# AWS Application Discovery Service

## User Guide

# AWS Application Discovery Service: User Guide

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# What Is AWS Application Discovery Service?

AWS Application Discovery Service helps you plan application migration projects by automatically identifying servers, virtual machines (VMs), software, and software dependencies running in your on-premises data centers. Application Discovery Service also collects application performance data, which can help you assess the outcome of your migration. The data collected by Application Discovery Service is securely retained in an AWS-hosted and managed database in the cloud. You can export the data as a CSV or XML file into your preferred visualization tool or cloud-migration solution to plan your migration. For more information, see AWS Application Discovery Service FAQ.

Application Discovery Service offers two modes of operation:

- **Agentless discovery** mode is recommended for environments that use VMware vCenter Server. This mode doesn't require you to install an agent on each host. Agentless discovery gathers server information regardless of the operating systems, which minimizes the time required for initial on-premises infrastructure assessment. Agentless discovery doesn't collect information about software and software dependencies. It also doesn't work in non-VMware environments.
- **Agent-based discovery** mode collects a richer set of data than agentless discovery by using Amazon software, the AWS Application Discovery Agent, which you install on one or more hosts in your data center. The agent captures infrastructure and application information, including an inventory of installed software applications, system and process performance, resource utilization, and network dependencies between workloads. The information collected by agents is secured at rest and in transit to the Application Discovery Service database in the cloud.

We recommend that you use agent-based discovery for non-VMware environments and to collect information about software and software dependencies. You can also run agent-based and agentless discovery simultaneously. Use agentless discovery to quickly complete the initial infrastructure assessment and then install agents on select hosts.

Application Discovery Service integrates with application discovery solutions from AWS Partner Network (APN) partners. Third-party application discovery tools can query Application Discovery Service and write to the Application Discovery Service database using a public API. You can then import the data into either a visualization tool or cloud-migration solution.

> **Important**
> Application Discovery Service doesn't gather sensitive information. All data is handled according to the AWS Privacy Policy. You can operate Application Discovery Service offline to inspect collected data before it is shared with the service.

For more information about the data that Application Discovery Service collects, see AWS Application Discovery Service Components (p. 2).

# AWS Application Discovery Service Components

AWS Application Discovery Service uses a combination of AWS software agents and cloud-based services to identify, map, and store an inventory of the assets in your computing environment.

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## Arsenal

Arsenal is an agent service managed and hosted by AWS that sends data from AWS Application Discovery Agents and the AWS Agentless Discovery Connector to Application Discovery Service in the cloud. The word *arsenal* is included in some URLs and IAM policies.

## Agentless Discovery Components

Agentless discovery uses the AWS Agentless Discovery Connector to communicate with Arsenal. Install the connector as a virtual machine (VM) in your VMware vCenter Server environment using an Open Virtualization Archive (OVA) file. When you start the connector, it registers with Arsenal, and frequently pings Arsenal for configuration information. When you send a command for the connector to start collecting data, it connects to VMWare vCenter Server and collects information about all the VMs and hosts managed by this specific vCenter. The collected data is sent to Arsenal using Secure Sockets Layer (SSL) encryption. The connector is configured to automatically upgrade when new versions of the connector become available. You can change this configuration setting at any time.

### Data Collected During Agentless Discovery

Agentless discovery does not collect information about your applications. It only collects information about your VMware vCenter Server hosts and VMs, including performance data about those hosts and VMs. The information collected by agentless discovery is shown in the following tables. Items in **bold** are only captured if VMware vCenter Server tools are installed. Agentless discovery attempts to collect all the following data; however, in some situations, vCenter might not have the data, as noted in the following tables.

**Inventory Data about VMs in vCenter**

| Data | Data availability |
|---|---|
| Timestamp | Guaranteed |
| **OSType** | If available |
| **SystemRelease** | If available |
| MoRefID<br><br>(Unique vCenter Managed Object Reference ID) | Guaranteed |

| Data | Data availability |
| --- | --- |
| instanceUuid<br><br>(Unique ID for a virtual machine, not for the host system) | If available |
| FolderPath<br><br>(VM folder path in vCenter) | Guaranteed |
| Name<br><br>(Name of the vCenter VM or host) | Guaranteed |
| **Hostname** | If available |
| Hypervisor | Guaranteed |
| Manufacturer | Guaranteed |
| ToolsStatus<br><br>(VMware tools status) | If available |
| HostSystem<br><br>(MoRefId of the VM or host system) | Guaranteed for VM |
| Datacenter<br><br>(MoRefID of the data center where the system is located) | Guaranteed |
| Type<br><br>(Host or VM) | Guaranteed |
| vCenterId<br><br>(Unique vCenter ID) | Guaranteed |
| smBiosId | If available |
| MacAddress | Guaranteed |
| **IpAddress** | If available |
| Network - List<br><br>(A VMware object representation of a network) | If available |
| macAddress<br><br>(For the network) | Guaranteed if the network exists |
| portGroupName<br><br>(For the network) | If available |

| Data | Data availability |
| --- | --- |
| portGroupId<br><br>(For the network) | If available |
| virtualSwitchName | If available |
| Name<br><br>(Network name specified by the user) | If available |
| CPUType<br><br>(vCPU for a VM, actual model for a host) | If available |

### Performance Data for VMs in vCenter

| Data | Guaranteed or If Available |
| --- | --- |
| Timestamp | Guaranteed |
| MoRefID<br><br>(Managed Object Reference ID of the system producing the metrics) | Guaranteed |
| Type<br><br>(Host or VM) | Guaranteed |
| vCenterId<br><br>(Unique ID of the vCenter) | Guaranteed |
| smBiosId | If available |
| PowerState | Guaranteed |
| MemorySize<br><br>(Memory size of the VM/host) | If available |
| MemoryReservation<br><br>(Reservation set for a VM) | If available |
| **ActiveRAM**<br><br>(Average RAM over the polling period) | If available |
| **MaxActiveRam**<br><br>(Max RAM over polling period) | If available |
| NetworkCards | If available |
| Name<br><br>(Name associated with the metrics collected) | If available |

| Data | Guaranteed or If Available |
| --- | --- |
| **BytesReadPerSecond**<br><br>(Average over the polling period) | If available |
| **BytesWrittenPerSecond**<br><br>(Average over the polling period) | If available |
| **TotalUsage**<br><br>(Average transmitted/received over the polling period) | If available |
| **MaxTotalUsage**<br><br>(Max transmitted/received over the polling period) | If available |
| Disks | If available |
| DeviceID<br><br>(Name associated with metrics collected; for a virtual device, it is the SCSI ID) | If available |
| Name | If available |
| Capacity | If available |
| scsi<br><br>(For mapping performance metrics to a virtual disk) | If available |
| BytesReadPerSecond<br><br>(Average over the polling period) | If available |
| BytesWrittenPerSecond<br><br>(Average over the polling period) | If available |
| ReadOpsPerSecond<br><br>(Average over the polling period) | If available |
| WriteOpsPerSecond<br><br>(Average over the polling period) | If available |
| Cpus | If available |
| Name<br><br>(Name associated with the metrics collected) | If available |
| **UsagePct** | If available |
| **UsageMHz**<br><br>(Average over the polling period) | If available |

| Data | Guaranteed or If Available |
|---|---|
| MaxUsageMHz (Max over the polling period) | If available |
| numCores | If available |
| speedMHz | If available |
| reservationMHz<br><br>(Reservation set for a VM) | If available |

# AWS Application Discovery Agent

The AWS Application Discovery Agent is AWS software that you install on on-premises servers and VMs targeted for discovery and migration. Agents run on Linux and Windows and collect server configuration and activity information about your applications and infrastructure. You can also install the agent on Amazon EC2 instances. When you start an agent, it registers with Arsenal and frequently pings the service for configuration information. When you send a command that tells an agent to start collecting data, it collects an extensive amount of data for the host or VM where it resides, including TCP and UDP connections to other hosts or VMs, which can help you map your IT assets without having to install an agent on every host or VM. Agents are configured to upgrade automatically when new versions become available. You can change this configuration setting at any time.

Agents collect information in the following categories and send it to Application Discovery Service using Secure Sockets Layer (SSL) encryption:

- User information (user name, home directory, and so on)
- Group information (name)
- List of installed packages
- List of kernel modules
- All create and stop process events
- DNS queries
- NIC information
- TCP/UDP process listening ports
- TCPV4/V6 connections
- Operating system information
- System performance
- Process performance

After you install agents, you manage them using the Application Discovery Service API. The API includes actions to start and stop agents. You can also retrieve information about agents, including the host name where agents reside, their health, and the version number of each agent. For more information, see the Application Discovery Service API Reference.

> **Note**
> The AWS Application Discovery Agent is a component of Amazon Inspector. The word *inspector* is associated with the AWS agent download site and installation package.

# Processing and Database Components

AWS Application Discovery Agents and the AWS Agentless Discovery Connector send data to Application Discovery Service, which includes a processing component that ingests the data and identifies (maps) IT

assets. The service also includes the AWS Discovery database, a repository for discovered and mapped IT assets called *configuration items*.

Data in the Discovery database is encrypted at rest. Encryption keys for the data are managed using the AWS KMS.

> **Note**
> The AWS Discovery database is not a general purpose, enterprise configuration management database (CMDB). You can't save snapshots of discovered resources or track resource changes. The service does not alert you when resource configurations change. Similarly, though the service does collect performance data, it is not a general purpose, health monitoring solution.

When you use Application Discovery Service, you can specify filters and query specific configuration items in the AWS Discovery database. The service supports server, process, and connection configuration items. This means you can specify a value for the following keys and query your IT assets.

> **Note**
> Server Performance, shown below, is an attribute of Server.

| Server | Process | Connection | ServerPerformance |
|---|---|---|---|
| cpuType | name | sourceIp | numCores |
| hostName | commandLine | sourceProcess | numCpus |
| hypervisor | path | destinationIp | numDisks |
| osName | avgFreeRAMInKB | destinationPort | numNetworkCards |
| osVersion | minFreeRAMInKB | dstProcess | totalDiskSizeInKB |
| transportProtocol | avgDiskReadsPerSecondInKB | dstPort | totalDiskFreeSizeInKB |
| lastReportedTime | | ipVersion | totalRAMInKB |
| avgDiskWritesPerSecondInKB | | | |
| avgDiskReadIOPS | | | |
| avgDiskWriteIOPS | | | |
| maxDiskReadsPerSecondInKB | | | |
| maxDiskWritesPerSecondInKB | | | |
| maxDiskReadIOPS | | | |
| maxDiskWriteIOPS | | | |
| avgNetworkReadsPerSecondInKB | | | |
| avgNetworkWritesPerSecondInKB | | | |
| maxNetworkReadsPerSecondInKB | | | |
| maxNetworkWritesPerSecondInKB | | | |

# Prerequisites

Agentless discovery is compatible only with VMware vCenter Server.

