



Configure Group-Based Access Control Policies and Analytics

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Group-Based Access Control

Cisco DNA Center implements Software-Defined Access in two ways:

- Virtual networks (VNs) provide macro-level segmentation, such as to separate IoT devices from the corporate network.
- Group-based policies provide micro-level segmentation, such as to control what types of network traffic to permit or deny between engineering and HR groups.

Group-Based Access Control policies provide the following benefits:

- Rich identity-based access control functionality with network automation and assurance benefits.
- Granular access control.
- Scalable groups apply to all virtual networks, which simplifies policy management.
- Policy views help you to understand the overall policy structure, and create or update required access control policies.
- Eliminates the need to switch between different applications to manage scalable groups and define protected assets.
- Provides enhanced features for deploying enterprise-wide access control policies.
- Restricts lateral movement of threats like ransom ware before you have identity or Network Admission Control (NAC) applications in place.
- Provides an easy migration path to Cisco Identity Services Engine (Cisco ISE) for users who are using third-party identity applications, but want to move to Cisco ISE.

For information about creating IP pools, sites, and virtual networks in Cisco DNA Center, see the [Cisco DNA Center User Guide](#).

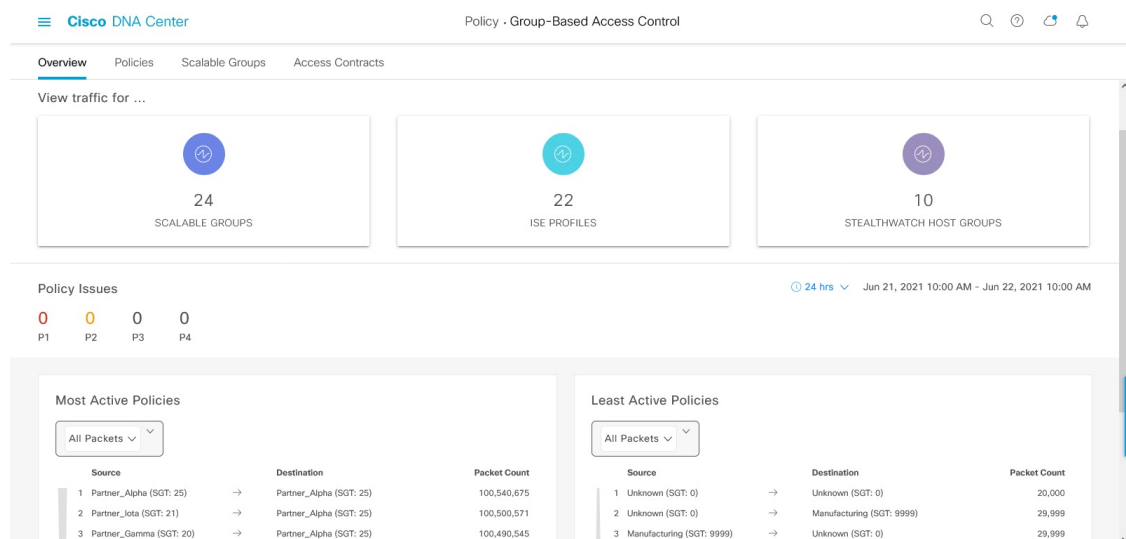
For information about configuring Cisco DNA Center for Cisco ISE, see the [Cisco DNA Center Installation Guide](#).

For information about configuring Cisco ISE for Cisco DNA Center, see the [Cisco Identity Services Engine Administrator Guide](#).

Group-Based Access Control Policy Dashboard

The Group-Based Access Control Policy dashboard provides you with a summary of network activity, policy-related issues, and traffic trends. Click the menu icon (☰) and choose **Policy > Group-Based Access Control > Overview** to view this dashboard.

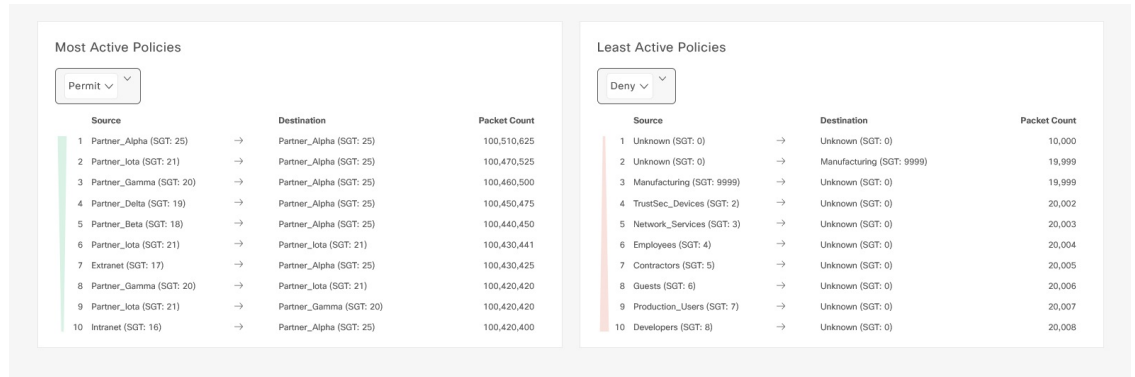
Figure 1: Group-Based Access Control Policy Dashboard



You can view the following details in this dashboard:

- **View Traffic:** You can view the traffic for scalable groups, Cisco ISE profiles, and stealthwatch host groups. You must install the Group-Based Policy Analytics package to view this data. Group-Based Policy Analytics provides you with insights to create group-based policies by visualizing communications between assets in order to assess the impact of introducing new access controls, and understand exactly which protocols you need to allow in the policies. Cisco Group-Based Policy Analytics aggregates information on groups of assets on your network, and their communication. For more information, see [Cisco Group-Based Policy Analytics, on page 12](#).
- **View Policy-Related Issues:** It displays a count of policy-related issues. Click a counter to view the details. It opens the **Assurance Issues** dashboard in a new browser tab, where you can view the details. Note that this view of policy-related issues is for the currently selected time period. Use the time selector to adjust the time window, as needed.
- **View Most Active and Least Active Policies:** It provides the details about the most active and least active policies. By default, this view is based on the count of total number of packets seen in the network for each policy (for each source-to-destination group pairing). You can use the drop-down list to select only the permitted packets or dropped packets. You can use the dropped packets option to see which policies are enforcing policy-based drops most actively.

Figure 2: Most and Least Active Policy Dashlets



Note that this view of policy activity is for the currently selected time period. Use the time selector to adjust the time window, as needed.

Group-Based Access Control Policies

The access control policies define which network traffic can pass from a source security group to a destination security group.

