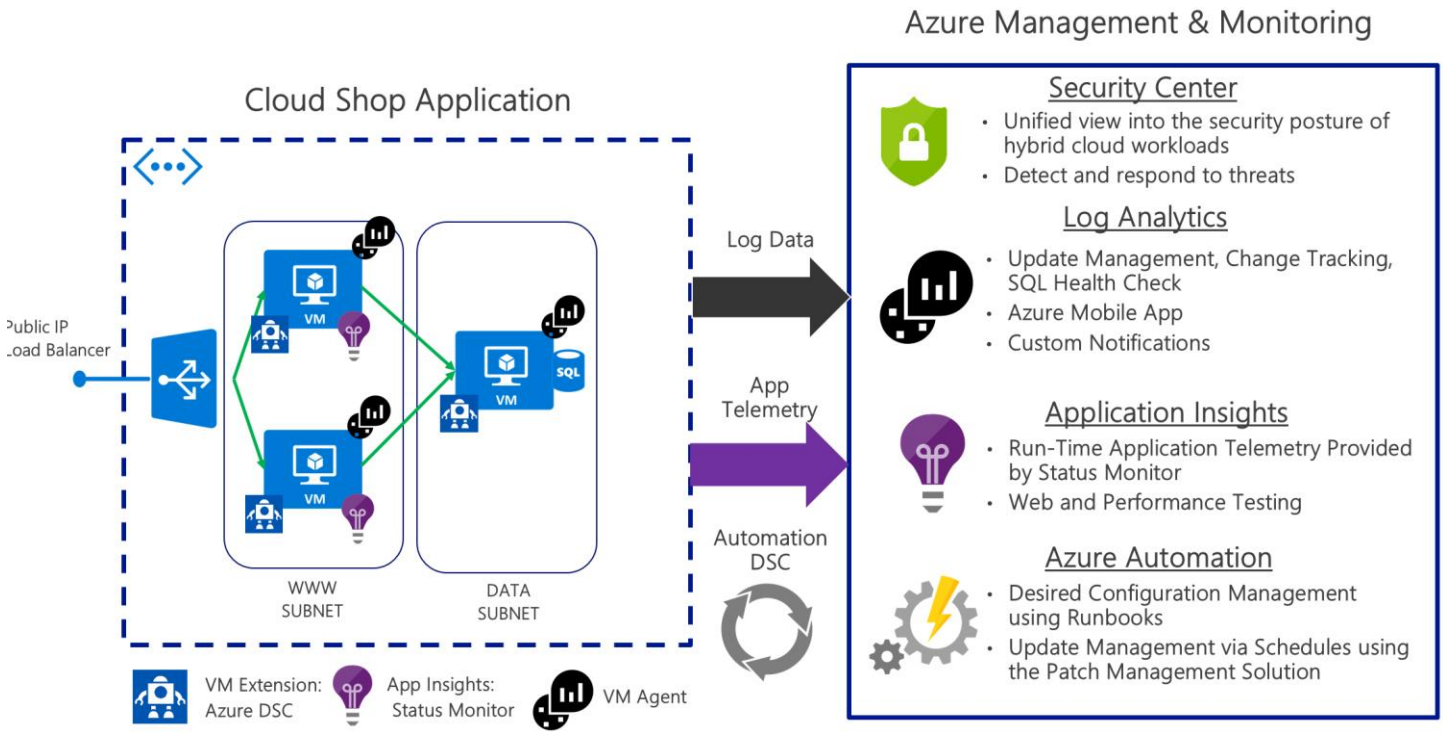
Recently FT has started to investigate what it would take to move from on-premises datacenters to the cloud. Most of their applications are ASP.NET running on Windows VMs with SQL Server in a traditional N-tier configuration. Their goal is to lift and shift these applications over to the cloud while gaining more control over the applications and improving their security posture.

They are looking for you to build out a prototype system in Azure using a sample web application they have provided to you called CloudShop.

They are looking for management tools that will allow them to have a full end-to-end view of both the infrastructure and application performance. Their goal will be to effectively lift and shift all applications over to the cloud. They do not have time or money to instrument the applications. Of course, security is on the top of the chain, so they also need a security solution and updated management system.

Per Roberto Milian, VP of Development and IT Operations, "FT's primary concern is how to best: deploy, test, manage, monitor, patch, secure and troubleshoot these applications in Azure IaaS."

Solution architecture



Requirements

1. A corporate e-mail address (e.g., your @microsoft.com email)
2. Microsoft Azure subscription must be pay-as-you-go or MSDN
    a. Trial subscriptions will *not* work
3. Local machine or an Azure LABVM virtual machine configured with:
    a. Visual Studio 2017 Community Edition or later
    b. Azure SDK 2.9.+ or Later for Visual Studio
    c. Azure PowerShell 4.0 or later

Before the hands-on lab

Duration: 30 mins

Overview

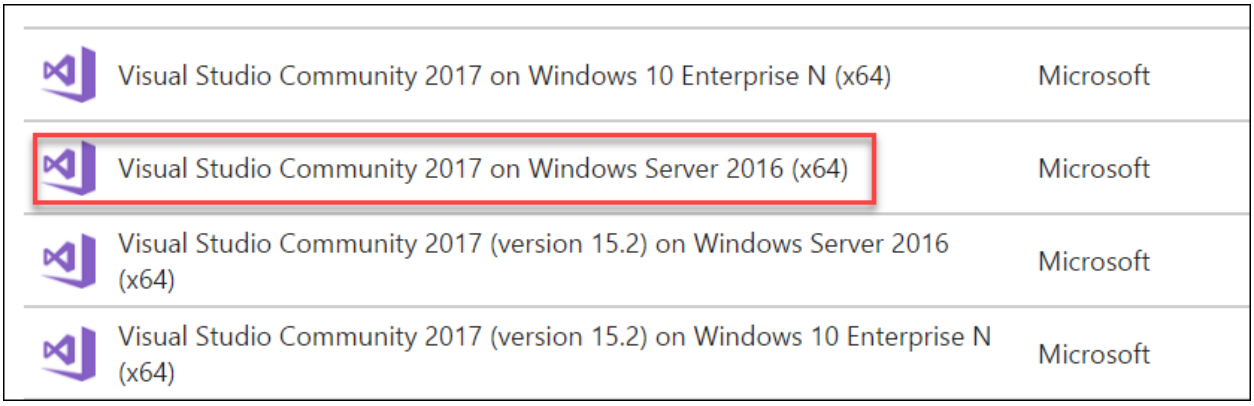
Before attending the HOL, you should follow these steps to prepare your environment for an efficient day. Your first task will be to build a **LABVM** to use for the HOL, and download some student files that will be used. Then, you will create a new Azure Dashboard to use during the HOL.

Task 1: Build a Lab Virtual Machine in Azure.

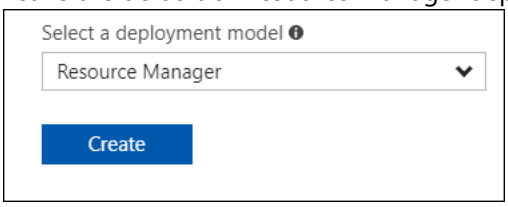
1. Launch a browser and navigate to https://portal.azure.com. Once prompted, login with your Microsoft Azure credentials. If prompted, choose whether your account is an organization account or just a Microsoft Account.

Note: You may need to launch an "in-private" session in your browser if you have multiple Microsoft Accounts.

2. Click on **+NEW**, and in the search box, type in **Visual Studio Community 2017,** and press enter. Click the Visual Studio Community 2017 image running on Windows Server 2016.



3. Leave the default of Resource Manager deployment model, and click **Create**



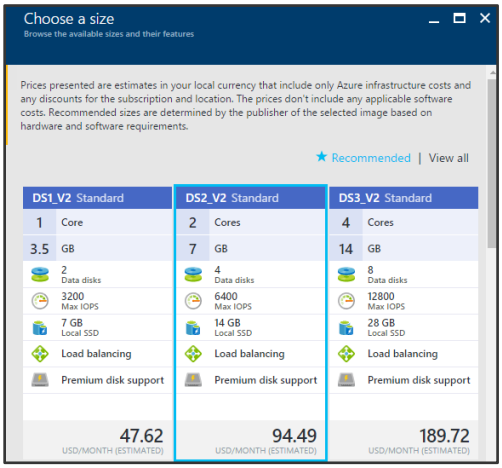
4. Set the following configuration on the Basics tab, and click **OK**

    - Name: **LABVM**
    - VM disk type: **SSD**
    - User name: **demouser**
    - Password: **demo@pass123**
    - Subscription: **If you have multiple subscriptions, choose the subscription to execute your labs in**
    - Resource Group: **OPSLABRG**

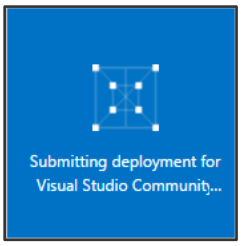
- Location: **Choose the closest Azure region to you.**

5. Choose the **DS2_V2 or D2S_V3 Standard** instance size on the Size blade

Note: You may have to click the View All link to see the instance sizes.



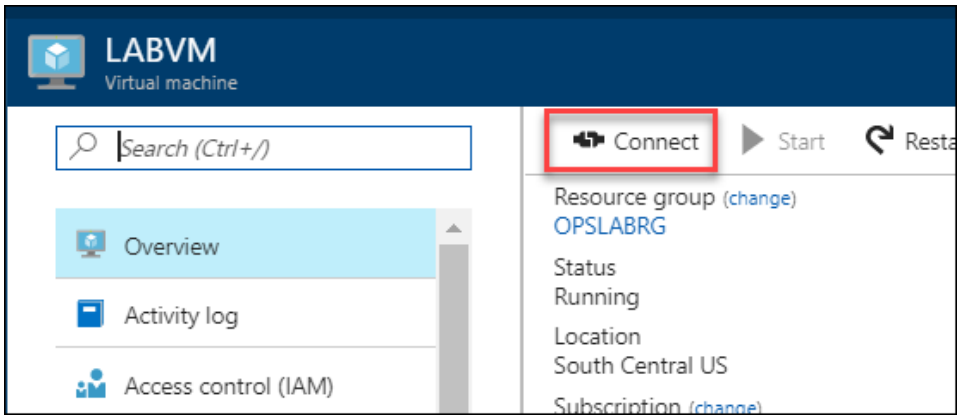
6. Accept the default values on the Settings blade, and click **OK**. On the Summary page, click **OK**. The deployment should begin provisioning. It may take 10+ minutes for the virtual machine to complete provisioning.



7. Once the deployment is complete, move on to the next exercise

Task 2: Connect to LABVM & download and unzip student files

1. Move back to the Portal page on your local machine, and wait for **LABVM** to show the Status of **Running**. Once it is running, click **Connect** to establish a new Remote Desktop Session.



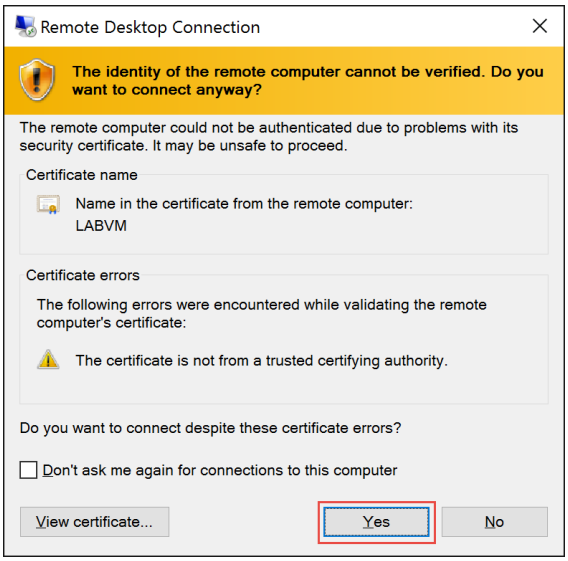
2. Depending on your remote desktop protocol client and browser configuration, you will either be prompted to open an RDP file, or you will need to download it and then open it separately to connect.

3. Login with the credentials specified during creation:

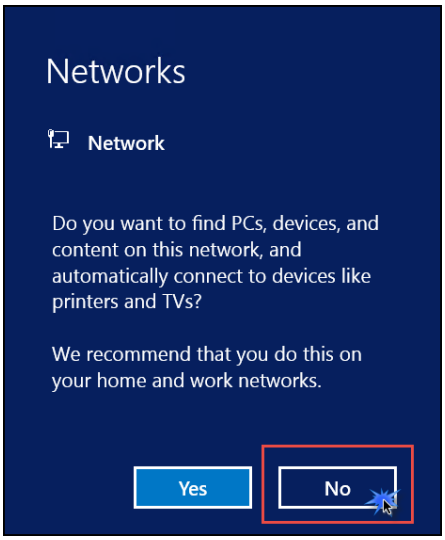
    a. User: **demouser**

    b. Password: **demo@pass123**

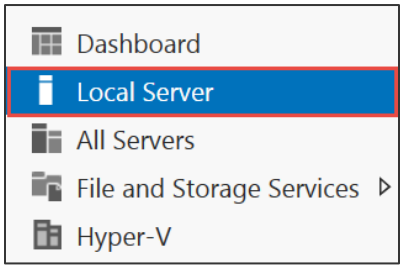
4. You will be presented with a Remote Desktop Connection warning because of a certificate trust issue. Click **Yes** to continue with the connection.



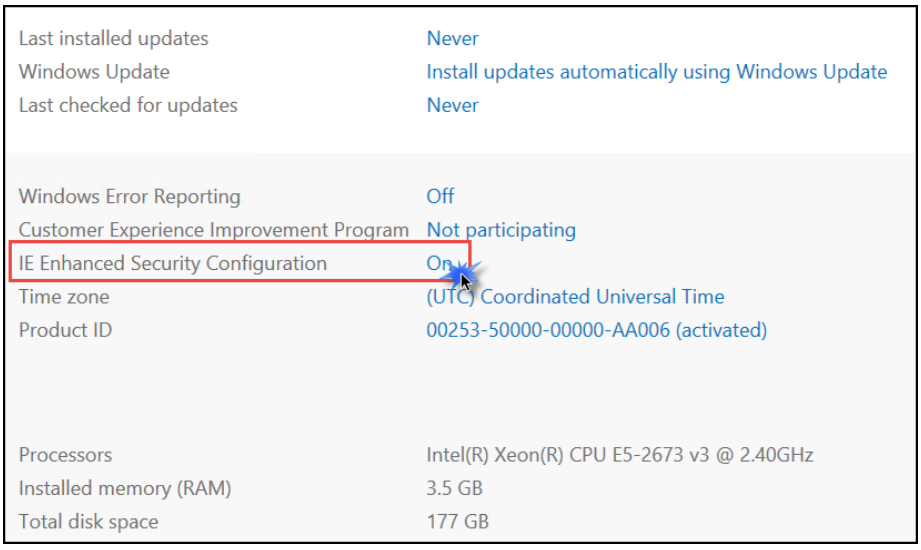
5. When logging on for the first time, you will see a prompt on the right asking about network discovery. Click **No**.



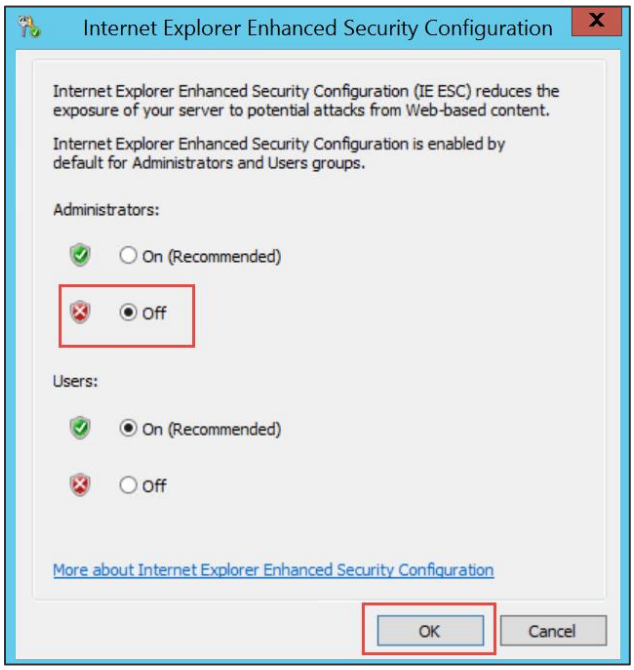
6. Notice that Server Manager opens by default. On the left, click **Local Server**



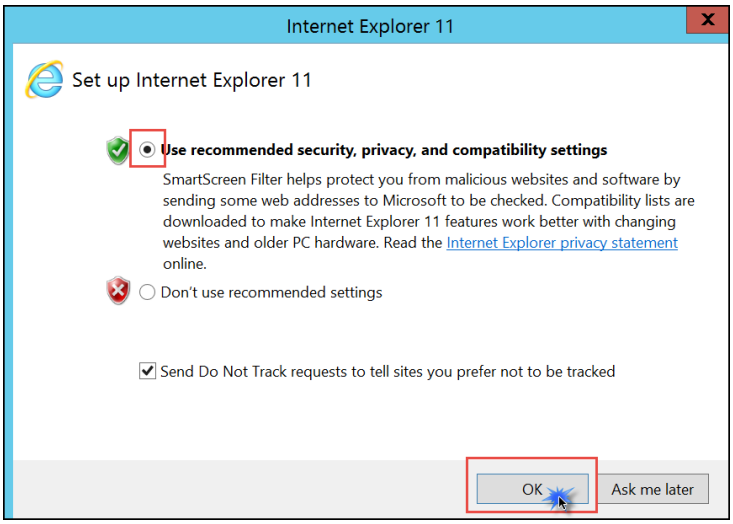
7. On the right side of the pane, click **On** by **IE Enhanced Security Configuration**



8. Change to **Off** for Administrators, and click **OK**



9. In the lower left corner, click on the **Windows** button to open the **Start Screen**. Then, click **Internet Explorer** to open it. On first use, you will be prompted about security settings. Accept the defaults by clicking **OK**.

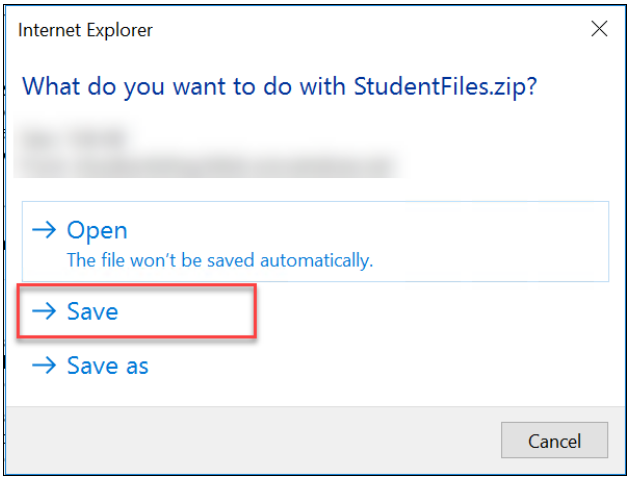


10. If prompted, choose to Turn Protected mode on

11. In the URL address window enter the below URL and hit the Enter key. This will download the class files (in a .zip format) needed for the remaining labs. https://cloudworkshop.blob.core.windows.net/operations-management-suite/StudentFiles.zip

NOTE: In some Azure VM images, the image is configured so that downloads are disabled. To enable the download of the Student Files, go to Internet Options, select the Security Tab, and on the Internet Zone select "Custom Level". Then scroll down to the Downloads section and select the radio button for Enable in the File Download subsection.

12. You will be prompted about what you want to do with the file. Select **Save**.



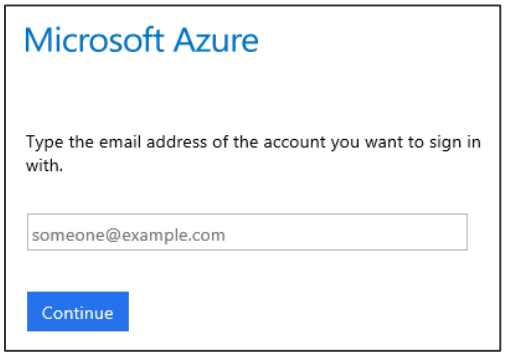
13. Download progress is shown at the bottom of the browser window. When the download is complete, click **Open folder**.

14. The **Downloads** folder opens. ***Right-click*** the zip file, and click **Extract All**. In the **Extract Compressed (Zipped) Folders** window, enter **C:\HOL** in the **Select a Destination and Extract Files** dialog. Click the **Extract** button.

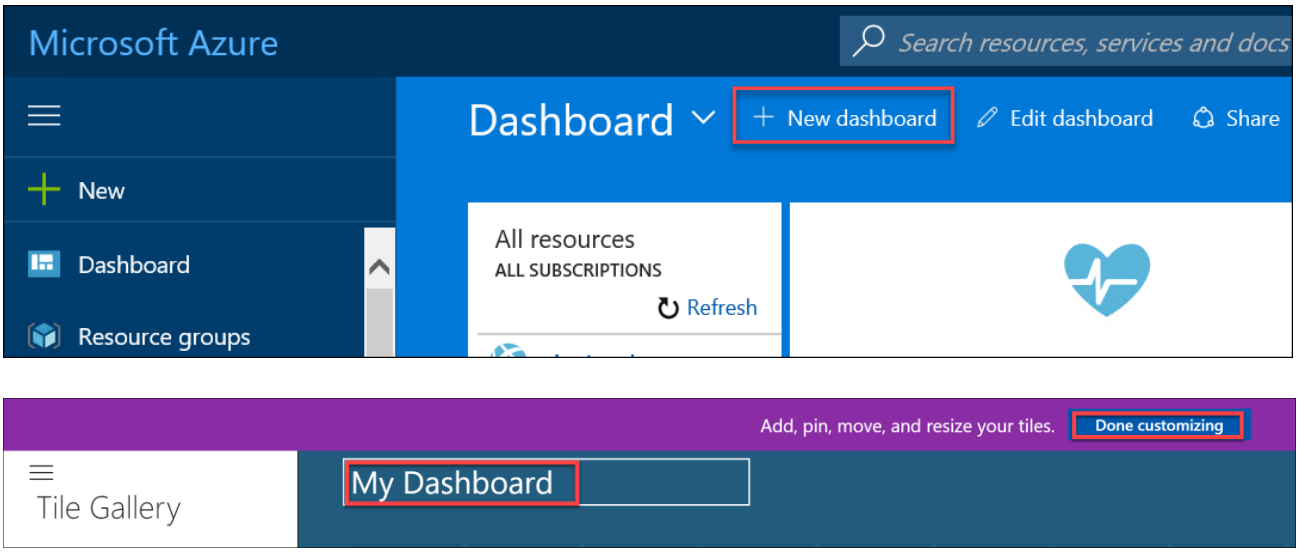
Task 3: Create a new Azure portal dashboard

1. Open Internet Explorer on LABVM and point to https://portal.azure.com

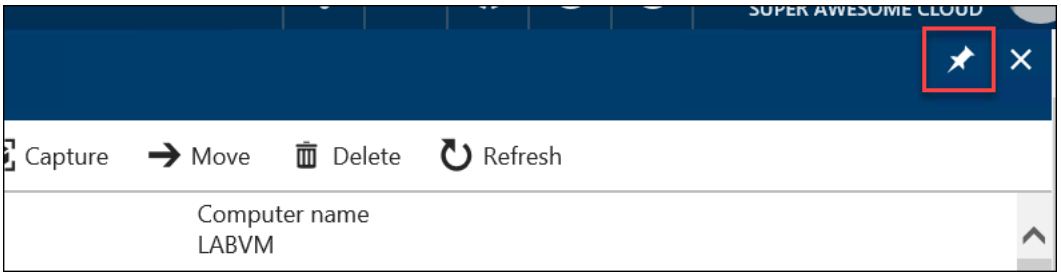
2. Sign in to Azure using your credentials.



3. Once you are at the Azure Portal Dashboard click **New Dashboard,** and type the name **My Dashboard,** then click **done customizing.**



4. Then navigate to your **LABVM** blade, and use the "**Pin**" to add it to **My Dashboard**. This Dashboard will be used for the rest of this HOL.



5. If you're going to be finishing this lab today, then continue to the next exercise. Otherwise, if you won't be finishing the rest of the lab today, then it may be helpful to click **Stop** on your **LABVM** within the Azure Portal. This will put the VM into a Stopped / Deallocated state, and save money until it's needed again. When you're ready to continue with the lab, then navigate back to the **LABVM** blade and click **Start** to start it back up again.

Summary

In this exercise, you built a LABVM to use for the HOL and downloaded some student files that will be used. Then, you created a new Azure Dashboard to use during the HOL.

Note: You should follow all steps provided before attending the HOL.

Exercise 1: Configure Azure automation

Duration: 15 minutes

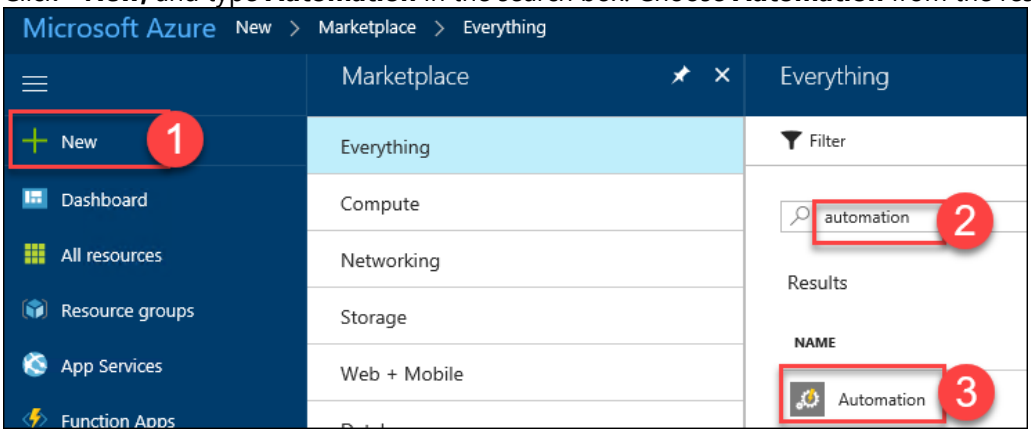
Overview

In this exercise, you will create and configure an Azure Automation account in the Azure Portal which will be used to configure the application servers using Azure DSC.

Task 1: Create automation account

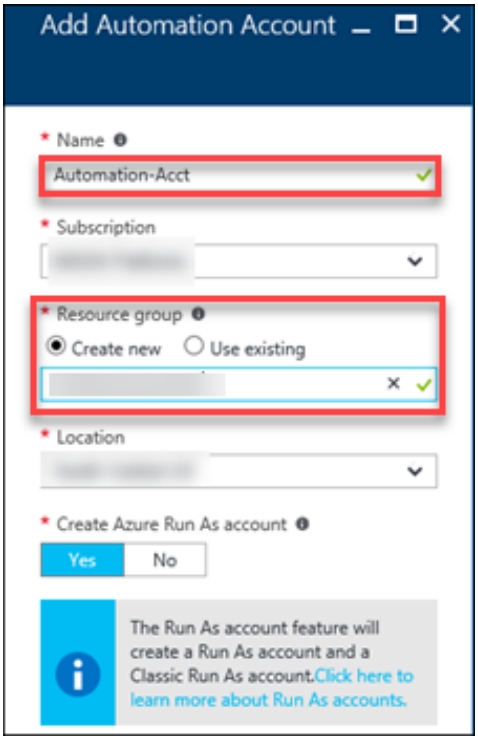
1. Browse to the Azure Portal, and authenticate at https://portal.azure.com/

2. Click **+New,** and type **Automation** in the search box. Choose **Automation** from the results.

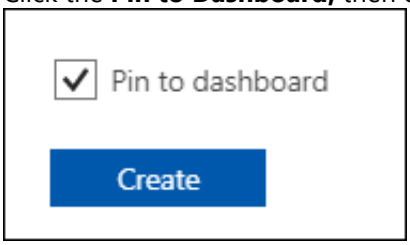


3. Click **Create** on the Automation blade. This will display the **Add Automation Account** blade.

4. On the **Add Automation Account** blade, specify the following information:
   a. Name: **Automation-Acct**
   b. Resource group: **HOLRG** (create a new resource group)
   c. Location: **Choose the closest Azure region to you**

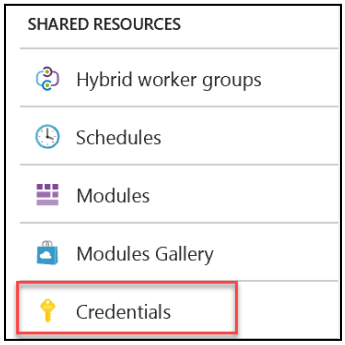


5. Click the **Pin to Dashboard,** then click **Create**.



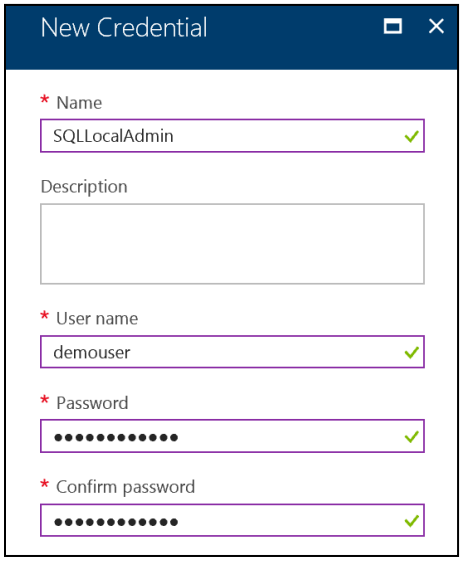
Task 2: Add an Azure Automation credential

1. The CloudShopSQL DSC configuration requires a credential object to access the local administrator account on the virtual machine. Within the Azure Automation DSC configuration click **Credentials** in the **SHARED RESOURCES** section



2. Click the **Add a credential** button

3. Specify the following properties and confirm creation to continue:
    a. **Name**: SQLLocalAdmin
    b. **User Name**: demouser
    c. **Password & Confirm**: demo@pass123



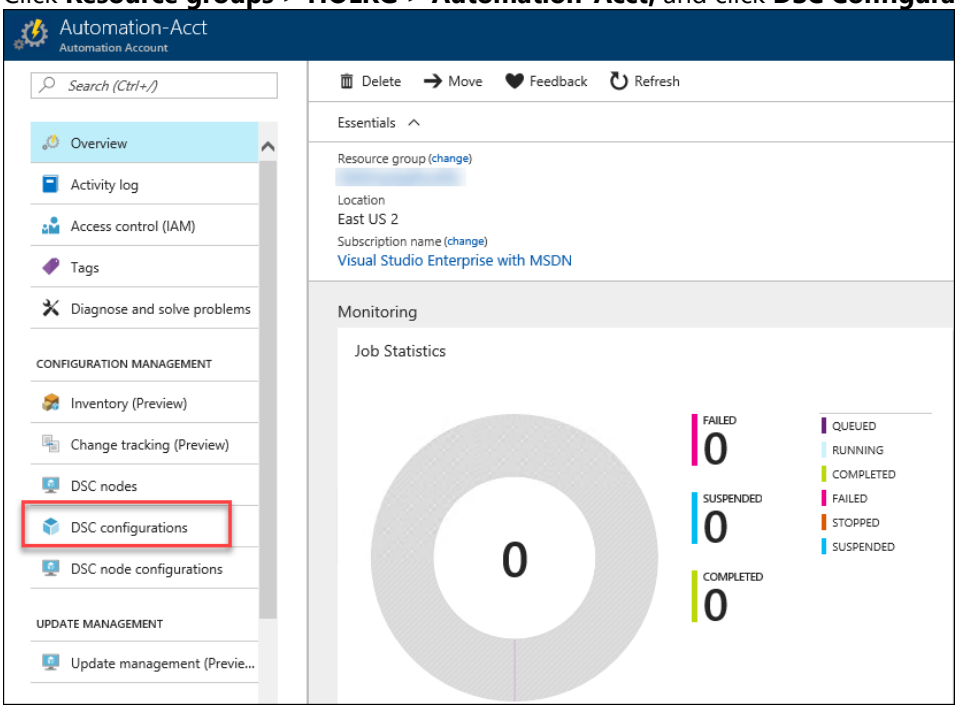
Important: It is important to use the exact name for the credential, because one of the scripts you upload in the next step references the name directly.