Agent-based discovery is compatible with the following operating systems.

### Linux

- Ubuntu 14
- Amazon Linux 2012.03 or 2015.03
- Centos 6 or 7
- Redhat 6 or 7

### Microsoft Windows

- Windows Server 2012 R2
- Windows Server 2012
- Windows Server 2008 R2

> **Note**
> There is a known issue on servers running Microsoft Windows Server 2008 R2 with Service Pack 1 where agents do not send data to Application Discovery Service. If you plan to run agents on this operating system, install the following hotfix: Availability of SHA-2 Code Signing Support for Windows 7 and Windows Server 2008 R2.

### Firewall Configuration

The AWS Application Discovery Agent requires outbound access to arsenal.us-west-2.amazonaws.com:443. It does not require any inbound ports to be open. Agents also work with transparent web proxies.

# Related Services and Partner Tools

You can use the AWS VM Import/Export tools to import VM images from your local environment into AWS and convert them into ready-to-use Amazon EC2 Amazon Machine Images (AMIs) or instances. For more information, see Importing and Exporting Instances.

You have the flexibility to choose the discovery and migration tools that you need by integrating with AWS Partner tools using the Application Discovery Service API. For more information, see the Application Discovery Service API Reference.

# Accessing Application Discovery Service

Application Discovery Service supports the following command line and programmatic access options:

**AWS Command Line Interface**

The AWS CLI provides commands for a broad set of AWS products. It is supported on Windows, Mac, and Linux. For more information, see AWS Command Line Interface User Guide.

**Application Discovery Service API**

You can use the Application Discovery Service API to manage software agents in your data center, query discovered assets, categorize discovered assets using tags, and export data. Application Discovery Service uses JavaScript Object Notation format (JSON) to send and receive formatted data. JSON presents data in a hierarchy so that both data values and data structure are conveyed simultaneously. For more information, see the Application Discovery Service API Reference.

### AWS SDKs and tools

If you prefer to build applications using language-specific APIs instead of submitting a request over HTTP or HTTPS, AWS provides libraries, sample code, tutorials, and other resources for software developers. These libraries provide basic functions that automate tasks such as cryptographically signing your requests, retrying requests, and handling error responses, making it is easier for you to get started. For more information, see Tools for Amazon Web Services.

# Limitations

Application Discovery Service has the following limitations for agentless and agent-based discovery.

### Agentless discovery

The service limits you to 10 GB of data per day. If you reach this limit, the service won't process any more data for that day. If you frequently reach this limit, contact AWS Support about extending the limit.

### Agent-based discovery

Agent-based discovery currently has the following limitations.

- The AWS Application Discovery Agent does not support Linux environments with non-standard Ethernet naming conventions. The system requires an eth0 adapter.
- The service enforces the following maximum limits:
  - 250 active agents (agents that are collecting and sending data to Application Discovery Service in the cloud).
  - 10,000 inactive agents (agents that are responsive but not collecting data).
  - 10 GB of data per day (collected by all agents associated with a given AWS account).
  - 90 days of data storage (after which the data is purged).

# Setting Up AWS Application Discovery Service

This section describes the steps required to set up Application Discovery Service.

> **Note**
> You need to provide your AWS account when you request access to Application Discovery Service. If you don't have an account, open https://aws.amazon.com/, choose **Create an AWS Account**, and follow the instructions provided.

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## Request Access

Before you can use AWS Application Discovery Service, you must create an AWS account and configure access permissions for that account. AWS partners and customers must also submit a request to be whitelistedin order to gain access to Application Discovery Service. When we receive the request, we send you detailed information about how to get started with the service.

## Create and Configure an IAM User

Services in AWS, such as Application Discovery Service, require that you provide credentials when you access them, so that the service can determine whether you have permission to access its resources. We don't recommend that you access AWS using the credentials for your AWS account; we recommend that you use AWS Identity and Access Management (IAM) instead. Create an IAM user, and then add the user

to an IAM group with administrative permissions and grant this user administrative permissions. You can then access AWS using a special URL and the credentials for the IAM user.

For more information about setting up an IAM administrator, see Creating Your First IAM Admin User and Group. For information about IAM, see What Is IAM?

# Attach Required IAM User Policies

Application Discovery Service uses the following IAM managed policies to control access to the service or components of the service. For information about how to attach managed policies to an IAM user account, see Working with Managed Policies.

**AWSApplicationDiscoveryServiceFullAccess**

Grants the IAM user account access to the Application Discovery Service API. With this policy, the user can configure Application Discovery Service, start and stop agents, start and stop agentless discovery, and query data from the AWS Discovery Service database. This policy also grants the user access to Arsenal. Arsenal is an agent service managed and hosted by AWS that forwards data to Application Discovery Service in the cloud.

**AWSApplicationDiscoveryAgentAccess**

Grants the AWS Application Discovery Agent access to register and communicate with Application Discovery Service. This policy needs to be attached to any user whose credentials are to be used by an AWS Application Discovery Agent.

**AWSAgentlessDiscoveryService**

Grants the AWS Agentless Discovery Connector running in your VMware vCenter Server access to register, communicate with, and share connector health metrics with Application Discovery Service. This policy needs to be attached to any user whose credentials are to be used by the connector.

**Note**
The `AWSAgentlessDiscoveryService` policy uses the following API actions: `awsconnector:RegisterConnector` and `awsconnector:GetConnectorHealth`. For more information , see API Actions of the AWSAgentlessDiscoveryService IAM Policy (p. 13).

Each of the Application Discovery Service managed policies is shown here so that you can customize them as needed.

**AWSApplicationDiscoveryServiceFullAccess**

```
{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Effect": "Allow",
            "Action": [
                “discovery:*"
            ],
            "Resource": "*"
        }
    ]
}
```

**AWSApplicationDiscoveryAgentAccess**

```
{
```

```
    "Version": "2012-10-17",
    "Statement": [
        {
            "Effect": "Allow",
            "Action": [
                "arsenal:RegisterOnPremisesAgent"
            ],
            "Resource": "*"
        }
    ]
}
```

**AWSAgentlessDiscoveryService**

```
{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Effect": "Allow",
            "Action": [
                "awsconnector:RegisterConnector",
                "awsconnector:GetConnectorHealth"
            ],
            "Resource": "*"
        },
        {
            "Effect": "Allow",
            "Action": "iam:GetUser",
            "Resource": "*"
        },
        {
            "Effect": "Allow",
            "Action": [
                "s3:GetObject",
                "s3:ListBucket"
            ],
            "Resource": [
                "arn:aws:s3:::connector-platform-upgrade-info/*",
                "arn:aws:s3:::connector-platform-upgrade-info",
                "arn:aws:s3:::connector-platform-upgrade-bundles/*",
                "arn:aws:s3:::connector-platform-upgrade-bundles",
                "arn:aws:s3:::connector-platform-release-notes/*",
                "arn:aws:s3:::connector-platform-release-notes",
                "arn:aws:s3:::prod.agentless.discovery.connector.upgrade/*",
                "arn:aws:s3:::prod.agentless.discovery.connector.upgrade"
            ]
        },
        {
            "Effect": "Allow",
            "Action": [
                "s3:PutObject",
                "s3:PutObjectAcl"
            ],
            "Resource": [
                "arn:aws:s3:::import-to-ec2-connector-debug-logs/*"
            ]
        },
        {
            "Effect": "Allow",
            "Action": [
                "SNS:Publish"
            ],
            "Resource": "arn:aws:sns:*:*:metrics-sns-topic-for-*"
        },
        {
```

```
            "Sid": "Discovery",
            "Effect": "Allow",
            "Action": [
                "Discovery:*"
            ],
            "Resource": "*"
        },
        {
            "Sid": "arsenal",
            "Effect": "Allow",
            "Action": [
                "arsenal:RegisterOnPremisesAgent"
            ],
            "Resource": "*"
        }
    ]
}
```

## API Actions of the AWSAgentlessDiscoveryService IAM Policy

The `AWSAgentlessDiscoveryService` IAM policy uses `awsconnector:RegisterConnector` and `awsconnector:GetConnectorHealth` to grant the AWS Agentless Discovery Connector access to register, communicate with, and share connector health metrics with Application Discovery Service. More specifically, these API actions perform the following operations and return the following errors:

```
<operation name="RegisterConnector">
    <input target="RegisterConnectorRequest" /> Request type for RegisterConnector API.
    <output target="RegisterConnectorResponse" /> Response type for RegisterConnector API.
    <member name="snsTopicArn" target="String" /> Metrics SNS topic arn that is created/
whitelisted for caller.
    <error target="AuthenticationFailureException" /> This exception is thrown if the
 credentials passed in the request could not be validated or user is not authorized to
 perform the operation.
    <error target="ServerInternalErrorException" /> This exception is thrown if there is
 erroneous logic in the service. It also includes all service dependency exceptions.
    <error target="ServiceUnavailableException" /> The request has failed due to a
 temporary failure of the server.
    <error target="ServerThrottleException" /> This exception is thrown if maximum number
 of request(for a given API) from an IAM user has been reached.
    <error target="InvalidParameterException" /> The request is missing required
 parameter(s) or has invalid parameter(s).
</operation>

<operation name="GetConnectorHealth">
    <input target="GetConnectorHealthRequest" /> Request type for GetConnectorHealth API.
    <member name="connectorId" target="String" /> Connector Id that will be used to verify
 identity of caller.
    <output target="GetConnectorHealthResponse" /> Response type for GetConnectorHealth
 API.
    <member name="serviceHealthList" target="ServiceHealthList" /> Contains all services'
 health information.
    <member target="ServiceHealth" /> The object that contains all health information for a
 given service.
    <member name="serviceName" target="String" /> The name of the service which was using
 connector health metrics publisher.
    <member name="healthList" target="HealthList" /> The list of health for the given
 service.
    <member target="Health" /> The object that represent a unique health metric that was
 published from the connector.
    <error target="AuthenticationFailureException" /> This exception is thrown if there is
 erroneous logic in the service. It also includes all service dependency exceptions.
```

```
    <error target="ServiceUnavailableException" /> The request has failed due to a
 temporary failure of the server.
    <error target="ServerThrottleException" /> This exception is thrown if maximum number
 of request(for a given API) from an IAM user has been reached.
    <error target="InvalidParameterException" /> The request is missing required
 parameter(s) or has invalid parameter(s).
</operation>

<structure name="Health"> The object that represent a unique health metric that was
 published from the connector.
    <member name="name" target="String" /> The name of the health that corresponds to
 "metric" field in Connector Metrics Publisher. The value of name is not user visible label
 that will show in Connector dashboard.
    <member name="value" target="String" /> The value for the health metric. It's a json
 that contains more information about how a health will display in connector dashboard.
    <member name="lastChecked" target="TimeStamp" /> The publish time for the last received
 metric.
</structure>
```

## Create a Key Pair

To use Application Discovery Service with EC2 instances, you must create a key pair. AWS uses public-key cryptography (key pairs) to secure the login information for EC2 instances.