- **Security Group:** A classification category, to which you can assign users, network devices, or resources. Security groups are used in access control policies. You can associate security groups with virtual networks based on your organization's network configuration, access requirements, and restrictions.
- **Contract:** An access contract is a set of rules that controls the type of network traffic that is allowed to pass between the source and destination security groups. In other words, a contract is a traffic filter definition. Access contracts define the actions (permit or deny) performed when the traffic matches a network application, protocol, and port. The default action is to use the Catch All rule when no other rules match.
- **Group-Based Access Control Policies:** A group-based access control policy identifies a specific source and destination group pair and associates an access contract. The access contract specifies what types of traffic are permitted or denied between the source group and the destination group. These policies are unidirectional.

Security groups and access contracts are the basic building blocks of access control policy. While creating the access control policy, you can use the security groups and contracts that you have created before or create new security groups and contracts while creating the policy. If you want to specify the network resources that can be accessed from a specific source group, you can create an access control policy with a single source and multiple destination groups. On the other hand, if you want to specify the source groups that are permitted to access a particular network resource, you can create an access control policy with a single destination and multiple source groups. For example, if you want to specify the network resources that can be accessed by the users associated with the "contractors" source security group, you can create an access control policy with a single source and multiple destination groups. If you want to specify the source groups that are permitted to access the "Finance Servers" destination security group, you can create an access control policy with single destination and multiple source groups.

You can specify the default policy to use when no contract is specified for a source and destination security group combination. The default policy is **Permit**. You can change this policy to **Deny**,

Permit_IP_Log, or **Deny_IP_Log**, if necessary. You can set the default policy based on your network type, an open or closed network.



Note We recommend that you change the default policy from **Permit** to **Deny** only if you have created explicit policies to permit necessary network traffic for all your network infrastructure devices. Failure to do so can result in loss of network connectivity.

List View

Click the **List** icon at the top right of the **Group-Based Access Control** window to launch the **List** view.

- **Source View:** Displays a list of existing policies organized based on the source groups. You can expand each row to view the specific source-destination policy details.
- **Destination View:** Displays a list of existing policies organized based on the destination groups. You can expand each row to view the specific source-destination policy details.

To see which destination groups are available from a specific source group, use the **Source** view. To see which source groups are permitted to access a particular destination group, use the **Destination** view. For example, to see which destination groups are available to users who are part of the "Contractors" source security group, use the **Source** view. To see which source groups can access the "Finance servers" destination security group, use the **Destination** view.

You can also view the policy enforcement statistics data in the policies listing table. The total number of policy permits and denies are displayed for the selected time period.

The policy enforcement statistics are collected from the network devices that are provisioned for group-based policy and telemetry data language (TDL) subscription. These configurations are normally provisioned automatically for network devices that are part of a fabric. Manual configuration can be done for nonfabric network devices.

Note the following points while using the policy enforcement statistics data:

- Policy enforcement statistics data is available only when Group-Based Policy Analytics package is deployed.
- Telemetry subscription is added as part of base provisioning for both fabric and nonfabric network devices. TrustSec enforcement command is pushed when a new network device is added to Cisco DNA Center and assigned to a site.
- Software-Defined Access (SD-Access) adds TrustSec enforcement for the network devices that are added to a fabric. TrustSec telemetry data is collected only when this enforcement is enabled on a network device. If it is not enabled, the telemetry subscriptions used for policy monitoring are used to collect the TDL data for TrustSec.
- Cisco IOS XE 16.12 and later supports TDL streaming data.
- NETCONF must be enabled on the network devices.
- The following configuration must be added manually for the nonfabric network devices:

```
cts role-based enforcement vlan-list <VLAN of the endpoints>
```

- After upgrading, you might see the following message in the **Provision > Network Devices > Inventory** window:

We detected IOS-XE devices in your network where new telemetry subscription for assurance data needs to be enabled and some of the existing subscription needs to be optimized for performance. Please note that you will have to enable netconf and configure the netconf port in the Inventory credentials for these devices. Also note that these devices will receive a new subscription for group based policy monitoring telemetry. Do you want to take an action to provision these subscriptions?

Click **Apply Fix** to push the configuration to all network devices with site assigned.

Click **Deploy** to deploy the updated policies to the network devices. When you click **Deploy**, Cisco DNA Center requests Cisco ISE to send notifications about the policy changes to the network devices.

Matrix View

Click the **Grid** icon at the top right of the **Group-Based Access Control** window to launch the Matrix view. The Matrix view is a core policy view, which provides an overview of all policies for all security groups (whether explicit or default). You can use the Matrix view to view all source and destination policies and understand the overall policy structure. You can view, create, and update access control policies from the Matrix view.

The Matrix view contains two axes:

- **Source Axis:** The vertical axis lists all the source security groups.
- **Destination Axis:** The horizontal axis lists all the destination security groups.

Place the cursor on a cell to view the policy for a given source security group and a destination security group. The color of a cell is based on the policy that applies to that cell. The following colors indicate which policies are applied to each cell:

- **Permit:** Green
- **Deny:** Red
- **Custom:** Gold
- **Default:** Gray

Place the cursor on the **Permit**, **Deny**, **Custom**, or **Default** icon that is displayed at the top of the matrix to view the cells to which that policy is applied.

Click a cell to open the **Create Policy** or **Edit Policy** slide-in pane that allows you to create or edit the policies for the selected cell. The **Create Policy** slide-in pane shows the source and destination security groups as read-only fields. You can update the policy status and access contract.

You can create custom views of the policy matrix to focus only on the policies that you are interested. To do this, click the **View** drop-down list and choose **Create View**. While creating the custom view, you can specify the subset of security groups that you want to include in the custom view. You can save the custom views and edit them later, if required. Click the **View** drop-down list and choose **Manage Views** to create, edit, duplicate, or delete the custom views. The **Default View** shows all the source and destination security groups.

You can navigate through the matrix by dragging the matrix content area with the cursor or by using horizontal and vertical scroll bars. You can also use the mini-map to navigate through the matrix. The mini-map helps you to easily navigate through the matrix when the matrix size is large and it extends beyond the screen size.

You can move and place the mini-map anywhere on your screen. The mini-map provides the whole matrix view. The light gray portion in the mini-map represents the portion of the matrix that is currently displayed on your screen. You can drag that area to scroll through the matrix.



Note The mini-map is closed by default. Click the **Expand** icon to expand and view the mini-map.

The Matrix view highlights the cell and the corresponding row (source security group) and column (destination security group) when a cell is selected. The coordinates (source and destination security groups) of the selected cell are displayed near the matrix content area.

Click **Deploy** to deploy the updated policies on the network devices. When you click **Deploy**, Cisco DNA Center requests Cisco ISE to send notifications about the policy changes to the network devices.

You can use the **Filter** option to view a subset of the policy matrix, for a selected set of source and destination groups. You can create a filter to focus only on the policies that you are interested. To create the filter, select the source and destination groups that you want to include.

Cisco DNA Center integrates with Cisco ISE. Cisco ISE provides the runtime policy platform for providing policy download to the network devices on behalf of Cisco DNA Center. The TrustSec Workcenter user interface screens for Security Groups, Security Group Access Control Lists (SGACLs), and Egress Policy are displayed in Read-Only mode in Cisco ISE to prevent policy synchronization issues.