Summary

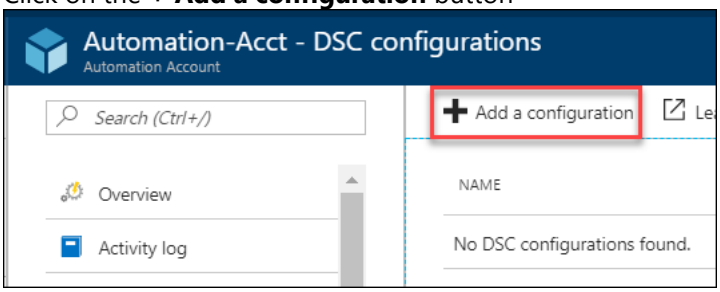
In this exercise, you configured an Automation account, and configured DSC configuration scripts that will be leveraged by the virtual machine resources.

Task 3: Upload DSC configurations into automation account

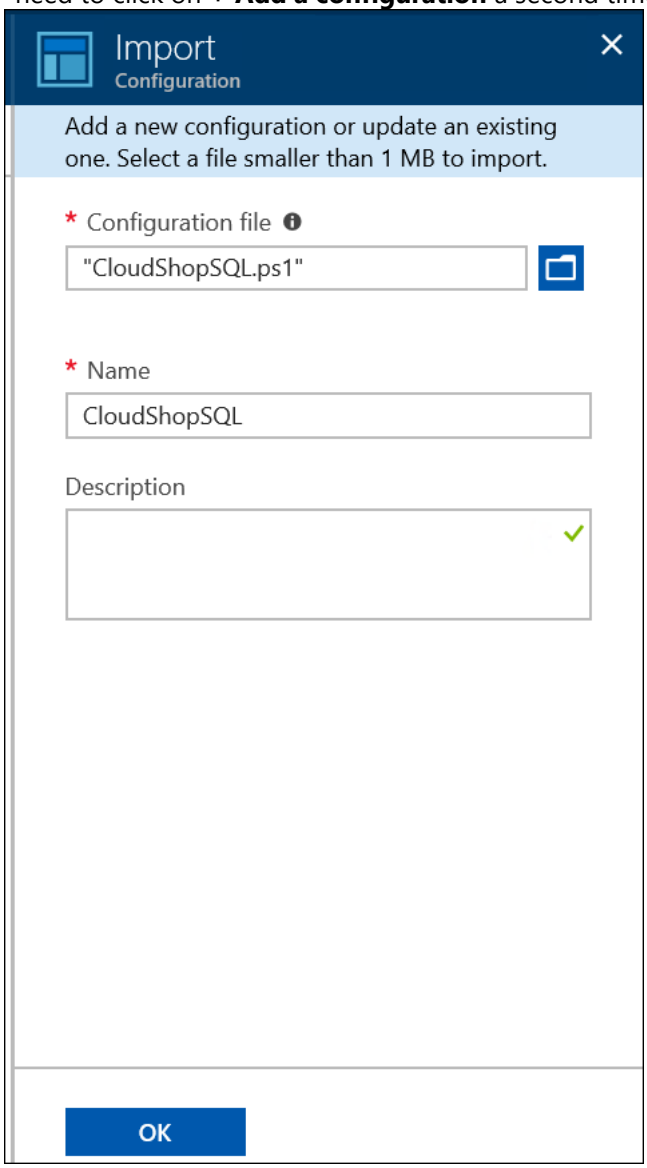
1. Click **Resource groups > HOLRG > Automation-Acct,** and click **DSC Configurations**



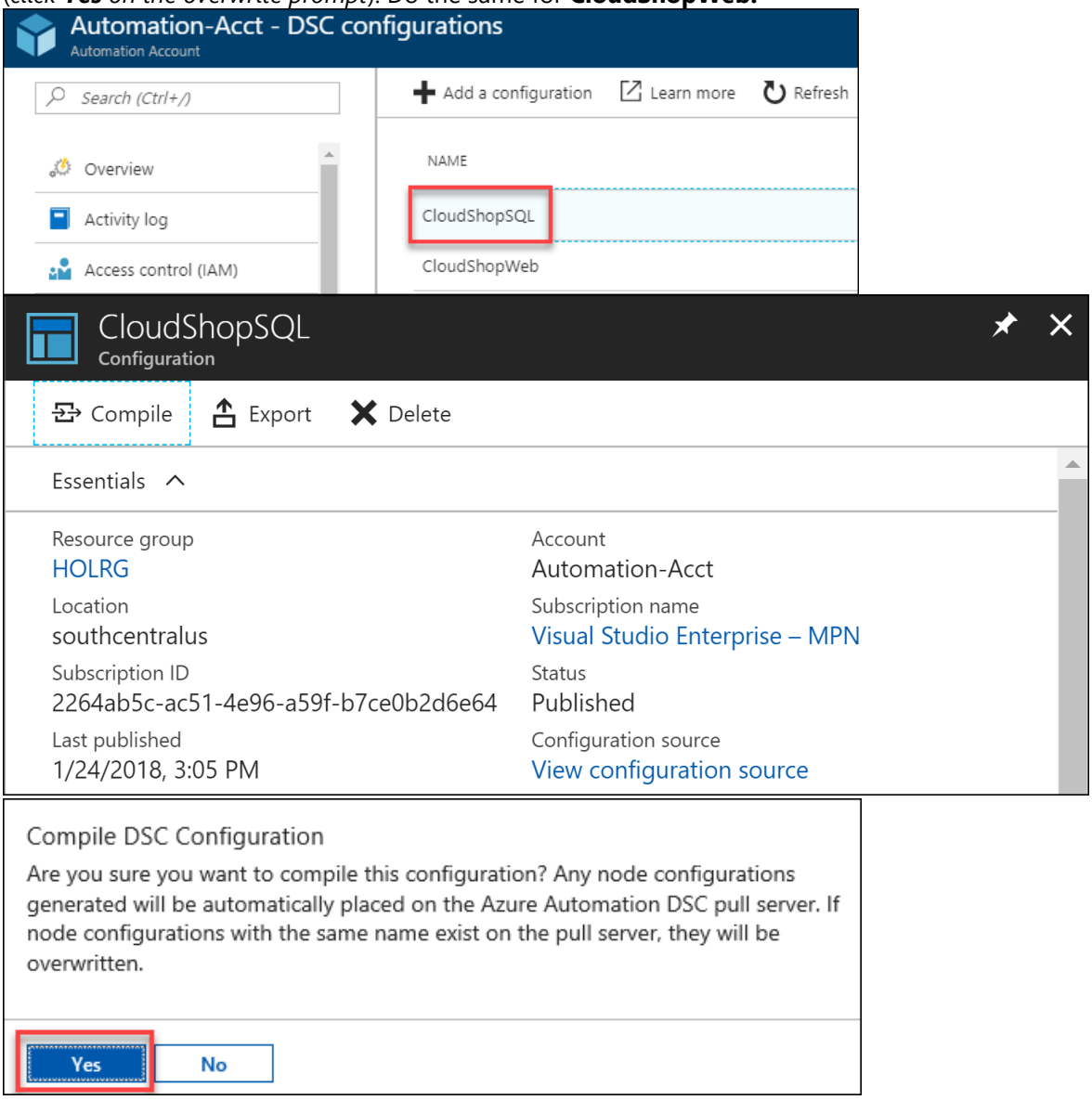
2. Click on the **+ Add a configuration** button



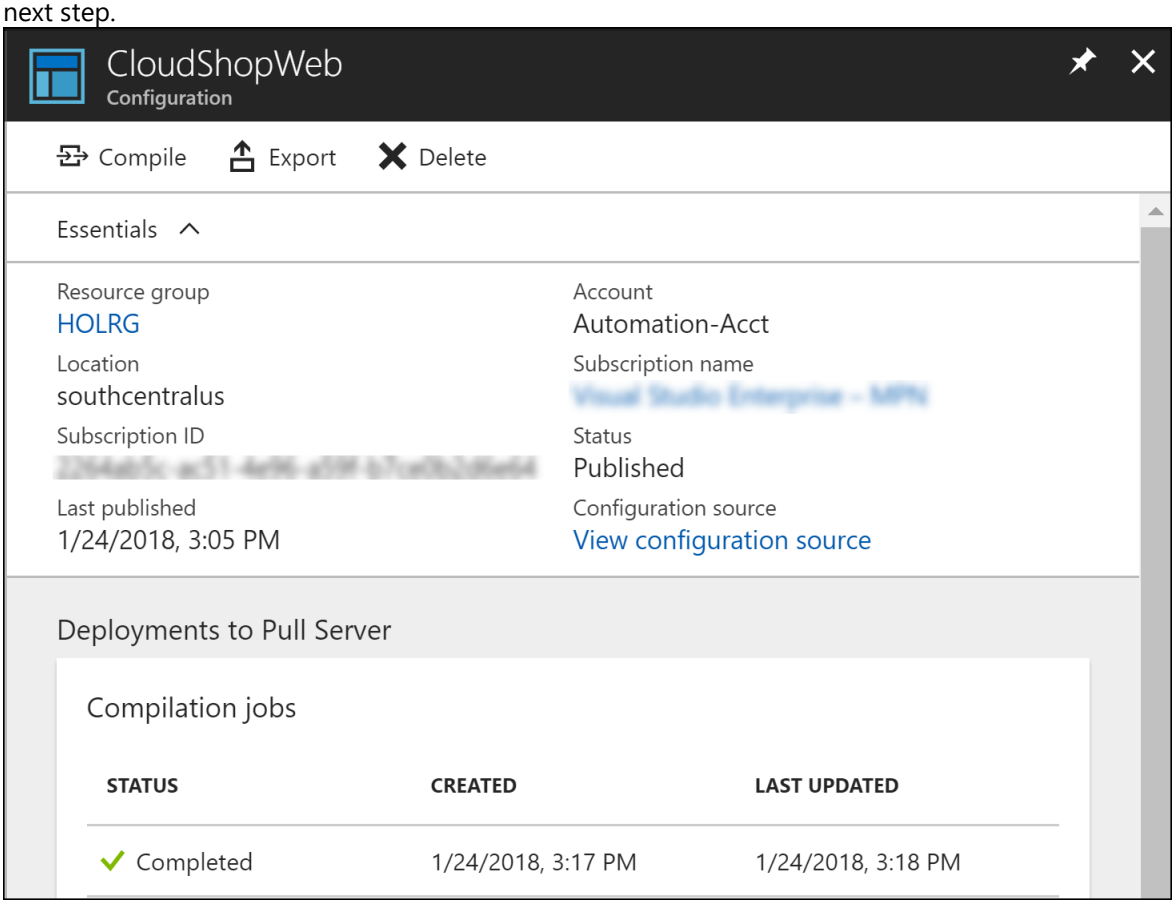
3. On the **Import** pane, upload both **C:\HOL\CloudShopSQL.ps1** and **C:\HOL\CloudShopWeb.ps1** files. You'll need to click on **+ Add a configuration** a second time to upload the second file.



4. After importing the .ps1 files, click the **CloudShopSQL** DSC Configuration. Then, select **Compile** on the toolbar (*click **Yes** on the overwrite prompt*). Do the same for **CloudShopWeb.**



5. Make sure to review the DSC configurations to ensure they have completed the compile prior to moving on to the next step.



Exercise 2: Build CloudShop environment

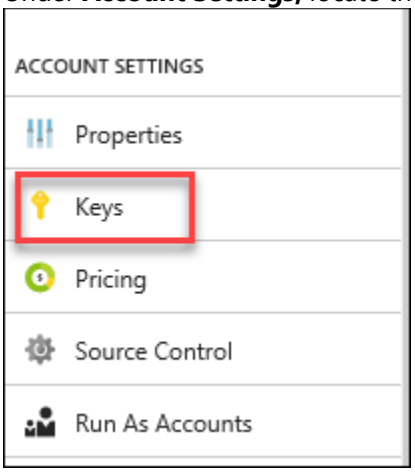
Duration: 60 minutes

Overview

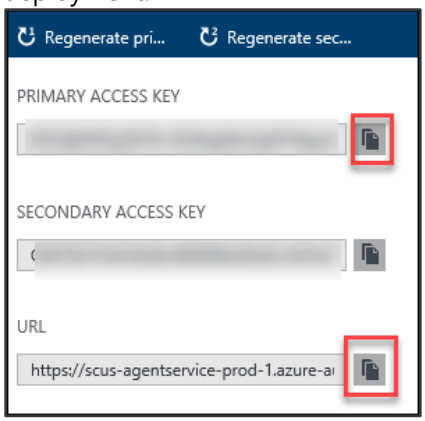
In this exercise, you will run a template deployment using an ARM template provided which will deploy a Virtual Network, Azure Load balancer, two IIS Servers and a SQL Server. The Servers will check into Azure Automation and run the DSC Configurations that you built in Exercise 1. This will configure the boxes with the CloudShop Application. You will also configure Inbound NAT Rules to allow RDP access to the Web Servers. Azure diagnostics will also be configured into a new storage account for the VMs.

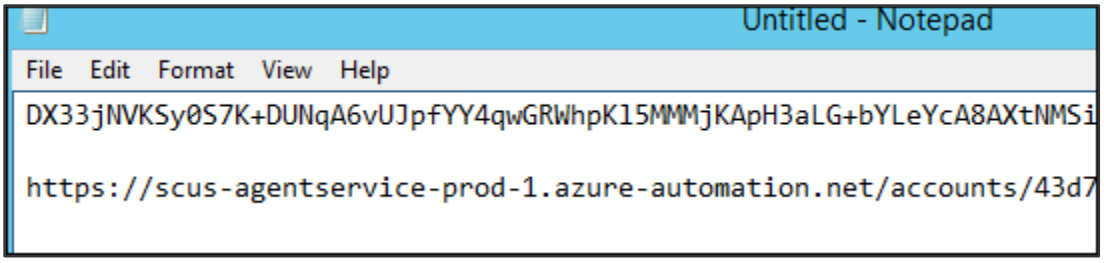
Task 1: Template deployment

1. In the portal, open your Azure Automation Account created earlier
2. Under **Account Settings,** locate the and click **Keys**

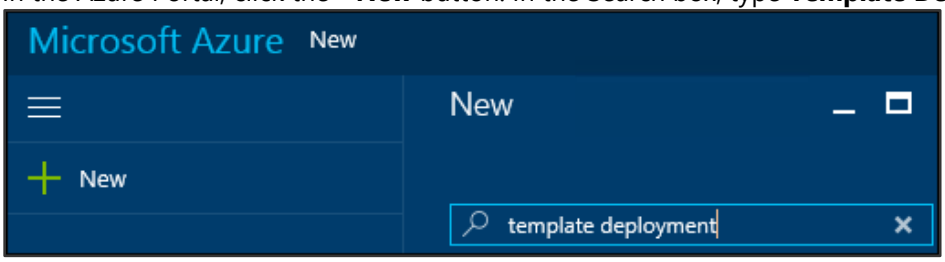


3. Open Notepad, and copy both the Primary Access Key and the URL. These will be needed inputs for the template deployment.

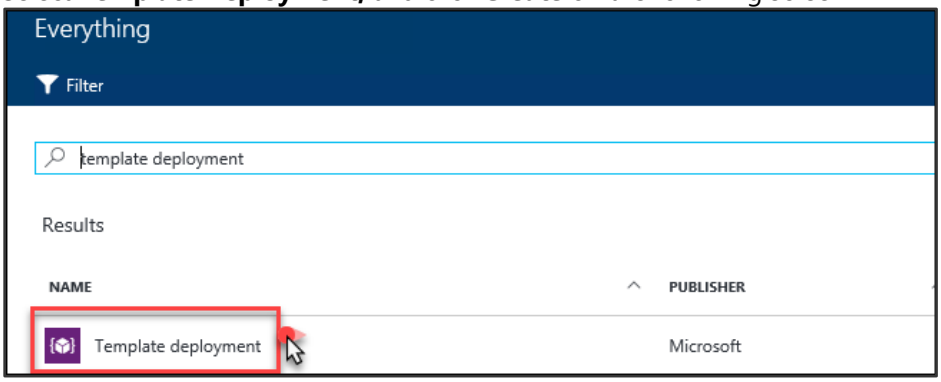




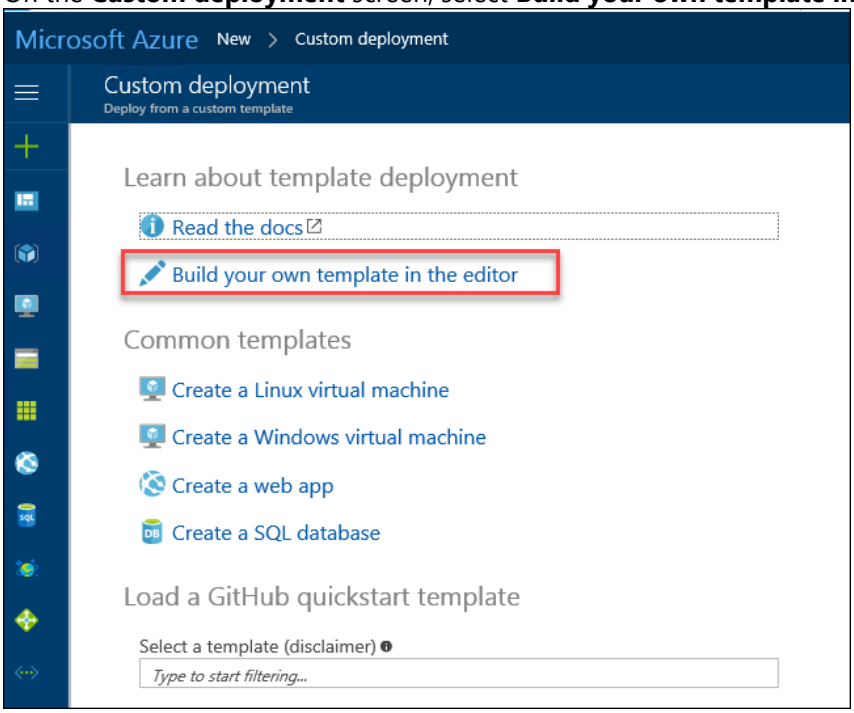
4. In the Azure Portal, click the **+New** button. In the Search box, type **Template Deployment.**



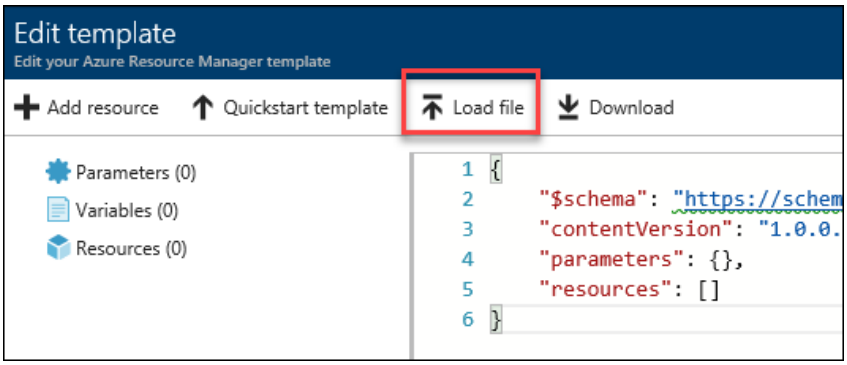
5. Select **Template Deployment,** and click **Create** on the following screen



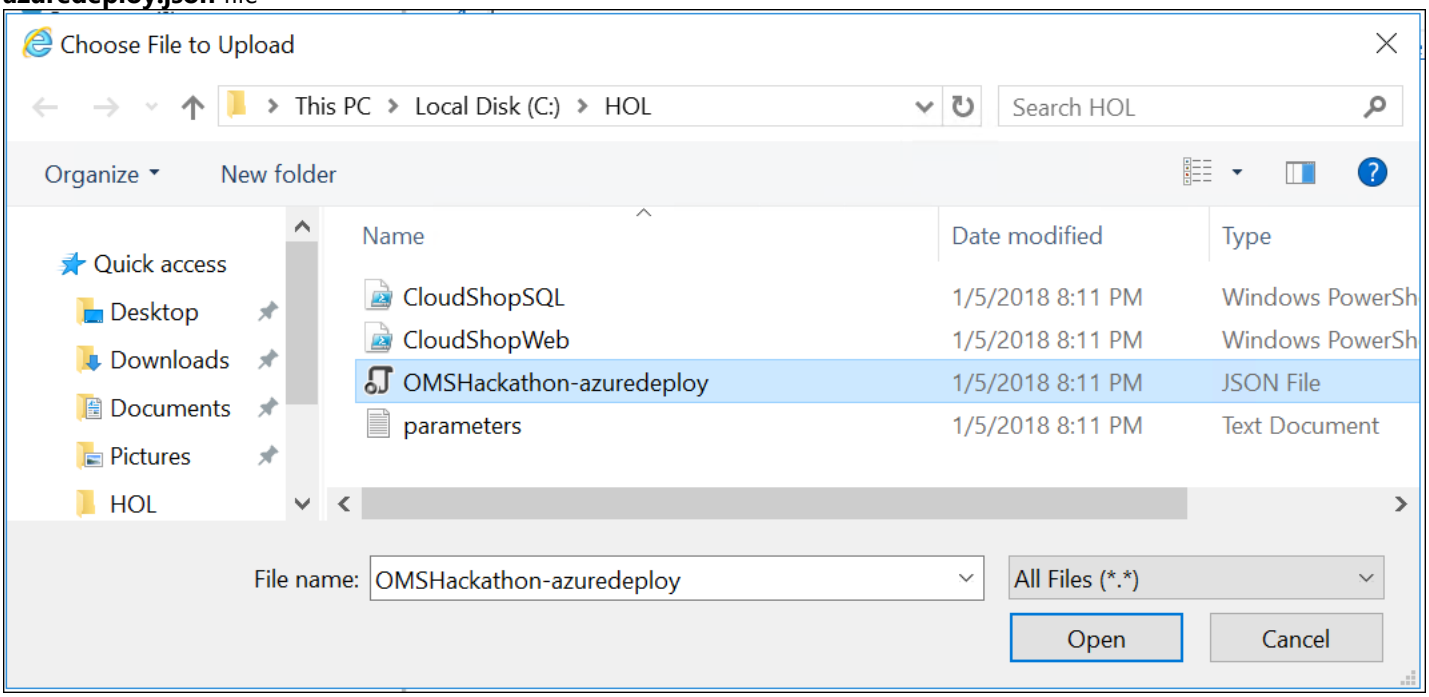
6. On the **Custom deployment** screen, select **Build your own template in the editor**



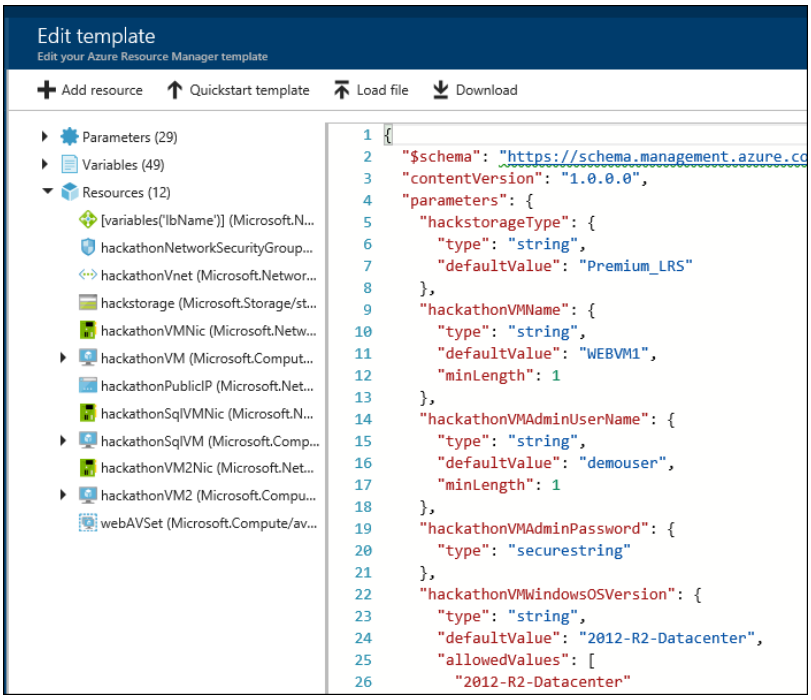
7. Click **Load File**



8. In the Choose File to Upload dialog, navigate to the **C:\HOL** folder, and locate the **OMSHacakthon-azuredeploy.json** file



9. The JSON file will now be in the text window and the Parameters, Variables, and Resources should load in the Window. Click **Save**.



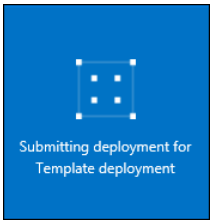
10. Once saved, the window will change to a screen which is asking for inputs. Use the following information to complete:

NOTE: In your student files C:\HOL\parameters.txt there is a parameters file that you can use to quickly copy and paste into the portal.

a. Subscription: **Use the current subscription**
b. Resource Group: Use Existing: **HOLRG**
c. Location: Should be completed by using the **HOLRG**
d. HOL Storage Type: **Premium_LRS**
e. HOL VM Name: **WEBVM1**
f. HOL VM Admin User Name: **demouser**
g. HOL VM Admin Password: **demo@pass123**
h. HOL VM Windows OS Version: **2016-Datacenter**
i. HOL Public IP DNS Name: **hol-then-five-random-lowercase-characters**
j. Registration Key: Locate in the Automation Account Blade/Keys
k. Registration URL: Locate in the Automation Account Blade/Keys
l. Webnode Configuration Name: **CloudShopWeb.WebServer**
m. Sqlnode Configuration Name: **CloudShopSQL.SQLSERVER**
n. Reboot Node If Needed: **true**
o. Allow Module Overwrite: **true**
p. Configuration Mode: **ApplyAndMonitor**
q. Configuration Mode Frequency Mins: **15**
r. Refresh Frequency: **30**
s. Action After Reboot: **ContinueConfiguration**
t. HOL SQL VM Name: **SQLVM**
u. HOL SQL VM Admin Name: **demouser**
v. HOL SQL VM Admin Password: **demo@pass123**
w. HOL Sql VMSKU: **SQLDEV**
x. VM Size SQL: **Standard_DS2_v2**
y. HOL VM2Name: **WEBVM2**
z. HOL VM2 Admin Name: **demouser**
aa. HOL VM2 Admin Password: **demo@pass123**
bb. HOL VM2 Windows OS Version: **2016-Datacenter**
cc. Web AV Set Name: **webAVSet**

11. Once completed, click the **I agree to the terms and conditions stated above,** and the **Pin to Dashboard** followed by **Purchase**

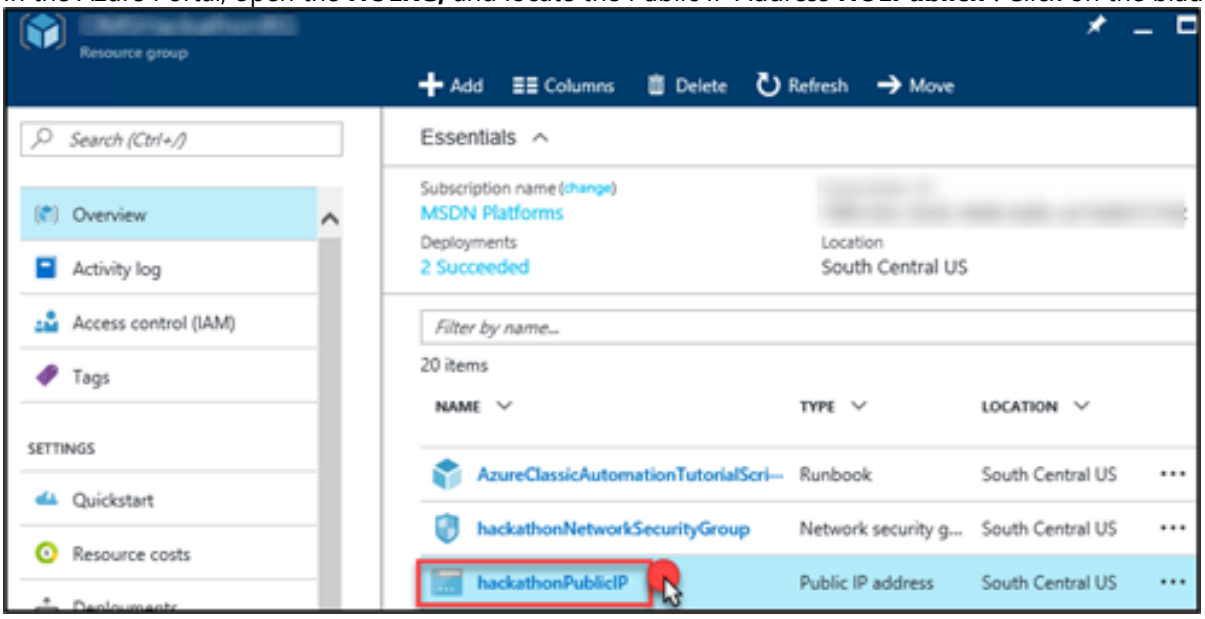
12. A Deployment tile will appear on your **My Dashboard**. This deployment should take about 25-30 minutes. The servers will take some time to check in with Azure Automation and configure the CloudShop application.



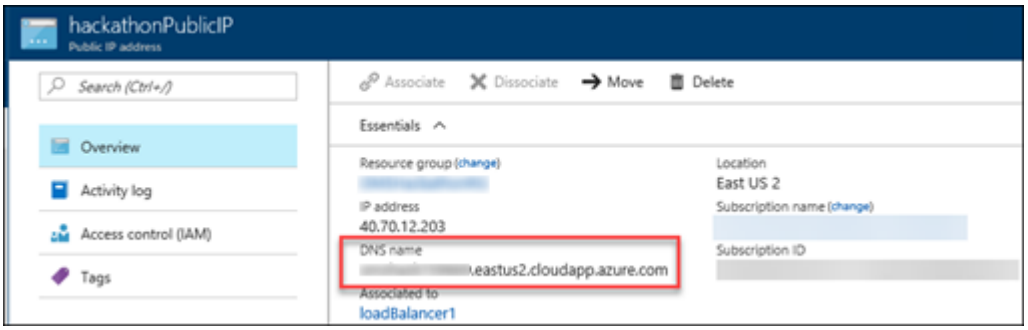
NOTE: Wait for the Deployment to successfully complete prior to moving on to the next steps.

13. Now that the servers are built and the deployment is complete, let's verify the servers are built and up and running properly

14. In the Azure Portal, open the **HOLRG,** and locate the Public IP Address **HOLPublicIP**. Click on the blade to open.

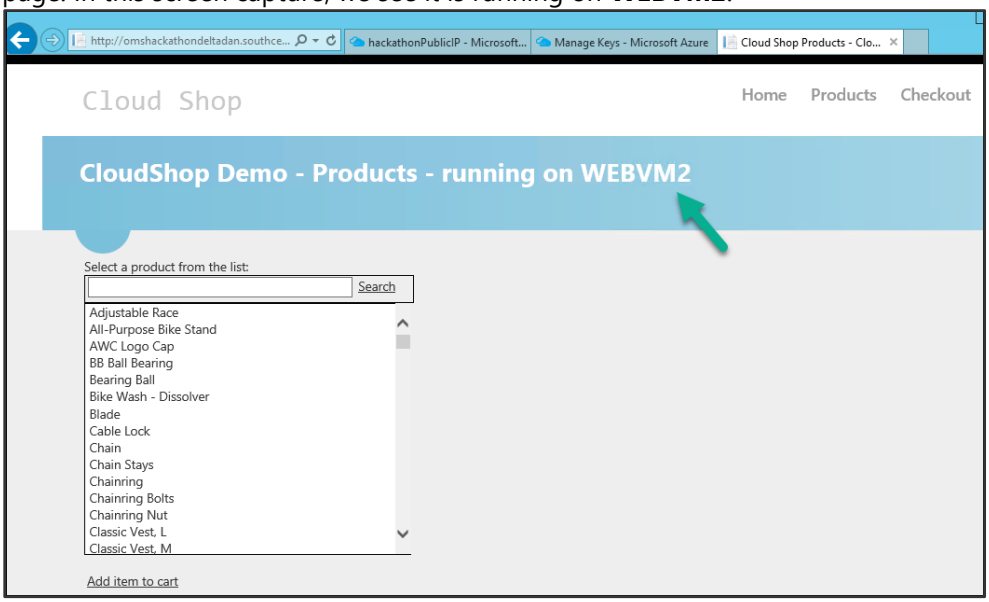


15. On the **HOLPublicIP** blade, locate the DNS Name you provided during the template deployment. If you hover your mouse over the name, you can **click to copy** the name to the clipboard. Paste this into your Notepad document you opened earlier.