If you haven't created a key pair already, you can create one using the Amazon EC2 console. Note that if you plan to launch instances in multiple regions, you'll need to create a key pair in each region. For more information about regions, see Regions and Availability Zones (Linux).

For more information, see Amazon EC2 Key Pairs.

# Set Up Agentless Discovery

To set up agentless discovery, you must deploy the AWS Agentless Discovery Connector virtual appliance on a VMware vCenter Server host in your on-premises environment. After you deploy the virtual appliance, you must configure the connector using the web-based console.

## Deploying the AWS Agentless Discovery Connector Virtual Appliance

Before you can download the AWS Agentless Discovery Connector virtual appliance, you must register with AWS to be whitelisted. You will receive information about how to download the virtual appliance (as an Open Virtualization Archive (OVA) file) after you register with AWS.

**To deploy the connector virtual appliance**

1. Sign in to vCenter as a VMware administrator.
2. Choose **File**, **Deploy OVF Template**. Enter the URL that was sent to you after you completed the registration and complete the wizard.
3. On the **Disk Format** page, select one of the thick provision disk types. We recommend that you choose **Thick Provision Eager Zeroed**, because it has the best performance and reliability. However, it requires several hours to zero out the disk. Do not choose **Thin Provision**. This option makes deployment faster but significantly reduces disk performance. For more information, see Types of supported virtual disks in the VMware documentation.
4. Locate and open the context (right-click) menu for the newly deployed template in the vSphere client inventory tree and choose **Power**, **Power On**. Open the context (right-click) menu for the template

again and choose **Open Console**. The console displays the IP address of the connector console. Save the IP address in a secure location. You'll need it to complete the connector setup process.

## Configuring the AWS Agentless Discovery Connector

To finish the setup process, open a web browser and complete the following procedure.

**To configure the connector using the console**

1. In a web browser, type the following URL in the address bar: https://*ip_address*/, where *ip_address* is the IP address of the connector console that you saved earlier.
2. In **Step 1: License agreement**, read and accept the agreement and choose **Next**.
3. In **Step 2: Create a password**, type a strong password for access to the connector and choose **Next**.
4. In **Step 3: Network information**, read the information provided and configure network settings.
5. In **Step 4: Log uploads and upgrades**, select the right options and choose **Next**.
6. In **Step 5: Discovery Connector setup**, choose **Configure vCenter credentials**.
    a. For **vCenter IP address**, type the IP address of your VMware vCenter Server host.
    b. For **vCenter username**, type the name of a local or domain user that the connector uses to communicate with vCenter. For domain users, use the form *domain\username* or *username@domain*.
    c. For **vCenter password**, type the user password.
    d. Choose **Ignore security certificate** to bypass SSL certificate validation with vCenter. Choose **Save**.
7. Choose **Configure AWS credentials** and type the credentials for the IAM user who is assigned the `AWSAgentlessDiscoveryService` IAM policy that you created in Attach Required IAM User Policies (p. 11). Choose **Save**.
8. Choose **Configure where to publish data** and select the publishing options. Choose **Save**.

    **Note**
    After you complete this initial setup, you can access connector settings by using SSH and the connector IP address: root@*Connector_IP_address*. The default user name is ec2-user and the default password is ec2pass. We strongly encourage you to change the value of the default user name and password.

You've completed the setup process and are ready to start using agentless discovery with Application Discovery Service. You can use the Application Discovery Service command line interface (CLI) to start collecting data, manage the service, tag and query configuration items, and export data. You can export data as a CSV or an XML file to an Amazon S3 bucket or an application that enables you to view and evaluate the data. For an example of how to use the API, see AWS Application Discovery Service CLI Walkthrough (p. 27). For more information about the Application Discovery Service API, see the Application Discovery Service API Reference.

# Set Up AWS Application Discovery Agents

The AWS Application Discovery Agent is AWS software that you install on on-premises servers and virtual machines (VMs) that you can target for discovery and migration. Agents run on Linux and Windows servers and collect configuration and activity information about your applications and infrastructure. Agents send this data to Application Discovery Service using Secure Sockets Layer (SSL) encryption. Several minutes after you instruct agents to start collecting data, Application Discovery Service receives the data and begins to process connections and discover dependencies. Discovered IT assets are called *configuration items*.

For more information about the AWS Application Discovery Agent, see AWS Application Discovery Service Components (p. 2).

# Before You Begin

If you installed a Linux preview version of the AWS Application Discovery Agent, you must uninstall it or you won't be able to install the current version. This does not apply to the agent for Windows. Use the following command to download the removal script to your Linux instance or server:

```
curl -O https://d1wk0tztpsntt1.cloudfront.net/linux/latest/remove_preview_agent
```

To remove the preview agent, run the following command:

```
sudo ./remove_preview_agent
```

# Installing the AWS Application Discovery Agent

When you are ready to install the AWS Application Discovery Agent in an on-premises data center, work with application owners to identify the IP address or DNS name of at least one of the server or VM workloads hosting the application. With the help of the application's operations team, install an AWS Application Discovery Agent within that workload. The agent identifies the servers or VMs that communicate with the workload and report the data to Application Discovery Service. You can then install agents on one or more of these servers to discover their dependencies. Iterate through this process until you have discovered all of the application dependencies.

> **Important**
> Only certified AWS partners can download the installer from the Amazon Partner Network. If you are an AWS partner who wants to join the list of certified partners, contact the Application Discovery Service team through the APN program.

Topics



## On-Premises Installation for Microsoft Windows

Use the following procedure to install an AWS Application Discovery Agent on a Windows-based VM or server in your data center.

### To install the AWS Application Discovery Agent in your data center

1. Download the agent installer to a host server or VM.
2. Open a command prompt as an administrator and navigate to the location where you saved the installation package.
3. Run the following command to install the agent:

```
DiscoveryAgentInstall.exe REGION=us-west-2
```

> **Note**
> The AWS Application Discovery Agent automatically downloads and applies updates as they become available. If you don't want agents to download and apply updates automatically, then run the following command when you install the agent:

```
DiscoveryAgentInstall.exe REGION=us-west-2 AUTOUPDATE=No
```

4. Open the %SystemRoot%\system32\config\systemprofile\.aws\credentials file and specify your AWS credentials. If you do not locate the file, you must create it. Specify credentials in the following format:

```
[default]
aws_access_key_id=AKIAIOSFODNN7EXAMPLE
aws_secret_access_key=wJalrXUtnFEMI/K7MDENG/bPxRfiCYEXAMPLEKEY
```

   **Note**
   The IAM policy attached to your AWS account must have access to Application Discovery Service resources. For more information, see Attach Required IAM User Policies (p. 11).

5. Update your firewall settings. The AWS Application Discovery Agent requires outbound access to arsenal.us-west-2.amazonaws.com:443. It does not require any inbound ports to be open. Agents also work with transparent web proxies.

Use the following procedure to verify the agent installation.

### To verify that the AWS Application Discovery Agent is running

1. On the EC2 instance where you installed the AWS Application Discovery Agent, open a command prompt with administrator permissions and navigate to C:/Program Files/Amazon Web Services/Aws Agent.
2. Run the following command:

```
AWSAgentStatus.exe
```

   This command returns the status of the currently running agent, or an error stating that the agent cannot be contacted.

To start or stop an AWS Application Discovery Agent, use Windows Services Manager to start or stop the AWS Agent service and the AWS Agent Updater service. To uninstall an agent, use **Add/Remove Programs** to remove these services.

## On-Premises Installation for Linux

Use the following procedure to install an AWS Application Discovery Agent on a Linux-based VM or server in your data center.

### To install the AWS Application Discovery Agent in your data center

1. Log on to the Linux-based server or VM and open the AWS CLI.
2. Open the ~/.aws/credentials file and specify your AWS credentials:

```
[default]
aws_access_key_id=AKIAIOSFODNN7EXAMPLE
aws_secret_access_key=wJalrXUtnFEMI/K7MDENG/bPxRfiCYEXAMPLEKEY
```

   **Note**
   The IAM policy attached to your AWS account must have access to Application Discovery Service resources. For more information, see Attach Required IAM User Policies (p. 11).

3. Download the agent installer to a host server or VM.
4. Open the /opt/aws/awsagent/etc/agent.cfg file and verify that the endpoint is (arsenal.us-west-2.amazonaws.com) and the region is (us-west-2).
5. Run the following command to install the agent in the us-west-2 region:

```
sudo bash install -r us-west-2
```

**Note**
Agents automatically download and apply updates as they become available. If you don't want agents to download and apply updates automatically, then run the following command when you install the agent:

```
sudo bash install -u false
```

6. After the installation completes, use the following command to remove the agent installation script:

```
rm install
```

7. Update your firewall settings. The AWS Application Discovery Agent requires outbound access to arsenal.us-west-2.amazonaws.com:443. It does not require any inbound ports to be open. Agents also work with transparent web proxies.

The following table lists commands that you can use to manage or uninstall agents.

### Linux Commands for AWS Application Discovery Agents

| Task | Command |
|---|---|
| Start an agent | **sudo /etc/init.d/awsagent start** |
| Verify an agent is running | **sudo /opt/aws/awsagent/bin/awsagent status** |
| Stop an agent | **sudo /etc/init.d/awsagent stop** |
| Restart an agent | **sudo /etc/init.d/awsagent restart** |
| Uninstall an agent from Amazon Linux, CentOS, or Red Hat | **yum remove AwsAgent** |
| Uninstall an agent from Ubuntu Server | **apt-get remove awsagent** |

After you install agents, you can use the Application Discovery Service API to programmatically manage agents, tag and query configuration items, and export data. You can export data as a CSV file to an Amazon S3 bucket or an application that enables you to view and evaluate the data. For an example of how to use the API, see AWS Application Discovery Service CLI Walkthrough (p. 27). For more information, see the Application Discovery Service API Reference.

# Tutorial: Using the AWS Application Discovery Service Console

This tutorial provides console-based examples of workflows involved in using the AWS Application Discovery Service. Using Application Discovery Service, you can efficiently plan the migration of applications in your virtualized on-premises environment to Amazon EC2.

> **Note**
> Before beginning this tutorial, confirm that your AWS account has been whitelisted for access to the Application Discovery Service console. To request access, complete the form provided at How to Start.

Contents



## Step 1: Working with the Dashboard

The **Dashboard** page offers high-level summaries of Application Discovery Service status in a single view, along with links to other console components and to user documentation.

## Step 2: Working with the Data Collection Page

The **Data collection** page displays a tab for each type of data collection tool currently supported: application discovery agents and agentless discovery connectors. On this page, you can:



> **Note**
> You must explicitly start data collection for discovery to begin.

This topic describes how to carry out typical data-related management tasks.