Policy Creation Overview

1. Define categorizations for your organization, or the portion of your organization that you plan to start with.
2. Create scalable groups for the categorizations that you identified.
3. Create access contracts for the types of network traffic you wish to control. There are predefined sample access contracts to Permit or Deny all traffic, and also some example contracts showing more specific traffic filtering. You can create additional, more granular access contracts based on specific application definitions.
4. Decide which categories of network users require access to particular network resources, such as application servers and connections to other networks.
5. Create access policies, associate a source group, a destination group, and an access contract, to define how traffic is allowed to flow from the source to the destination.

Create Scalable Groups

Before you begin

To perform the following task, you must be a Super Admin or Network Admin.

-
- Step 1** Click the menu icon () and choose **Policy > Group-Based Access Control > Scalable Groups**.
- Step 2** Click **Create Scalable Group**.
The **Create Scalable Group** slide-in pane appears.

Step 3 In the **Create Scalable Group** slide-in pane, enter a name and description (optional) for the scalable group.

Note The following characters are supported for the **Name** field:

- alphanumeric characters
- underscore (_)

The scalable group name must start with an alphabetic character.

Cisco DNA Center generates the tag value. You can update this value, if necessary. An error message is displayed if the value that you specify is already used by an existing scalable group. The valid range is from 2 to 65519.

Step 4 Choose the **Virtual Networks** to be associated with this scalable group from the drop-down list. By default, the default virtual network (DEFAULT_VN) is selected.

Step 5 Check the **Propagate to ACI** check box if you want the scalable group to be propagated to Cisco Application Centric Infrastructure (ACI).

Step 6 Click **Save**.

The **Scalable Groups** window displays the scalable group name, tag value, assigned virtual networks, and associated policies. You can also view the sample scalable groups in this window. You can use or delete those scalable groups.

You can edit or delete the scalable groups from the **Scalable Groups** window. Click the **Scalable Group Name** link to view the details of a scalable group. Click **Edit** in the **View Scalable Group** window to update the scalable group details. When you click **Deploy**, Cisco DNA Center requests Cisco ISE to send notifications about the changes to the network devices.

Click the link in the **Policies** column of a scalable group to view the access control rules that use that scalable group and the policy to which it belongs. You cannot delete a scalable group if it is used in any access policy.

An orange triangle icon is displayed next to a scalable group if synchronization with Cisco ISE is not completed.

Cisco ISE supports packets coming from ACI to the TrustSec domain by synchronizing the Internal Endpoint Groups (IEPGs) and creating correlating read-only scalable groups in Cisco ISE. These scalable groups are displayed in the **Scalable Groups** window with the value ACI in the **Created In** column. You cannot edit or delete the scalable groups that are learned from ACI, but you can use them in the policies.

The **Associated Contracts** column shows the associated ACI-learned contracts for the scalable groups that are learned from ACI. Click the link displayed in the **Associated Contracts** column to view the details about the associated contracts.

When an IEPG is updated in ACI, the corresponding scalable group configuration is updated in Cisco ISE. A new EEPG is created in ACI, when a scalable group is created in Cisco ISE.



Note You cannot create a scalable group with the name "ANY" or tag value 0xFFFF/65535. Scalable Group ANY/65535 is a reserved internal scalable group that is used for the Cisco DNA Center default policy.

While synchronizing the scalable groups in Cisco DNA Center with Cisco ISE:

- If a scalable group is present in Cisco DNA Center and is not present in Cisco ISE, it is created in Cisco ISE.

- If a scalable group is present in Cisco ISE and is not present in Cisco DNA Center, it is created in Cisco DNA Center.
- If the scalable group name is same in both Cisco DNA Center and Cisco ISE, but the description and ACI data are different, Cisco DNA Center is updated with the data specified in Cisco ISE.
- If the scalable group name is same in Cisco DNA Center and Cisco ISE, but the tag values are different, a new scalable group with the tag value specified in Cisco ISE is created in Cisco DNA Center. The name of the existing scalable group in Cisco DNA Center is updated with the suffix `_DNAC`.
- If the tag value is same but the scalable group name is different, the scalable group name in Cisco DNA Center is updated with the name specified in Cisco ISE.

Create Access Contracts

An access contract is a set of rules that controls the type of network traffic that is allowed to pass between the source and destination scalable groups. Access contracts define the actions (permit or deny) performed when the traffic matches a network application, protocol, and port.



Note Security Group Access Control List (SGACL) in Cisco ISE is called `Access Contract` in Cisco DNA Center.

Before you begin

To perform the following task, you must be a Super Admin or Network Admin.

Step 1 Click the menu icon () and choose **Policy > Group-Based Access Control > Access Contracts**.

Step 2 Click **Create Access Contract**.

Step 3 In the **Create Access Contract** slide-in pane, enter a name and description for the contract.

Step 4 Create the traffic filter rules:

- From the **Action** drop-down list, choose **Deny** or **Permit**.
- From the **Application** drop-down list, choose the application for which you want to apply that action. The port and protocol are automatically selected based on the application that you select.

If you want to specify the transport protocol, source port, and destination port, choose the **Advanced** option from the **Application** drop-down list.

You can create multiple rules. To create multiple rules for a contract, click the + symbol and choose the settings for the **Action** and **Application** columns. The rules are checked in the order in which they are listed in the contract. Use the handle icon at the left end of a rule to drag and change the order of the rule.

You can enable or disable logging for any traffic filter rule (including the default action) by using the **Logging** toggle. Logging is disabled by default. When logging is enabled, the network device sends a syslog message when the traffic filter rule is hit. This might be helpful in troubleshooting and initial testing of a policy. However, we recommend that you use this option sparingly, because it might have a resource and performance impact on the network devices.

Step 5 From the **Default Action** drop-down list, choose **Deny** or **Permit**.

You can enable logging for the default action, if required.

Step 6 Click **Save**.

You can view, create, duplicate, update, and delete contracts from the **Access Contracts** listing window.

You can also view the sample contracts in the **Access Contracts** window. You can use or delete those sample contracts. However, you cannot delete the default contracts (Permit IP, Deny IP, Permit_IP_Log, and Deny_IP_Log).

Click the **Contract Name** link in the **Access Contracts** window to view the details of a contract. Click **Edit** in the **View Contract** window to edit the contract details.

An orange triangle icon is displayed next to a contract if synchronization with Cisco ISE is incomplete.

The contracts that are learned from ACI are displayed in the **Access Contracts** window with the value **ACI** in the **Created In** column. You cannot edit or delete the contracts that are learned from ACI, but you can use them in the policies while using the ACI-learned scalable groups. While creating or updating a policy from the Matrix view, if you select an ACI-learned scalable group as the destination group, the associated contracts are displayed in the **Preferred Contracts** tab. You can view all the contracts in the **All Contracts** tab.

You can view the number of rules used in each contract in the **Rules Count** column.

Click the link in the **Policies** column of a contract to view the policies that use that contract.

