Networking Lab 11

NSG Flow Logs

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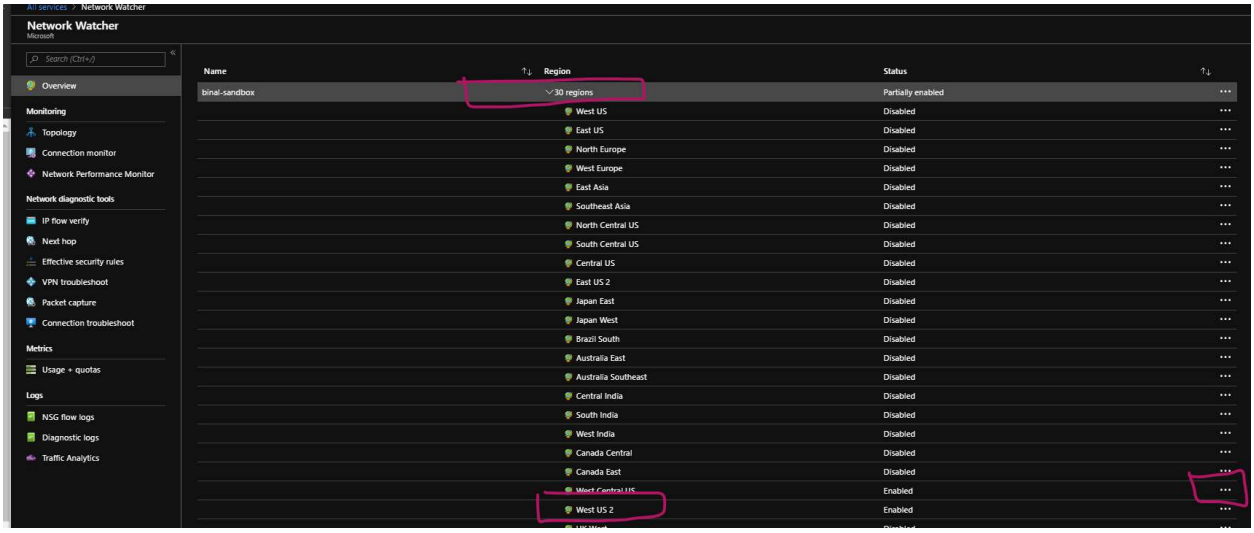
Lab Overview

In this lab, we will enable Network Security groups flow logs to get visibility into the flows to the virtual machines. We will then download and view flow content.

Enable Network Watcher

1. In the portal, select **All services**. In the **Filter box**, enter *Network Watcher*. When **Network Watcher** appears in the results, select it.
2. Select **Regions**, to expand it, and then select **...** to the right of **West US 2**, as shown in the following picture:

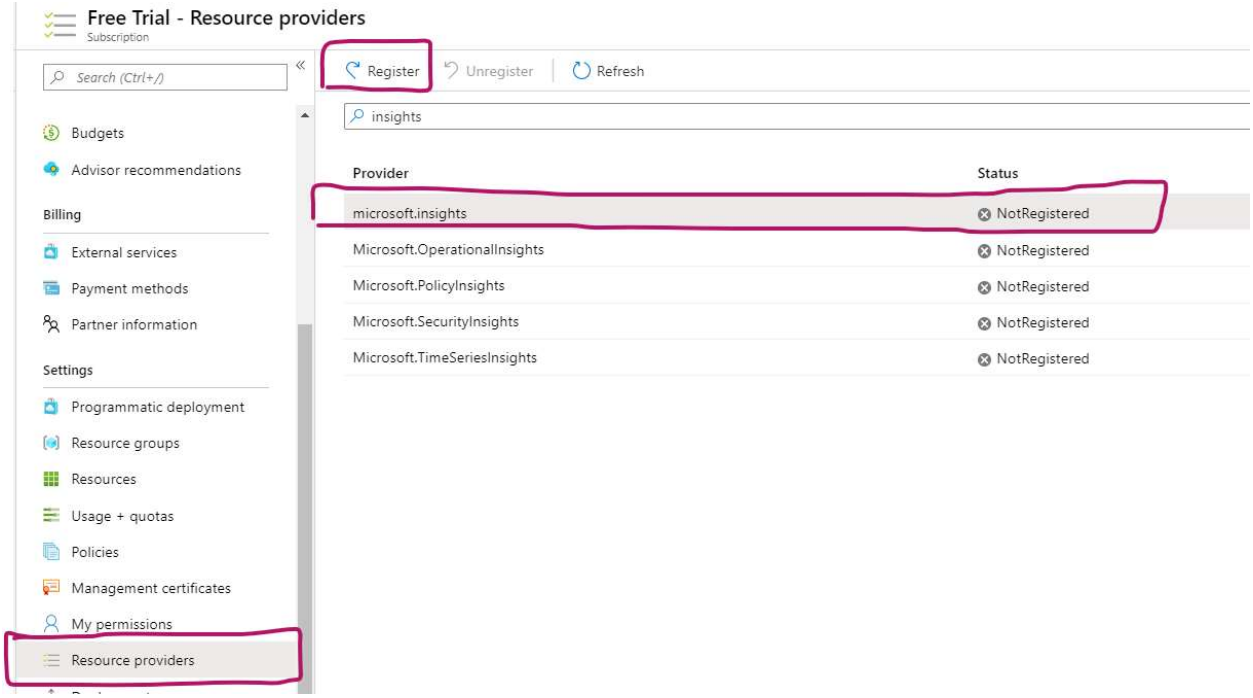


3. Select **Enable Network Watcher**.

Register Insights provider

NSG flow logging requires the **Microsoft.Insights** provider. To register the provider, complete the following steps:

4. In the top, left corner of portal, select **All services**. In the Filter box, type *Subscriptions*. When **Subscriptions** appear in the search results, select it.
5. From the list of subscriptions, select the subscription you want to enable the provider for.
6. Select **Resource providers**, under **SETTINGS**.
7. Confirm that the **STATUS** for the **microsoft.insights** provider is **Registered**, as shown in the picture that follows. If the status is **Unregistered**, then select **Register**, to the right of the provider.



Enable NSG flow log

8. NSG flow log data is written to an Azure Storage account. To create an Azure Storage account, select **+ Create a resource** at the top, left corner of the portal.
9. Select **Storage**, then select **Storage account - blob, file, table, queue**.
10. Click **Add** and configure the following information, accept the remaining defaults, and then select **Create**.

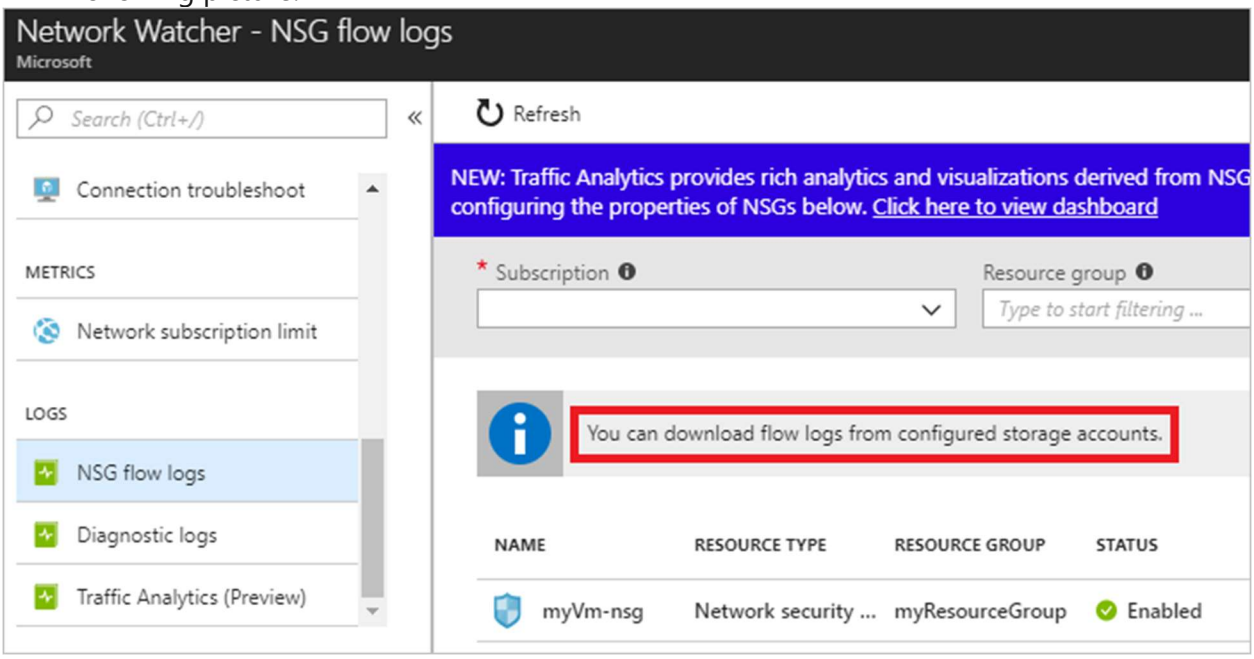
Setting	**Value**
Name	3-24 characters in length, can only contain lowercase letters and numbers, and must be unique across all Azure Storage accounts.
Location	Select **West US 2**
Resource group	Select **rg-lab**