The following procedure focuses on discovery agents, but the steps for agentless discovery connectors are nearly identical.

### To view and search data collection tools

1. In the navigation menu, choose **Data collection**.
2. Choose **Agents** to view a table of installed application discovery agents. Each entry provides detailed information about an agent, such as its ID and host name.
3. To filter the display, choose the menu-driven filter bar, and select one of the available fields in the resulting menu, shown in part here:

   - **Collection status**
   - **Health**
   - **Host name**
   - **IP address**
   - **Agent ID**
4. Select one of the available operators:

   - **==**
   - **!=**
5. Select a field value. These vary based on the filter selected earlier. For **Health**, you see a menu with the following possible values, shown in part here:

   - **HEALTHY**
   - **RUNNING**
   - **UNHEALTHY**
   - **UNKNOWN**
   - **BLACKLISTED**
   - **SHUTDOWN**

The table now displays only the entries that match your filter criterion. You can also define multiple filters, delete filters, and bypass the filter menus by typing into the filter bar directly. For more information about agent health status and collection status, see Querying Discovered Configuration Items in the *Application Discovery Service API Reference*.

The collection states encountered in the procedures below have the following meanings:

- **STARTED**—The collection tool has started collecting and sending data to Discovery service.
- **START_SCHEDULED**—The data collection has been scheduled to be started. The next time collection tool contacts AWS, it will start sending data to the Discovery Service and the collection status will change to **STARTED**.
- **STOPPED**—The collection tool has stopped sending data to the Discovery service.
- **STOP_SCHEDULED**—The data collection has been scheduled to be stopped. The next time collection tool contacts AWS, it will stop sending data to the Discovery service and the Collection status will change to **STOPPED**.

### To start data collection for both agents and connectors

1. In the navigation menu, choose **Data collection**, **Agents**.
2. In the table, select the checkbox associated with each of the agents to start.

3. Choose **Start data collection**. In the **Collection status** field, note that the status of each of your selected collection tools changes to either **START_SCHEDULED** or **STARTED**. The next time each of your selected collection tools contacts AWS, it collects and sends data to Application Discovery Service.

### To stop data collection

1. In the navigation menu, choose **Data collection**, **Agents**.
2. In the table, select the checkbox associated with each of the agents to stop.
3. Choose **Stop data collection**. In the **Collection status** field, note that the status of each of your selected collection tools is now either **STOP_SCHEDULED** or **STOPPED**. The next time each of your selected collections tools contacts AWS, it stops sending discovery data to Application Discovery Service. The status of each selected collection tool changes to **STOPPED** after data collection has halted.

# Step 3: Working with the Servers Page

The **Servers** page provides detailed information about each server instance known to the data discovery tools, including basic system data, performance, service interdependencies, and network topology. You can group servers into logical units called *applications*, which represent higher-level solutions that need to be migrated jointly to remain functional. You can also apply custom tags to servers to assist in your migration planning.

On this page, you can:

- To view and search server information (p. 21)
- To tag multiple servers (p. 22)
- To group servers as applications (p. 24)

The following procedures describe how to carry out typical server-related management tasks.

### To view and search server information

1. In the navigation menu, choose **Servers**.
2. To filter the display, choose the menu-driven filter bar, and select one of the available fields in the resulting menu:

   - **Server ID**—Server configuration item identifier generated by Application Discovery Service to uniquely identify a server.
   - **Host name**—Host name of the server.
   - **OS name**—Operating system name.
   - **OS version**—Operating system version.
   - **Agent ID**—Identifier for agent that collected server data.
   - **Connector ID**—Identifier of the connector that collected the server data.
   - **Type**—Server type.
   - **VMware more ID**—VMware VM Managed Object Reference (MoRef) ID.
   - **VMware vCenter ID**—Identifier for the vCenter.
   - **VMware host system ID**—Identifier for the host system.
   - **IP address**—IP address of the server.
   - **MAC address**—Mac address of the server.
   - **Avg CPU usage %**—Average CPU usage percentage.

- **Total disk free size (KB)**—Total disk free size in KB.
- **Avg free RAM (KB)**—Total disk free size in KB.
- **Tag value**—Configuration tag value.
- **Tag key**—Configuration tag key.
- **Application name**—Name of application to which the server belongs.
- **Application description**—Description of application to which the server belongs.
- **Application ID**—Unique identifier of Application configuration item to which the server belongs.
- **Process ID**—Unique identifier of process configuration item that the server is running.
- **Process name**—Name of process that server is running.
- **Process command line**—Command line parameters of process that server is running.

3. Select one of the available operators:

   - **==**
   - **!=**
   - **Contains**
   - **Not Contains**

4. Supply a value or choose from values offered by the menu. These vary based on the filter that you selected earlier. For **Type**, you see a menu with values such as the following:

   - **EC2**
   - **OTHER**
   - **VMWARE_VM**
   - **VMWARE_HOST**
   - **VMWARE_VM_TEMPLATE**

   The table now displays only the entries that match your filter criterion. You can also define multiple filters, delete filters, and bypass the filter menus by typing into the filter bar directly.

5. In the table, open a **Server ID** link to display details about that server. This opens a detail page with a diagram of the server's connections to other servers, basic system information, system performance, running processes, and inbound and outbound connections. Choose **Applications** to list the applications to which the server belongs, or **Tags** to list tags that have been applied to the server. Choose **Actions** to see the actions that can be performed on the server, including **Group as application**, **Add tag**, **Remove server from application**, and **Remove tag**.

Tags are user-defined key/value pairs that can store meta-information about servers. Application discovery tags are similar to AWS tags, but the two types of tag cannot be used interchangeably. You can add or remove tags on up to 10 servers at a time on the **Servers** page. On server detail pages, you can add or remove tags only for the selected server. Up to five tags can be added or removed from a server or servers in a single operation.

### To tag multiple servers

1. In the navigation menu, choose **Servers**.
2. In the table, select the checkboxes of the servers to tag and choose **Add tag**.
3. In the **Add Tags** window, provide a key (ttag name) and a value.
4. To add additional tags to the selected servers, choose **Additional tag** and repeat the previous step.
5. Choose **Save**. Note that table entries for the tagged servers now display the new tag keys in the **Tags** field.
6. Open the **Server ID** link of a newly tagged server. On the detail page, note that the **Tags** list near the top of the page displays the new tag keys.

7. Choose the tag key names. The **Tags** window opens with a table containing all of the tag key/value pairs for the selected server.

### To tag a single server

1. In the navigation menu, choose **Servers**.
2. In the table of servers, select a server ID to open the server detail page.
3. Choose **Actions**, **Add tag**.
4. In the **Add Tags** window, provide a key (tag name) and a value.
5. To add additional tags to the selected server, choose **Additional tag** and repeat the previous step.
6. Choose **Save**. On the detail page, note that the **Tags** list near the top of the page displays the new tag keys.

### To remove tags from multiple servers

1. In the navigation menu, choose **Servers**.
2. In the table of servers, select the checkboxes of the servers sharing a tag to remove.
3. Choose **Actions**, **Remove tag**.
4. In the **Remove Tags** window, enter the key/value pair of the tag to remove.
5. To remove additional tags from the selected servers, choose **Additional tag** and repeat the previous step.
6. Choose **Remove** to delete the tags from the selected servers. Note that table entries for the selected servers no longer display keys for removed tags.

### To remove tags from a single server

1. In the navigation menu, choose **Servers**.
2. Choose **Actions**, **Remove tag**.
3. In the **Remove Tags** window, select the checkboxes of key/value pairs to remove.
4. To remove additional tags from the selected server, choose **Additional tag** and repeat the previous step.
5. Choose **Save**. On the detail page, note that the **Tags** list near the top of the page no longer displays keys for removed tags.

# Step 4: Working with the Server Network Diagram

On a server details page, the server network diagram is displayed if the neighboring server count is less than the allowed maximum. For larger networks, neighboring servers are displayed in a table. The selected server for which details are displayed is shown in orange while rest of the servers are gray. Each arrow indicates the source and destination of a network connection. The diagram initially displays the first-order neighbors of the selected server. Choosing the **+** icon extends the view to additional neighbors.

The following screenshot shows the server network diagram in its initial state for the selected server.

Hover over an element of the diagram to view additional information about it. Hovering over a server node displays basic system information, and hovering over a connection displays the destination port and network protocol.

The following screenshot shows the detailed information displayed for a server node.

Choose a server node to select it. Selected nodes are displayed with green check mark in nodes. Multiple nodes can be selected and grouped as an application. Open a server node to view the details for that server.

In the following screenshot, two neighboring server nodes have been selected.

Application Discovery Service supports grouping individual servers into applications. An application is a higher-level group of interdependent servers that implement a solution together. On the **Servers** page, you can select up to 10 discovered servers at a time and group them into a new or existing application. From a server detail page, you can manipulate the diagram of neighboring servers to create or add to an application.

### To group servers as applications

1. In the navigation menu, choose **Servers**.
2. In the table, select the checkboxes of the servers to group as an application and choose **Group as application**.
3. In the **Group as application** window, choose **Group as a new application**. Provide values for **Application name** and (optional) **Application description**.
4. Choose **Save**. Note that table entries for the grouped servers now display the name of the new application in the **Applications** field.

### To add servers to an existing application

1. In the navigation menu, choose **Servers**.
2. In the table, select the checkboxes of the servers to add to an application.
3. Choose **Group as application**, **Add to an existing application** and select an application from the list.
4. Choose **Save**. Note that table entries for the selected servers now display the name of the existing application in the **Applications** field.

### To group servers in a new application using the interactive diagram

1. In the navigation menu, choose **Servers**.
2. In the interactive diagram, select the server that owns the detail page, and then select one or more neighboring servers. In the following screenshot, one additional server has been selected.
3. Choose **Group as application**, **Group as a new application**.
4. Provide values for **Application name** and (optional) **Application description**.
5. Choose **Save**. In the following example screenshot, note that the new application (**NewApp**, in this example) is now listed in the **Applications** list.

### To add a server to an existing application from the interactive diagram

1. In the navigation menu, choose **Servers**.
2. In the interactive diagram, select a server to add to an existing application. In the following example screenshot, server **ip-10-0-0-33**, has been selected.
3. Choose **Group as application**, **Add to an existing application**.
4. In the **Group as application** window, choose an application from the list.
5. Choose **Save**.
6. Choose **Show table of all connections**. Note that the **Applications** value for the selected server confirms that it is now a member of  the application, along with the original members.

### To remove multiple servers from an application

1. In the navigation menu, choose **Servers**.
2. In the table, select the checkboxes of the servers to remove from an application where they have shared membership.
3. Choose **Actions**, **Remove server from application**.
4. In the **Remove server from application** window, choose the application from which to remove the server.
5. Choose **Remove**. Note that the **Applications** field no longer includes the selected servers.