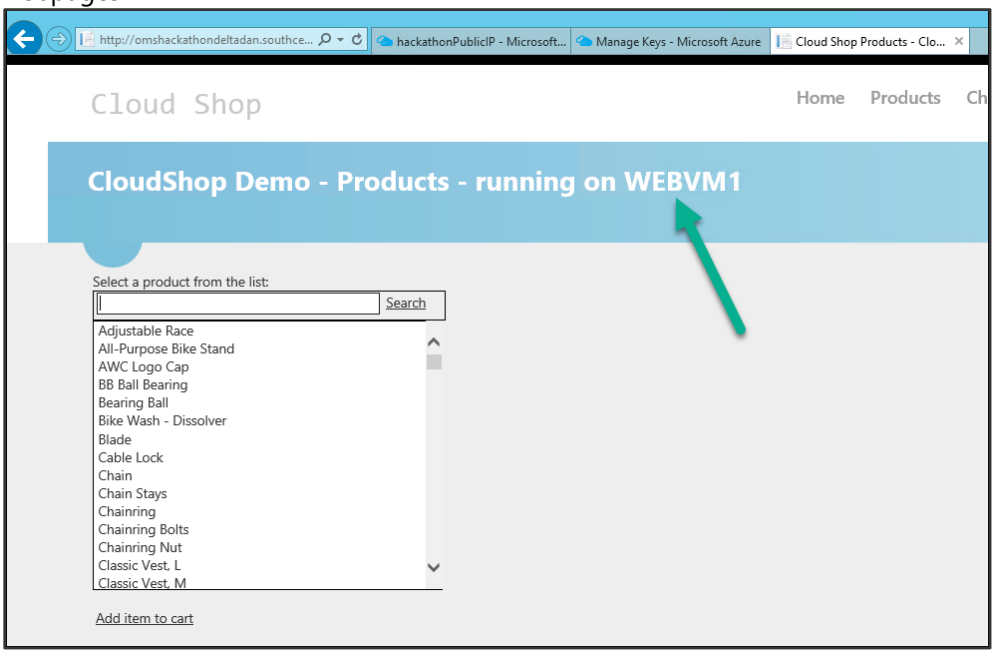


16. Open a new tab in Internet Explorer, and paste the URL. This is the DNS name that is attached to the Azure Load Balancer in front of the CloudShop Application web servers **WEBVM1** & **WEBVM2**.

17. When the page loads, the CloudShop application should appear, and it will show which VM is serving the web page. In this screen capture, we see it is running on **WEBVM2**.



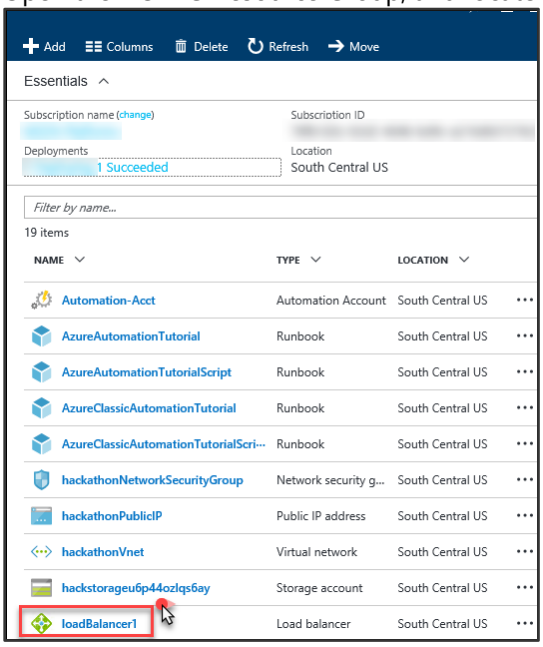
18. By pressing **F5** on your keyboard, you can refresh the website until you see that **WEBVM1** is also serving webpages



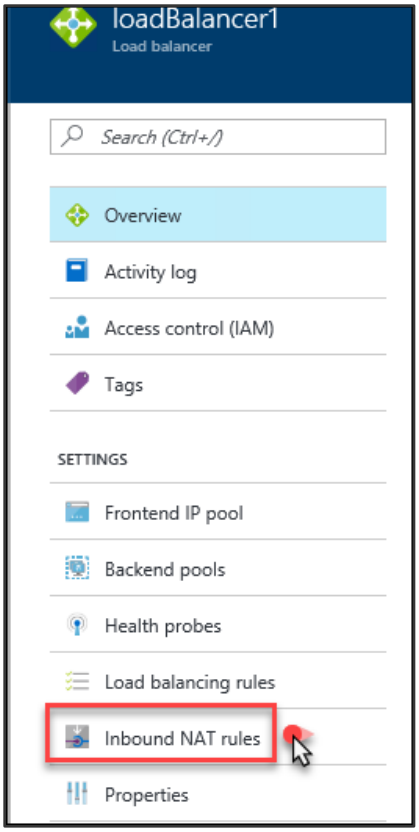
Task 2: Allow remote desktop to the WEBVM1 & WEBVM2 using NAT rules

Now that the deployment and the application is up and running, the next step is to allow RDP to the Web Servers. This will be accomplished by building NAT Rules through the Azure Load Balancer.

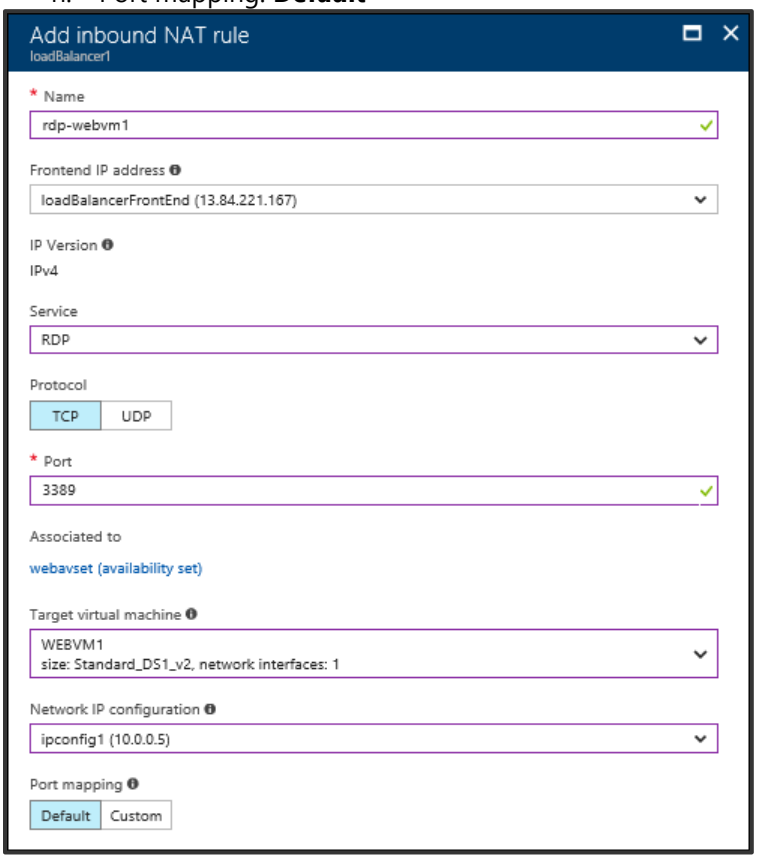
1. Open the HOLRG Resource Group, and locate **loadBalancer1**. Click to open its administration blade.



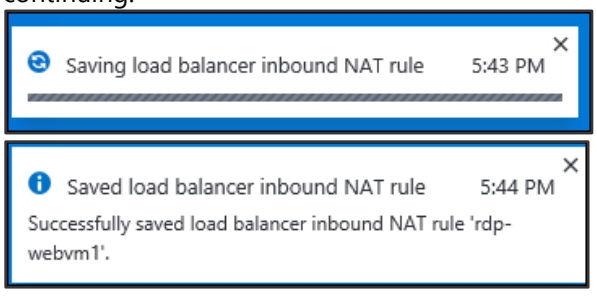
2. On the **loadBalancer1** blade, locate **Inbound NAT rules,** and click in **Settings**



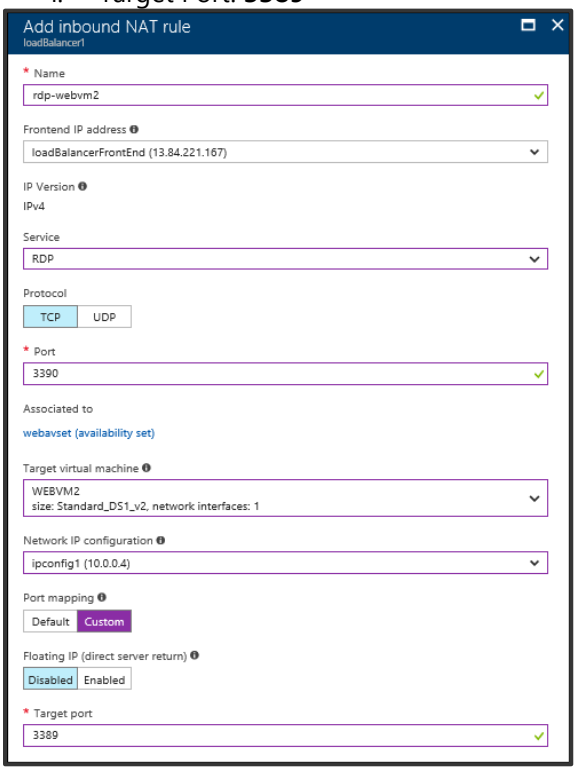
3. Click **+Add,** and complete the blade using the following information:
    a. Name: **rdp-webvm1**
    b. Frontend IP Address: **accept default**
    c. Service: **RDP**
    d. Port: **3389**
    e. Associated to: **webavset**
    f. Target: **Choose a virtual machine: WEBVM1**
    g. Network IP configuration: **ipconfig1 (10.0.0.5)**
    h. Port mapping: **Default**



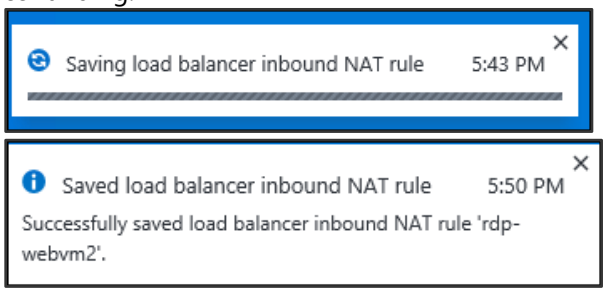
4. The portal will give a notice that it is: **"Saving load balancer inbound NAT rule**". Wait until this completes before continuing.



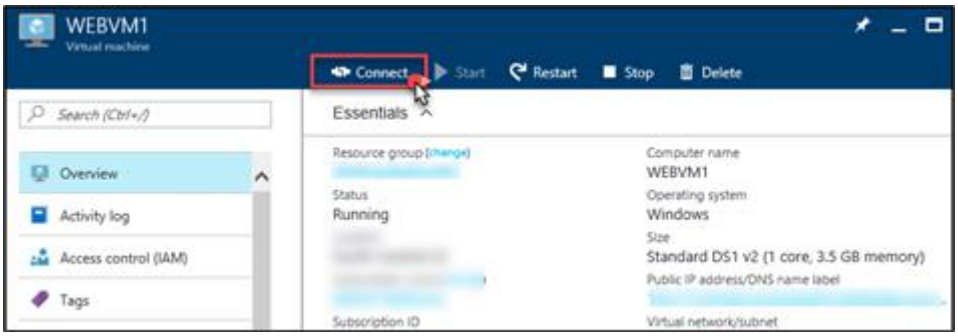
5. Click **+Add,** and complete the blade using the following information:
    a. Name: **rdp-webvm2**
    b. Frontend IP Address: **accept default**
    c. Service: **RDP**
    d. Port: **3390**
    e. Target **Choose a virtual machine: WEBVM2**
    f. Network IP configuration: **ipconfig1 (10.0.0.4)**
    g. Port mapping: **Custom**
    h. Floating IP: **Disabled**
    i. Target Port: **3389**



6. The portal will give a notice that it is: **"Saving load balancer inbound NAT rule**". Wait until this completes before continuing.

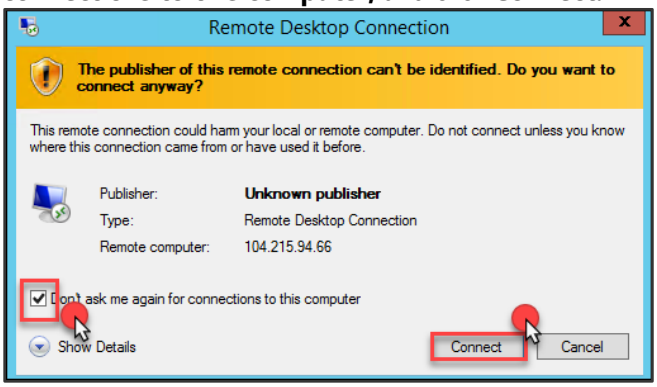


7. To verify the new NAT Rules are working, move back to the **HOLRG** in the Azure portal. Click **WEBVM1,** and the **Connect** Link should now be available. Click **Connect,** and the portal will download an RDP file. Open this, and connect to the VM.

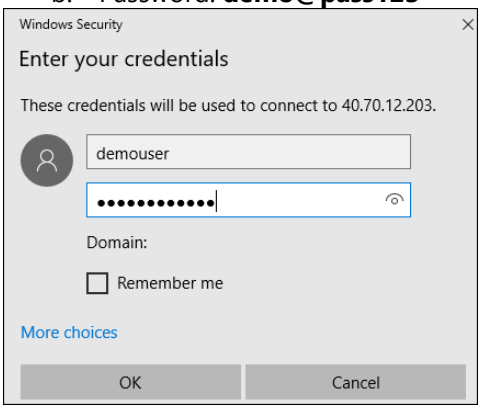


8. Click **Open** when the RDP file downloads

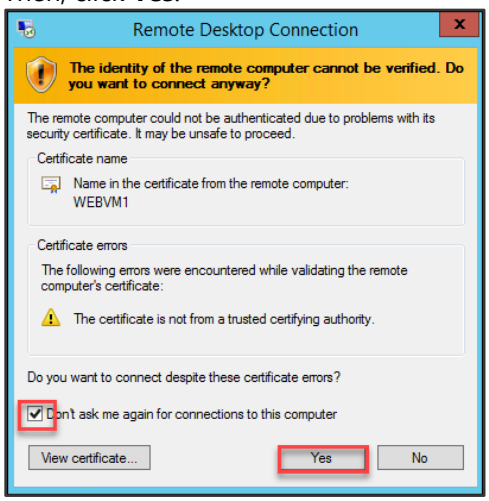
9. You will get a warning about the publisher of the RDP file being unknown. Click **Don't ask me again for connections to this computer,** and click **Connect.**



10. When prompted by Windows Security, enter your credentials
    a. User Name: **demouser**
    b. Password: **demo@pass123**

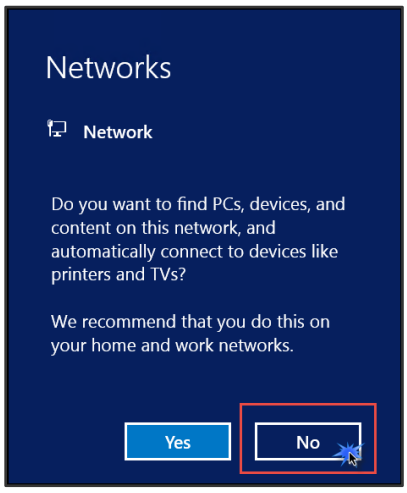


11. A warning will appear stating: **The identity of the remote computer cannot be verified. Do you want to connect anyway?** Click the checkbox for the disclaimer: **Don't ask me again for connection to this computer.** Then, click **Yes**.

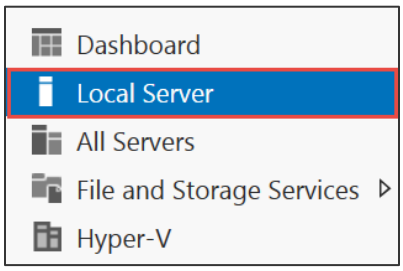


NOTE: When connecting to machines during this lab for the first time, you may encounter the same warnings etc. Follow these same steps to no longer receive those warnings as they do not apply to our setup.

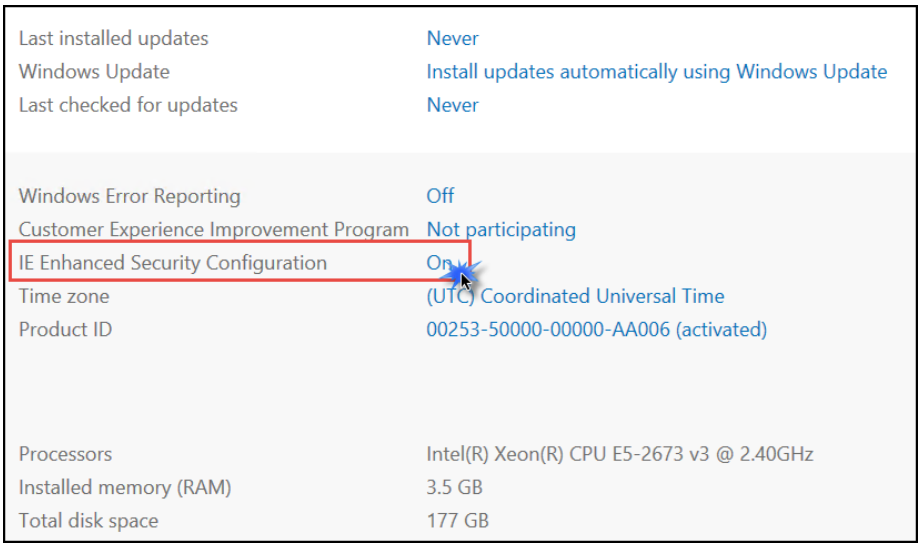
12. When logging on for the first time, you will see a prompt on the right asking about network discovery. Click **No**.



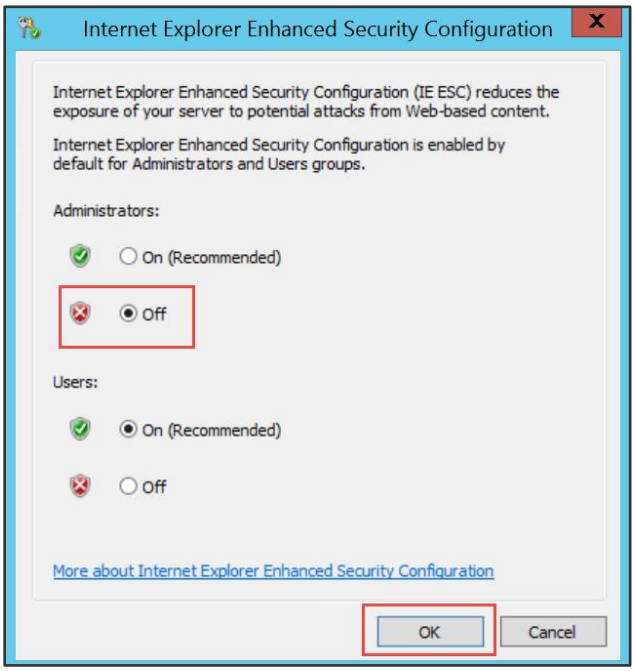
13. Notice the Server Manager opens by default. On the left, click **Local Server**



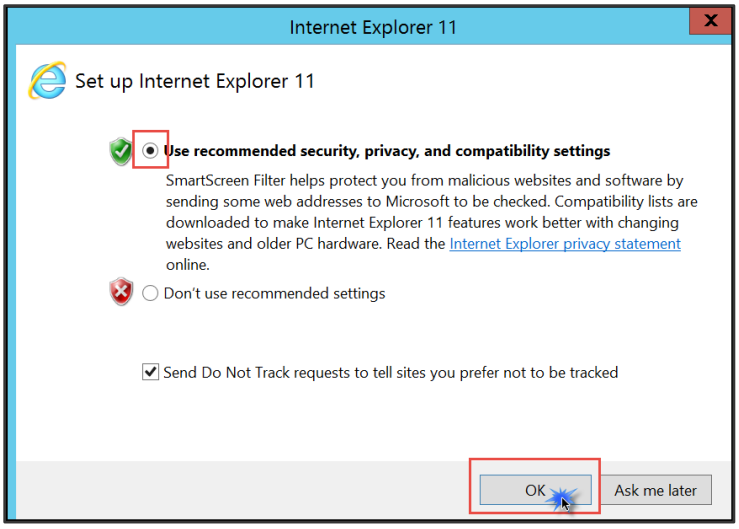
14. On the right side of the pane, click **On** by **IE Enhanced Security Configuration**



15. Change to **Off** for Administrators, and click **OK**



16. In the lower left corner, click on the **Windows** button to open the **Start Screen**. Then, click **Internet Explorer** to open it. On first use, you will be prompted about security settings. Accept the defaults by clicking **OK**.



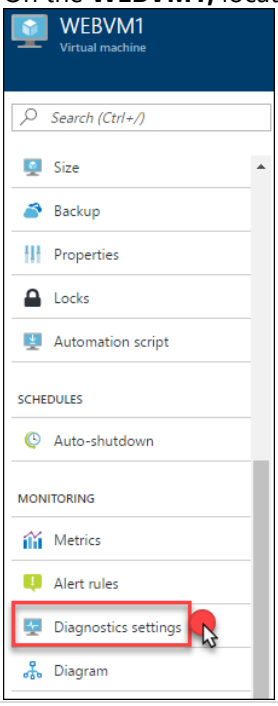
17. Leave your RDP Session to **WEBVM1** open and minimized. Then, repeat this same procedure for **WEBVM2**.

Task 3: Configure diagnostics accounts for the VMs

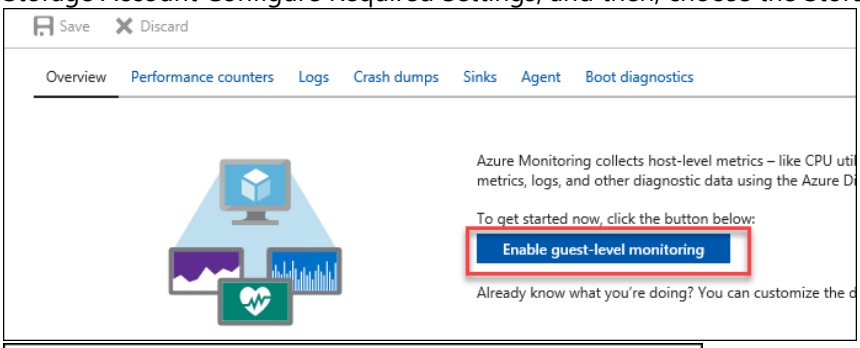
In this task, you will configure the VMs to capture diagnostic data in an Azure Storage Account. Later you will connect this account to the Azure security and operations management portal.

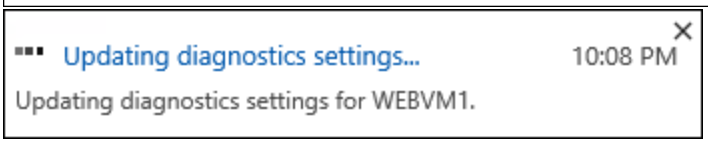
1. In the Azure Portal navigate to the **HOLRG** Resource Group and locate **WEBVM1**. Click the name to open the blade.

2. On the **WEBVM1,** locate the **Monitoring** section, and click on **Diagnostic Settings**

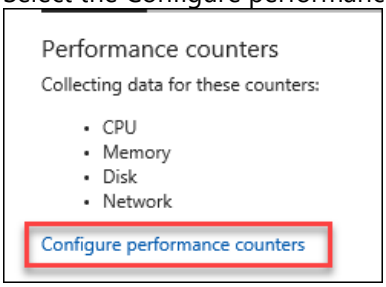


3. Click the **Enable guest-level monitoring** button. This will load more information to choose from. Click the Storage Account Configure Required Settings, and then, choose the Storage Account you just created.

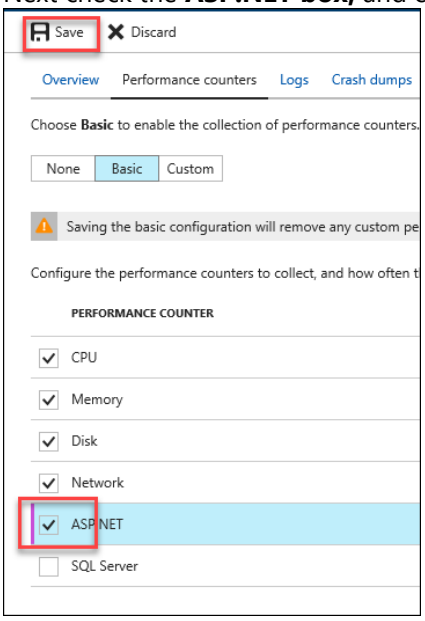




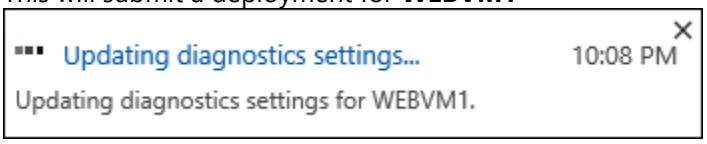
4. Select the Configure performance counters



5. Next check the **ASP.NET box,** and click **Save**



6. This will submit a deployment for **WEBVM1**



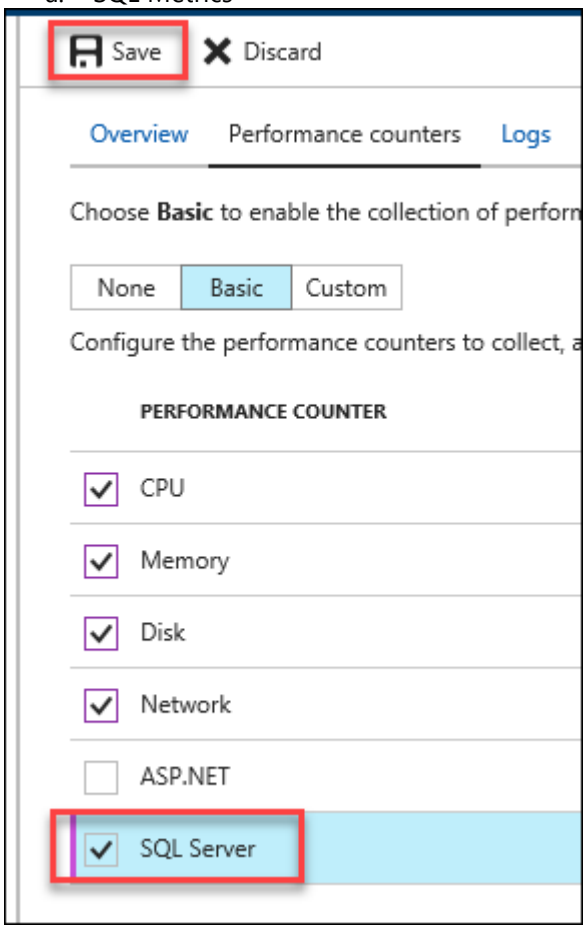
NOTE: You will need to wait for the portal to complete the update before moving to the next step.

7. Complete the same steps for **WEBVM2**.

NOTE: You will need to wait for the portal to complete the update before moving to the next step.

8. Next, using the same steps, configure **SQLVM** for Diagnostics as well, select the following metrics for this SQL Server, and click **Save**

   a. SQL Metrics



Summary

In this exercise, you ran a template deployment using an ARM template provided which created a Virtual Network, Azure Load balancer, two IIS Servers and a SQL Server. The servers checked into Azure Automation and ran the DSC Configurations that configured the boxes with the CloudShop Application. You then configured Inbound NAT Rules to allow RDP access to the Web Servers and successfully connected. Azure diagnostics was also configured into a new storage account for the VMs.

Exercise 3: Build and configure the Azure security and operations management portal

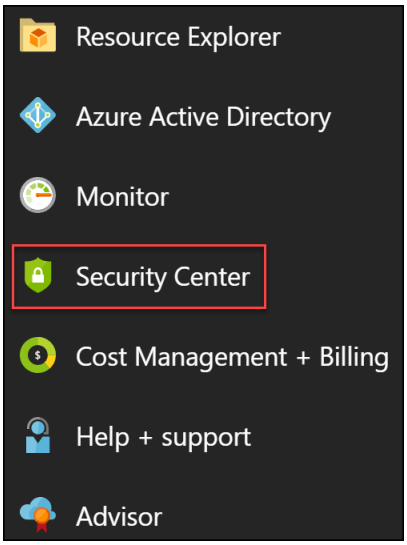
Duration: 30 minutes

Overview

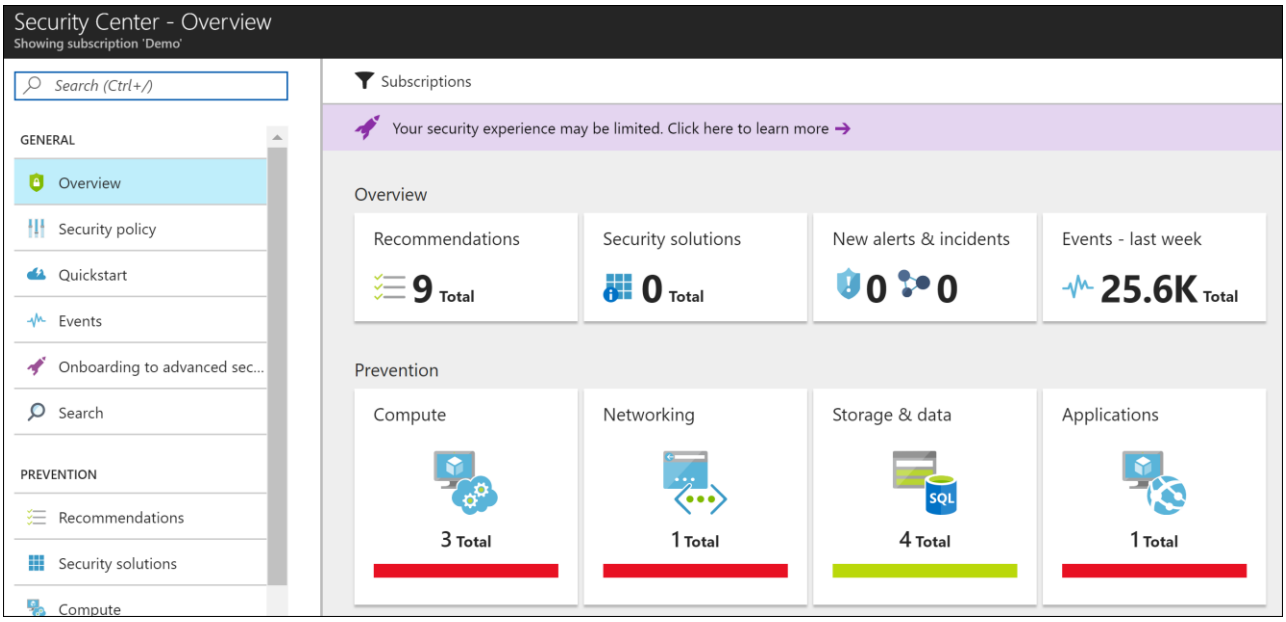
The next step is to provision the Azure security and operations management portal, configure the VMs for the CloudShop application to be managed by the portal, and configure the diagnostics storage account to load data into the Log Analytics platform. Additionally, solution packs will be installed and configured to gather data and provide dashboards for application deployed in Azure IaaS.