You cannot delete a contract if it is used in a policy. You must delete the contract from that policy before you delete the contract.

When you update the scalable groups, contracts, or policies, you must deploy the changes on the network devices. If you update the policies and do not deploy the updated policies, notifications about the policy changes are not sent to the network devices and the policies that are currently active in the network may not be consistent with the policy information displayed in Cisco DNA Center. To resolve this situation, you must deploy the updated policies on the network devices.

You can duplicate an existing contract and create a new contract by editing the required details. When you duplicate a contract, all information in the existing contract is copied and the copied contract has the existing contract name with the string `copy` appended at the end.

You can use the **Filter** option to search for the contracts that you look for.

While synchronizing the access contracts in Cisco DNA Center with Cisco ISE:

- If a contract is present in Cisco DNA Center and is not present in Cisco ISE, it is created in Cisco ISE.
- If a contract is present in Cisco ISE and is not present in Cisco DNA Center, it is created in Cisco DNA Center.
- If the contract name is the same in Cisco DNA Center and Cisco ISE, but the description and traffic rule content are different, Cisco DNA Center is updated with the data specified in Cisco ISE.
- If the contract name and rule are the same, but the description is different, Cisco DNA Center is updated with the description specified in Cisco ISE.
- Text SGACL command lines in Cisco ISE are migrated as content that cannot be parsed. You can edit these contracts, but Cisco DNA Center does not parse them or check syntax. The changes that you make in Cisco DNA Center are reflected in Cisco ISE.

- If a policy has multiple SGACLs in Cisco ISE, those contracts are migrated as default policies in Cisco DNA Center.

Create Group-Based Access Control Policy

Scalable groups and access contracts are the basic building blocks of an access control policy. While creating an access control policy, you can use the scalable groups and contracts that you have created before, or create new scalable groups and contracts while creating the policy.

If you want to specify the network resources that can be accessed from a specific source group, you can create an access control policy with a single source and multiple destination groups. On the other hand, if you want to specify the source groups that are permitted to access a particular network resource, you can create an access control policy with a single destination and multiple source groups.

For example, if you want to specify the network resources that can be accessed by the users associated with the *Contractors* source scalable group, you can create an access control policy with a single source and multiple destination groups. If you want to specify the source groups that are permitted to access the *Finance Servers* destination scalable group, you can create an access control policy with a single destination and multiple source groups.

Group-based access control policies can also be created or updated based on the traffic flows for a given source and destination group pair.

To create a group-based access control policy, use the following procedure.

Step 1 From the **Policy List** or **Matrix** view, click **Create Policies**.

Step 2 To create an access control policy with a single source and multiple destination groups, click **Source to Destination(s)** and complete these steps:

- Click the radio button next to the source scalable group that you want to select. If the scalable group that you need does not exist, click **Create Scalable Group** to create a new scalable group. For more information, see [Create Scalable Groups, on page 6](#).
- Click **Next**.
- Choose the destination scalable groups to map to the selected source scalable group.

You can view the scalable group details and edit the scalable groups, if necessary.

If a policy already exists between the source and destination, an orange triangle icon is displayed near a scalable group.

- Click **Next**.
- Click the radio button next to the contract that you want to select. If the contract that you need does not exist, click **Create Contract** to create a new contract. For more information, see [Create Access Contracts, on page 8](#).

You can view and edit the contract details, if necessary.

Note You can choose only one contract for a policy.

- Click **Next**.

The **Summary** window lists the policies that are created based on the selected scalable groups and contract.

- Click **Save**.

Step 3 To create an access control policy with a single destination and multiple source groups, click **Destination to Source(s)** and complete the following steps:

- a) Click the radio button next to the destination scalable group that you want to select. If the scalable group that you need does not exist, click **Create Scalable Group**.
- b) Click **Next**.
- c) Choose the source scalable groups to map to the selected destination scalable group.

You can view the scalable group details and edit the scalable groups, if necessary.

If a policy already exists between the source and destination, an orange triangle icon is displayed near a scalable group.

- d) Click **Next**.
- e) Click the radio button next to the contract that you want to select. If the contract that you need does not exist, click **Create Contract**.

You can view and edit the contract details, if necessary.

Note You can choose only one contract for a policy.

- f) Click **Next**.

The **Summary** window lists the policies that are created based on the selected scalable groups and contract.

- g) Click **Save**.

Note You can toggle between the **List** view and the **Drag and Drop** view using the **Toggle** button in the top-right corner of the scalable group listing area. The **Drag and Drop** view allows you to drag and drop the scalable groups to the **Source** and **Destination** fields while creating the access control policy. However, only the first 50 scalable groups are listed in the **Drag and Drop** view. You can use the **Drag and Drop** view if you have a smaller number of scalable groups (up to 50). If you have more than 50 scalable groups, use the **List** view to view them all.

To create or modify a group-based access control policy based on the traffic flows:

1. From the policy matrix view, click the cell for which you want to create or modify the group-based access control policy.
2. In the **Policy Details** slide-in pane, click **View Traffic Flows**.

In the **View Traffic Flows** slide-in pane, you can see the rules for the selected contract or the default policy in the left pane. You can view the traffic flows that match any selected rule in the right pane.

3. Click **View Traffic** in the Default Action rule to see the list of flows that match that rule. While modifying an existing policy using access contracts with additional rules, you can use the **View Traffic** option for any rule to see the list of flows matching that rule.
4. For policies that are using the Default Action rule (with no explicitly selected access contract), you can select an access contract or create a new access contract to be used by that policy.

For policies with access contract PERMIT or DENY, you can select an access contract or create a new access contract to be used by that policy.

For policies with custom access contract, you can edit the selected access contract.

While saving a newly created or edited contract, you have the following options:

- Save the changes to the existing contract. Changes affect all policies that reference the contract.
- Save the changes as a new contract. Changes are applied only to the current policy.
- Save the changes as a new contract. Changes are not applied to any policy.

While synchronizing the policies in Cisco DNA Center with Cisco ISE:

- If a policy is present in Cisco DNA Center and is not present in Cisco ISE, it is created in Cisco ISE.
- If a policy is present in Cisco ISE and is not present in Cisco DNA Center, it is created in Cisco DNA Center.
- If a policy contract is different in Cisco ISE, Cisco DNA Center is updated with the contract specified in Cisco ISE.
- Policy mode information (Enabled, Disabled, or Monitor) is also imported from Cisco ISE.

Cisco ISE has an option to allow multiple SGACLs for a single policy (this option is not enabled by default in Cisco ISE). Cisco DNA Center does not support the use of multiple access contracts for a single policy. During policy synchronization, if a policy in Cisco ISE has multiple SGACLs, the Cisco DNA Center administrator is given the option to change that policy to have no contract selected (to use the default policy). The administrator can select a new or existing access contract for that policy after the policy synchronization is complete.