### To remove a server using the interactive diagram

1. In the navigation menu, choose **Servers**.
2. In the table of servers, for **Server ID**, select the server to remove from an application.
3. In the interactive diagram, choose **Actions**, **Remove server from application**.
4. In the **Remove server from application** window,choose the application from which to remove the server.
5. Choose **Remove**. Note that the removed application no longer appears in the **Applications** list.

# Step 5: Working with the Applications Page

The **Applications** page lists your applications and allows you to view the servers that compose them. Each table entry represents an application and displays the application ID, application name, description, number of member servers, and creation time. You can search applications, create applications, and delete applications. On the detail page for each application, you can add and remove servers.

On this page, you can:

- To view and search applications (p. 25)
- To create an application (p. 26)
- To delete one or more servers from an application (p. 26)

### To view and search applications

1. In the navigation menu, choose **Applications**.
2. In the table, for **Application ID**, select an application with a non-zero number of member servers. A detail page with a list of all the member servers displays.
3. On the detail page of the selected application, choose the **Server ID** of a member server. From detail page for that server, you can perform management operations for the selected server described in Step 3: Working with the Servers Page (p. 21), including deleting it from the application. To delete servers in bulk from an application, see To delete one or more servers from an application (p. 26) below.
4. To filter the display, choose the menu-driven filter bar, and choose one of the available fields in the resulting menu:
   - **Application ID**
   - **Application name**
   - **Description**
   - **Server ID**
5. Choose one of the available operators:

- **==**
- **!=**
- **Contains**
- **Not Contains**

6. Supply a value or choose from predefined values. These vary based on the filter field selected earlier. For **Application name**, you see a menu listing all the applications that you previously created.

The table now displays only the entries that match your filter criterion. You can also define multiple filters, delete filters, and bypass the filter menus by typing into the filter bar directly.

### To create an application

1. In the navigation menu, choose **Applications**.
2. Choose **Create new application**.
3. In the **Create new application** window, provide values for **Application name** and (optionally) **Application description**.
4. When done, choose **Create**. Note that the newly created application is listed in the table.

### To delete one or more applications

1. In the navigation menu, choose **Applications**.
2. In the table of applications, select the checkboxes of applications to delete.
3. Choose **Delete applications**.
4. In the **Delete application** window, choose **Delete**. Note that entries for deleted applications have been removed from the table.

### To delete one or more servers from an application

1. In the navigation menu, choose **Applications**.
2. In the table, for **Application ID**, select an application with a non-zero number of member servers. A detail page with a list of all the member servers displays.
3. On the detail page of the selected application, select the checkboxes of servers to delete from the application.
4. When done, choose **Remove server from application**.
5. In the **Remove server from applications** window, when you are sure you want to proceed, choose **Remove**. Note that entries for deleted servers have been removed from the table.

# AWS Application Discovery Service CLI Walkthrough

This tutorial walks you through an example that shows you how to use AWS Application Discovery Service with Amazon EC2 instances. The tutorial uses sample scripts and a sample application that you'll need to download.

This topic includes the following:



## Setting Up the Environment

The following procedure shows you how to set up an environment from an Amazon EC2 instance. From this instance, you download and configure the AWS CLI, download and run a setup script, and launch a sample application that you use to access the Application Discovery Service API.

**Prerequisites**

Verify that you have completed the steps in Setting Up AWS Application Discovery Service (p. 10). By completing the steps in that topic, you ensure the following:

- You have an AWS account.
- Your account has been *whitelisted* and granted access to Application Discovery Service.

- You have a key pair named *discovery*.
- The IAM policy attached to your user account has access to Application Discovery Service resources, including the Arsenal service.

You can set up either Ubuntu Linux or Microsoft Windows EC2 instances for this tutorial.

- Configure an Ubuntu Linux Environment (p. 28).
- Configure a Microsoft Windows Environment (p. 29).

# Configure an Ubuntu Linux Environment

### To configure an Ubuntu Linux environment

1. Open the Amazon EC2 console and switch to the us-west-2 (Oregon) region.
2. Launch an Ubuntu 14.04 Amazon Machine Image (AMI) using this ID: ami-966687f6. You must launch this AMI because it includes dependencies required for this tutorial.
3. Log into the Ubuntu instance. Note that the default user for this AMI is "ubuntu," so your SSH command will look something like this:

   ```
   ssh -i "<path to key>/<key file name>.pem" ubuntu@<IP address of instance>
   ```

   Once logged in, use the following commands to install and update the AWS CLI.

   ```
   sudo apt-get update
   sudo apt-get install awscli
   aws configure
   ```

   When prompted, specify your whitelisted AWS credentials and set the default region to us-west-2.
4. Use the following command to download the training script from an Amazon S3 bucket. The blank space and period (.) at the end of the command are required.

   ```
   aws s3 cp s3://discovery.training.cli.formal/trainingsetup.sh .
   ```
5. The script performs the following tasks:

   - Installs the dependencies required for the Application Discovery Service sample application to run.
   - Downloads an AWS CloudFormation template and stores it locally in the /tmp folder.
   - Installs the Application Discovery Service sample application as a Python package.
   - Installs sample scripts that use the Application Discovery Service API to implement commonly used search queries as a standalone executable.

   **Note**
   You can view the source code for the scripts in the following directory: ~/discoverytrainingcli/discoverycli/src/. The source code also serves as an example of how to call the API. A readme document with information about the CLI commands is located in the following directory: ~/discoverytrainingcli/discoverycli/doc/README.
6. Use the following command to run the training setup script:

   ```
   sudo bash trainingsetup.sh .
   ```

During the installation, the script prompts you to specify your AWS credentials. The sample application uses these credentials to make calls to Application Discovery Service.

7. Use the following command to view the sample application Help and verify that the sample application installed correctly:

```
awsdiscovery –h
```

```
acbc328a2d9d:DiscoveryCli TestUser$ awsdiscovery –h
usage: awsdiscovery [–h]

                    {start-data-collection,list-connections,list-processe
scribe-agents,describe-export-tasks,list-servers}
                    ...

positional arguments:
  {start-data-collection,list-connections,list-processes,create-tag,delet
ribe-export-tasks,list-servers}

optional arguments:
  –h, ––help            show this help message and exit
```

8. Use the following command to provision Topology 1 using AWS CloudFormation templates. Topology 1 includes two clients that communicate with two Web servers but only one database.

```
aws cloudformation create-stack --stack-name topology1 --template-body file:///tmp/
SA_cloud_formation_topology2_vpc_with_key_without_EIP
```

9. After the command execution completes, you can view the resources that were created using the following command:

```
aws cloudformation list-stack-resources --stack-name topology1
```

10. Use the following command to provision Topology 2 using AWS CloudFormation templates. Topology 2 includes a client that communicate with a Web server and one database.

```
aws cloudformation create-stack --stack-name topology2 --template-body file:///tmp/
SA_cloud_formation_vpc_with_key_without_EIP
```

11. After the command execution completes, you can view the resources that were created using the following command:

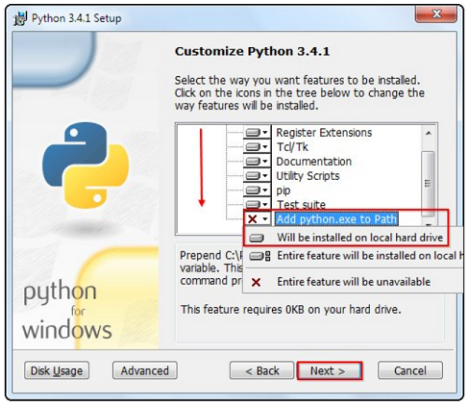
```
aws cloudformation list-stack-resources --stack-name topology2
```

# Configure a Microsoft Windows Environment

**To configure a Microsoft Windows environment**

1. Open the Amazon EC2 console and switch to the us-west-2 region.
2. Launch a Microsoft Windows Server 2012 R2 Base Amazon Machine Image (AMI).

3. Log onto the Windows instance, then download, and install Python. The sample application for this tutorial is a Python application.
4. In the Install wizard, scroll down to locate the **Add Python.exe to Path** option. Choose **Will be installed on local hard drive** and then complete the wizard.




5. Open a command prompt and run the following command to install the AWS CLI:

```
pip install awscli
```

   If the AWS CLI is already installed, run the following command to update it:

```
pip install --upgrade awscli
```

6. Run the following command to configure the session:

```
aws configure
```

   When prompted, specify your AWS credentials and set the default region to us-west-2. The AWS credentials must have been granted access to Application Discovery Service. For more information, see Setting Up AWS Application Discovery Service (p. 10).
7. Use the following command to download the training script from an Amazon S3 bucket. The blank space and period (.) at the end of the command are required.

```
aws s3 cp s3://discovery.training.cli.formal/DiscoveryCli.tgz .
```

   By default, the command downloads the file to the current user folder. For example, if you run the command as the Administrator, the command downloads the file to the C:\Users\Administrator folder.
8. Unzip the DiscoveryCli.tgz file using a zip/unzip utility like WinZip or 7-Zip. The extraction places a folder called DiscoveryCli in the specified location. Inside that folder, locate and unzip the DiscoveryCli.tar file.
9. In a command prompt, run the following command in the directory where the setup.py file was extracted during the most recent unzip. If you chose the defaults, the file is located at C:\Users*username*\DiscoveryCli\DiscoveryCli\DiscoveryCli.

```
python setup.py install
```

10. Run the following command to download files for this tutorial. Replace *Username* with the name of your Windows account.

```
aws s3 cp s3://poseidon.service.json/service-2.json c:\Users\Username\.aws\models\
```

11. The command performs the following tasks:

    - Installs the dependencies required for the Application Discovery Service sample application to run.
    - Installs the Application Discovery Service sample application as a Python package.
    - Installs sample scripts that use the Application Discovery Service API to implement commonly used search queries as a standalone executable.

    **Note**
    You can view the source code for the scripts in the following directory: C:\Users*user name*\DiscoveryCli\DiscoveryCli\DiscoveryCli\src. The source code also serves as an example of how to call the API. A README document with information about the CLI commands is located in the following directory: C:\Users*user name*\DiscoveryCli\DiscoveryCli\DiscoveryCli\doc\README

12. Use the following command to view the sample application Help and verify that the sample application installed correctly:

```
python C:\python27\Scripts\awsdiscovery --help
```

13. Use the following command to download AWS CloudFormation templates and store them locally in the /tmp folder. This command provisions Topology 1. Topology 1 includes two clients that communicate with two Web servers but only one database.

```
aws s3 cp s3://sa.cf.template/SA_cloud_formation_vpc_with_key_without_EIP C:\tmp\
```

14. Launch the template using the following command:

```
C:\Users\user name\DiscoveryCli\DiscoveryCli>aws cloudformation
 create-stack --stack-name topology1 --template-body file://C:/tmp/
SA_cloud_formation_vpc_with_key_without_EIP
```

15. Use the following command to provision Topology 2. Topology 2 includes a client that will communicate with a Web server and one database.
16. Launch the template using the following command:

```
C:\Users\user name\DiscoveryCli\DiscoveryCli>aws cloudformation
 create-stack --stack-name topology2 --template-body file://C:/tmp/
SA_cloud_formation_topology2_vpc_with_key_without_EIP
```

# Managing AWS Application Discovery Agents

After you install the AWS Application Discovery Agent on an Amazon EC2 instance, or on a server or virtual machine (VM) in your data center, you're ready for the next section of the tutorial. This section shows you how to manage the agents that were installed in the topologies as part of the AWS CloudFormation templates.