Task 1: Explore Security Center

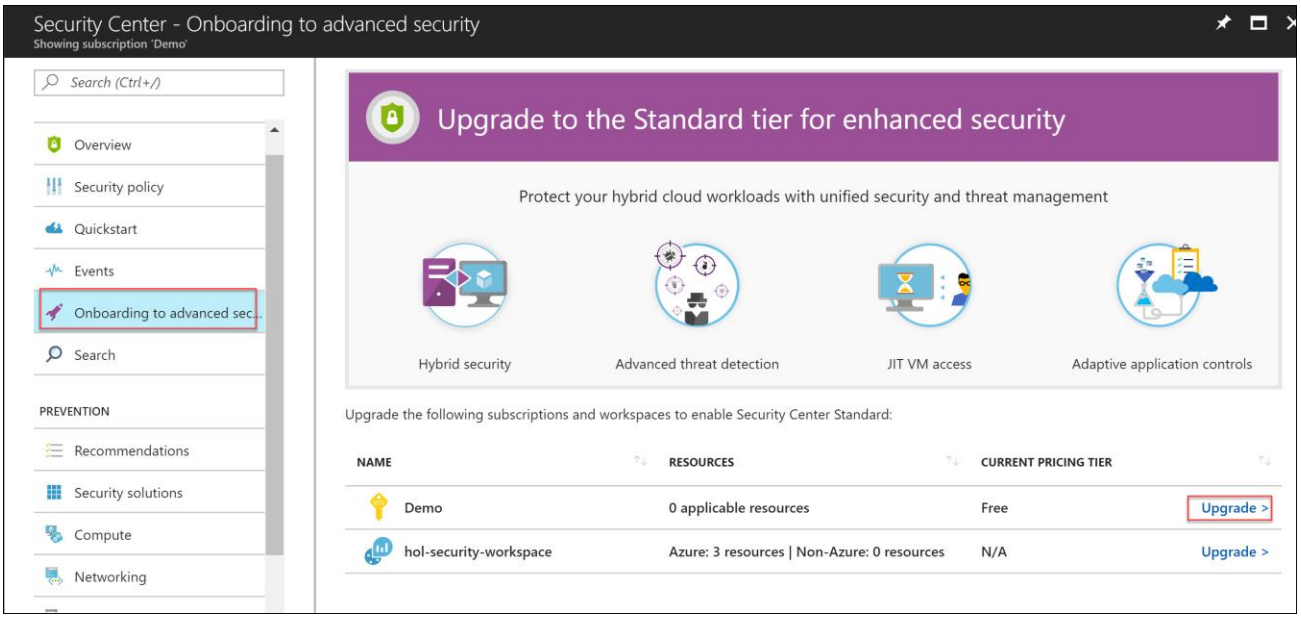
1. Open the Azure portal, and navigate to the **Security Center** menu option



2. This will present the Security Center Overview screen. Notice that it's already collecting data. For this exercise, you want to upgrade to Standard tier which extends the capabilities of the Free tier to workloads running in private and other public clouds. It provides unified security management and thread protection across your hybrid cloud workloads. The Standard tier also adds advanced thread detection capabilities, which uses built-in behavioral analytics and machine learning to identify attacks and zero-day exploits, access and application controls to reduce exposure to network attacks and malware, and more.

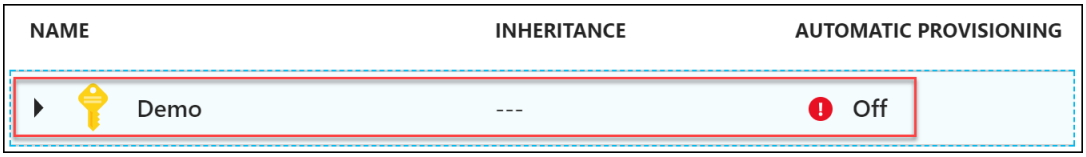


3. Click the **Onboarding to advanced security** menu item and then click **Upgrade >** next to the security workspace created earlier

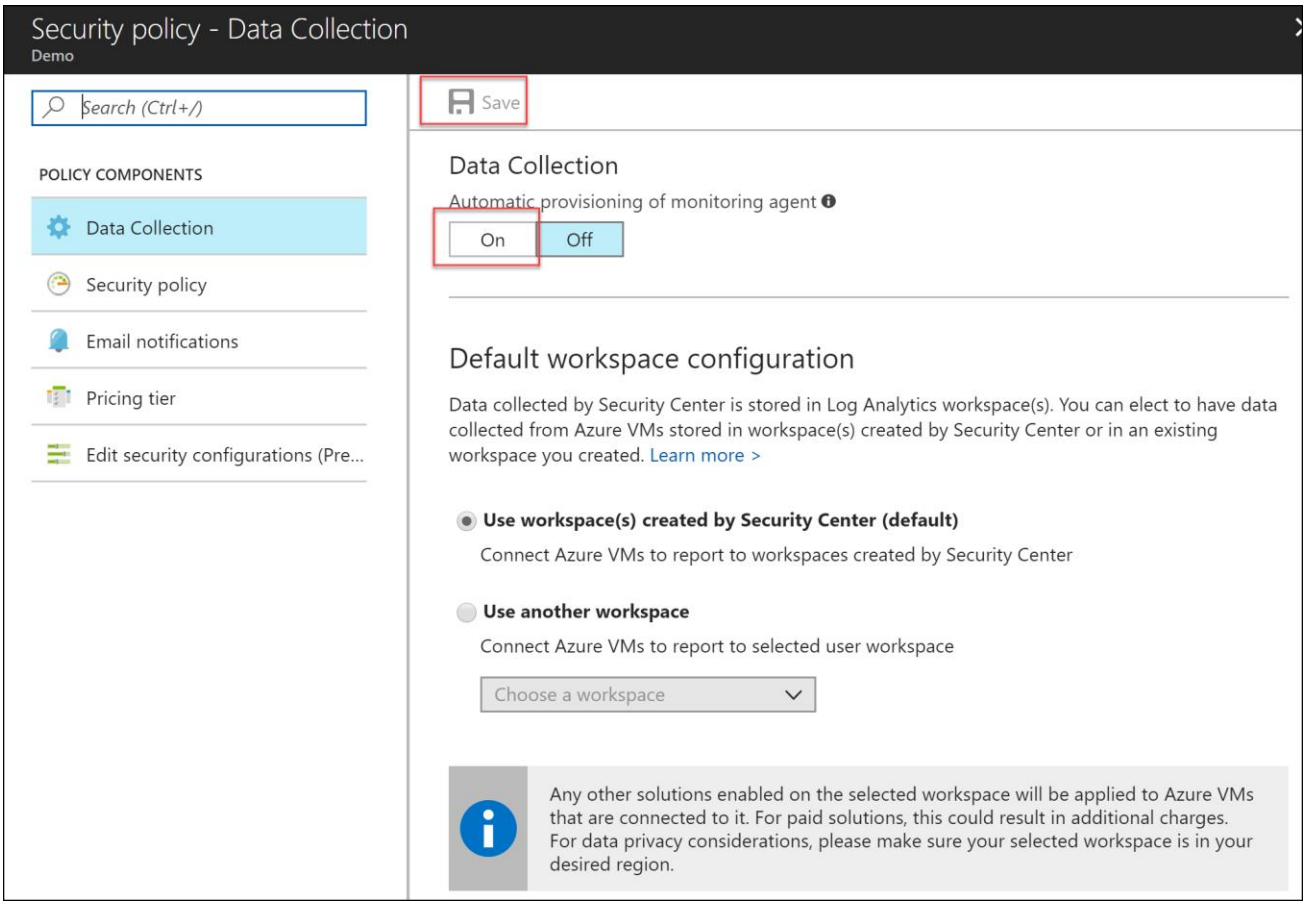


4. Close the panel and navigate back to the **Security Center Overview** screen. Click on **Security policy** under the **General** section. This is where you will enable data collection.

5. This brings up the **Security policy** screen where you will click on your subscription name which is currently in an Off state for data collection.

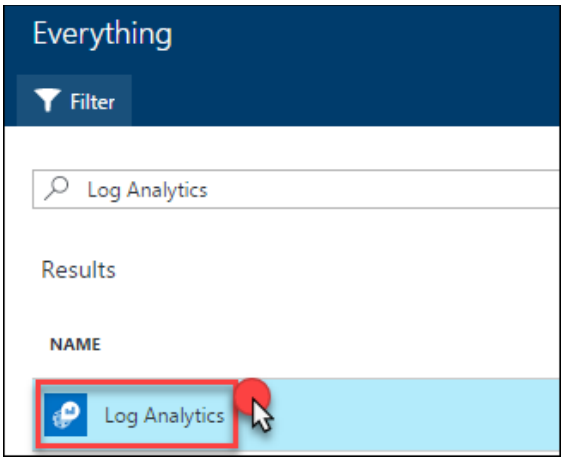


6. This presents the **Data Collection** screen. Turn on data collection by clicking the **On** button and then clicking **Save**

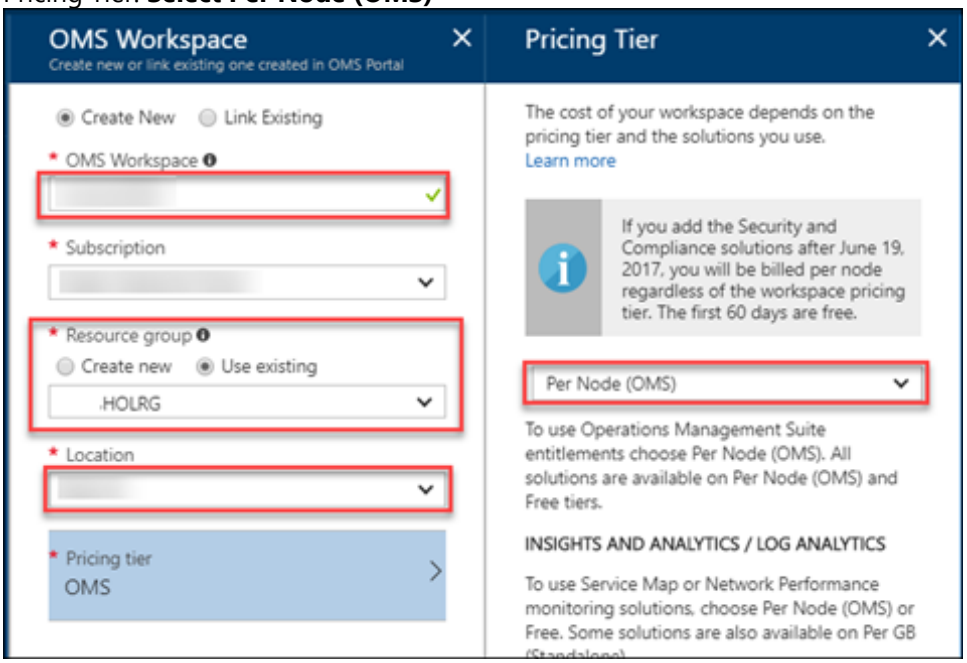


Task 2: Provision Log Analytics

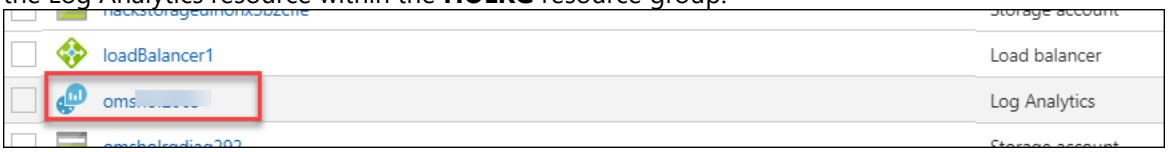
1. Open the Azure portal, and navigate to the **HOLRG** Resource Group
2. Click the **+Add**, button In the search box, type **Log Analytics,** and press enter. Then, click on **Log Analytics,** and click **Create.**



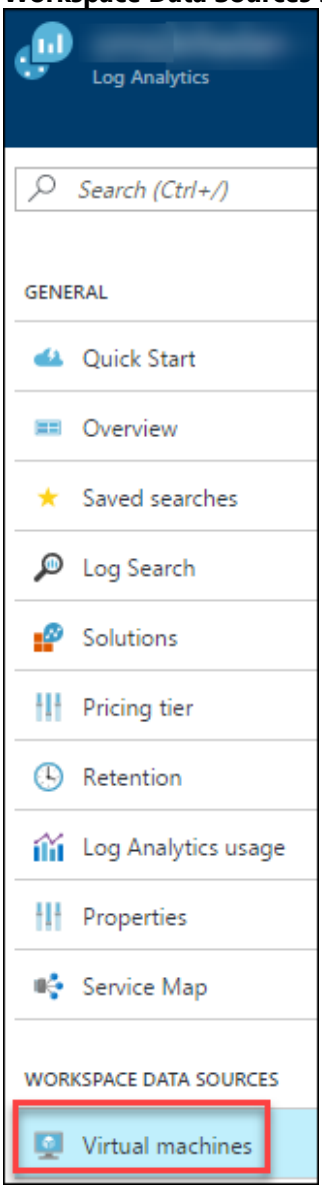
3. Complete the OMS Workspace blade using the following information. Then, click **Pin to Dashboard** and click **OK**:
   a. OMS Workspace: **unique-name**
   b. Subscription: **Select the current subscription**
   c. Resource Group: **HOLRG**
   d. Location: **Closest to your deployment**
   e. Pricing Tier: **Select Per Node (OMS)**



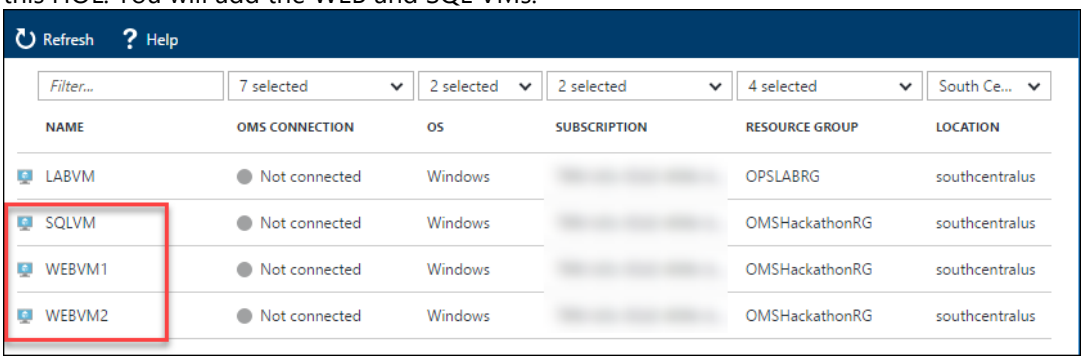
4. The deployment will only take a few moments to complete. Upon completion, open **Log Analytics** by clicking on the Log Analytics resource within the **HOLRG** resource group.



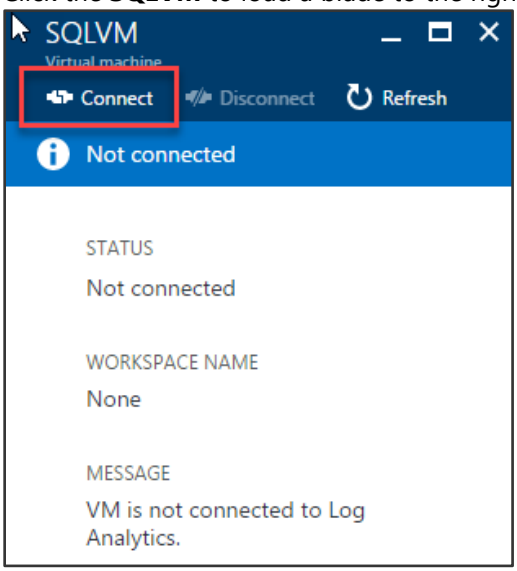
5. Once it loads in the Azure Portal, move the slider bar down, and click **Virtual Machines** which is found in the **Workspace Data Sources** section



6. A list of the VMs in your subscription will be shown in the list. You may want to filter your view to see the VMs for this HOL. You will add the WEB and SQL VMs.

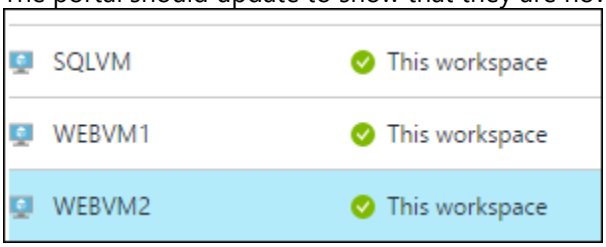


7. Click the **SQLVM** to load a blade to the right. Then, click **Connect** to add it to this Log Analytics Workspace.



8. Follow the same steps for the **WEBVM1** & **WEBVM2**

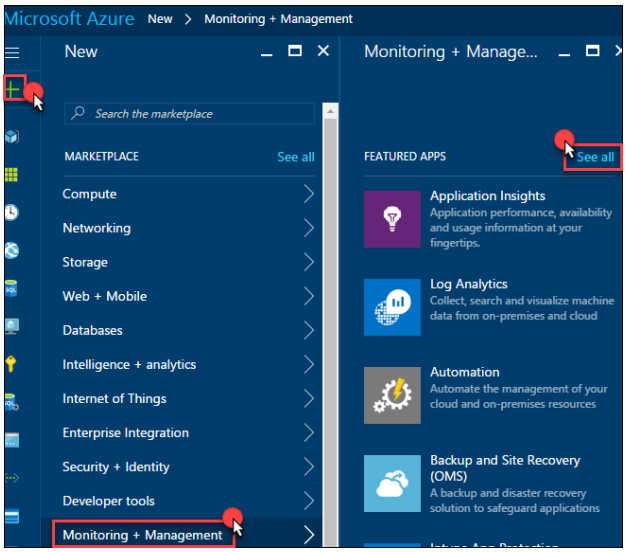
9. The portal should update to show that they are now a part of "This workspace" once they have all been added



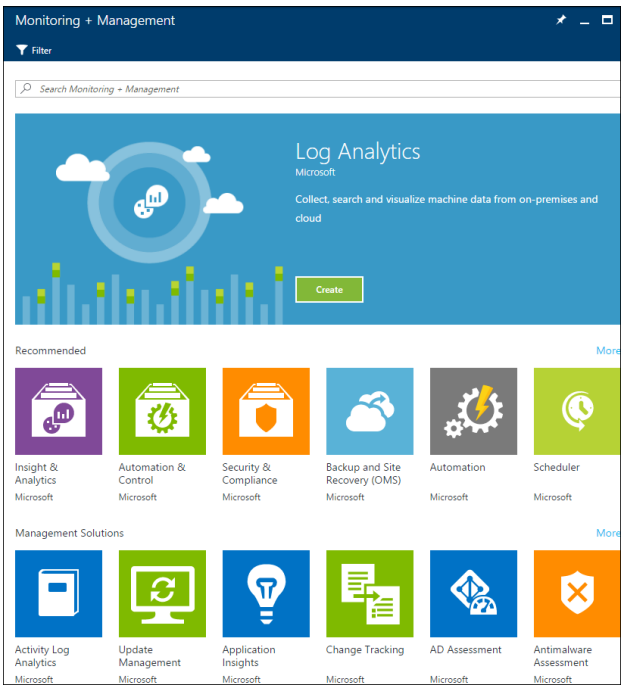
Task 3: Add solution packs

In this section, you will add Solution Packs to Log Analytics. Solution Packs reduce the time to value on Log Analytics by adding pre-built queries and visualizations you can use to gain insights from your data.

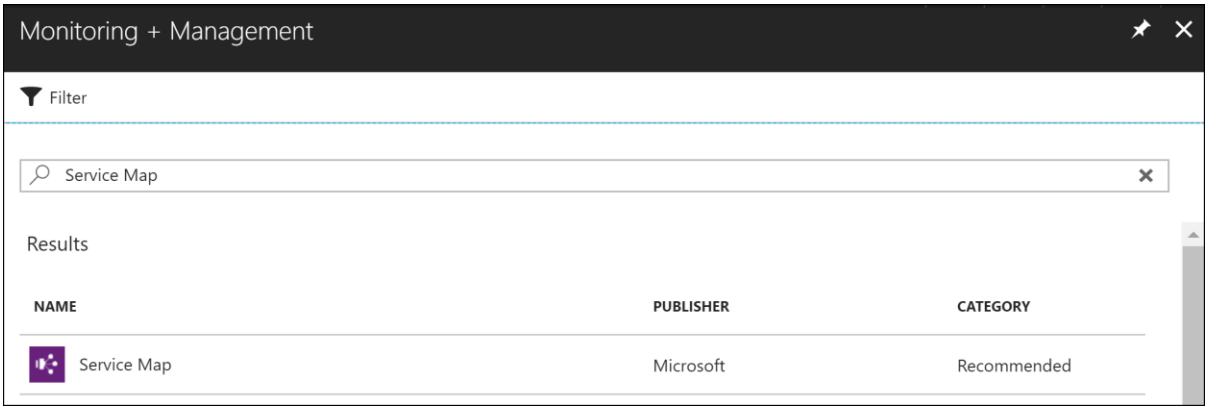
1. From the Azure portal, click the **+New** Link followed by **Monitoring + Management** and **See all**



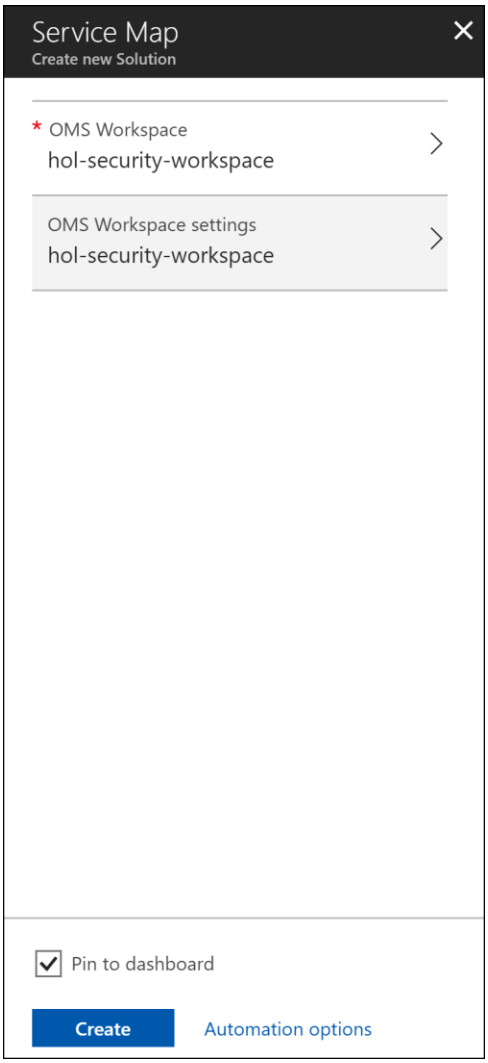
2. Note there are many solutions available, and more are added frequently. Browse the solutions to gain familiarity with the options



3. Locate the **Service Map** solution, and select it. If you don't see it on the page, use the *Search Monitoring + Management* field at the top of the screen to search for **Service Map**. On the Details page, you can read about the solution. When ready, click **Create.**

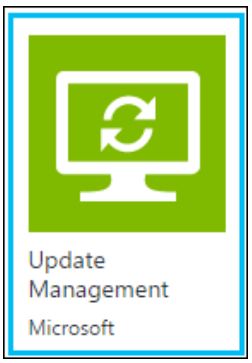


4. Select the OMS Workspace you created and check the **Pin to dashboard** before selecting **Create**

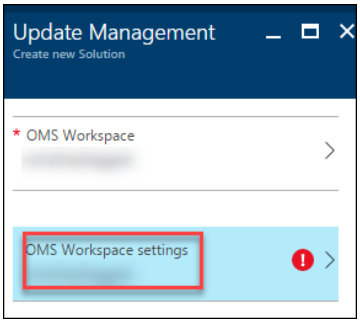


5. After deployment from the Azure portal, click the **+New** Link followed by **Monitoring + Management** and **See All**

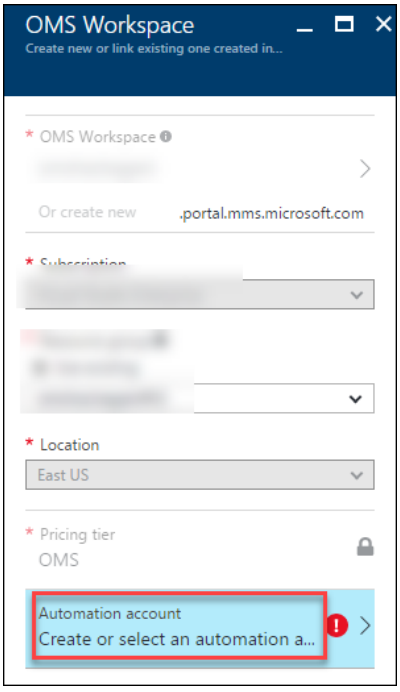
6. Locate the **Update Management** solution, and select it. Then, click **Create.**



7. Select the OMS Workspace that you are working with here



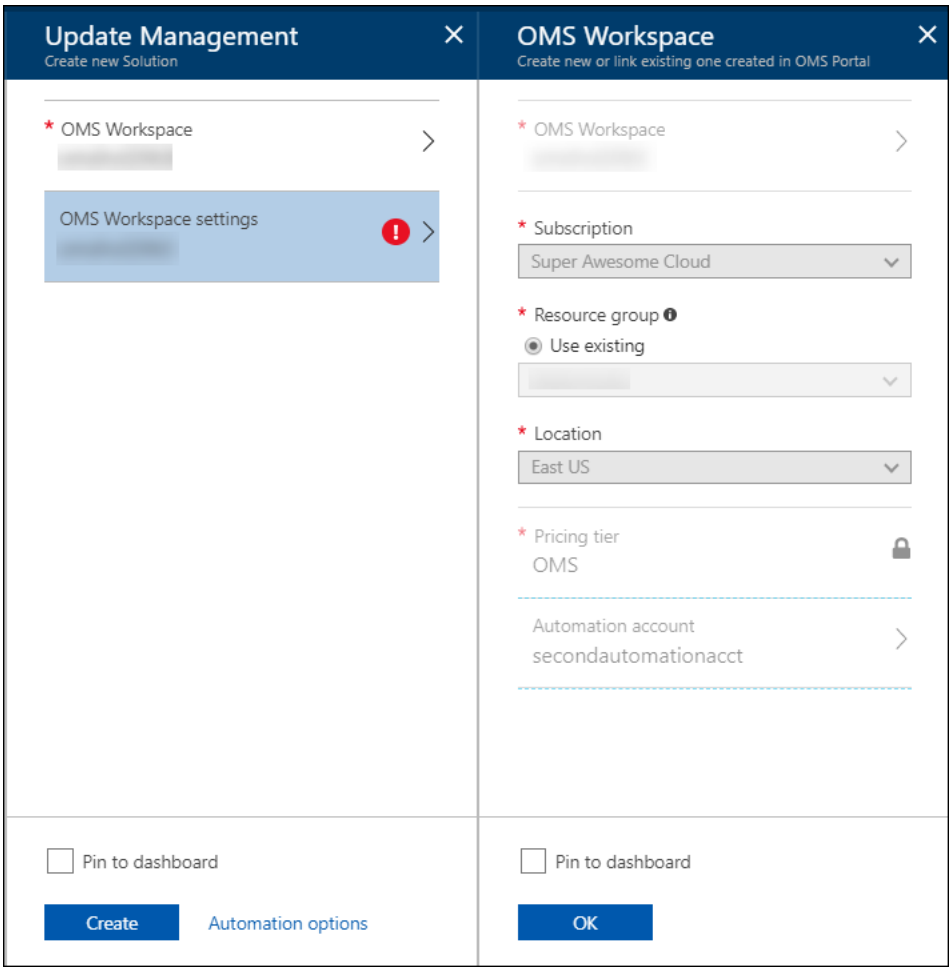
8. This solution requires an Azure Automation account. Click **OMS Workspace Settings** followed by **Automation account**



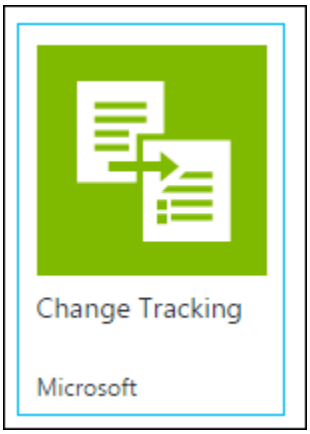
9. Select the **Automation Account** that was previously created within the **HOLRG** resource group

NOTE: If your Automation Account doesn't show up in the list it's because it's either not in the same Resource Group as the OMS Workspace, or because of a BUG in the Azure Portal blade. If you experience this, then you'll need to create another Automation Account by clicking "+ NEW", etc. then come back here to connect the two.

10. Then, click **OK**, and **Create**

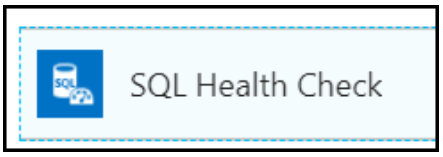


11. Add the **Change Tracking** solution thereby selecting the OMS Workspace.



NOTE: It will take some time (usually an hour) for the data to start flowing into the portal from the VMs. Move on to the next Exercise for now, and later, there will be steps to look at what was found by OMS.