Cisco Group-Based Policy Analytics

Group-Based Policy Analytics enables you with insights, to create group-based policies by visualizing communications between assets, to assess the impact of introducing new access controls, and understand exactly which protocols you need to allow in the policies.

Cisco Group-Based Policy Analytics aggregates information on groups of assets on your network, and their communication to answer the following questions:

- Which groups are communicating with each other?
- What kind of communication is this?
- Which group does a given asset belong to?

Installation

You can purchase one of following types of licenses for Cisco DNA Center:

- Cisco DNA Essentials
- Cisco DNA Advantage
- Cisco DNA Premier

Cisco DNA Advantage and Cisco DNA Premier contain the Group-Based Policy Analytics package. This package consists of the following archives (.tar.gz files):

- Backend
- User Interface
- Summarizer Pipeline
- Aggregation definitions

Cisco Group-Based Policy Analytics is a part of Cisco DNA Center but, is not installed by default. Click the menu icon (☰) and choose **System > Software Updates > Installed Apps**. Scroll down to **Group-Based Policy Analytics** under **Policy Applications**. Click **Install** to install the application.

Hardware and Software Compatibility

Platform Support

Cisco Group-Based Policy Analytics is supported on the following hardware platforms:

- 44 cores, single node or three-node cluster
- 56 cores, single node or three-node cluster
- 112 cores, single node or three-node cluster

These platforms must meet the performance and scalability requirements mentioned here.

For details about the supported hardware, see [Cisco UCS M4 appliances](#) or [Cisco UCS M5 appliances](#).

The following table lists the performance metrics that Cisco DNA Center and Cisco Group-Based Policy Analytics support on each of the core platforms. The NetFlow metrics were introduced by Cisco Group-Based Policy Analytics.



Note The following table lists the performance metrics for a standalone deployment. These values might vary based on the number of nodes in the cluster and the number of installed packages.

Table 1: Performance Metrics

| Metric | 44 cores, three nodes | 56 cores | 112 cores |
|---------------------|---|---|---|
| Devices (NADs) | 5000 1000 switches or 1000 routers or a combination of both; 4000 APs | 8000 2000 switches or 2000 routers or a combination of both; 6000 APs | 18,000 5000 switches or 5000 routers or a combination of both; 13,000 APs |
| Clients (endpoints) | 25,000 20,000 wireless; 5,000 wired | 40,000 30,000 wireless; 10,000 wired | 100,000 60,000 wireless; 40,000 wired |
| NetFlows per sec | 30,000 | 48,000 | 120,000 |

Device Support

You must enable NetFlow to use Cisco Group-Based Policy Analytics. The following table shows the various ways in which NetFlow can be enabled on different network devices.

Table 2: Device Support

| Network Devices | Series | NetFlow Configurable in telemetry section of Network Settings in Cisco DNA Center UI (Flexible NetFlow or Application Visibility and Control Based NetFlow) | NetFlow Configurable using the template editor tool in the Cisco DNA Center UI (Flexible NetFlow or Application Visibility and Control Based NetFlow) | NetFlow Collection in Fabric Deployment | NetFlow Collection in Nonfabric Deployment |
|-----------------|--|---|---|---|--|
| Routers | Cisco 1000 Series Integrated Services Routers (ISR1K) | Yes | Yes | Yes | Yes |
| | Cisco 4000 Series Integrated Services Routers (ISR4K) | Yes | Yes | Yes | Yes |
| | Cisco Cloud Services Router 1000v Series (CSR 1000v) | Yes | Yes | Yes | Yes |
| | Cisco 1000 Series Aggregation Services Routers (ASR1K) | Yes | Yes | Yes | Yes |
| Switches | Cisco Catalyst 9200 series | Yes | Yes | Yes | Yes |
| | Cisco Catalyst 9300 Series | Yes | Yes | Yes | Yes |
| | Cisco Catalyst 9400 Series | Yes | Yes | Yes | Yes |
| | Cisco Catalyst 9500 Series | No | Yes | Yes | Yes |
| | Cisco Catalyst 9600 Series | No | Yes | Yes | Yes |
| | Cisco Catalyst 2k series | No | Yes | NA | Yes |
| | Cisco Catalyst 3560 series | No | Yes | NA | Yes |
| | Cisco Catalyst 3650 series | No | Yes | Yes | Yes |
| | Cisco Catalyst 3850 series | No | Yes | Yes | Yes |
| | Cisco Catalyst 4k series | No | Yes | Yes | Yes |
| | Cisco Catalyst 6500 Series Switches | No | Yes | Yes | Yes |
| | Cisco Catalyst 6800 Series Switches | No | Yes | Yes | Yes |

| Network Devices | Series | NetFlow Configurable in telemetry section of Network Settings in Cisco DNA Center UI (Flexible NetFlow or Application Visibility and Control Based NetFlow) | NetFlow Configurable using the template editor tool in the Cisco DNA Center UI (Flexible NetFlow or Application Visibility and Control Based NetFlow) | NetFlow Collection in Fabric Deployment | NetFlow Collection in Nonfabric Deployment |
|----------------------|---|---|---|---|--|
| Wireless Controllers | Cisco 3504 Wireless Controller (AireOS-Based) | Yes | Yes | No | Yes, only central switching SSID |
| | Cisco 5520 Wireless Controller (AireOS-Based) | Yes | Yes | No | Yes, only central switching SSID |
| | Cisco 8540 Wireless Controller (AireOS-Based) | Yes | Yes | No | Yes, only central switching SSID |
| | Cisco Catalyst 9800 based controller | Yes | Yes | Yes | Yes |

Cisco ISE

Cisco ISE 2.4 Patch 7 and later, Cisco ISE 2.6 Patch 1 and later, and Cisco ISE 2.7 and later are supported.

Cisco Stealthwatch

Cisco Stealthwatch 7.x or later is supported.

Understand Connectors

Cisco Group-Based Policy Analytics gathers telemetry from the following sources, which are also known as connectors. You can configure the connectors either by following the [Initial Configuration of Cisco Group-Based Policy Analytics, on page 16](#) workflow, or by choosing **Policy > Group-Based Access Control > Analytics > Configurations > Analytics Settings**.

Group Data Connectors

The group data connectors collect information about groups that assets are classified into. Cisco ISE and Cisco Stealthwatch are group data connectors.

- **Cisco ISE**

Cisco ISE is a next-generation identity and access control policy platform that enables enterprises to enforce compliance, enhance infrastructure security, and streamline their service operations. Cisco ISE

is installed on a virtual machine, a physical machine or a combination of both. Cisco ISE uses the Cisco Platform Exchange Grid (pxGrid) service as the publisher-subscriber module for sharing SessionDirectory, Scalable Groups, and other information. PxGrid uses a query interface and supports bulk download. Users on the network are authenticated, authorized, and accounted for, and a session directory is maintained. User events are published to the connectors that are subscribed to the SessionDirectory service. Other services like scalable group notifications can also be subscribed to.