**Note**
Instance IDs throughout this tutorial have been made generic and are shown, for example, in the following format: i-xxxxxxx1.

### To manage AWS Application Discovery Agents

1. Use the following command to get the status and location of installed agents.

   On Linux:

```
awsdiscovery describe-agents
```

On Windows:

```
python C:\python27\Scripts\awsdiscovery describe-agents
```

The command output includes the agent status.

- UNKNOWN – Application Discovery Service does not know the agent status.
- HEALTHY – Agents responded to the command, but are not collecting data.
- RUNNING – Agents are collecting data.

The following sample output shows that all agents are healthy, but not running.

```
+------------+-----------+-----------------+---------------+
| Id         | Health    | HostName        | IPAddress     |
+============+===========+=================+===============+
|i-xxxxxxx1 | HEALTHY   | ip-10-0-1-250   | 10.0.1.250    |
+------------+-----------+-----------------+---------------+
|i-xxxxxxx2 | HEALTHY   | ip-10-0-1-187   | 10.0.1.187    |
+------------+-----------+-----------------+---------------+
|i-xxxxxxx3 | HEALTHY   | ip-10-0-0-61    | 10.0.0.61     |
+------------+-----------+-----------------+---------------+
|i-xxxxxxx4 | HEALTHY   | ip-10-0-1-31    | 10.0.1.31     |
+------------+-----------+-----------------+---------------+
|i-xxxxxxx5 | HEALTHY   | ip-10-0-1-105   | 10.0.1.105    |
+------------+-----------+-----------------+---------------+
|i-xxxxxxx6 | HEALTHY   | ip-10-0-1-249   | 10.0.1.249    |
+------------+-----------+-----------------+---------------+
|i-xxxxxxx7 | HEALTHY   | ip-10-0-0-109   | 10.0.0.109    |
+------------+-----------+-----------------+---------------+
|i-xxxxxxx8 | HEALTHY   | ip-10-0-1-166   | 10.0.1.166    |
+------------+-----------+-----------------+---------------+
```

2. Use the following command to instruct specific agents to start collecting data.

   On Linux:

   ```
   awsdiscovery start-data-collection i-xxxxxxx1 i-xxxxxx2 i-xxxxxx3 i-xxxxxx4 i-xxxxxx5
    i-xxxxxx6 i-xxxxxx7 i-xxxxxx8
   ```

   On Windows:

   ```
   python C:\python27\Scripts\awsdiscovery start-data-collection i-xxxxxxx1 i-xxxxxx2 i-
   xxxxxx3 i-xxxxxx4 i-xxxxxx5 i-xxxxxx6 i-xxxxxx7 i-xxxxxx8
   ```

```
+------------+---------------+
| Id         | Description   |
+============+===============+
| i-xxxxxxx1| Succeeded     |
+------------+---------------+
| i-xxxxxxx2| Succeeded     |
+------------+---------------+
|i-xxxxxxx3 | Succeeded     |
+------------+---------------+
|i-xxxxxxx4 | Succeeded     |
+------------+---------------+
|i-xxxxxxx5 | Succeeded     |
+------------+---------------+
|i-xxxxxxx6 | Succeeded     |
+------------+---------------+
|i-xxxxxxx7 | Succeeded     |
+------------+---------------+
|i-xxxxxxx8 | Succeeded     |
+------------+---------------+
```

3. Use the following command to get the agent status after they were instructed to start collecting data.

   On Linux:

   ```
   awsdiscovery describe-agents
   ```

On Windows:

```
python C:\python27\Scripts\awsdiscovery describe-agents
```

```
+-----------+---------+-----------------+---------------+
| Id        | Health  | HostName        | IPAddress     |
+===========+=========+=================+===============+
|i-xxxxxxx1| RUNNING  | ip-10-0-1-250   | 10.0.1.250    |
+-----------+---------+-----------------+---------------+
|i-xxxxxxx2| RUNNING  | ip-10-0-1-187   | 10.0.1.187    |
+-----------+---------+-----------------+---------------+
|i-xxxxxxx3| RUNNING  | ip-10-0-0-61    | 10.0.0.61     |
+-----------+---------+-----------------+---------------+
|i-xxxxxxx4| RUNNING  | ip-10-0-1-31    | 10.0.1.31     |
+-----------+---------+-----------------+---------------+
|i-xxxxxxx5| RUNNING  | ip-10-0-1-105   | 10.0.1.105    |
+-----------+---------+-----------------+---------------+
|i-xxxxxxx6| RUNNING  | ip-10-0-1-249   | 10.0.1.249    |
+-----------+---------+-----------------+---------------+
|i-xxxxxxx7| RUNNING  | ip-10-0-0-109   | 10.0.0.109    |
+-----------+---------+-----------------+---------------+
|i-xxxxxxx8| RUNNING  | ip-10-0-1-166   | 10.0.1.166    |
+-----------+---------+-----------------+---------------+
```

Application Discovery Service takes several minutes to receive and process the data.

4. Use the following command to instruct specific agents to stop collecting data.

   On Linux:

   ```
   awsdiscovery stop-data-collection i-xxxxxxx1 i-xxxxxxx2 i-xxxxxxx3 i-xxxxxxx4 i-
   xxxxxxx5 i-xxxxxxx6 i-xxxxxxx7 i-xxxxxxx8
   ```

   On Windows:

   ```
   python C:\python27\Scripts\awsdiscovery stop-data-collection i-xxxxxxx1 i-xxxxxxx2 i-
   xxxxxxx3 i-xxxxxxx4 i-xxxxxxx5 i-xxxxxxx6 i-xxxxxxx7 i-xxxxxxx8
   ```

   ```
   +-----------+--------------+
   | Id        | Description  |
   +===========+==============+
   |i-xxxxxxx1| Succeeded    |
   +-----------+--------------+
   |i-xxxxxxx2| Succeeded    |
   +-----------+--------------+
   |i-xxxxxxx3| Succeeded    |
   +-----------+--------------+
   |i-xxxxxxx4| Succeeded    |
   +-----------+--------------+
   |i-xxxxxxx5| Succeeded    |
   +-----------+--------------+
   |i-xxxxxxx6| Succeeded    |
   +-----------+--------------+
   |i-xxxxxxx7| Succeeded    |
   +-----------+--------------+
   |i-xxxxxxx8| Succeeded    |
   +-----------+--------------+
   ```

# Working with Configuration Items

A *configuration item* is an IT asset that was discovered in your data center by an agent. With Application Discovery Service, you can query specific configuration items.

### To query specific configuration items

1. Use the following command to list discovered servers.

   On Linux:

```
awsdiscovery list-servers
```

On Windows:

```
python C:\python27\Scripts\awsdiscovery list-servers
```

```
+--------------+-----------------------------------------+------------+-------------------+
| Hostname     | OsName                                  | IP         | MAC               |
+==============+=========================================+============+===================+
| ip-10-0-0-109 | Linux - Amazon Linux AMI release 2015.03 | 10.0.0.109 | 06:22:14:9c:96:f9 |
+--------------+-----------------------------------------+------------+-------------------+
| ip-10-0-1-249 | Linux - Amazon Linux AMI release 2015.03 | 10.0.1.249 | 06:cd:9c:00:bf:b3 |
+--------------+-----------------------------------------+------------+-------------------+
| ip-10-0-1-31  | Linux - Amazon Linux AMI release 2015.03 | 10.0.1.31  | 06:2c:f4:70:73:13 |
+--------------+-----------------------------------------+------------+-------------------+
| ip-10-0-0-61  | Linux - "Ubuntu 14.04.2 LTS"             | 10.0.0.61  | 06:3f:d8:ee:cb:e3 |
+--------------+-----------------------------------------+------------+-------------------+
| ip-10-0-1-250 | Linux - Amazon Linux AMI release 2015.03 | 10.0.1.250 | 06:8a:6c:92:32:b1 |
+--------------+-----------------------------------------+------------+-------------------+
| ip-10-0-1-187 | Linux - Amazon Linux AMI release 2015.03 | 10.0.1.187 | 06:69:7a:61:cb:1d |
+--------------+-----------------------------------------+------------+-------------------+
| ip-10-0-1-105 | Linux - Amazon Linux AMI release 2015.03 | 10.0.1.105 | 06:82:6b:4e:03:bb |
+--------------+-----------------------------------------+------------+-------------------+
| ip-10-0-1-166 | Linux - "Ubuntu 14.04.2 LTS"             | 10.0.1.166 | 06:77:95:91:a6:e7 |
+--------------+-----------------------------------------+------------+-------------------+
```

2. Use the following command to list servers running a specific process.

   On Linux:

   ```
   awsdiscovery list-servers --process_name mysql
   ```

   On Windows:

   ```
   python C:\python27\Scripts\awsdiscovery list-servers --process_name mysql
   ```

   ```
   +--------------+-----------------------------------------+------------+-------------------+
   | Hostname     | OsName                                  | IP         | MAC               |
   +==============+=========================================+============+===================+
   | ip-10-0-0-61  | Linux - "Ubuntu 14.04.2 LTS"            | 10.0.0.61  | 06:3f:d8:ee:cb:e3 |
   +--------------+-----------------------------------------+------------+-------------------+
   | ip-10-0-1-187 | Linux - Amazon Linux AMI release 2015.03 | 10.0.1.187 | 06:69:7a:61:cb:1d |
   +--------------+-----------------------------------------+------------+-------------------+
   | ip-10-0-1-166 | Linux - "Ubuntu 14.04.2 LTS"            | 10.0.1.166 | 06:77:95:91:a6:e7 |
   +--------------+-----------------------------------------+------------+-------------------+
   ```

3. Use the following command to list a server by its MAC address and display detailed attributes.

   On Linux:

   ```
   awsdiscovery list-servers --mac 06:22:14:9c:96:f9 –verbose
   ```

   On Windows:

   ```
   python C:\python27\Scripts\awsdiscovery list-servers --mac 06:22:14:9c:96:f9 –verbose
   ```

   ```
   +--------------+-----------+-------------------+-----------+----------+----------+-------------------+-----------------+----------+-------------------+-------------+
   | HostName     | IP        | MAC               |  Prov CPU |  Max CPU |  Avg CPU |  Prov mem(in MB) |  Max mem(in MB) |  Num disk |  Disk size(in MB) |  Ntwk cards |
   +==============+===========+===================+===========+==========+==========+==================+=================+==========+===================+=============+
   | ip-10-0-0-109 | 10.0.0.109 | 06:22:14:9c:96:f9 |         1 |       61 |    0.175 |          592.301 |          141.23 |         1 |           7935.43 |           2 |
   +--------------+-----------+-------------------+-----------+----------+----------+------------------+-----------------+----------+-------------------+-------------+
   ```

# Query Server Dependencies and Connections

This section shows you how to query configuration items based on the following discovery objectives. In this case, the user wants to:

- Inspect server dependencies based on network connectivity.
- Identify the processes in a server that were responsible for the connection.