12. Add the SQL Health Check solution, and selecting this OMS workspace, and setting the Scope Configuration to **All onboarded resources** and then clicking **Create**

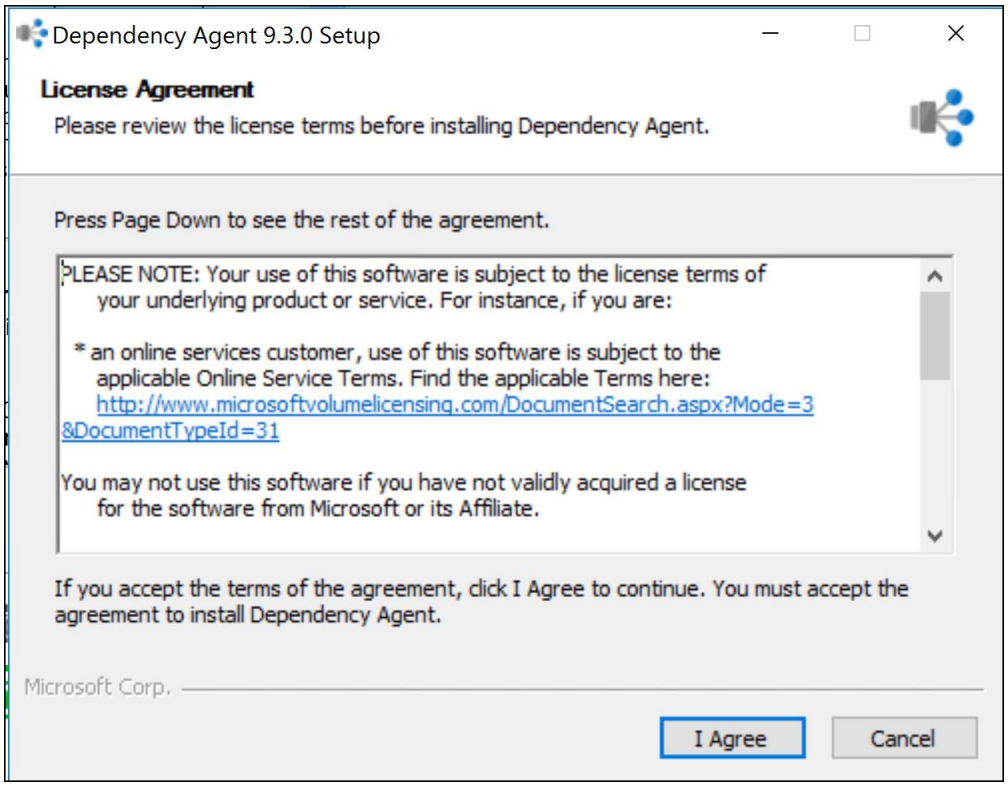


Task 4: Configure Service Map

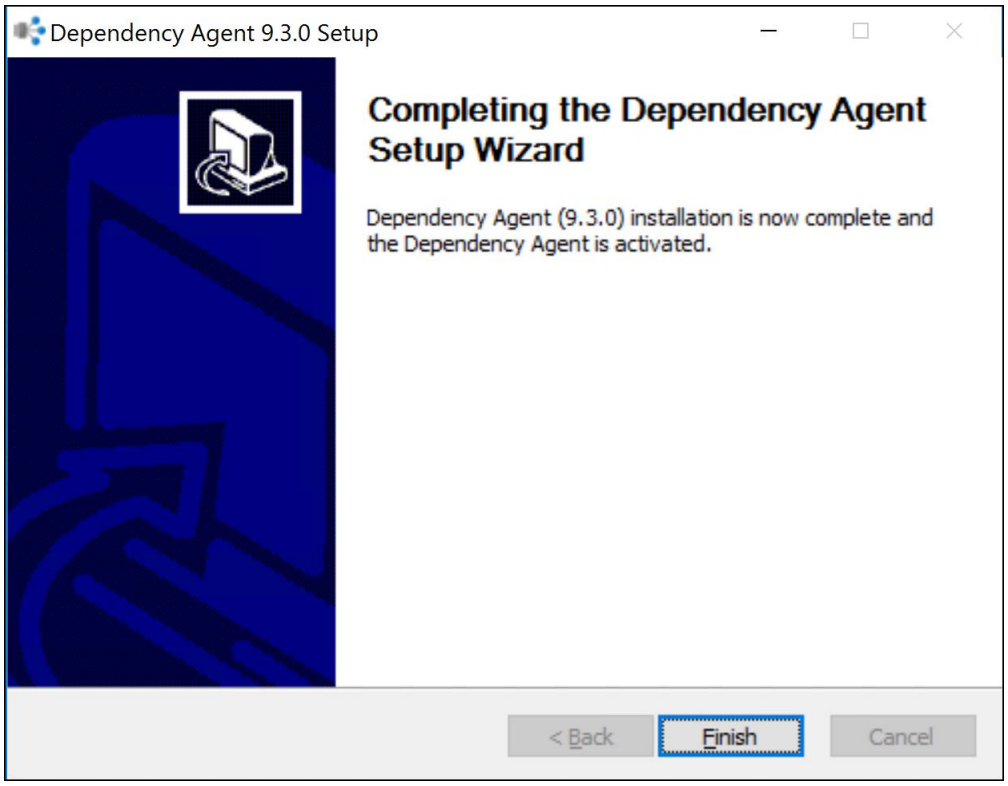
In order to configure the Service Map functionality, the Microsoft Dependency Agent needs to be installed on each virtual machine.

1. Open a Remote Desktop Connection to **WEBVM1**. Use the same credentials we configured during the earlier exercise.
2. Open the web browser to download and run the installer from: https://aka.ms/dependencyagentwindows

3. The installer will start. Click **I Agree**

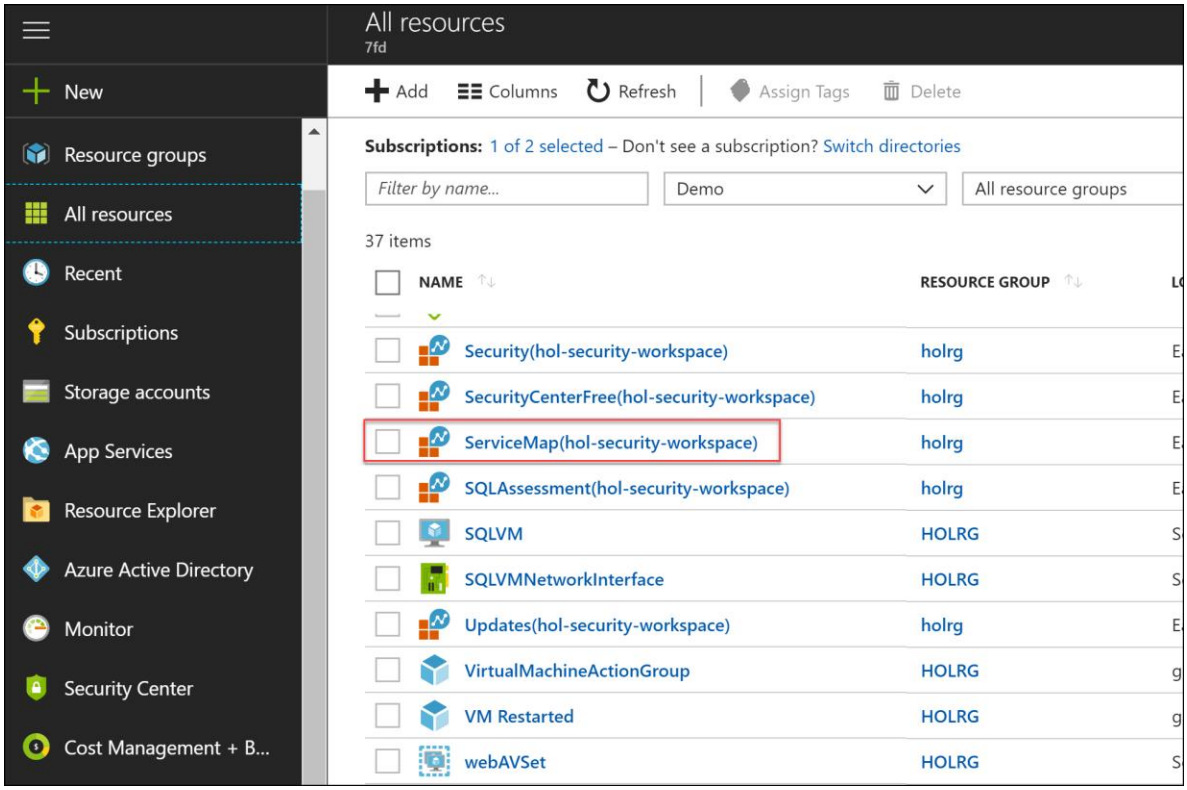


4. The installer will take a few moments and once it has completed, click on the **Finish** button

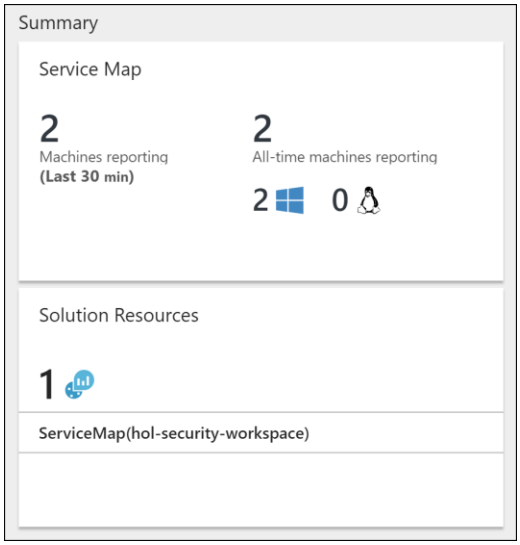


5. Repeat the same steps above for **WEBVM2**
6. Disconnect from any remote desktop connections

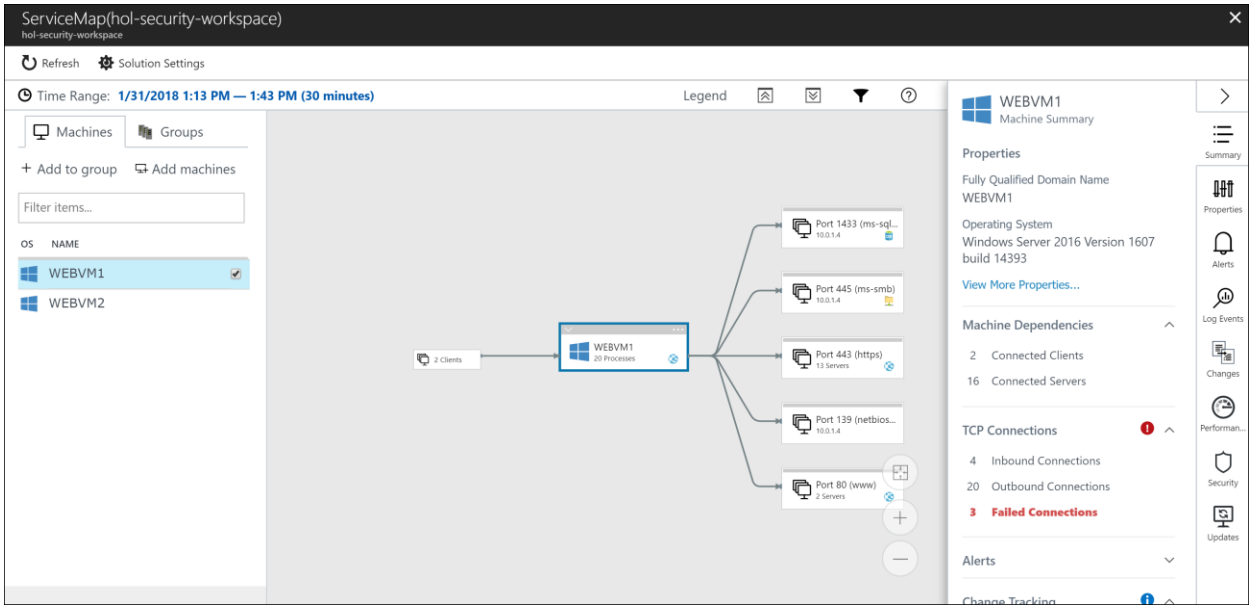
7. In the Azure Portal, navigate to the **All Resources** menu and locate the **Service Map** resource you created earlier. Click on the resource name.



8. This will bring up the Service Map screen and you'll see that it's already populated with some data. Since we installed the agent on the two Windows virtual machines, the Service Map is showing both virtual machines now reporting data. Click on the **Service Map** tile.



9. When the Service Map loads, click on **WEBVM1** to see the data that has been analyzed for that virtual machine



Summary

In this exercise, you provisioned the portal, configured the VMs for the CloudShop application to be managed by the Portal, and configured the diagnostics storage account to load data into the Log Analytics platform. Additionally, solution packs were installed and configured to gather data and provide dashboards for applications deployed in Azure IaaS. You also configured Service Map and now understand how it surfaces data.

Exercise 4: Instrument CloudShop using Azure Application Insights

Duration: 45 minutes

Overview

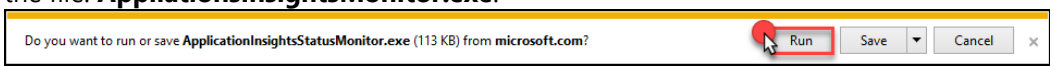
In this exercise, you will instrument the CloudShop using Application Insights at runtime. This will be accomplished by installing the Applications Insights tool on the web services and configuring an Application Insight workspace in Azure. Then, you will configure Application Insights to perform web tests and alerts. The final task will be to connect the Application Insights workspace to send data to the Portal.

Task 1: Install and Configure the Application Insights Status Monitor

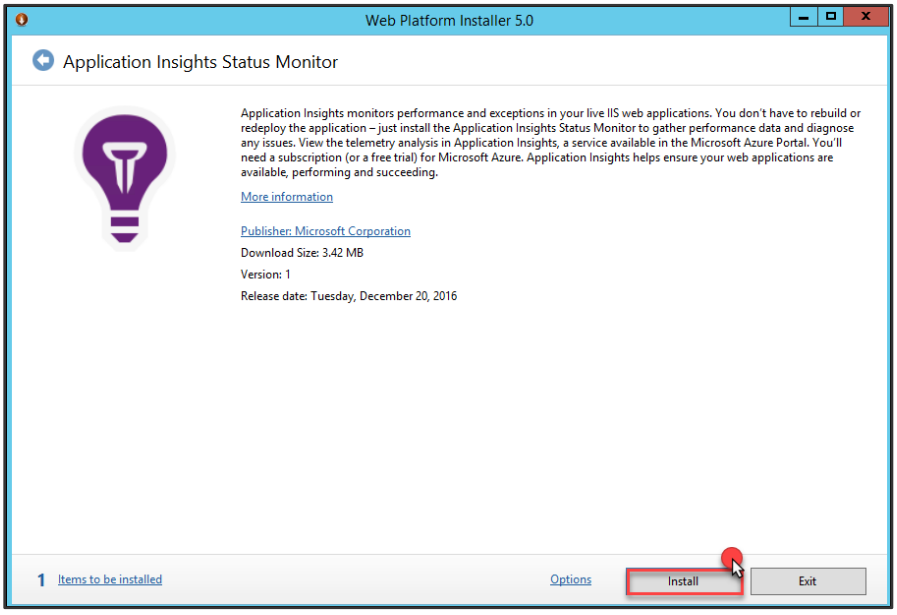
To read more about this tool follow this link: http://bit.ly/2ksdzKV

1. Open a Remote Desktop Connection to **WEBVM1**

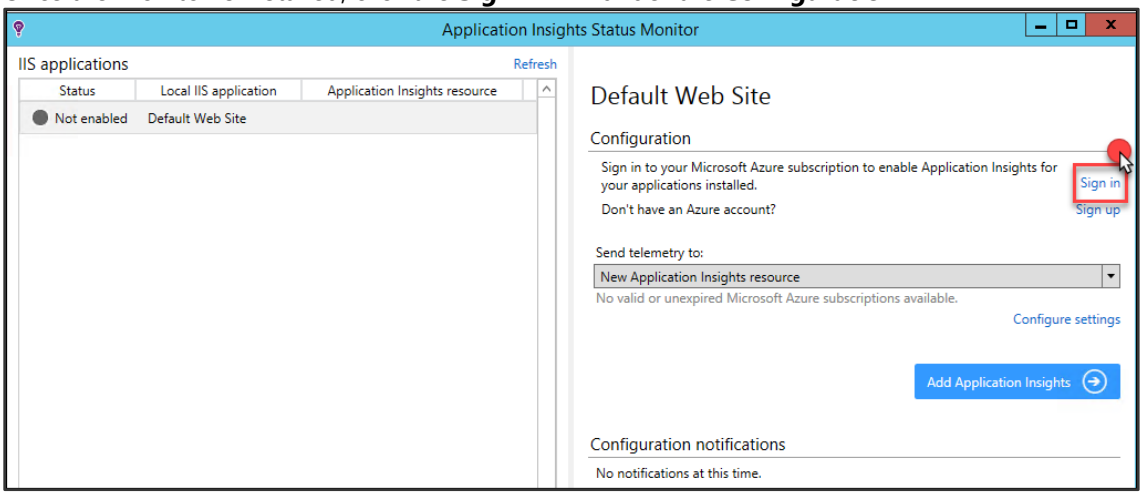
2. Open Internet Explorer, and follow this link: http://bit.ly/2jxQ43z. Click **Run** on the Question if you want to run the file: **AppliationsInsightsMonitor.exe**.



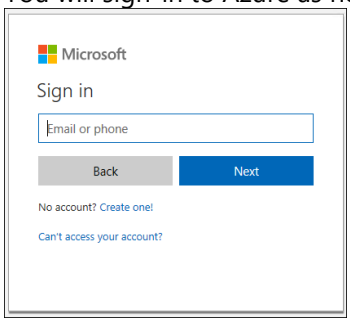
3. This will start the Web Platform Installer. Click **Install** followed by **I Accept** on the following screen, and **Continue**.



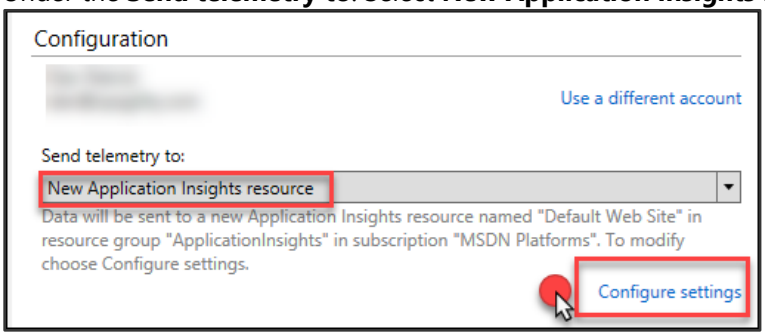
4. Once the Monitor is installed, click the **Sign In** link under the **Configuration**



5. You will sign-in to Azure as normal

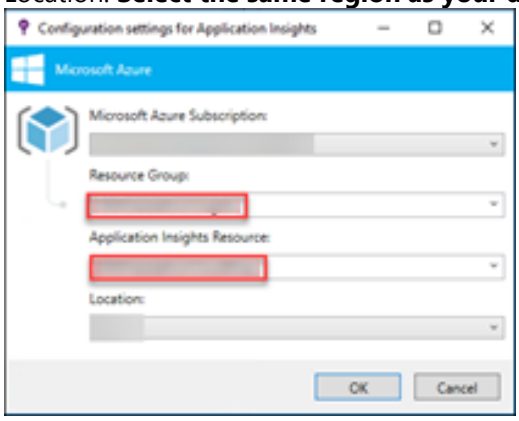


6. Under the **Send telemetry to**: Select **New Application Insights resource**. Then, click **Configure settings**.



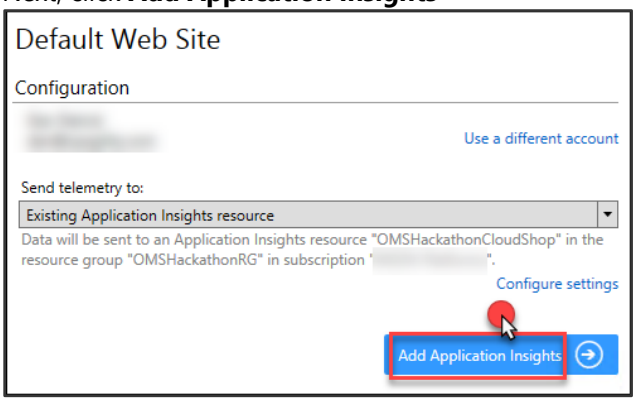
7. On the **Configuration settings for Application Insights**, complete the information as follows, and click **OK**
    a. Microsoft Azure Subscriptions: **Use the same subscription**
    b. Resource Groups: **HOLInsights**
    c. Application Insights Resource: **HOLCloudShop**

d. Location: **Select the same region as your deployment**

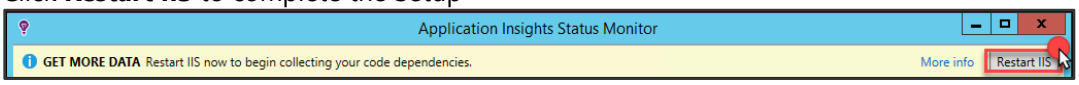


8. This will build the Application Insights workspace for you in Azure

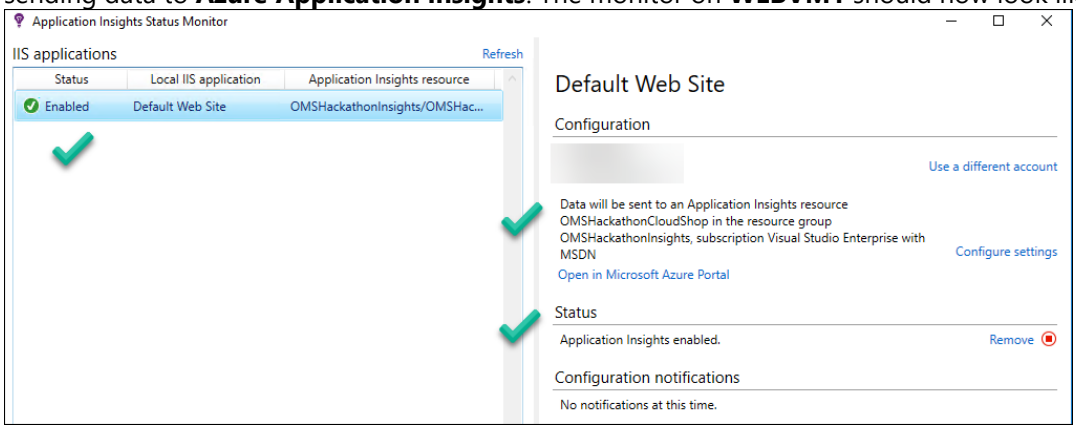
9. Next, click **Add Application Insights**



10. Click **Restart IIS** to complete the Setup



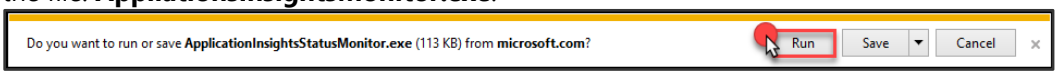
11. This will only take a few seconds. Now, the CloudShop application running on **WEBVM1** is instrumented and sending data to **Azure Application Insights**. The monitor on **WEBVM1** should now look like below:



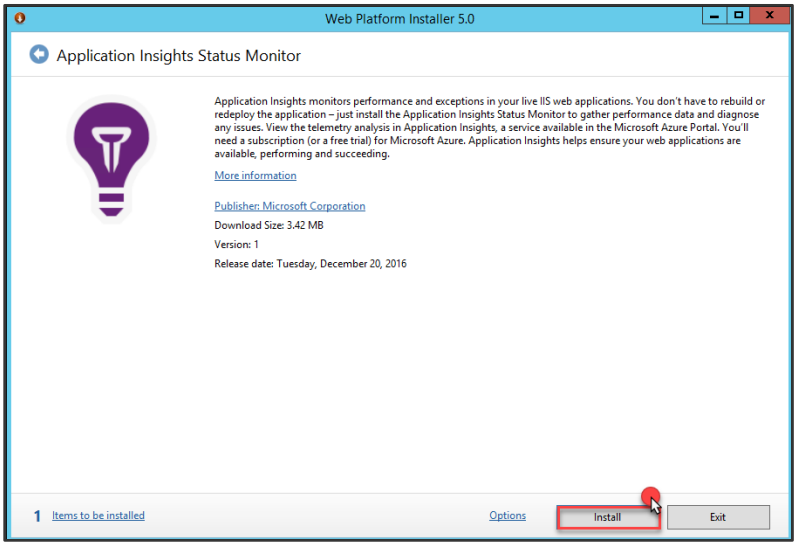
12. Disconnect from **WEBVM1**

13. Connect to a Remote Desktop Session for **WEBVM2**

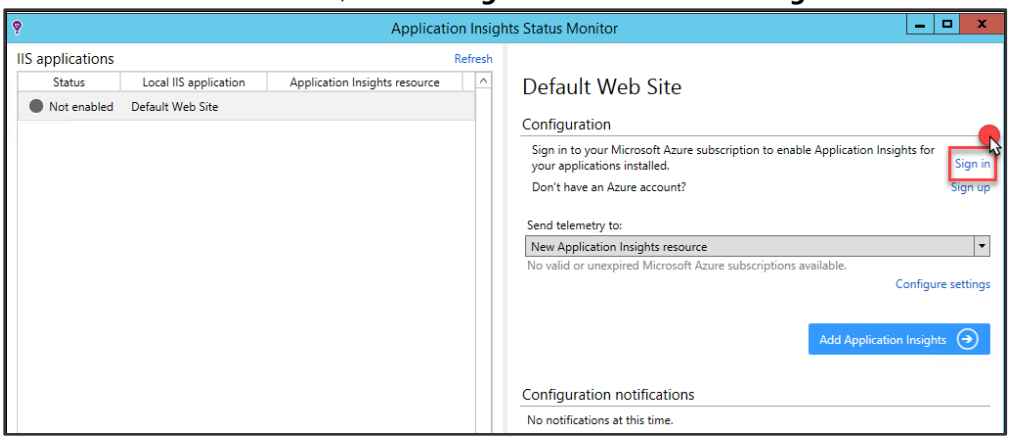
14. Open Internet Explorer, and follow this link: http://bit.ly/2jxQ43z. Click **Run** on the Question if you want to run the file: **AppliationsInsightsMonitor.exe**.



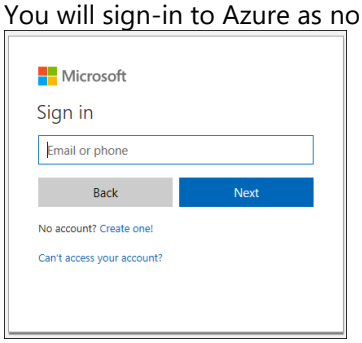
15. This will start the Web Platform Installer. Click **Install** followed by **I Accept** on the following screen, and **Continue**.



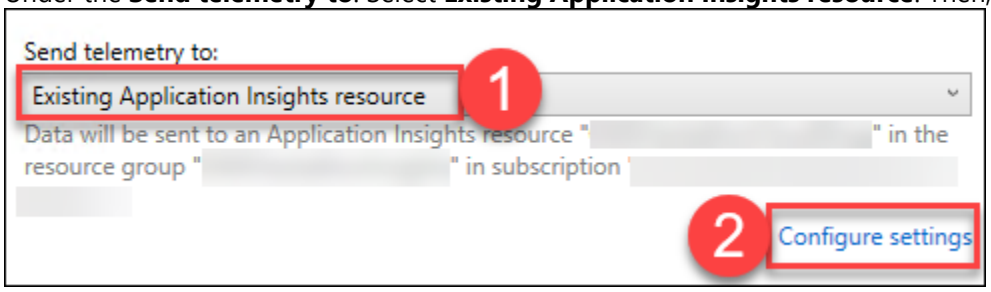
16. Once the Monitor is installed, click the **Sign In** link under the **Configuration**



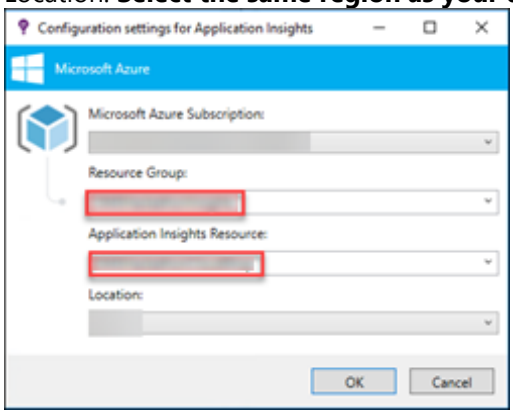
17. You will sign-in to Azure as normal



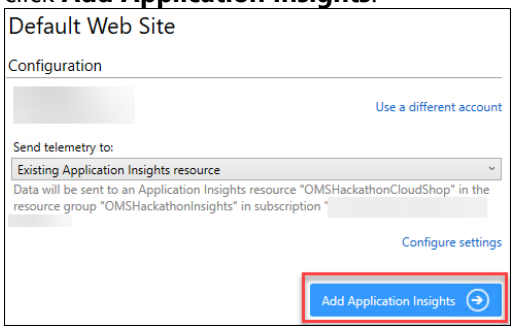
18. Under the **Send telemetry to**: Select **Existing Application Insights resource**. Then, click **Configure Settings**.



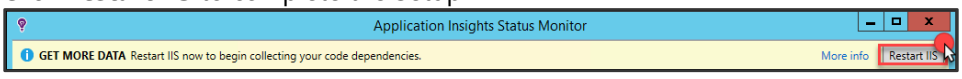
19. On the **Configuration settings for Application Insights**, complete the information as follows, and click **OK**
    a. Microsoft Azure Subscriptions: **Use the same subscription**
    b. Resource Groups: **HOLInsights**
    c. Application Insights Resource: **HOLCloudShop**
    d. Location: **Select the same region as your deployment**



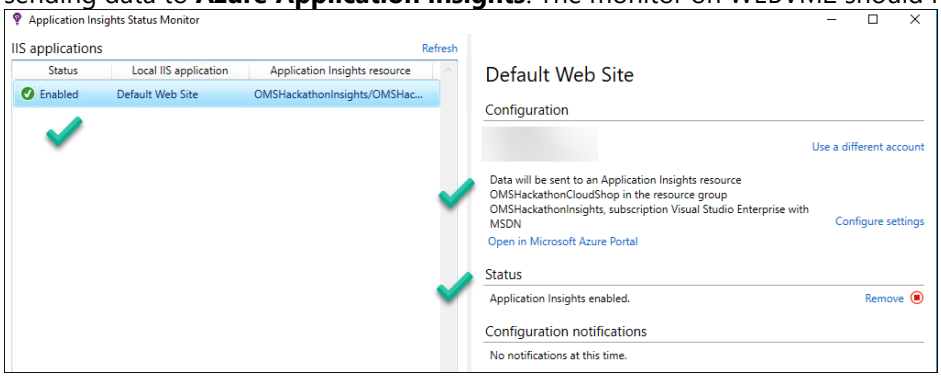
20. This will attach **WEBVM2** to the Application Insights workspace you created a moment ago in Azure. Next, click **Add Application Insights**.



21. Click **Restart IIS** to complete the Setup



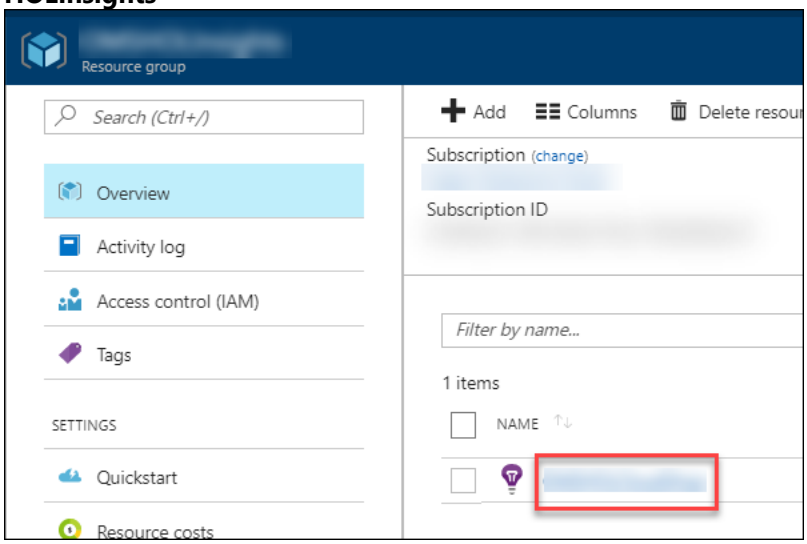
22. This will only take a few seconds. Now, the CloudShop application running on **WEBVM2** is instrumented and sending data to **Azure Application Insights**. The monitor on WEBVM2 should now look like below:



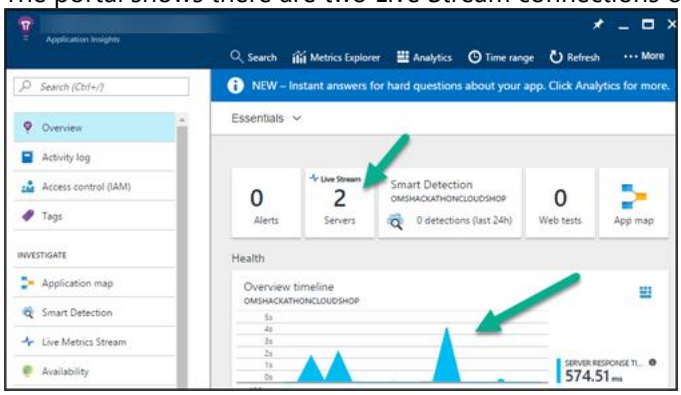
23. Disconnect from **WEBVM2**

Task 2: Configure the Applications Insights workspace in Azure

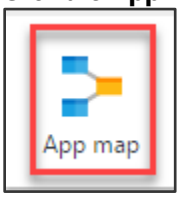
1. Open the Azure Portal, and locate the **HOLCloudShop** Applications Insight Resource in the resource group **HOLInsights**



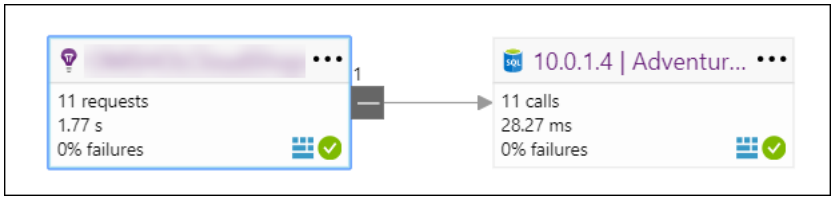
2. Notice the monitors installed on the **WEBVM1** & **WEBVM2** servers have already started to send information. The portal shows there are two Live Stream connections online, and there is data about Server Response time.