User identity and device information obtained during authentication is used to classify the packets, as they enter the network. This packet classification is maintained by tagging packets when they enter the network so that they can be properly identified for applying security and other policy criteria along the data path. The tag, also called the Scalable Group Tag (SGT), allows Cisco ISE to enforce access control policies by enabling the network device to act upon the SGT to filter traffic.

In addition, Cisco ISE collects information about endpoints connected to your network, such as the type of device, OS, OS version, IP address and other attributes. These are called ISE profiles.

The Cisco ISE connector provides Cisco Group-Based Policy Analytics with SGT definitions and profiles from Cisco ISE.

- **Cisco Stealthwatch**

Cisco Stealthwatch is a network-based anomaly detection system which provides advanced threat detection, accelerated threat response and network traffic security analysis. The Cisco Stealthwatch connector obtains the host groups that are configured on Cisco Stealthwatch. A host group is essentially a virtual container containing multiple host IP addresses or IP address ranges that have similar attributes, such as location, function, or topology.

Communication Connector

The communication connector helps gather information on traffic seen between groups, that could be leveraged in Group-Based Policy decisions. This is done using NetFlow from network devices managed by Cisco DNA Center. NetFlow is collected and aggregated natively by Cisco DNA Center.

Initial Configuration of Cisco Group-Based Policy Analytics

This workflow helps you configure the data connectors that are required to collect telemetry data related to network activity, and endpoints from specific sources such as Cisco ISE, Cisco Stealthwatch, and NetFlow. This task is useful when you are configuring the data connectors for the first time.

Before you begin

Cisco DNA Center must have Cisco Group-Based Policy Analytics installed.

Step 1 Click the menu icon () and choose **Policy > Group-Based Access Control > Overview**. The **Create policies with more confidence** window appears.

Step 2 Click **Get Started**.
The **Configure your data connectors** window appears.

Step 3 Click **Let's Do It**.
The **Configure Group Data Connectors** window appears.

Note If the Cisco ISE version is earlier than the version required for running Cisco Group-Based Policy Analytics, an error message is displayed.



- Step 4** Click **Configure** at the bottom of the connector that you want to configure. A new window opens, redirecting you to the Cisco DNA Center **Settings** window, where you can configure the required connectors. You must configure the Cisco ISE connector. Configuring the Cisco Stealthwatch connector is optional.
- Step 5** Close the **Settings** window. You will see a green dot next to the **Configure** option for the successfully configured connectors in the **Configure Group Data connectors** window.
- Step 6** Click **Next**.
The **Configure Communication Connectors** window appears.
- Step 7** Configure the communication connector (NetFlow) by using one of the following options:
- Provision NetFlow on the Cisco DNA Center device interface manually.
 - Click **Template Editor** to configure NetFlow using the **Template Editor Tool** in Cisco DNA Center.
 - Click **Telemetry in Network Settings** to configure NetFlow in the telemetry section of network settings.
- Step 8** Click **Next**.
The **Summary** window displays the configuration details of the connectors.
- Step 9** Click **Done** to start discovering your groups and endpoints.

Explore Groups and Endpoints

The following section provides information about the different ways to visualize traffic between different groups.

Multiple Groups to Multiple Groups

When you click the number that is displayed in the **Scalable Groups** box in the **Overview** window, the **Explore Scalable Groups** window is displayed. In this window, you can see a summary of all the group-to-group communication among Scalable Groups. By default, the time range for this view is the last available 24 hours of data. Note that this is different from the time range mentioned in the **Overview** window, where it is set to the last 14 days. The chart shows the top 25 source Scalable Groups and their corresponding interactions, starting with the source Scalable Group with the highest number of unique flows within the given time period and so on.

Click the  icon to display the chart view, or  to display the table view.

In the table view, if you click the **See destinations** link on a particular row, it opens a window showing all the destination Scalable Groups for the selected source Scalable Group, and the unique flow count for each destination Scalable Group.

Click a source group to view the **Single Group to Multiple Groups** window.

When you hover your cursor over a link, the link is highlighted and a tooltip shows the number of unique traffic flows. Clicking the link takes you to the **Single Group to Single Group** window.

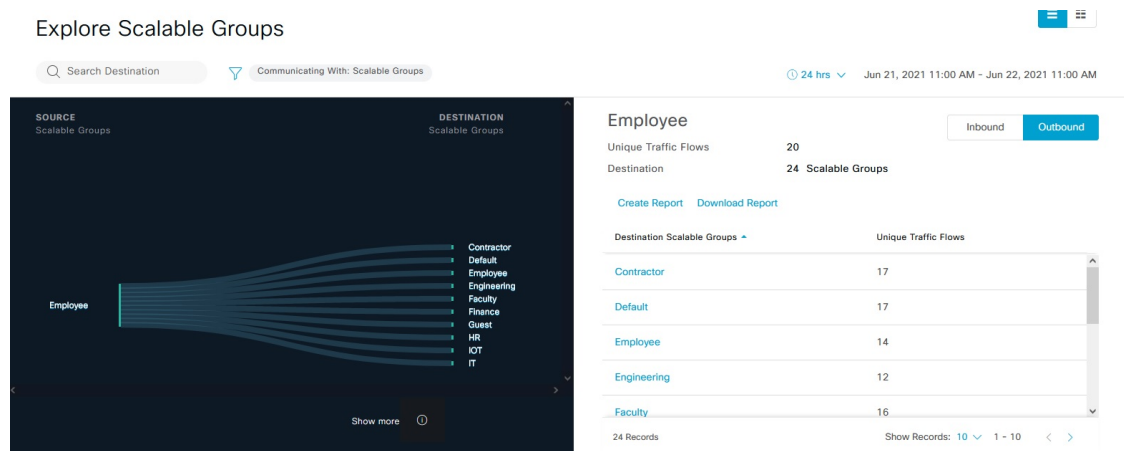
When you click the number displayed in the **ISE Profiles** box in the **Overview** window, the **Explore ISE Profiles** window is displayed. In this window, you can see a summary of all the communication from ISE Profiles as the source and Scalable Groups as the destination. In order to focus on group-based policy decisions, either the source or destination category must be Scalable Groups in this view.



When you click the number displayed in the **Stealthwatch Host Groups** box in the **Overview** window, the **Explore Stealthwatch Host Groups** window is displayed. In this window, you can see a summary of all the communication, with Stealthwatch Host Groups as the source and the Scalable Groups as the destination. In order to focus on group-based policy decisions, either the source or destination category must be Scalable Groups in this view.

Single Group to Multiple Groups

Single Group to Multiple Groups: Outbound

This window displays the activity between a single source group and multiple destination groups. The source or the destination or both must be a Scalable Group. By default, the time range for this view is the last available 24 hrs of data and the default number of links or records shown is 10.



Click the  icon to display the chart view or  to view the table view.

Outbound displays the connections initiated by the selected scalable group. **Inbound** displays the connections initiated by another group to this scalable group.

Click any column to sort in ascending or descending order.