### To query configuration items

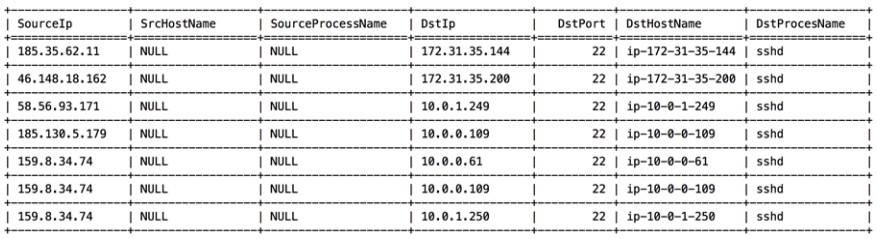
1. Use the following command to list all connections.

   On Linux:

   ```
   awsdiscovery list-connections
   ```

   On Windows:

   ```
   python C:\python27\Scripts\awsdiscovery list-connections
   ```

   ```
   +-----------------+-----------------+---------------------+-----------------+-----------+-----------------------+-----------------+
   | SourceIp        | SrcHostName     | SourceProcessName   | DstIp           |   DstPort | DstHostName           | DstProcesName   |
   +=================+=================+=====================+=================+===========+=======================+=================+
   | 185.35.62.11    | NULL            | NULL                | 172.31.35.144   |        22 | ip-172-31-35-144      | sshd            |
   +-----------------+-----------------+---------------------+-----------------+-----------+-----------------------+-----------------+
   | 46.148.18.162   | NULL            | NULL                | 172.31.35.200   |        22 | ip-172-31-35-200      | sshd            |
   +-----------------+-----------------+---------------------+-----------------+-----------+-----------------------+-----------------+
   | 58.56.93.171    | NULL            | NULL                | 10.0.1.249      |        22 | ip-10-0-1-249         | sshd            |
   +-----------------+-----------------+---------------------+-----------------+-----------+-----------------------+-----------------+
   | 185.130.5.179   | NULL            | NULL                | 10.0.0.109      |        22 | ip-10-0-0-109         | sshd            |
   +-----------------+-----------------+---------------------+-----------------+-----------+-----------------------+-----------------+
   | 159.8.34.74     | NULL            | NULL                | 10.0.0.61       |        22 | ip-10-0-0-61          | sshd            |
   +-----------------+-----------------+---------------------+-----------------+-----------+-----------------------+-----------------+
   | 159.8.34.74     | NULL            | NULL                | 10.0.0.109      |        22 | ip-10-0-0-109         | sshd            |
   +-----------------+-----------------+---------------------+-----------------+-----------+-----------------------+-----------------+
   | 159.8.34.74     | NULL            | NULL                | 10.0.1.250      |        22 | ip-10-0-1-250         | sshd            |
   +-----------------+-----------------+---------------------+-----------------+-----------+-----------------------+-----------------+
   ```

   Output in the image has been truncated.

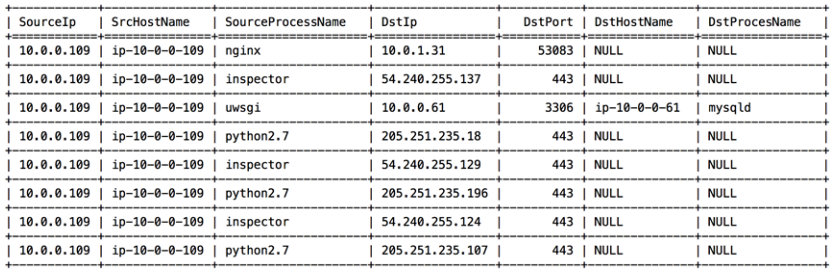
2. Use the following command to list all dependencies for a specific host.

   On Linux:

   ```
   awsdiscovery list-connections --src_hostname ip-10-0-0-109
   ```

   On Windows:

   ```
   python C:\python27\Scripts\awsdiscovery list-connections --src_hostname ip-10-0-0-109
   ```

   ```
   +-------------+---------------+---------------------+-----------------+-----------+---------------+---------------+
   | SourceIp    | SrcHostName   | SourceProcessName   | DstIp           |   DstPort | DstHostName   | DstProcesName |
   +=============+===============+=====================+=================+===========+===============+===============+
   | 10.0.0.109  | ip-10-0-0-109 | nginx               | 10.0.1.31       |     53083 | NULL          | NULL          |
   +-------------+---------------+---------------------+-----------------+-----------+---------------+---------------+
   | 10.0.0.109  | ip-10-0-0-109 | inspector           | 54.240.255.137  |       443 | NULL          | NULL          |
   +-------------+---------------+---------------------+-----------------+-----------+---------------+---------------+
   | 10.0.0.109  | ip-10-0-0-109 | uwsgi               | 10.0.0.61       |      3306 | ip-10-0-0-61  | mysqld        |
   +-------------+---------------+---------------------+-----------------+-----------+---------------+---------------+
   | 10.0.0.109  | ip-10-0-0-109 | python2.7           | 205.251.235.18  |       443 | NULL          | NULL          |
   +-------------+---------------+---------------------+-----------------+-----------+---------------+---------------+
   | 10.0.0.109  | ip-10-0-0-109 | inspector           | 54.240.255.129  |       443 | NULL          | NULL          |
   +-------------+---------------+---------------------+-----------------+-----------+---------------+---------------+
   | 10.0.0.109  | ip-10-0-0-109 | python2.7           | 205.251.235.196 |       443 | NULL          | NULL          |
   +-------------+---------------+---------------------+-----------------+-----------+---------------+---------------+
   | 10.0.0.109  | ip-10-0-0-109 | inspector           | 54.240.255.124  |       443 | NULL          | NULL          |
   +-------------+---------------+---------------------+-----------------+-----------+---------------+---------------+
   | 10.0.0.109  | ip-10-0-0-109 | python2.7           | 205.251.235.107 |       443 | NULL          | NULL          |
   +-------------+---------------+---------------------+-----------------+-----------+---------------+---------------+
   ```

   Output in the image has been truncated.

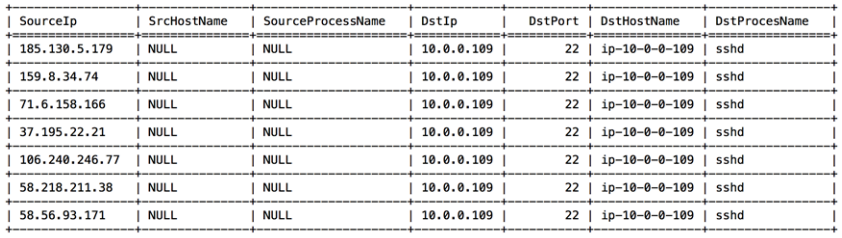
3. Use the following command to list all dependents for a specific host.

On Linux:

```
awsdiscovery list-connections --dest_hostname ip-10-0-0-109
```

On Windows:

```
python C:\python27\Scripts\awsdiscovery list-connections --dest_hostname ip-10-0-0-109
```



| SourceIp | SrcHostName | SourceProcessName | DstIp | DstPort | DstHostName | DstProcesName |
|---|---|---|---|---|---|---|
| 185.130.5.179 | NULL | NULL | 10.0.0.109 | 22 | ip-10-0-0-109 | sshd |
| 159.8.34.74 | NULL | NULL | 10.0.0.109 | 22 | ip-10-0-0-109 | sshd |
| 71.6.158.166 | NULL | NULL | 10.0.0.109 | 22 | ip-10-0-0-109 | sshd |
| 37.195.22.21 | NULL | NULL | 10.0.0.109 | 22 | ip-10-0-0-109 | sshd |
| 106.240.246.77 | NULL | NULL | 10.0.0.109 | 22 | ip-10-0-0-109 | sshd |
| 58.218.211.38 | NULL | NULL | 10.0.0.109 | 22 | ip-10-0-0-109 | sshd |
| 58.56.93.171 | NULL | NULL | 10.0.0.109 | 22 | ip-10-0-0-109 | sshd |

Output in the image has been truncated.

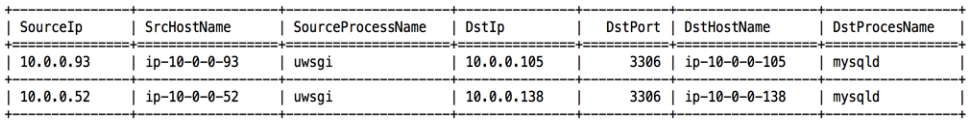
4. Use the following command to list Linux-uwsgi servers communicating with Ubuntu-MySQL servers.

   On Linux:

   ```
   aluwsgi_ubmysql
   ```

   On Windows

   ```
   python C:\python27\Scripts\aluwsgi_ubmysql
   ```



| SourceIp | SrcHostName | SourceProcessName | DstIp | DstPort | DstHostName | DstProcesName |
|---|---|---|---|---|---|---|
| 10.0.0.93 | ip-10-0-0-93 | uwsgi | 10.0.0.105 | 3306 | ip-10-0-0-105 | mysqld |
| 10.0.0.52 | ip-10-0-0-52 | uwsgi | 10.0.0.138 | 3306 | ip-10-0-0-138 | mysqld |

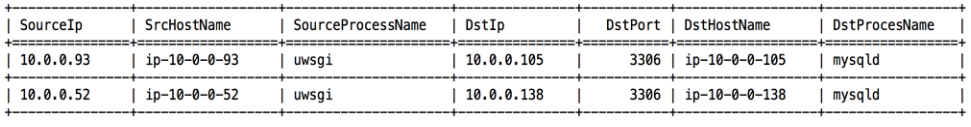
5. Use the following command to list Linux-uwsgi servers communicating with Ubuntu-MySQL servers.