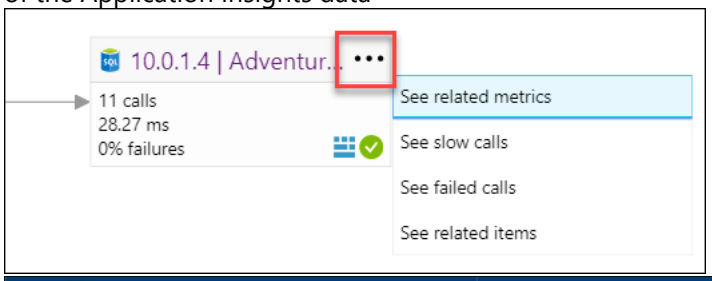
3. Click the **App map**

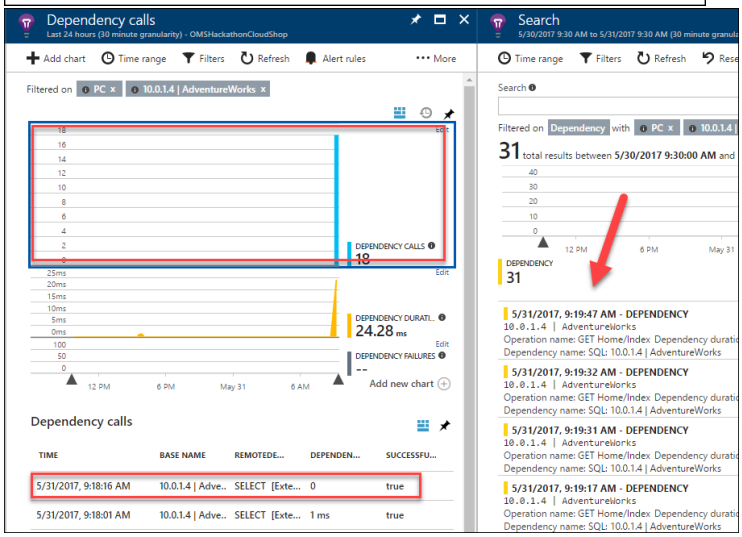


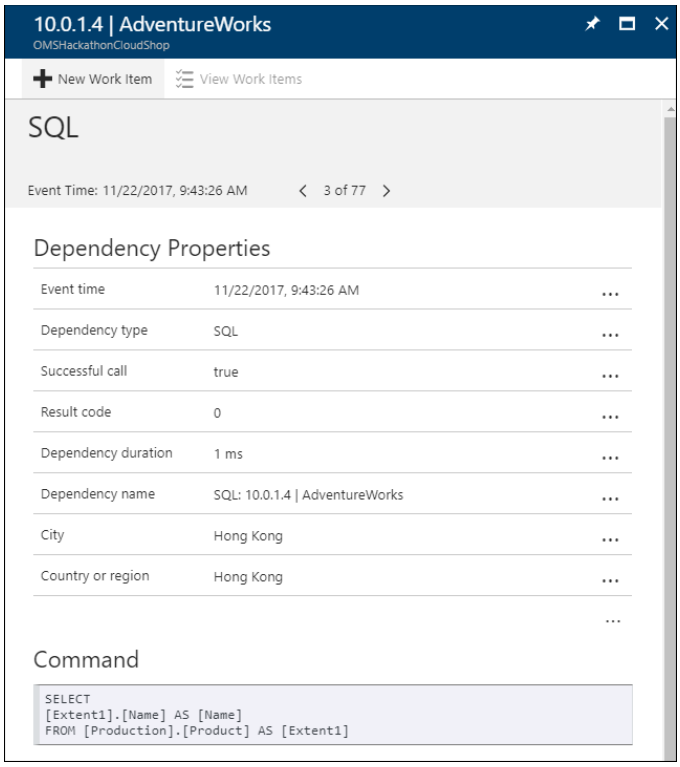
4. Notice how the application is automatically shown in a map format where you can drill into the captured data. We can see how the Server at the front is connected to the DB at the DB Server as a dependency.



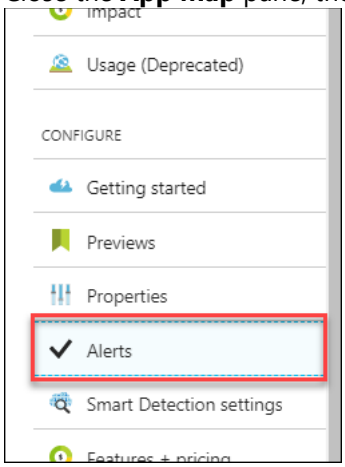
5. Click the ellipse on each '...' tile, and click through each option to see the different data being pulled as a part of the Application Insights data





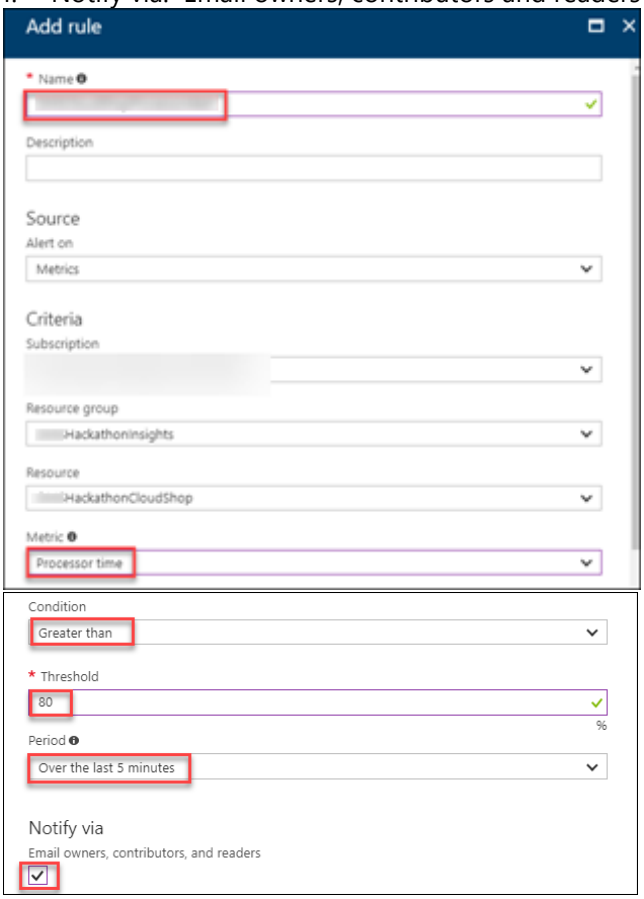


6. Close the **App Map** pane, then Click on the **Alerts** in the **Configure** section

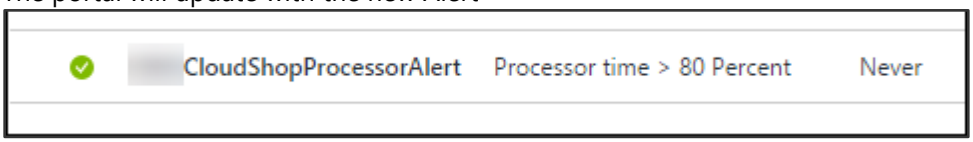


7. Click **+Add Metric Alert,** complete the blade with the following information, and click **OK**
    a. Name: **CloudShopProcessorAlert**
    b. Metric: **Processor Time**
    c. Condition: **Greater than**
    d. Threshold: **80**
    e. Period: **Over the last 5 minutes**

f. Notify via: Email owners, contributors and readers – **Check the Box**

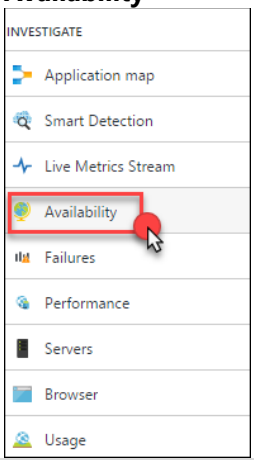


8. The portal will update with the new Alert

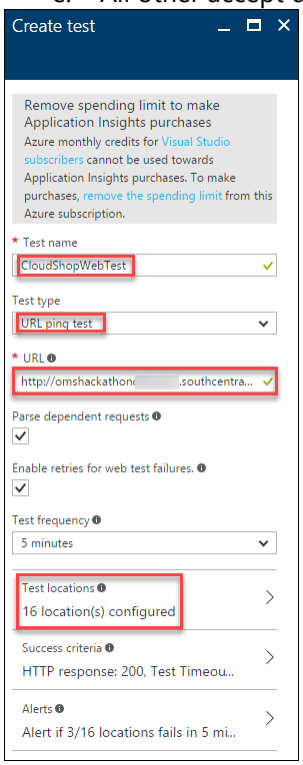


9. In your **HOLRG,** locate the **HOLPublicIP** Public IP Address, and take note of the DNS name which is on the front of the Azure Load Balancer for the CloudShop App running on **WEBVM1** & **WEBVM2**

10. Next in the **HOLCloudShop** Application Insights workspace, under the **Investigate** section, and click **Availability**

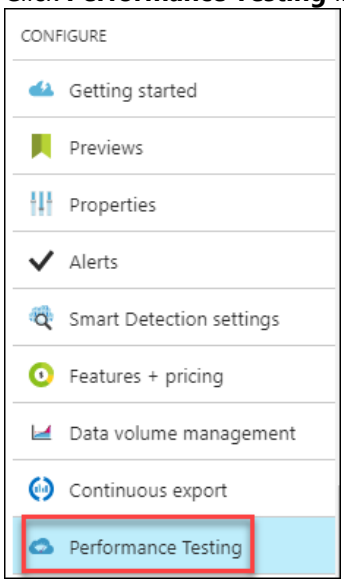


11. Click **+Add test**, and complete the blade using the following information. Then, click **Create**.
    a. Test name: **CloudShopWebTest**
    b. Test type: **URL Ping Test**
    c. URL: **http://HOLXXXXXX.southcentralus.cloudapp.azure.com**
    d. Test locations: Choose locations from all over the world
    e. All other accept defaults



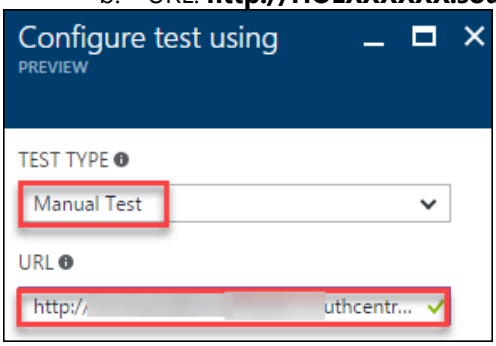
Note: If the CloudShop Application becomes unavailable to this WebTest, you will then receive an email alert from Azure Application Insights.

12. Click **Performance Testing** in the **Configure** section.=

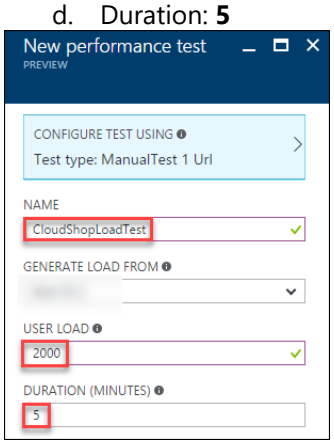


13. Click **+New**

14. Click **Configure Test Using** and complete this using these inputs. Then, click **Done**.
    a. Test Type: Manual Test
    b. URL: **http://HOLXXXXXX.southcentralus.cloudapp.azure.com**

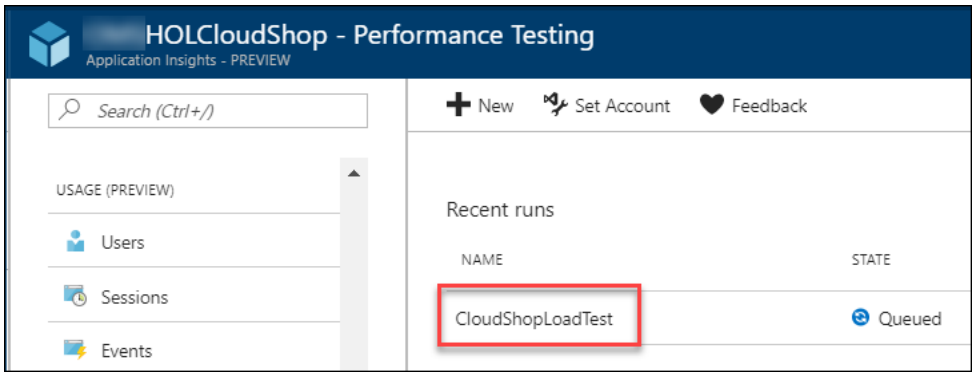


15. Complete the **New Performance Test** blade using the following information, and click **Run Test**
    a. Name: **CloudShopLoadTest**
    b. Generate Load from: **Select a Region**
    c. User Load: **2000**
    d. Duration: **5**

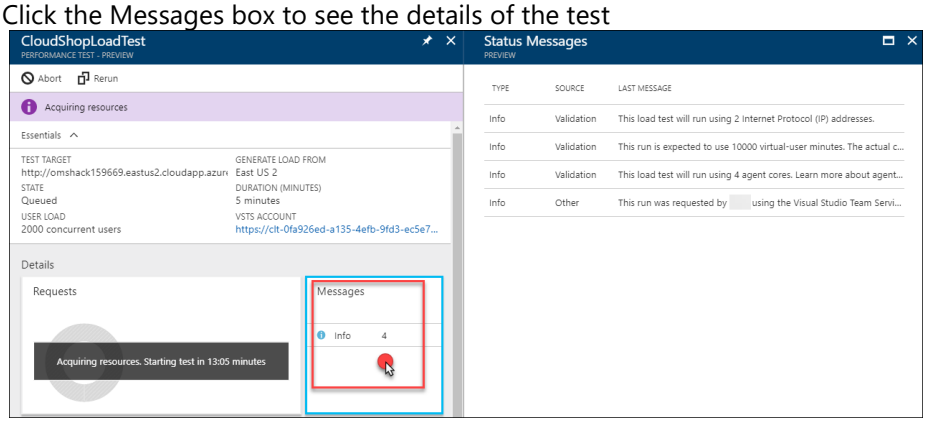


NOTE: An error may occur if you do not have a Visual Studio Team Services (VSTS) Account configure. If so, then you'll need to create one before setting up the Performance Test.

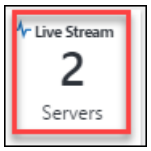
16. Once this is submitted it will show as **Queued.** Click the line and then details about the performance test will be shown.



17. Click the Messages box to see the details of the test

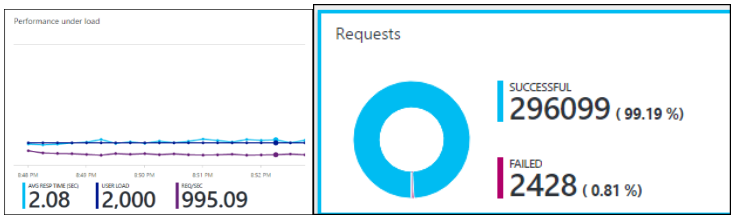


18. Now, head back to the Overview blade of the **HOLCloudShop** Application Insights, and click **Live Stream**

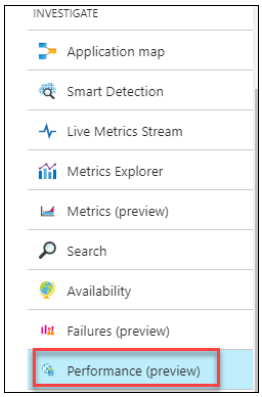


19. Real-time application information can be seen regarding the CloudShop App running in Azure on our IaaS VMs. Here, you can wait for the Performance Test to run, and show how the Web Application performs.

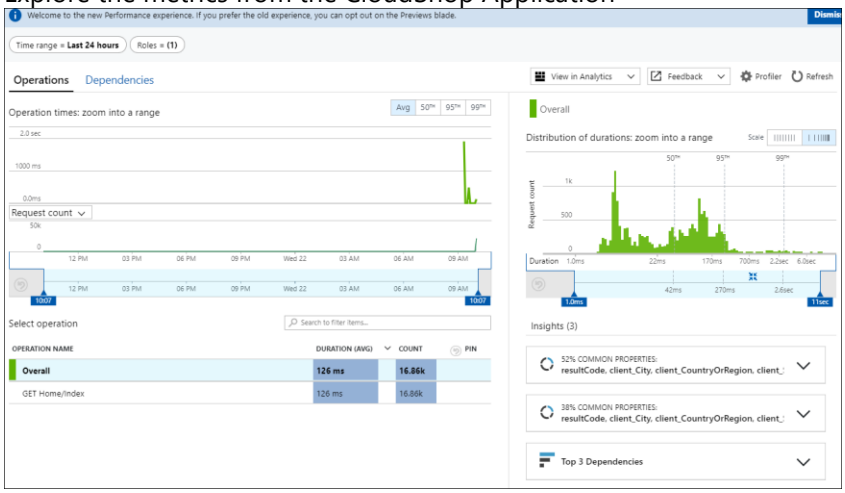
20. If you go back to the **Performance Testing** blade, and click on **CloudShopLoadTest,** you will see the metrics form the run



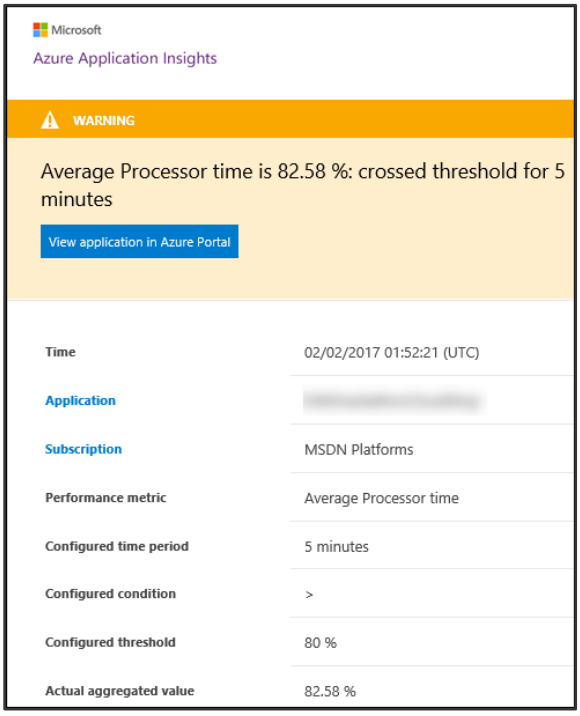
21. Close the Performance Test, and click on the **Performance** under Investigate



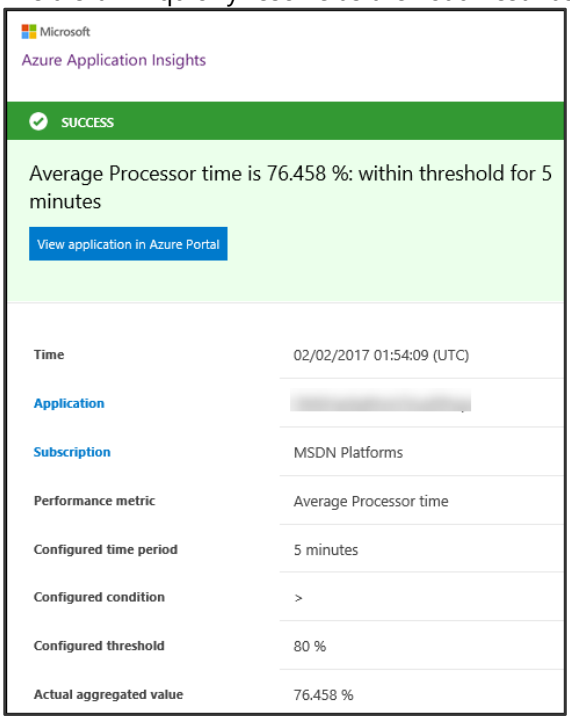
22. Explore the metrics from the CloudShop Application



23. The Load Test should also have caused the Alert configured to be trigged. An email should have been received



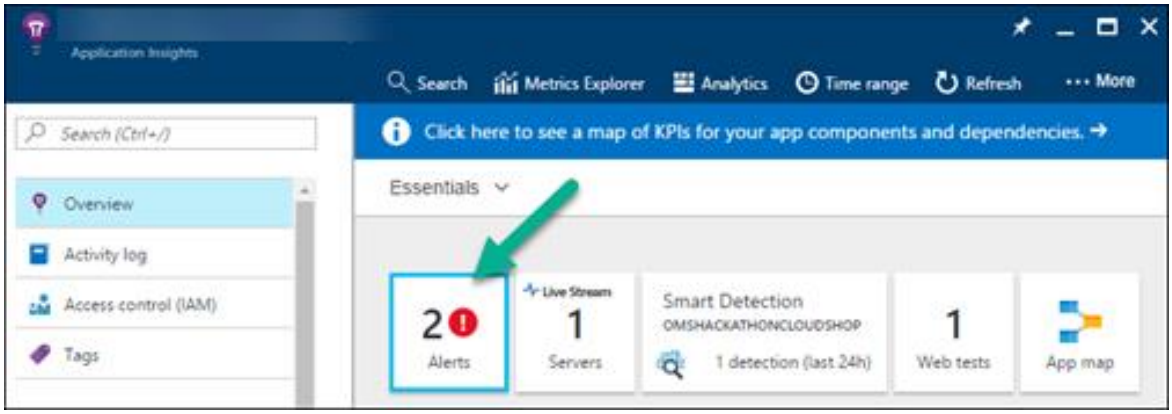
24. The alert will quickly resolve as the Load Test has completed causing the CPU condition to quiet



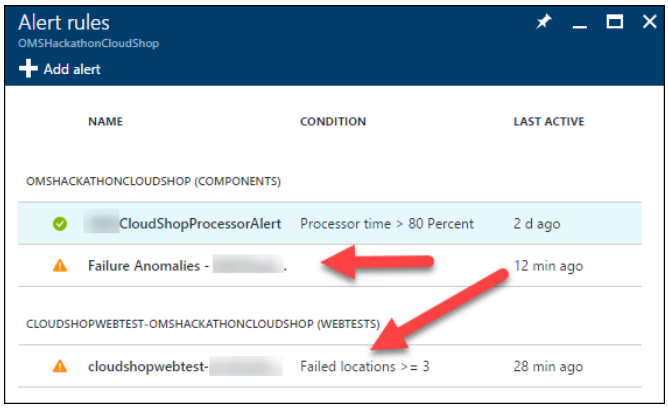
Task 3: Simulate a failure of the CloudShop application

1. Move to your **HOLRG** Resource group, and stop both **WEBVM1** and **WEBVM2**

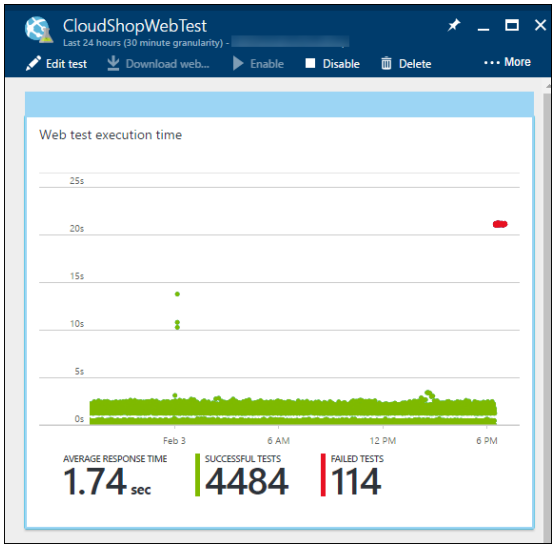
2. Navigate back to the **HOLCloudShop** Application Insights portal. Once the website goes down, notice there are now Alerts



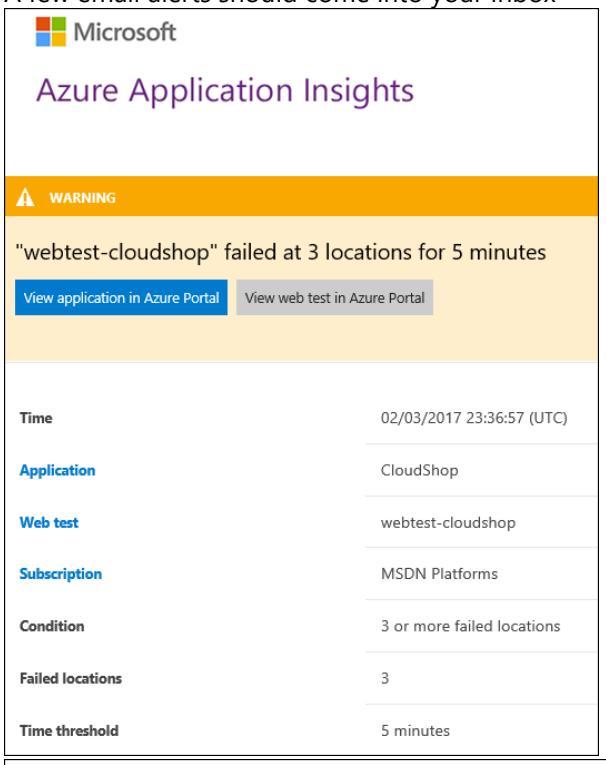
3. Hover over the tile **Pin the Alerts** to **My Dashboard**. Click the **Alert Tile**, and this will load the Alert Rules Blade. The first alert will be an alert based on the WebTest. The second will be a Failure Anomalies Alert.

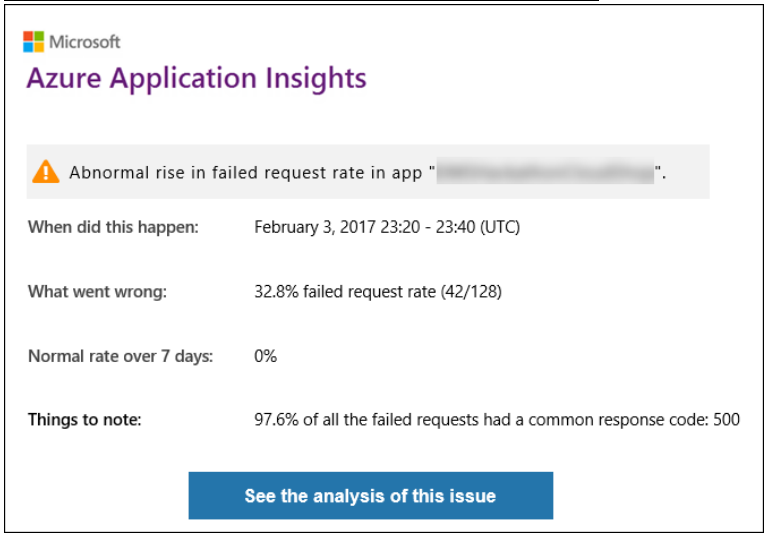


4. Click the **CLOUDSHOPWEBTEST** alert which will show you more details about the error condition

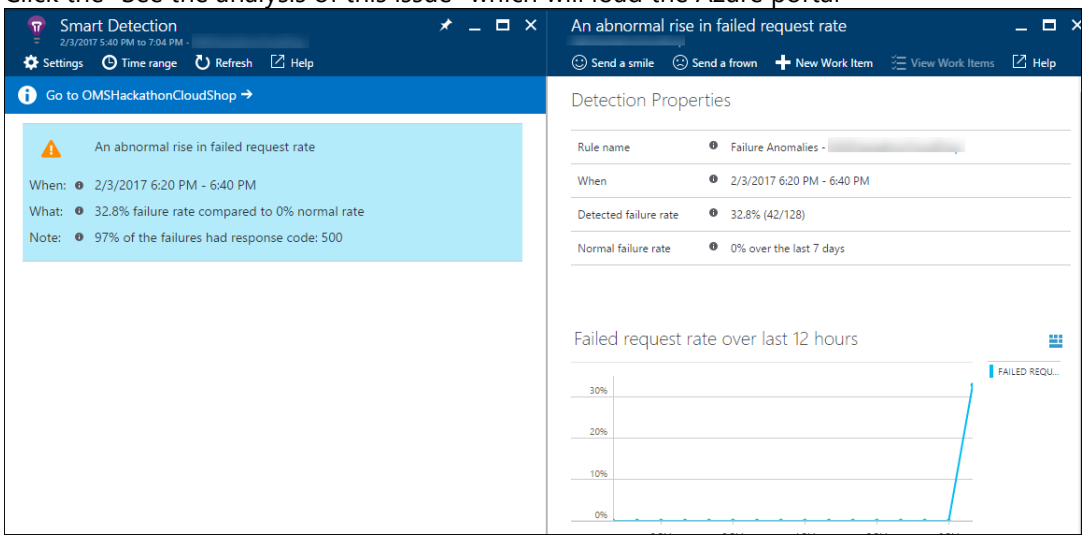


5. A few email alerts should come into your inbox



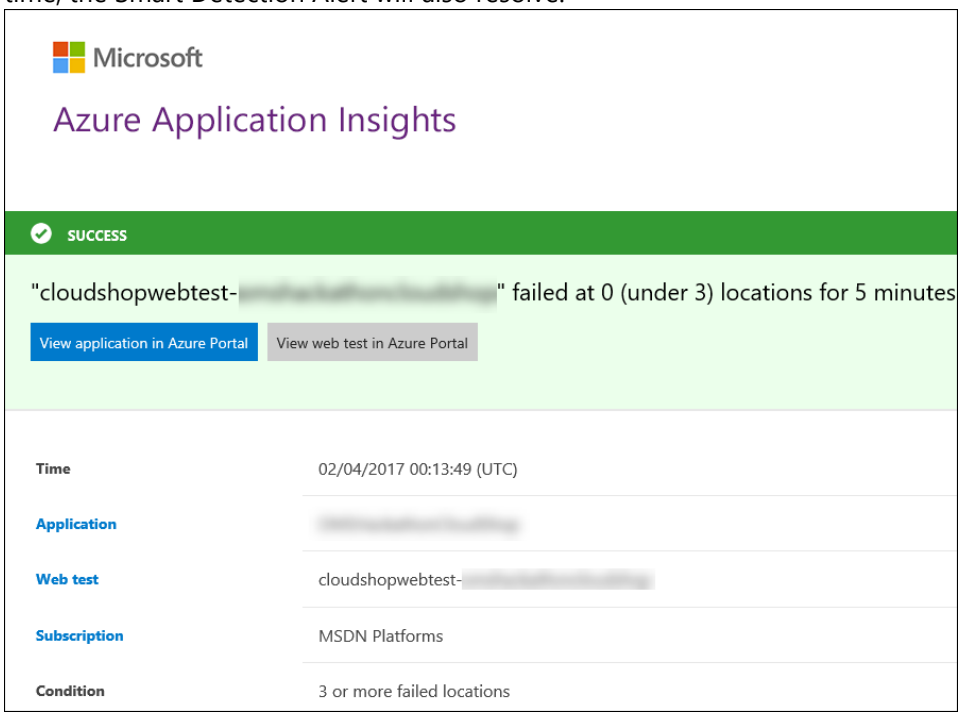


6. Click the "See the analysis of this issue" which will load the Azure portal



7. Move back to your **HOLRG,** and restart the VMs

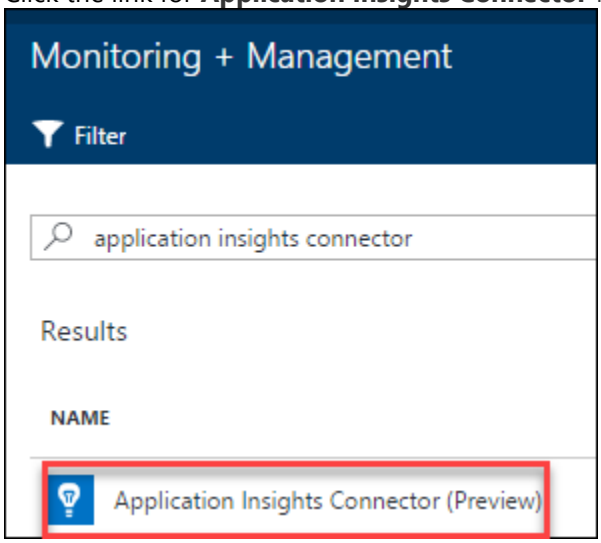
8. Once the VMs are back online, the website will come back up. This will initiate responses to the Web Test and sending data to the Applications Insights portal. An email will be sent resolving the Alert. After a period of time, the Smart Detection Alert will also resolve.