Click a group to view the **Single Group to Single Group** window with the corresponding destination as the selected group. The source group does not change.

When you hover your cursor over a link, it is highlighted, and a tooltip shows the number of unique traffic flows. If you click this link, it takes you to the **Single Group to Single Group** window.

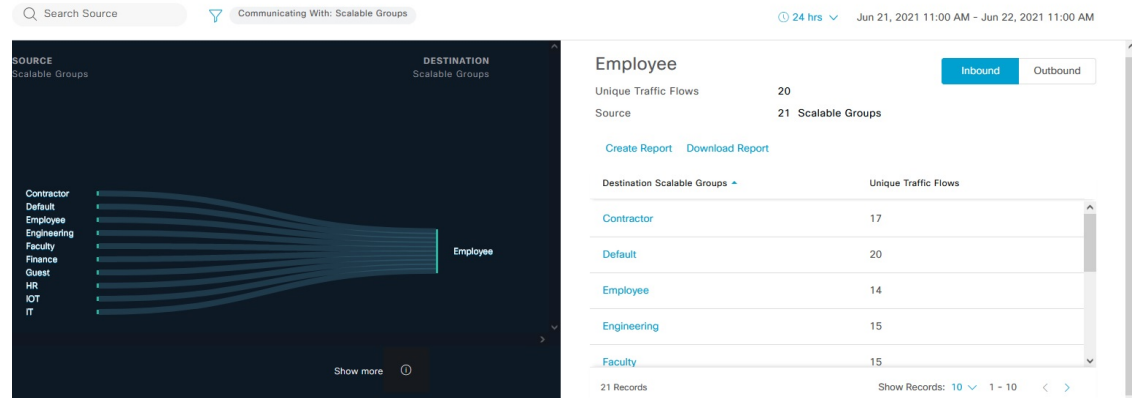
Click **Create Report** to generate a new report in CSV format with the information in this view. The **Reports** window opens, where you can see the generated report. This window also provides you access to previously generated reports and allows you to download the reports.

Click **Download Report** to view the generated reports. The **Reports** window opens, where you can click the *download* icon under the **Last Run** column to download a report.

Single Group to Multiple Groups: Inbound

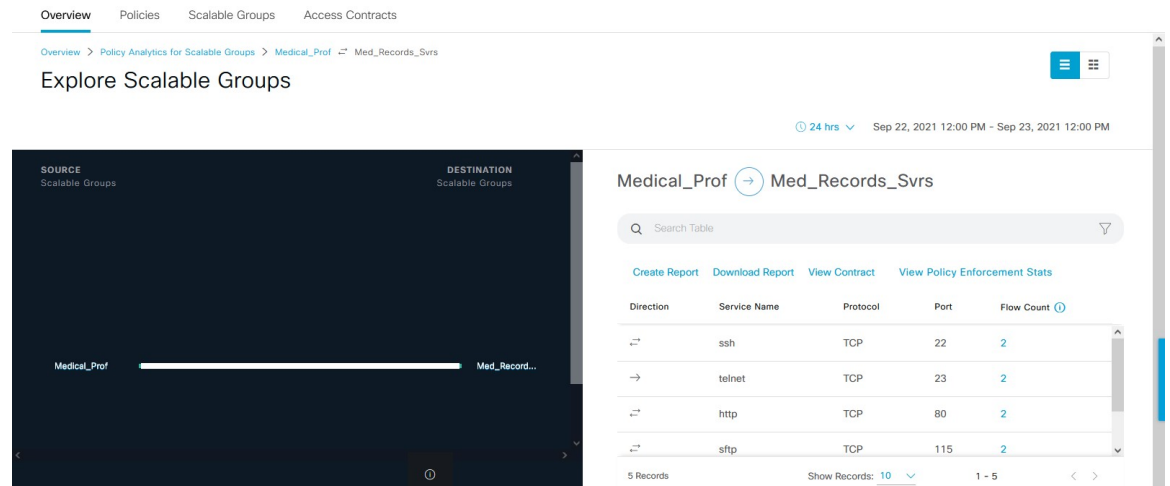
If you click **Inbound**, it shows all the connections initiated by any group as the source and the selected Scalable Group as destination.

Explore Scalable Groups



Single Group to Single Group

This window shows the activity between a source group and a destination group. The source group or the destination group or both must be a scalable group. By default, the time range for this visual is the last available 24 hours of data and the default number of links or records shown is 10.



When you click the directional arrow displayed between the source and destination groups, the source and destination groups are interchanged in this view.

Click **View Contract** to view a side-by-side comparison of traffic flows with the access contract rules that are in effect for this source and destination group pair.

Contract: Secure_Web_SFTP [Edit](#)

| # | Action | Application | Protocol | Source Port | Destination Port | Logging | Action |
|---|--------|-------------|----------|-------------|------------------|---------|------------------------------|
| 1 | PERMIT | advanced | TCP | | 443 | OFF | View traffic |
| 2 | PERMIT | advanced | TCP | | 115 | OFF | View traffic |
| 3 | PERMIT | advanced | TCP | | 22 | OFF | View traffic |

| Direction | Service Name | Protocol | Port | Flow Count |
|-----------|--------------|----------|------|-------------------|
| ↔ | ssh | TCP | 22 | 2 |
| → | telnet | TCP | 23 | 2 |
| ↔ | http | TCP | 80 | 2 |
| ↔ | sftp | TCP | 115 | 2 |
| ↔ | https | TCP | 443 | 2 |

The left pane in the **View Contract** window displays the rules for permitted and denied traffic between the source and destination groups. You can view the traffic flows that match any selected rule in the right pane. You can view the flow direction, service name, flow count, ports, and protocol details in the right pane. The **Flow Count** column displays the number of flows detected for that particular service, port, and protocol combination for the selected time period. You can click the flow count link to view the flow details for each endpoint.

Medical_Prof -> Med_Records_Svrs Port: 22 Protocol: TCP Service Name: ssh Date Selected: Sep 22, 2021 12:00 PM - Sep 23, 2021 12:00 PM