11. In the top, left corner of portal, select **All services**. In the **Filter** box, type *Network Watcher*. When **Network Watcher** appears in the search results, select it.
12. Under **LOGS**, select **NSG flow logs**, as shown in the following picture:
13. From the list of NSGs, select the NSG named **nsg1**.
14. **Flow logs settings**: On
15. **Flow logging version**: Version 1
16. Select the storage account that you created in step 3.
17. **Traffic Analytics Status:** On

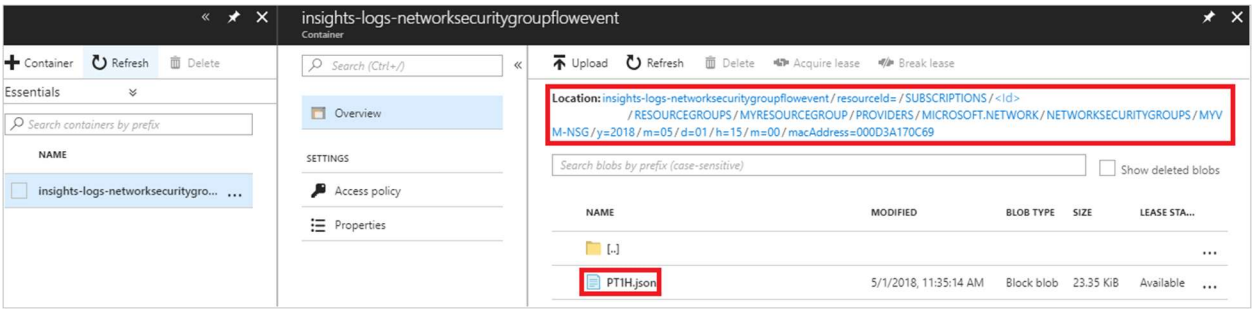
18. **Traffic Analytics processing interval**: Every 10 mins
19. **Log Analytics Workspace**: **+Create New Workspace**
    1. **Log Analytics Workspace**: <give workspace name e.g. nsgflowlogslab>
    2. **Subscription**: Select your subscription
    3. **Resource group**: rg-lab
    4. **Location**: West US 2
    5. **Pricing tier**: Per GB (2018)
20. Click **Save**.
21. Repeat steps 17-26 for nsg **nsg-hub**. Use the same storage account and Log Analytics workspace that you created above.

Download flow log

22. From Network Watcher, in the portal, select **NSG flow logs** under **LOGS**.
23. Select **You can download flow logs from configured storage accounts**, as shown in the following picture:



24. Select the storage account that you configured above.
25. Under **Blob service**, select **Containers**, and then select the **insights-logs-networksecuritygroupflowevent** container.
26. In the container, navigate the folder hierarchy until you get to a PT1H.json file, as shown in the picture that follows. Log files are written to a folder hierarchy that follows the following naming convention: https://{storageAccountName}.blob.core.windows.net/insights-logs-networksecuritygroupflowevent/resourceId=/SUBSCRIPTIONS/{subscriptionID}/RESOURCEGROUPS/{resourceGroupName}/PROVIDERS/MICROSOFT.NETWORK/NETWORKSECURITYGROUPS/{nsgName}/y={year}/m={month}/d={day}/h={hour}/m=00/macAddress={macAddress}/PT1H.json



27. Select **...** to the right of the PT1H.json file and select **Download**.

View flow log

The following json is an example of what you'll see in the PT1H.json file for each flow that data is logged for:

Version 1 flow log event

JSONCopy

```
{
  "time": "2018-05-01T15:00:02.1713710Z",
  "systemId": "<Id>",
  "category": "NetworkSecurityGroupFlowEvent",
  "resourceId":
"/SUBSCRIPTIONS/<Id>/RESOURCEGROUPS/MYRESOURCEGROUP/PROVIDERS/MICROSOFT.NETWORK/NETWORKSECURITYGROUPS/MYVM-NSG",
  "operationName": "NetworkSecurityGroupFlowEvents",
  "properties": {
    "Version": 1,
    "flows": [
      {
        "rule": "UserRule_default-allow-rdp",
        "flows": [
          {
            "mac": "000D3A170C69",
            "flowTuples": [
              "1525186745,192.168.1.4,10.0.0.4,55960,3389,T,I,A"
            ]
          }
        ]
      }
    ]
  }
}
```

Version 2 flow log event

JSONCopy


```
{
  "time": "2018-11-13T12:00:35.3899262Z",
  "systemId": "a0fca5ce-022c-47b1-9735-89943b42f2fa",
  "category": "NetworkSecurityGroupFlowEvent",
  "resourceId": "/SUBSCRIPTIONS/00000000-0000-0000-0000-
000000000000/RESOURCEGROUPS/FABRIKAMRG/PROVIDERS/MICROSOFT.NETWORK/NETWORKS
ECURITYGROUPS/FABRIAKMVM1-NSG",
  "operationName": "NetworkSecurityGroupFlowEvents",
  "properties": {
    "Version": 2,
    "flows": [
      {
        "rule": "DefaultRule_DenyAllInBound",
        "flows": [
          {
            "mac": "000D3AF87856",
            "flowTuples": [
              "1542110402,94.102.49.190,10.5.16.4,28746,443,U,I,D,B,,,,",
              "1542110424,176.119.4.10,10.5.16.4,56509,59336,T,I,D,B,,,,",
              "1542110432,167.99.86.8,10.5.16.4,48495,8088,T,I,D,B,,,,"
            ]
          }
        ]
      },
      {
        "rule": "DefaultRule_AllowInternetOutBound",
        "flows": [
          {
            "mac": "000D3AF87856",
            "flowTuples": [
              "1542110377,10.5.16.4,13.67.143.118,59831,443,T,O,A,B,,,,",
              "1542110379,10.5.16.4,13.67.143.117,59932,443,T,O,A,E,1,66,1,66",
              "1542110379,10.5.16.4,13.67.143.115,44931,443,T,O,A,C,30,16978,24,14008",
              "1542110406,10.5.16.4,40.71.12.225,59929,443,T,O,A,E,15,8489,12,7054"
            ]
          }
        ]
      }
    ]
  }
}
```


The value for **mac** in the previous output is the MAC address of the network interface that was created when the VM was created. The comma-separated information for **flowTuples**, is as follows:

Example data	What data represents	Explanation
1542110377	Time stamp	The time stamp of when the flow occurred, in UNIX EPOCH format. In the previous example, the date converts to May 1, 2018 at 2:59:05 PM GMT.

10.0.0.4	Source IP address	The source IP address that the flow originated from. 10.0.0.4 is the private IP address of the VM you created in Create a VM.
13.67.143.118	Destination IP address	The destination IP address that the flow was destined to.
44931	Source port	The source port that the flow originated from.
443	Destination port	The destination port that the flow was destined to. Since the traffic was destined to port 443, the rule named **UserRule_default-allow-rdp**, in the log file processed the flow.
T	Protocol	Whether the protocol of the flow was TCP (T) or UDP (U).
O	Direction	Whether the traffic was inbound (I) or outbound (O).
A	Action	Whether the traffic was allowed (A) or denied (D).
C	Flow State **Version 2 Only**	Captures the state of the flow. Possible states are **B**: Begin, when a flow is created. Statistics aren't provided. **C**: Continuing for an ongoing flow. Statistics are provided at 5-minute intervals. **E**: End, when a flow is terminated. Statistics are provided.
30	Packets sent - Source to destination **Version 2 Only**	The total number of TCP or UDP packets sent from source to destination since last update.
16978	Bytes sent - Source to destination **Version 2 Only**	The total number of TCP or UDP packet bytes sent from source to destination since last update. Packet bytes include the packet header and payload.
24	Packets sent - Destination to source **Version 2 Only**	The total number of TCP or UDP packets sent from destination to source since last update.
14008	Bytes sent - Destination to source **Version 2 Only**	The total number of TCP and UDP packet bytes sent from destination to source since last update. Packet bytes include packet header and payload.