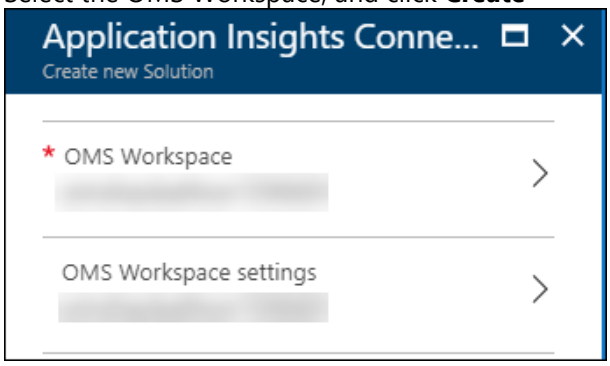
Task 4: Connect Application Insights to the portal

1. From the Azure portal, click the **+New** Link, then **Monitoring + Management** Then in the Search box, type: **Application Insights Connector,** and press enter.

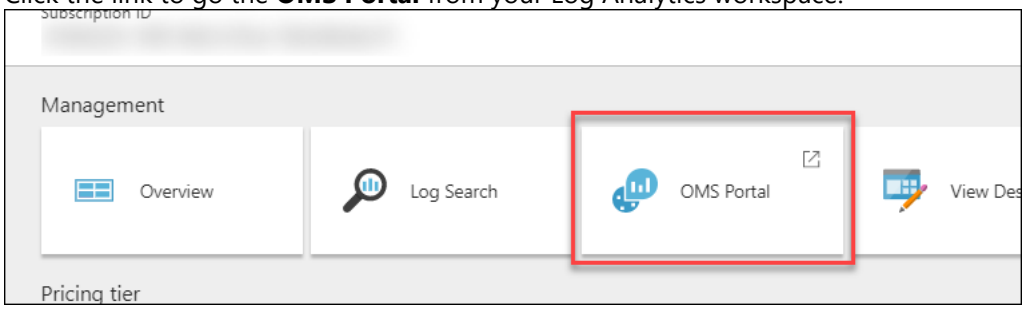
2. Click the link for **Application Insights Connector** followed by **Create**



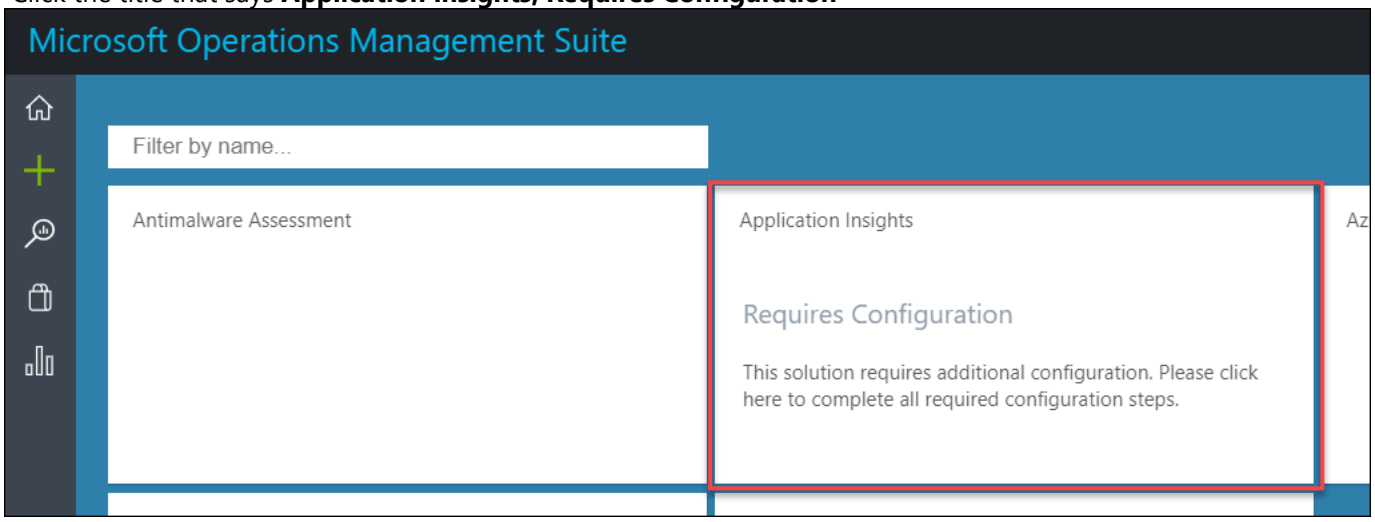
3. Select the OMS Workspace, and click **Create**



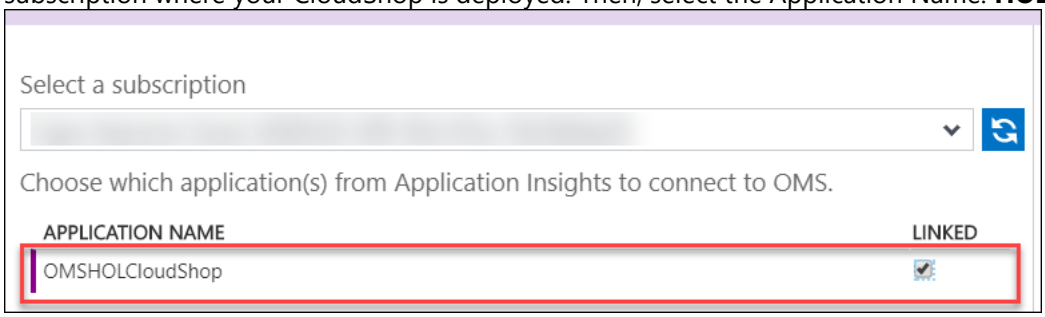
4. Once the solution is installed, it will show up in the Portal. Navigate to your **Log Analytic** workspace, then Click the link to go the **OMS Portal** from your Log Analytics workspace.



5. Click the title that says **Application Insights; Requires Configuration**

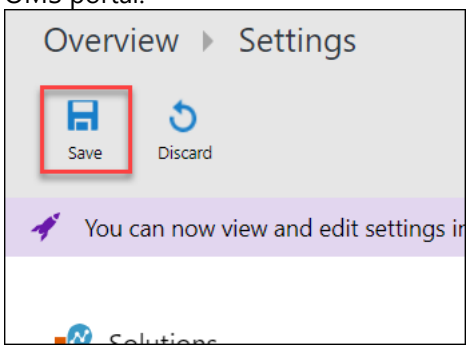


6. The Overview Settings page will load, and you will have the option to Select a Subscription. Select the correct subscription where your CloudShop is deployed. Then, select the Application Name: **HOLCloudShop.**



NOTE: You may need to click the blue "refresh" button next to the Select a subscription field to get the Application Insights instance to load in the list.

7. Click Save to add your **HOLCloudShop** to the OMS portal. It will take some time for the data to flow over the OMS portal.



Summary

In this exercise, you instrumented the CloudShop using Application Insights at runtime. This was accomplished by installing the Applications Insights Monitor for the web services and configuring an Application Insight workspace in Azure. Then, you configured Application Insights to perform web tests and alerts. The final task was to connect the Application Insights workspace to send data to the OMS Portal.

Exercise 5: Explore Azure Security and Operations Management, Application Insights and build a dashboard

Duration: 45 minutes

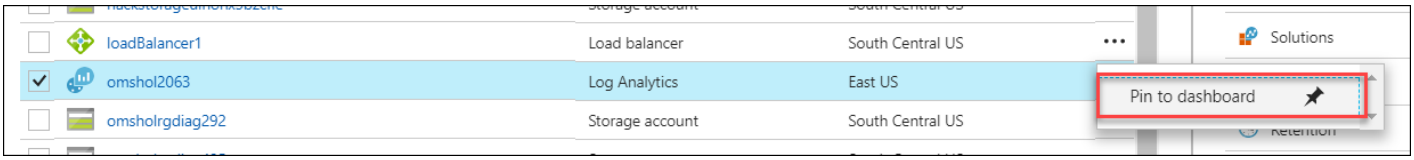
Overview

In this exercise, you will explore the information and data being provided by Azure Security and Operations Management and Application Insights to gain situational awareness of the application and infrastructure. You will look at the Security posture of the infrastructure, the applications performance, and build a dashboard that can be used to manage it moving forward.

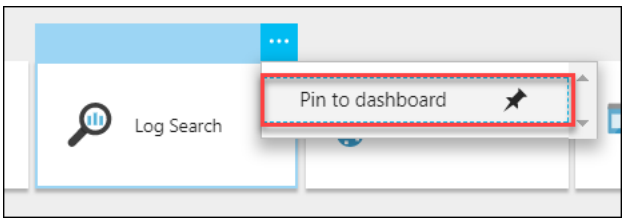
Task 1: Work with Log Analytics data

In this section, we will perform an ad-hoc search in Log Analytics data to see where our servers are not in compliance with security baselines. In the Log Search interface, we can perform ad-hoc searches against the log data being ingested into the Log Analytics service. Because the data is indexed, searching is very fast.

1. Within the Azure Portal, locate your **Log Analytics**, in the **HOLRG**
2. Look for the ellipse, then click **Pin to Dashboard.** This will add it to your **My Dashboard**.

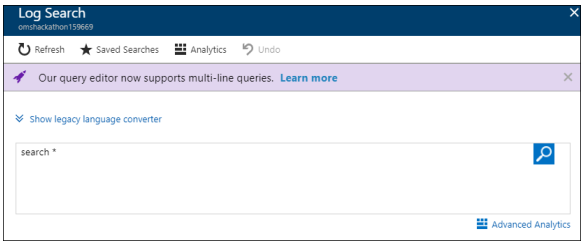


3. Go to your Dashboard and using the link you just created, open **Log Analytics**
4. Hover your mouse over the ellipse (...) of the Log Search tile, then click **Pin to dashboard**, and it will be added to your **My Dashboard**.



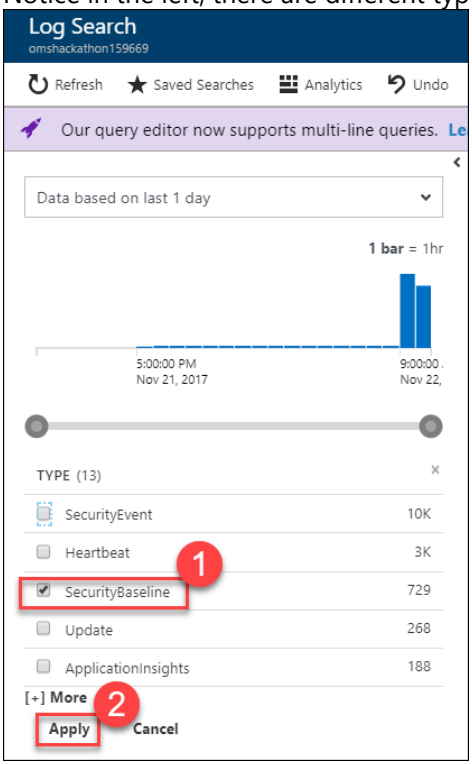
5. Go to your Dashboard and using the link you just created, open **Log Search**

6. In the search field, enter the following query: **search * <enter>**. Notice thousands of records are returned in a very few seconds along with the type of data listed.

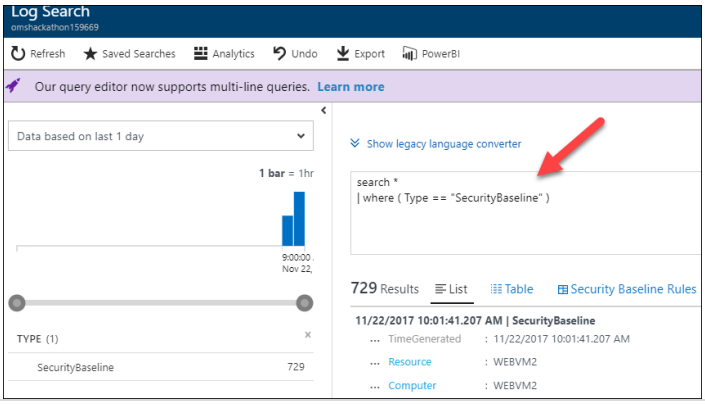


Note: you may have less or more data, but keep in mind, the service has only been collecting data since you began the lab.

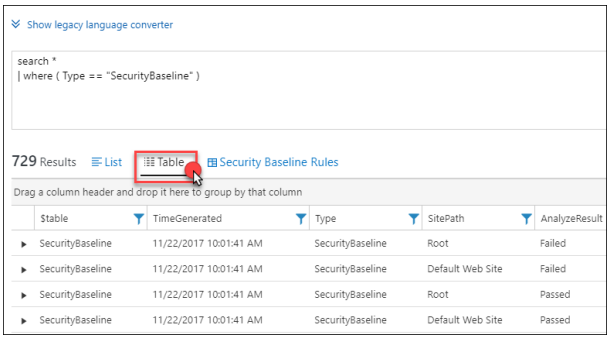
7. Notice in the left, there are different types of data. Click **SecurityBaseline** followed by **Apply**



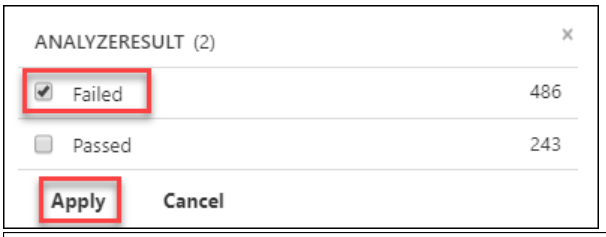
8. Notice the query dialog (where you entered a search * before) has a search string in it querying for the type "SecurityBaseline"

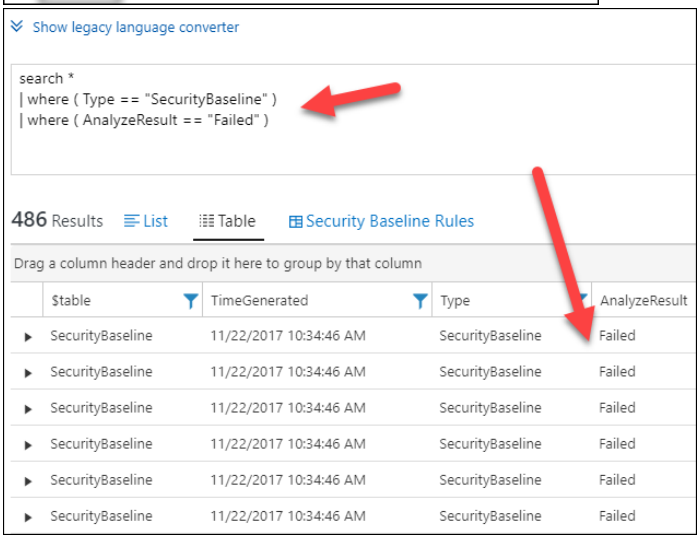


9. As you click on options in Log Search, queries are built automatically. Also, notice the results are paired down to a smaller subset of data. Click on **Table** to view the data in a column and row format.

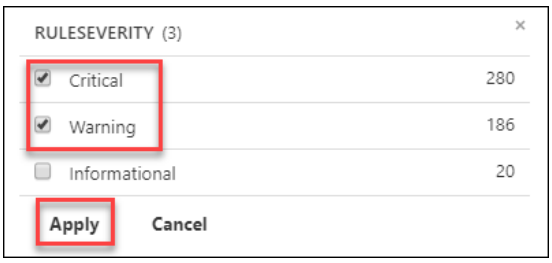


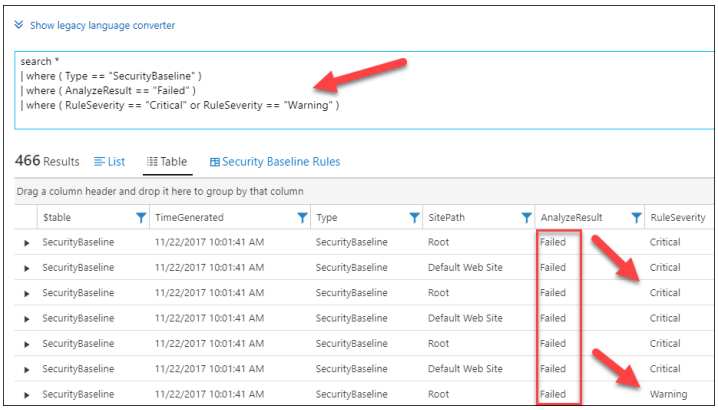
10. This is a list of Security Baseline findings, both passed and failed. Narrow down the list to findings that have failed, and have a severity rating of Warning or Critical. On the left, scroll down to the **ANALYZERESULT** section, and click on **Failed** followed by **Apply**. Notice the query is updated and now, and only Failed is found in the list of the AnalyzeResult column.



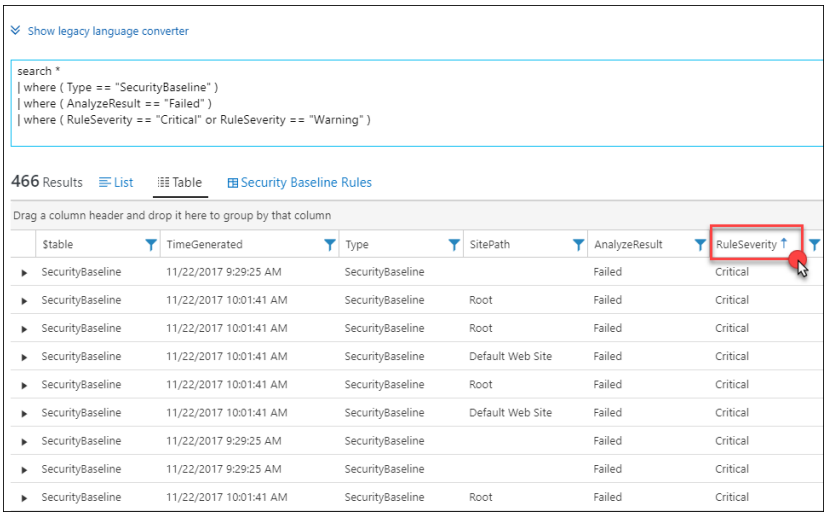


11. Next, find the **RULESEVERITY** section, and place check marks beside the **Critical** and **Warning** Then, click **Apply**. Now, you will see the query again has been updated to include all Failed Results with either Critical or Warning Rule violations.

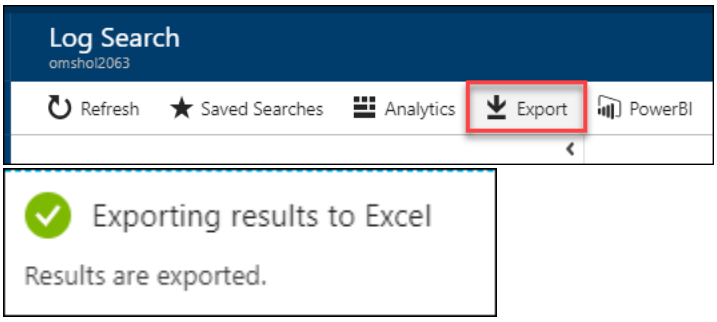




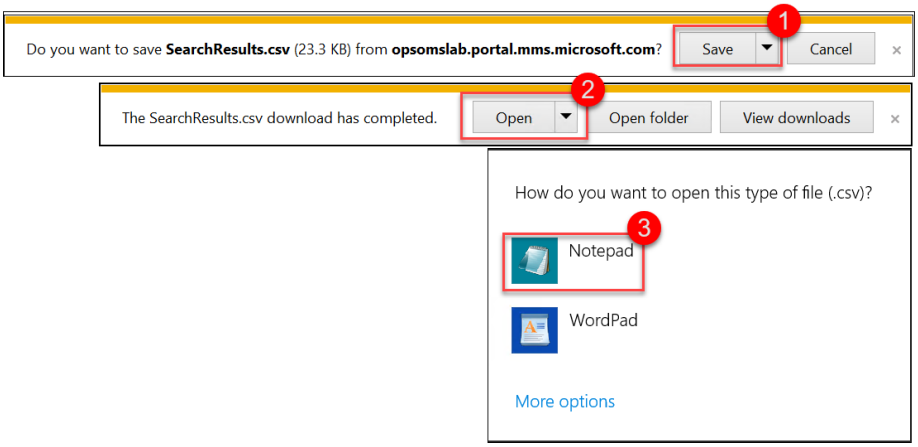
12. Next, sort the findings, so the critical findings are at the top. Click on the column header **RuleSeverity** until the critical findings show up on the top.



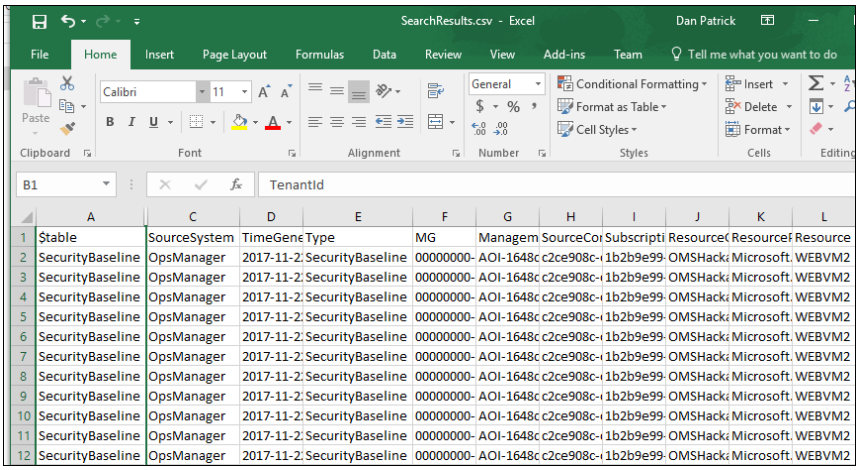
13. Now we will export the list. This may be helpful if we wanted to divide the findings list out amongst administrators, so several people can help remediate the findings. Click on **Export**.



14. Once the report is exported, you are prompted what to do with the file. Click on **Save**. Once completed, click on **Open**. Choose **Notepad** to open the file**.**

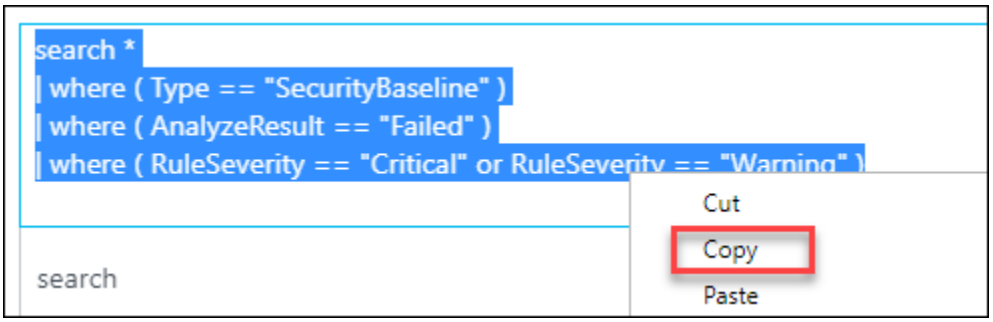


15. Review the text file. Then, close it. You can also copy the file to your local PC and view in Excel.

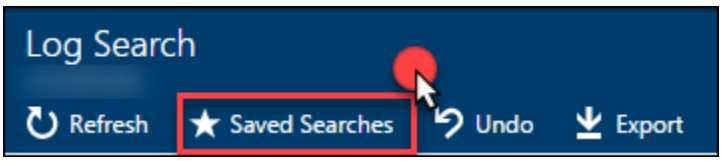


	A	C	D	E	F	G	H	I	J	K	L
1	$table	SourceSystem	TimeGene	Type	MG	Managem	SourceCo	Subscripti	Resource(	Resource	Resource
2	SecurityBaseline	OpsManager	2017-11-2	SecurityBaseline	00000000-	AOI-1648c	c2ce908c-(	1b2b9e99-	OMSHack	Microsoft.	WEBVM2
3	SecurityBaseline	OpsManager	2017-11-2	SecurityBaseline	00000000-	AOI-1648c	c2ce908c-(	1b2b9e99-	OMSHack	Microsoft.	WEBVM2
4	SecurityBaseline	OpsManager	2017-11-2	SecurityBaseline	00000000-	AOI-1648c	c2ce908c-(	1b2b9e99-	OMSHack	Microsoft.	WEBVM2
5	SecurityBaseline	OpsManager	2017-11-2	SecurityBaseline	00000000-	AOI-1648c	c2ce908c-(	1b2b9e99-	OMSHack	Microsoft.	WEBVM2
6	SecurityBaseline	OpsManager	2017-11-2	SecurityBaseline	00000000-	AOI-1648c	c2ce908c-(	1b2b9e99-	OMSHack	Microsoft.	WEBVM2
7	SecurityBaseline	OpsManager	2017-11-2	SecurityBaseline	00000000-	AOI-1648c	c2ce908c-(	1b2b9e99-	OMSHack	Microsoft.	WEBVM2
8	SecurityBaseline	OpsManager	2017-11-2	SecurityBaseline	00000000-	AOI-1648c	c2ce908c-(	1b2b9e99-	OMSHack	Microsoft.	WEBVM2
9	SecurityBaseline	OpsManager	2017-11-2	SecurityBaseline	00000000-	AOI-1648c	c2ce908c-(	1b2b9e99-	OMSHack	Microsoft.	WEBVM2
10	SecurityBaseline	OpsManager	2017-11-2	SecurityBaseline	00000000-	AOI-1648c	c2ce908c-(	1b2b9e99-	OMSHack	Microsoft.	WEBVM2
11	SecurityBaseline	OpsManager	2017-11-2	SecurityBaseline	00000000-	AOI-1648c	c2ce908c-(	1b2b9e99-	OMSHack	Microsoft.	WEBVM2
12	SecurityBaseline	OpsManager	2017-11-2	SecurityBaseline	00000000-	AOI-1648c	c2ce908c-(	1b2b9e99-	OMSHack	Microsoft.	WEBVM2

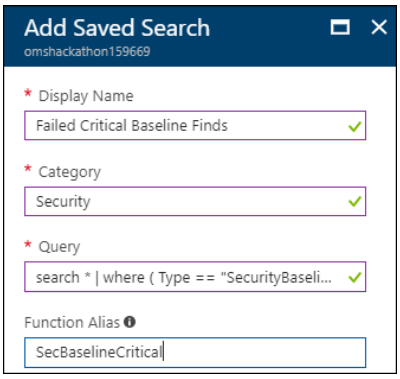
16. Because this is a useful query, we can save it to be able to quickly run it again anytime we wish. First, copy the search query to the clipboard.



17. Click the **Saved Searches** followed by **+Add**



18. Complete the Add Saved Search Blade with this information:
    a. Display Name: **Failed Critical Security Baseline Finds**
    b. Category: **My Security Queries**
    c. Query: paste the query from your clipboard
    d. Function Alias: **SecBaselineCritical**

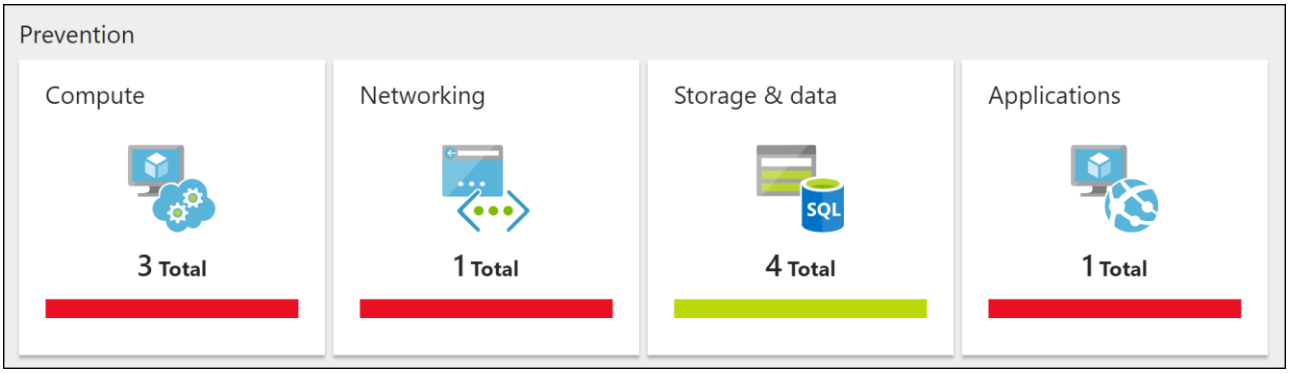


19. Click **OK**

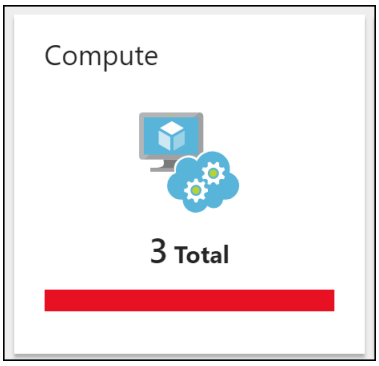
Task: 2 Prevention

In this section, we will use the Security Center Overview screen to review what preventative steps we can take to protect our environment.