   On Linux:

   ```
   aluwsgi_ubmysql
   ```

   On Windows:

   ```
   python C:\python27\Scripts\aluwsgi_ubmysql
   ```



| SourceIp | SrcHostName | SourceProcessName | DstIp | DstPort | DstHostName | DstProcesName |
|---|---|---|---|---|---|---|
| 10.0.0.93 | ip-10-0-0-93 | uwsgi | 10.0.0.105 | 3306 | ip-10-0-0-105 | mysqld |
| 10.0.0.52 | ip-10-0-0-52 | uwsgi | 10.0.0.138 | 3306 | ip-10-0-0-138 | mysqld |

# Working with Multi-Layered Stacks

The previous examples focused on discovery in a two-layered stack (for example, a server communicating with a database). This section shows you how to query configuration items for a three-layered stack. In the samples below, the stack includes a client computer that communicates with an NGINX web server that communicates with a MySQL database.

**To query configuration items for a three-layered stack**

- Use the following command to list three-layer stacks.

  On Linux:

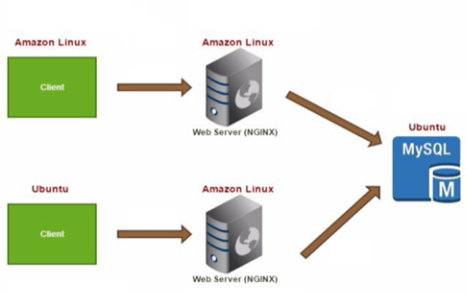
  ```
  three_layered_stacks
  ```

  On Windows:

  ```
  python C:\python27\Scripts\three_layered_stacks
  ```

```
+-------------------------+-----------------------------+-----------------------------+
| Client(ClientProcess)   | NginxServer(NginxSrvProc)   | MySQLServer(MySqlSrvProc)   |
+=========================+=============================+=============================+
| ip-10-0-1-166(python2.7) | ip-10-0-1-250(nginx / uwsgi) | ip-10-0-0-61(mysqld)        |
+-------------------------+-----------------------------+-----------------------------+
| ip-10-0-1-31(python2.7)  | ip-10-0-0-109(nginx / uwsgi) | ip-10-0-0-61(mysqld)        |
+-------------------------+-----------------------------+-----------------------------+
| ip-10-0-1-249(python2.7) | ip-10-0-1-105(nginx / uwsgi) | ip-10-0-1-187(mysqld)       |
+-------------------------+-----------------------------+-----------------------------+
```

Rows one and two of the command output reveal two clients communicating with two Web servers but only one database. The topology is as follows:




Row three of the command output reveals another three-layered stack. The topology is as follows:


# Tag and Export Configuration Items

You can tag discovered configuration items. Tags are metadata that help you categorize IT assets in your data center. Tags use a *key*,*value* format. You can also export configuration items and tagged items to a database or an Amazon S3 bucket as a CSV file.

### To tag and export configuration items

1. Use the following command to tag servers. The output shows if the configuration item was tagged.

   On Linux:

   ```
   awsdiscovery create-tag --hostname ip-10-0-1-166 --tag key=serverType,value=webServer
   ```

   On Windows:

   ```
   python C:\python27\Scripts\awsdiscovery create-tag --hostname ip-10-0-1-166 --tag
    key=serverType,value=webServer
   ```

2. Use the following command to list tagged servers.

   On Linux:

   ```
   awsdiscovery list-servers --tag key=serverType,value=webserver
   ```

   On Windows:

   ```
   python C:\python27\Scripts\awsdiscovery list-servers --tag
    key=serverType,value=webserver
   ```

   ```
   +--------------+-----------------------------+------------+-------------------+
   | Hostname     | OsName                      | IP         | MAC               |
   +==============+=============================+============+===================+
   | ip-10-0-1-166 | Linux - "Ubuntu 14.04.2 LTS" | 10.0.1.166 | 06:77:95:91:a6:e7 |
   +--------------+-----------------------------+------------+-------------------+
   ```

3. Use the following command to delete a tag. The output shows if the configuration item was untagged.

   On Linux:

   ```
   awsdiscovery delete-tag –tag --hostname ip-10-0-1-166 --tag
    key=serverType,value=webServer
   ```

   On Windows:

   ```
   python C:\python27\Scripts\awsdiscovery delete-tag –tag --hostname ip-10-0-1-166 --tag
    key=serverType,value=webServer
   ```

4. Use the following command to export data. The output includes an export ID which you use to view the export status.

   On Linux:

   ```
   awsdiscovery create-export-task
   ```

   On Windows:

   ```
   python C:\python27\Scripts\awsdiscovery create-export-task
   ```

5. Use the following command to view the export status. The output returns the status of the export and a URL where you can view the data.

   On Linux:

```
awsdiscovery describe-export-tasks export-xxxxxx-xxxx-xxxx-xxxx-6ed91c5c014e
```

On Windows:

```
python C:\python27\Scripts\awsdiscovery describe-export-tasks export-xxxxxx-xxxx-xxxx-
xxxx-6ed91c5c014e
```

# Troubleshooting the AWS Application Discovery Agent

The following documentation can help you troubleshoot problems with Application Discovery Service that you might encounter while migrating your on-premises servers to Amazon EC2.

## General Troubleshooting Tools

Before you begin troubleshooting specific issues, it helps to familiarize yourself with following basic approaches and tools.

### Inspect the AWSApplication Discovery Agent Configuration

You can find and inspect your existing AWSApplication Discovery Agent configuration file for your operating system:

- On Linux: `/opt/aws/aws/agent/etc/agent.cfg`
- On Windows: `%Program Files%AWS%agent.cfg`

### Run the AWS Application Discovery Agent in Offline Mode

To inspect the raw data captured by your agent, you can run it in offline mode. While in offline mode, data collected by the agent is logged to a local file instead of being sent to Application Discovery Service.

**To enter offline mode**

1. Create a temporary folder, such as `/var/tmp` for Linux or `C:\tmp` for Windows.

2. Edit the file the appropriate file for your operating system:

   - Linux: /`opt/aws/aws/agent/etc/agent.cfg`
   - Windows: `C:\ProgramData\Amazon Web Services\AWS Agent\agent.cfg`

   Add the following lines; in addition to your temporary folder path, supply a file name where indicated.

```
{
     "MustCollect" : true,
     "Publisher": "File",
     "MsgFile": "temporary path and file",
     "SystemPerformanceMsgs": true,
     "SystemPerformanceUpdateFrequency": 1,
     "SystemPerformanceMsgFrequency": 30,
     "ProcessPerformanceMsgs": true,
     "ProcessPerformanceUpdateFrequency": 1,
     "ProcessPerformanceMsgFrequency": 30,
     "ListeningPortInfo": true,
     "Users": true,
     "Groups": true,
     "NetworkInterfaces": true,
     "Terminals": true,
     "PackageInfo": true,
     "InstanceMetaData": true,
     "NetworkConnections": true,
     "ListeningPorts" : true,
     "Processes": true,
     "CodeModules": true,
     "KernelModules": true,
     "DnsEntries": true,
     "Subscribers": "discovery"
}
```

   This configuration causes the agent to write events to a location specified by `MsgFile`. The metrics that the agent collects are also specified. (In normal operation, the AWS endpoint would supply this information.)

3. Stop and restart the agent using the command appropriate for your operating system:

   - For Linux, `sudo /etc/init.d/awsagent stop` and `sudo /etc/init.d/awsagent start`
   - For Windows, `sc stop awsagent` and `sc start awsagent`

4. To inspect what events have been emitted by the agent, open the log file that you designated.

# Enable Logging for the AWS Application Discovery Agent

Complete the following procedure to create a log of agent actions.

### To activate debugging

1. Add the following lines to `agent.cfg`:

```
{
  "SubSystems" : "ALL",
  "LogLevels" : "LogAll",
  "LogFile" : "c:\\tmp\\agent.log"
}
```

2. Stop and restart the agent using the command appropriate for your operating system:
   - For Linux, `sudo /etc/init.d/awsagent stop` and `sudo /etc/init.d/awsagent start`
   - For Windows, `sc stop awsagent` and `sc start awsagent`

# Troubleshooting the AWS Application Discovery Agent Data

The following actions can assist with troubleshooting AWS Application Discovery Agent data.

- Although AWS does not currently support console-based data visualization for the Application Discovery Agent, you can manually convert the CSV format of discovery data to GraphML format and view it offline with any open-source visualization tool that can consume GraphML format.
- Download sample agent data in CSV format.
- Contact AWS Support to have obsolete discovery data purged from the repository.

# Troubleshooting AWS Application Discovery Agent Configuration

Use the following information to diagnose or repair errors with AWS Application Discovery Agent configuration.

## AWS Application Discovery Agent Fails to Register

If you encounter the error "Registration failure reason: Authentication failure: Authentication failed as the incoming request was not signed by AWS credentials", try the following approaches:

- If you are using Linux, confirm that the `.aws/credentials` file is located in the root user's home directory as described in On-Premises Installation for Linux. The file must not be in some other user's home directory.
- If you are using Windows, confirm that the AWS credentials are properly installed, as described in On-Premises Installation for Microsoft Windows. Check that the permissions provided for the AWS credentials conform to the appropriate managed policy, as described in Attach Required IAM User Policies.
- Run the following commands:
  - Linux: /opt/aws/awsagent/etc/agent.cfg
  - Windows: C:\ProgramData\Amazon Web Services\AWS Agent .\AWSAgentStatus.exe
- Check the region in the output. Agents should be configured to communicate with the endpoint of ADS in the `us-west-2` region.
- Check the time skew from your NTP servers and correct if necessary. Incorrect time skew causes the agent registration call to fail.
- Check that you are meeting all prerequisites, including OS support. If you attempt to install the inspector agent package on Ubuntu and the operation fails with message containing "Failed to find an inspector agent package for this OS...", contact AWS Support.
- If you use agentless discovery and don't see inventory information after starting data collection with the connector, confirm that you have registered the connector with your vCenter Server instance. Agentless discovery does not support a standalone ESX host that is not part of the vCenter Server instance.
- If you are using Windows 2008 R2, confirm that the security patches are up-to-date.

# Failure to Create AWS Application Discovery Agent Credentials for Windows Server

If you try to install the AWS Application Discovery Agent on Windows Server but cannot find or create the credentials folder at `%SystemRoot%\system32\config\systemprofile\.aws`, you need to create the folder using the command line. If you still cannot create the `.aws` folder, try appending a period to the folder name (that is, `.aws.`).

# Document History for AWS Application Discovery Service

The following table describes the important changes to the documentation since the last release of Application Discovery Service.

**Latest documentation update:** December 17, 2016

| Change | Description | Date |
| --- | --- | --- |
| Console | AWS management console added. | December 19, 2016 |
| Launch of agentless discovery | Added content that describes how to set. up and configure agentless discovery. | July 28, 2016 |
| Updates | Added Windows Server details to AWS Application Discovery Service CLI Walkthrough (p. 27). Fixed various command issues. | May 20, 2016 |
| Initial publication | Released *Application Discovery Service User Guide*. | May 12, 2016 |

# AWS Glossary

For the latest AWS terminology, see the AWS Glossary in the *AWS General Reference*.