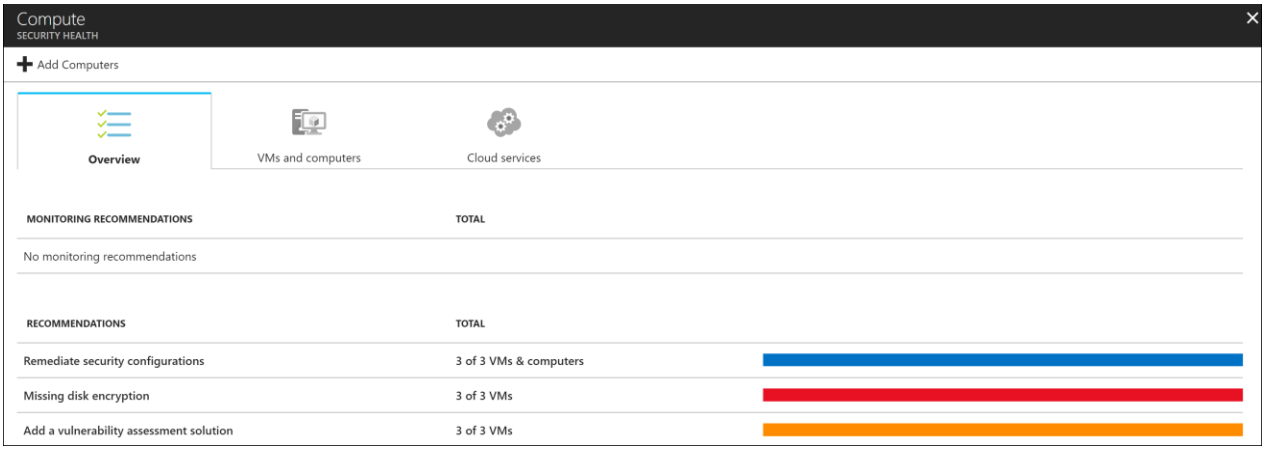
1. Within **Security Center Overview** page, there are four tiles in the middle of the screen under **Prevention**



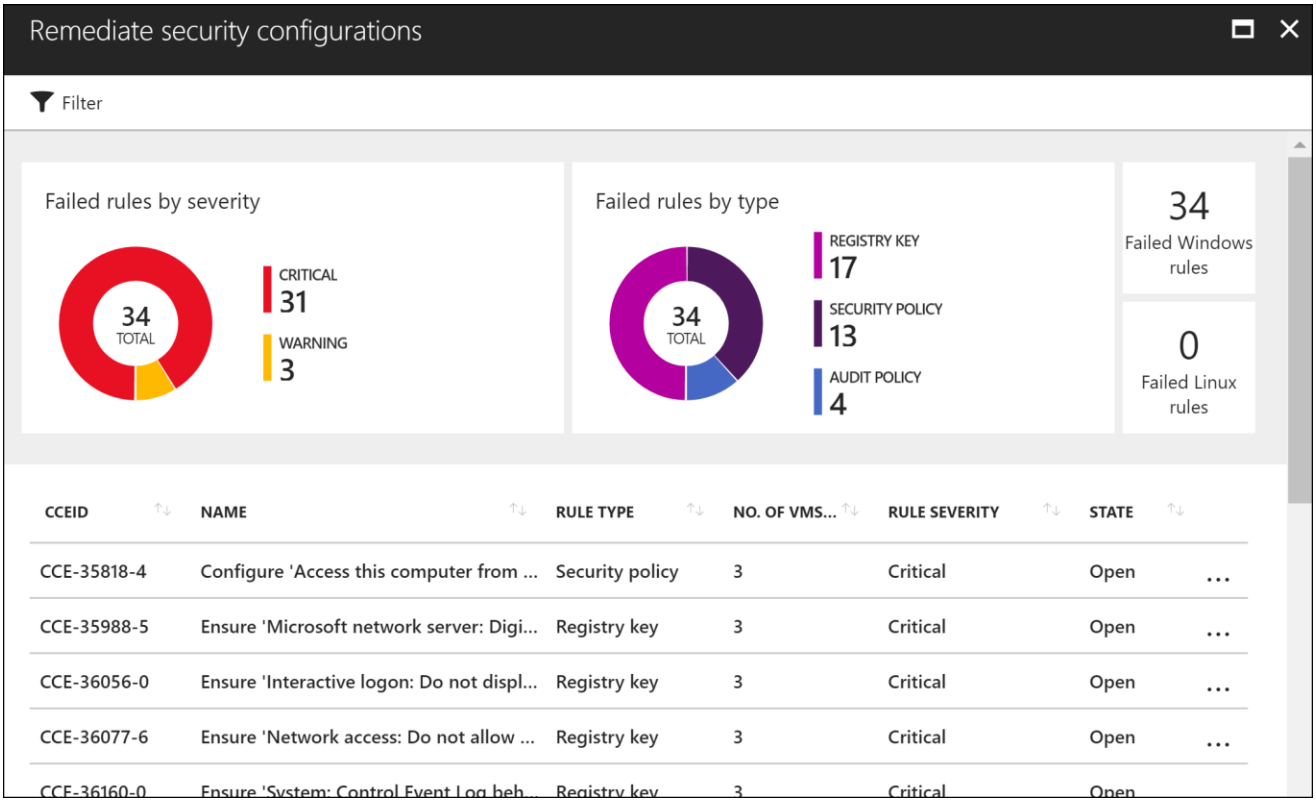
2. Click on the **Compute** tile to drill into the security health of your compute resources

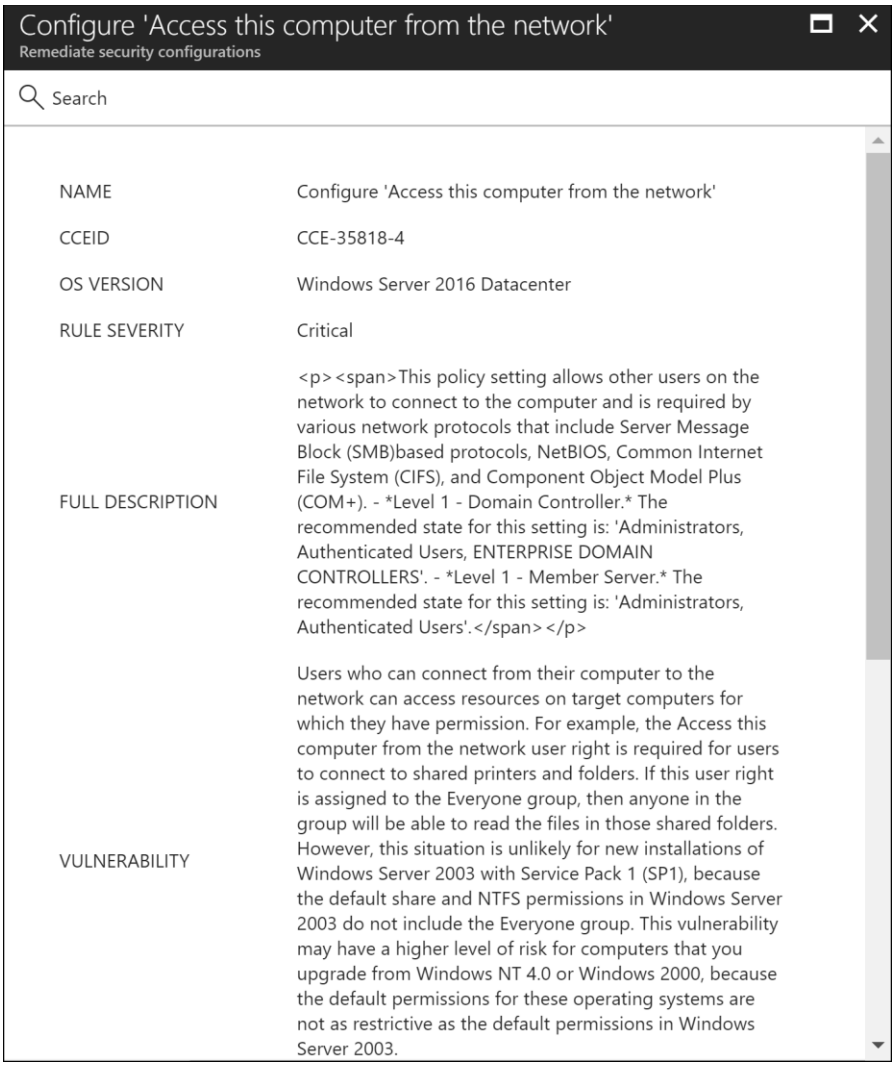


3. Notice there are several recommendations at the bottom of the screen. Let's go ahead and drill into these recommendations. Click on the **Remediate security configuration** item.

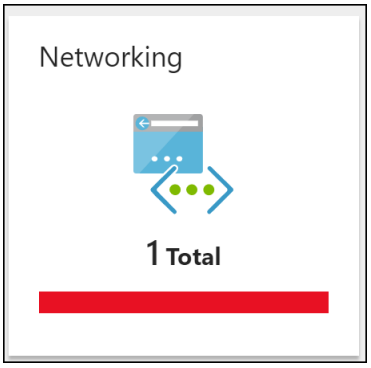


4. This brings up the **Remediate security configurations** panel where we can see there are many configuration items to address. Take some time to explore the items called out in this list. As you click on each item, you'll see more details that allow you better understand the recommendation, the vulnerability, and the potential impact.

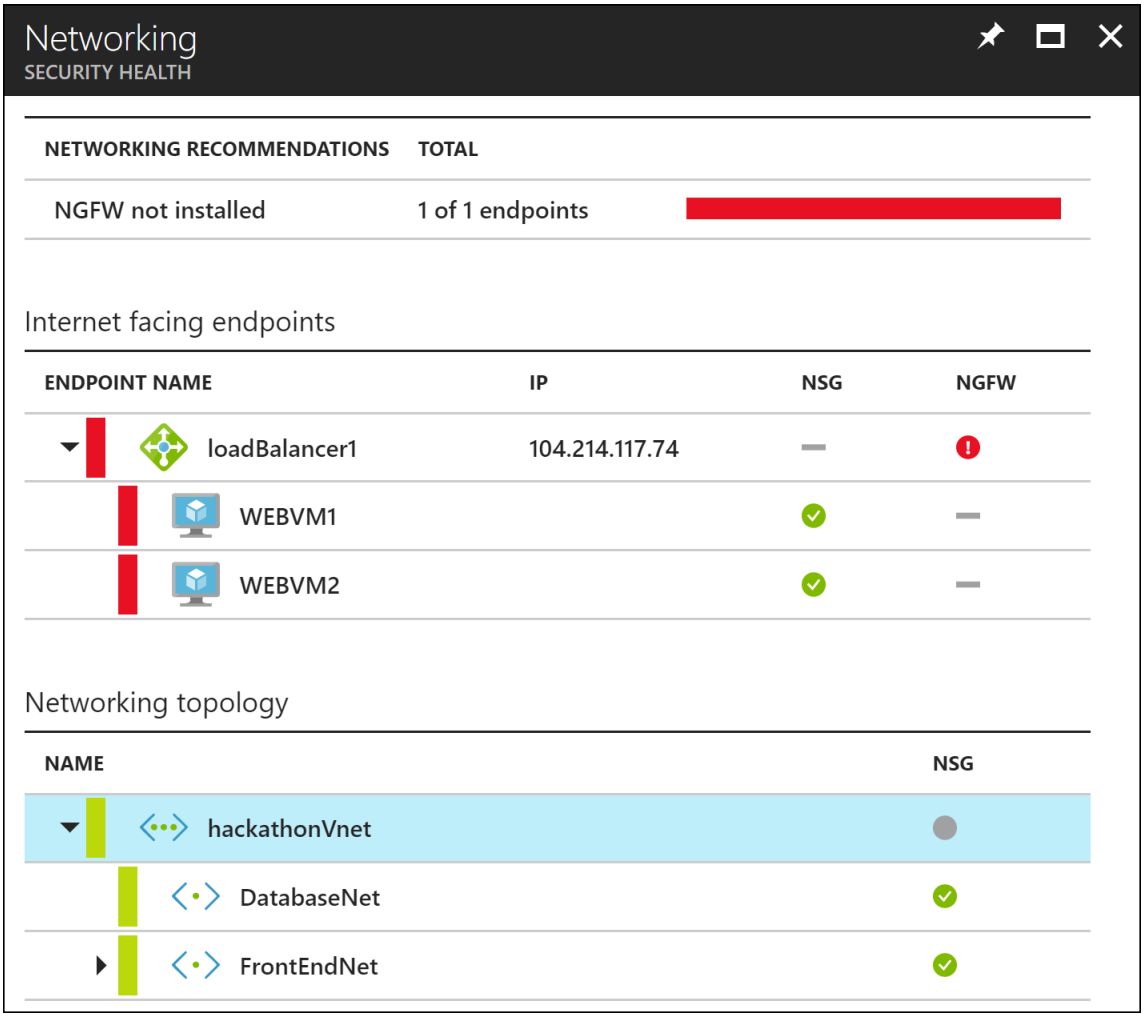




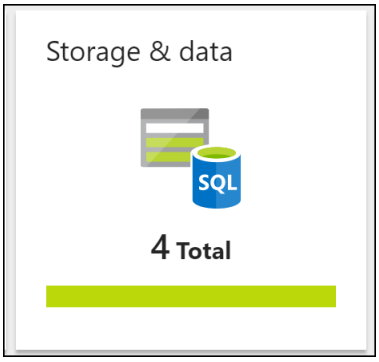
5. Close the panel and navigate back to the **Security Center Overview** page. This time, click on the **Networking** tile to drill into the security health of your networking resources.



6. Based on the details showing in the **Networking Recommendations**, it appears we don't have a Next Generation Firewall installed. We won't implement this recommendation today, but if we wanted to, we could click on the item and implement the recommendation from this panel.

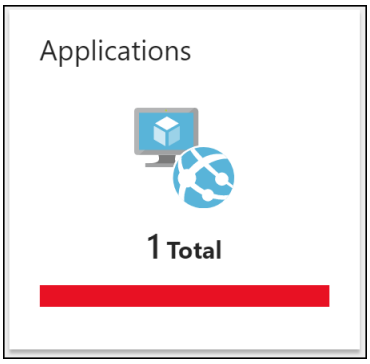


7. Close the panel and navigate back to the **Security Center Overview** screen. This time, click on the **Storage & data** tile.

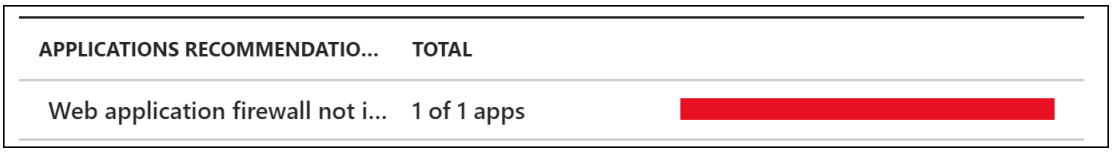


8. Notice this tile is green which is an indication the resources are in a healthy state. Azure Security Center will flag the tile as red if there are critical recommendations that need to be addressed.

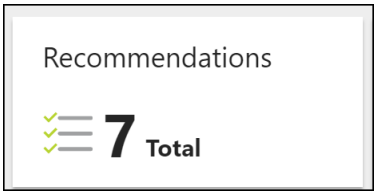
9. As a last step, let's navigate back to the **Security Center Overview** screen and click on the **Applications** tile



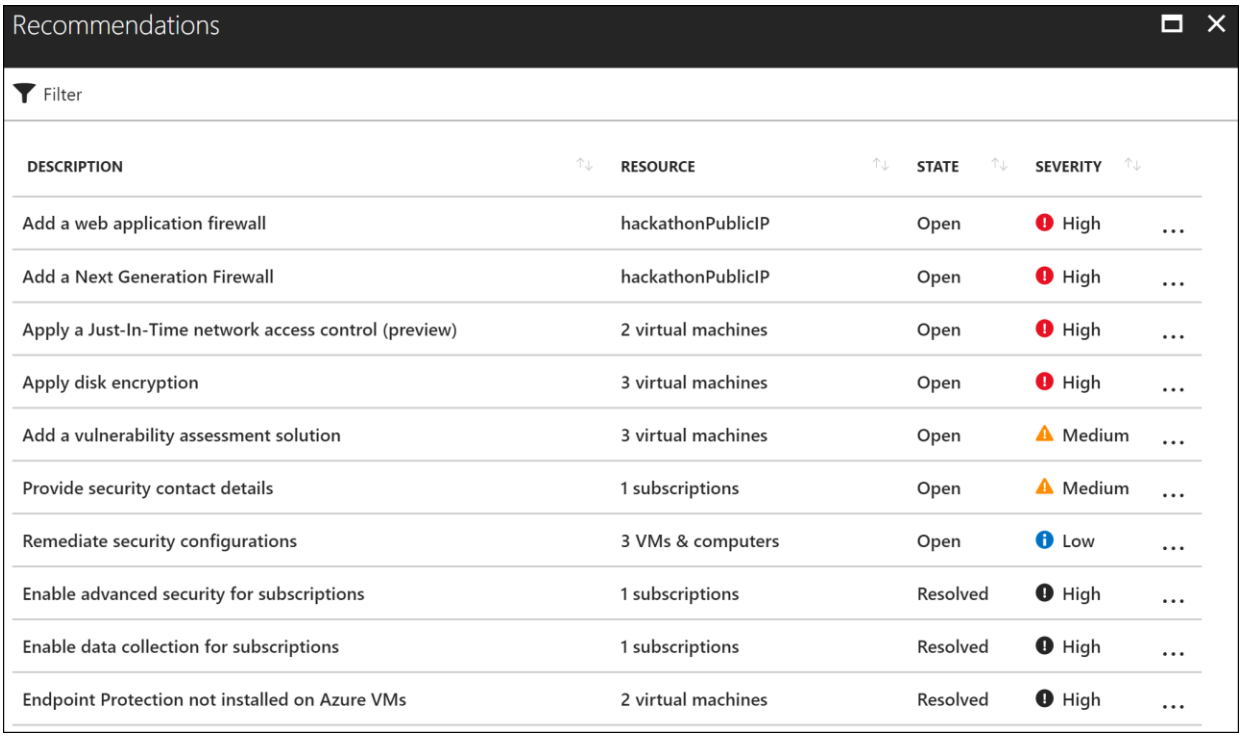
10. As you review the Applications Security Health, notice there's a recommendation to implement a Web application firewall



11. Go ahead and close this panel and return to the **Security Center Overview** page
12. Azure Security Center provides a quick way to see all the recommendations we just saw in a single view. Click on the **Recommendations** tile under the Overview section.



13. This presents the same recommendations you saw by navigating to each resource type in the previous steps. Clicking the ellipse by each of the recommendations will provide you with additional steps you can take to remediate the recommendation.

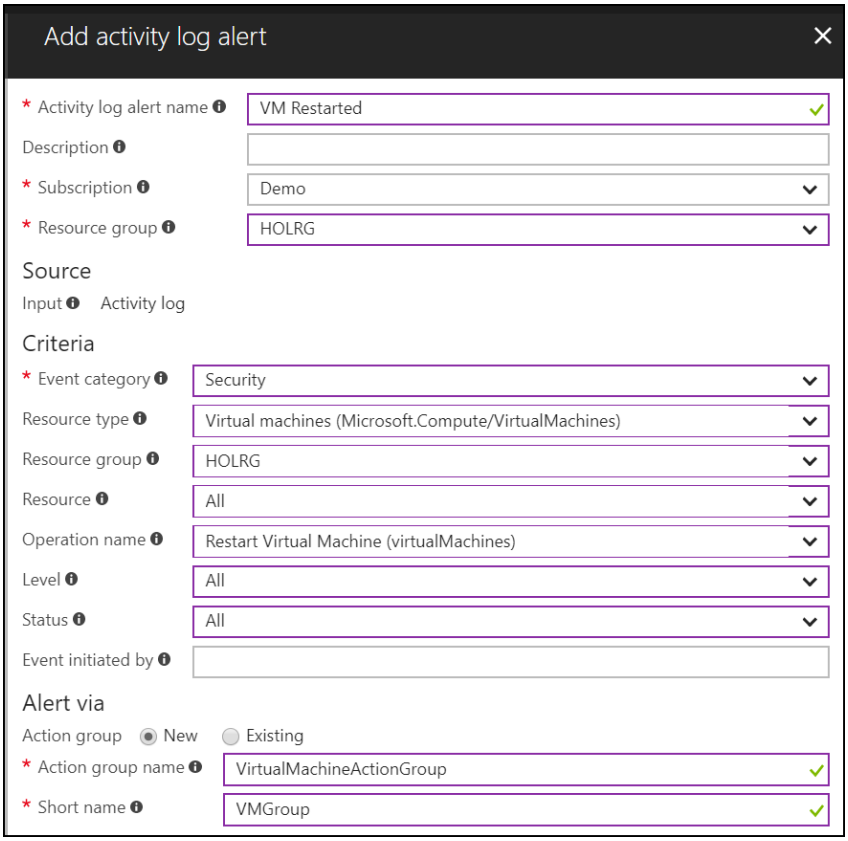


Task 3: Set up a manual activity log alert

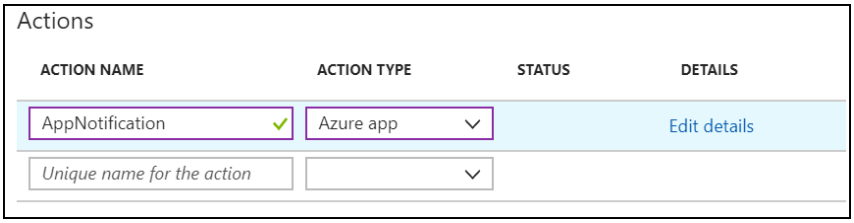
If one of the virtual machines in the resource group were to be restarted, that's a condition you would want to be notified of. In this section, we will set up a manual alert to detect this condition.

1. Navigate to the **HOLRG** resource group
2. Click on the **Alerts** item under the Monitoring section

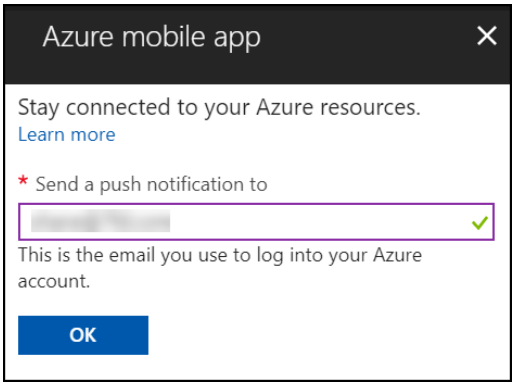
3. Then, click **Add activity log alert** and fill out the form to match the screen shot below for the **Source**, **Criteria**, and **Alert via** sections. We're creating the alert to notify us anytime a virtual machine in the HOLRG is restarted. Note that we are configuring it to notify us via the Azure mobile application which will configure shortly.



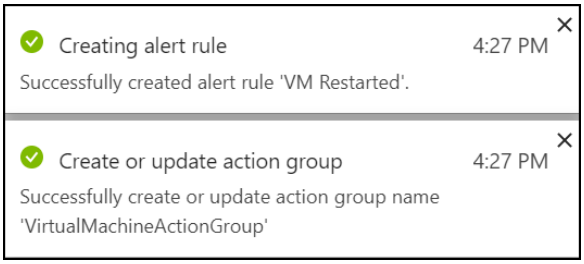
4. In the Actions section, enter a unique name in the **Action Name** field and select the **Action Type** of **Azure app**



5. Selecting the **Azure app** Action Type pops up a panel for entering the recipients email address. This is the same address you will use when you login to the Azure mobile application shortly. This is also the same address you are using to login to your Azure subscription.



6. Confirmation messages will display once the action group and the alert rule have been created successfully

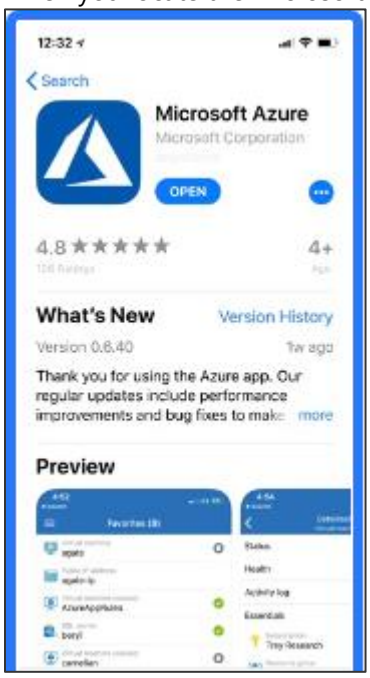


Task 4: Installing & using the Azure mobile application

In this section, you will take your monitoring solution mobile by installing and configuring the OMS Mobile Application.

1. Open the **AppStore** or **Google Play** on your mobile device. Locate the search box and type **Microsoft Azure,** and press enter.

2. When you locate the Microsoft Azure application, install it to your device

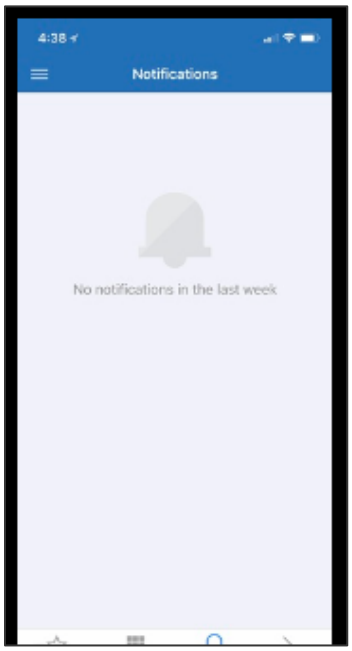


3. Once the application has been installed, you will need to allow the application to send you notifications

4. Next, touch the Sign In Button

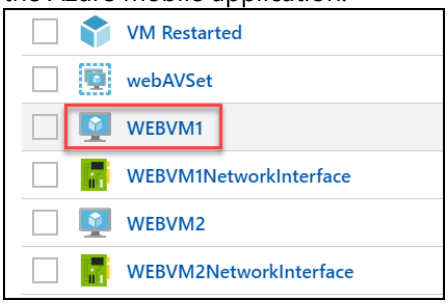
5. Once the login page loads, enter your Azure Credentials

6. Once you are logged into the app, navigate to the Notifications menu to see there are currently no notifications



7. Putting the phone aside for a moment, in your desktop web browser, navigate to the **HOLRG** resource group list in the Azure portal

8. Click on the WEBVM1 that you created earlier. We will restart this virtual machine, which should cause a trigger to the Azure mobile application.



9. Click the **Restart** button the toolbar to restart the virtual machine

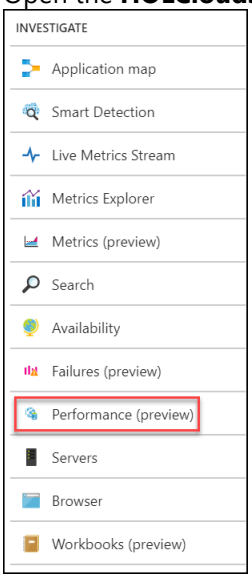
10. Click **Yes** to confirm that you want to restart this virtual machine
11. In a few moments, you will receive an alert through the Azure mobile app that the virtual machine was restarted

Task 5: Application Insights

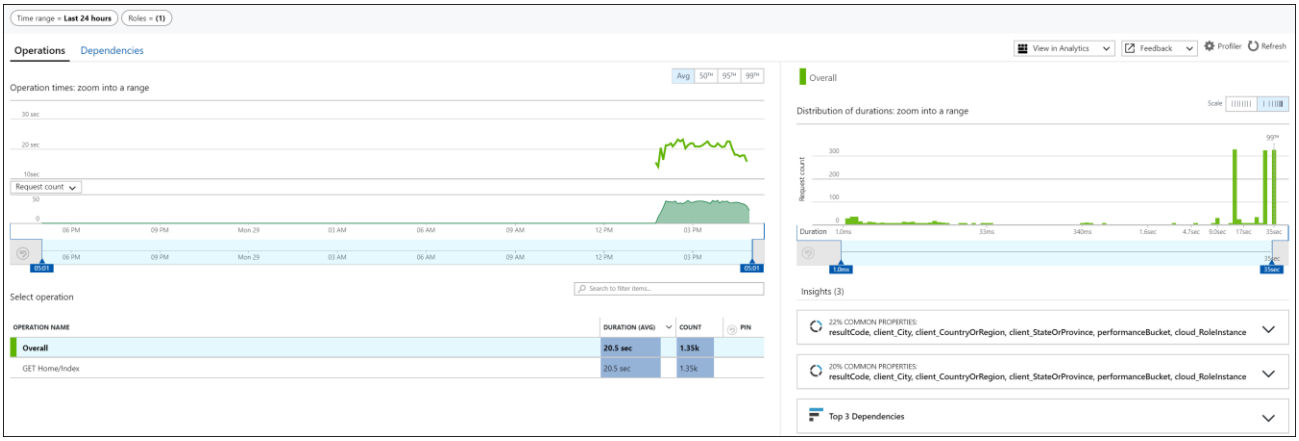
Understanding what is happening within an application can be very challenging, but with the Application Insights configured for CloudShop, there is great telemetry being fed to the Azure Portal. Here, you will investigate that data regarding how the CloudShop is performing.

1. In the **HOLInsights** resource group, locate **HOLCloudShop** Application Insights. **Right-click** the name and click **Pin to Dashboard**.

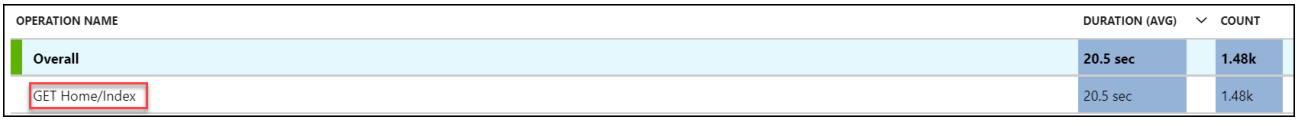
2. Open the **HOLCloudShop.** Then, under the Investigate section, click the **Performance** item**.**



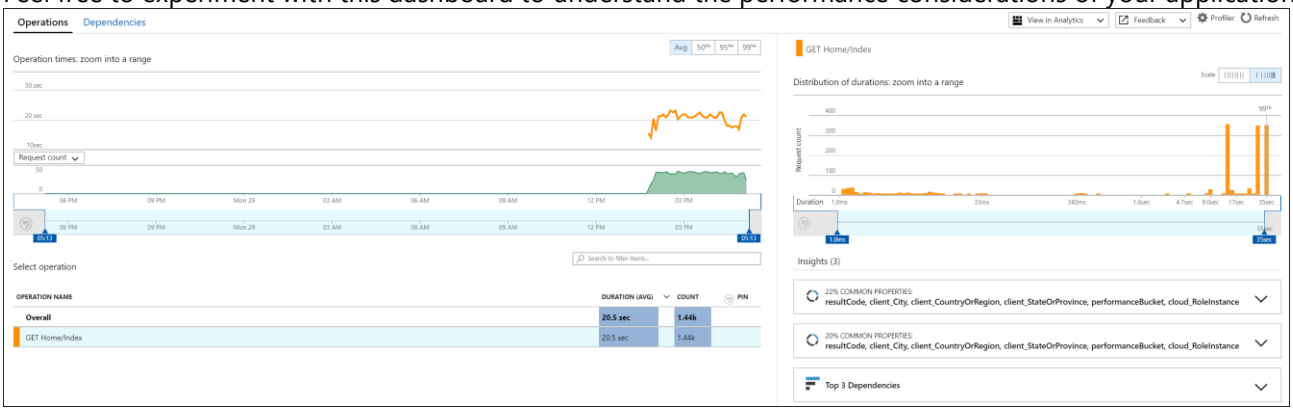
3. The **Performance** feature of Application Insights allows us to get rich performance monitoring and easy to consume dashboards



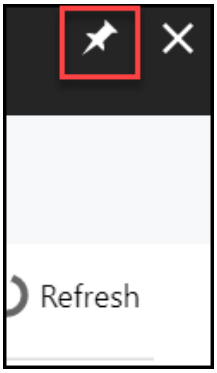
4. This dashboard gives near real-time insight into what's happening with your application. In the screenshot below, you can see this application appears to have a performance issue with the Home/Index page. It appears to be taking 20.5 seconds on average to load. NOTE: Your numbers may not match. By clicking on the GET Home/Index, you will see the other sections of the dashboard will filter to performance data focused on that page.



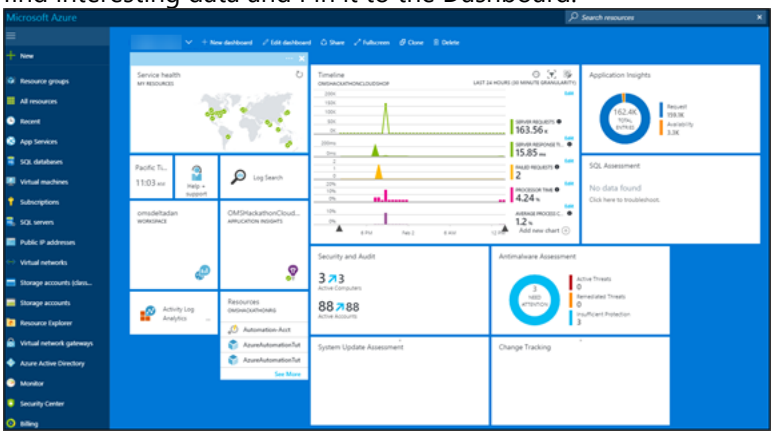
5. Feel free to experiment with this dashboard to understand the performance considerations of your application



6. Pin this dashboard to My Dashboard by clicking on the pin in the top right of the screen



7. At this point, navigate back to **My Dashboard** and click **Edit Dashboard,** and arrange the many tiles you have added to give yourself an all up view of the environment you have built. Feel free to open the various solutions, find interesting data and Pin it to the Dashboard.



Summary

In this exercise, you explored the information and data being provided by Azure Security and Operations Management and Application Insights to gain situational awareness of the application and infrastructure. You looked at the Security Posture of the infrastructure, the performance of applications, and you built a dashboard that can be used to manage it moving forward.

After the hands-on lab

Duration: 10 mins

Overview

In this exercise, attendees will de-provision any Azure resources that were created in support of the lab.

1. Delete the **HOLRG, HOLInsights and OPSLABRG** resource groups.