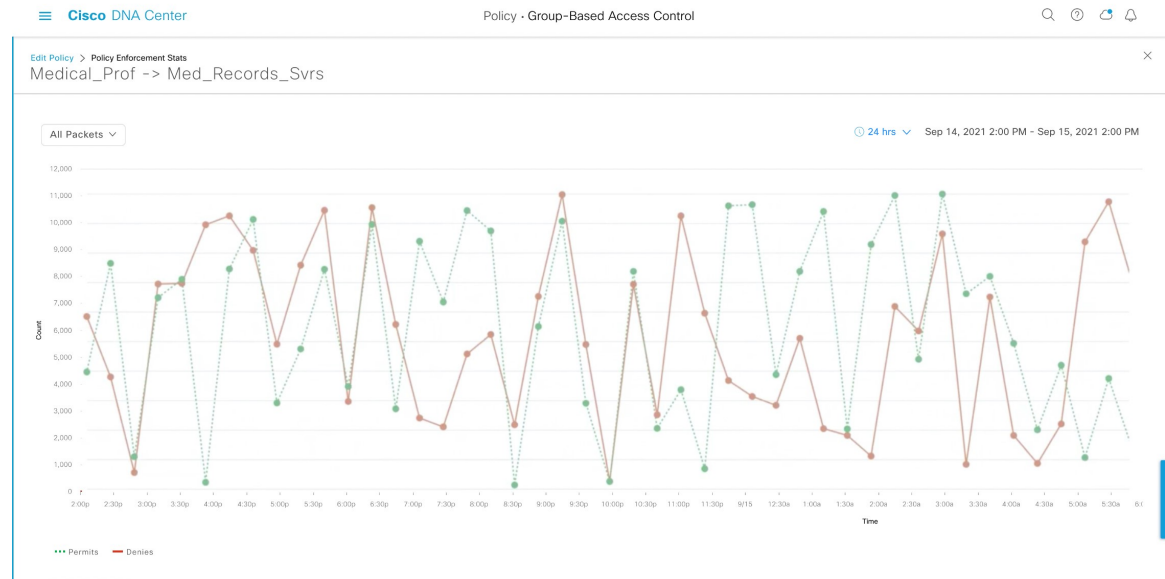
| Source IP Address | Source MAC Address | Source Location | Destination IP Address | Destination MAC Address | Destination Location | Flow Count |
|-------------------|--------------------|-----------------------|------------------------|-------------------------|-----------------------|------------|
| 101.111.22.19 | 06:15:00:26:00:03 | Global/MYAREA/MYSITE9 | 101.111.22.81 | 06:1B:00:26:00:0b | Global/MYAREA/MYSITE2 | 1 |
| 101.111.22.62 | 06:15:00:26:00:07 | Global/MYAREA/MYSITE1 | 101.111.22.81 | 06:1B:00:26:00:0b | Global/MYAREA/MYSITE2 | 1 |

Show Records: 10 1 - 10





Note When you sort the **Traffic Flows** table based on the flow count, only 1000 records are displayed.

Click **View Policy Enforcement Stats** to view a time-series graph of permit and deny counts for any source and destination group pair. It provides per-policy enforcement statistics visibility. You can use the **All Packets** drop-down list to select only the permitted or dropped packets. Graph data points are displayed for each 15-minute data collection period. You can hover over any data point to view the number of permits and denies. You can click a data point or time period to view the contract and traffic flow details for the selected time period.



Note Note that the selected time period will be the hour that contains the 15-minute interval corresponding to the selected data point, because the flow data aggregation is done every 60 minutes.

The **Traffic Flows** table can also be accessed from the **Policy Details** slide-in pane while creating or editing a policy.

Click the  icon to display the chart view or  to display the table view.

You can set the date and time using the [Date and Time Selector](#).

Click **Create Report** to generate a new report in CSV format with the information in this view. The **Reports** window opens, where you can see the generated report. This window also provides you access to previously generated reports and allows you to download the reports.


Click **Download Report** to view the generated reports. The **Reports** window opens, where you can click the *download* icon under the **Last Run** column to download a report.

Access Contracts

Access Contracts can now be created and modified directly in the Analytics workflow.

View Contract

To launch the **View Contract** window, from the **Explore Scalable Groups** window, click **View Contract**. The left pane in the **View Contract** window displays the rules for permitted and denied traffic between the source and destination groups. You can view the traffic flows that match any selected rule in the right pane.

This table can also be accessed from the **Policies** window. Click the menu icon () and choose **Policy > Group-Based Access Control > Policies**.

From the policy matrix view, click the cell for which you want to create or modify contracts. In the **Policy Details** slide-in pane, click **View Traffic Flows**.

If there is currently no contract assigned between the source and destination groups, no data is displayed. You can use the **Change Contract** or **Create Access Contract** option to create or modify the contract.

Click **View traffic** in the **Action** column to see the list of flows that match that rule.

Create Access Contract

To launch the **Contract Content** window, from the **Policy Details** pane, click **Create Access Contract**. To create the traffic filter rules:

1. From the **Action** drop-down list, choose **Deny** or **Permit**.
2. From the **Application** drop-down list, choose the application for which you want to apply that action. The port and protocol are automatically selected based on the application that you select.

If you want to specify the transport protocol, source port, and destination port, choose the **Advanced** option in the **Application** drop-down list.

You can create multiple rules. To create multiple rules for a contract, click the Plus icon and choose the settings for the **Action** and **Application** columns. The rules are checked in the order in which they are listed in the contract. Use the Handle icon at the left end of a rule to drag and change the order of the rule.

You can use the **Add to Contract** option within the **All Unique Traffic Flows** pane to add an entry to the contract.

While saving a newly created or edited contract, you have the following options:

- **Update current policy only:** A duplicate of the contract is created and applied to the current policy. Other policies that reference this contract are not affected.
- **Update contract for all referenced policies:** The contract is updated and applied to the current policy and other policies that reference this contract.
- **Create a new contract with no policies affected:** A duplicate of the contract is created but not applied to any policy.

Change Contract

To launch the **Change Contract** window, from the **Policy Details** pane, click **Change Contract**. All available contracts are displayed. You can select the required contract and click **Change** to add that contract to the policy.

Edit Contract

The **Edit** option is displayed only when a contract has already been added to the policy. If you want to edit the contract details, click **Edit** displayed after the name of the contract.

After updating the contract, click **Save**. The following options are available:

- **Update current policy only:** A duplicate of the contract is created and applied to the current policy. Other policies that reference this contract are not affected.
- **Update contract for all referenced policies:** The contract is updated and applied to the current policy and other policies that reference this contract.

- **Create a new contract with no policies affected:** A duplicate of the contract is created but not applied to any policy.

After choosing the appropriate option, enter a name and description (if you select the first or third option), and then click **Confirm**.

Date and Time Selector

You can select the time period for which you want to see the connection summary. You can select a time range within the last 14 days up to the current hour.

Figure 3: Date and Time Selector

Select a time range within the last 14 days upto the current hour
(Mar 26, 2020 3:00 PM)

1 → 1 hour 12 hours 24 hours

| Start Date | Start Time | End Date | End Time |
|---------------|------------|--------------|----------|
| 3 / 25 / 2020 | 3:00 PM | Mar 26, 2020 | 3:00 PM |

2 ↑ 3 ↑

1. Select one of the options. The **End Time** will be adjusted automatically.
2. Specify the **Start Date** by entering the month, day, and year manually or by using the calendar icon.
3. Choose the **Start Time** from the drop-down menu.

Use Search

The **Overview** window has a **Search** field that can search across the data for scalable groups, ISE profiles, Stealthwatch host groups, IP addresses, or MAC addresses.

As you start entering the characters in the search field, an automatic search is performed for scalable groups, ISE profiles, and Stealthwatch host groups, and up to three results are displayed for each group type. For MAC addresses, the relevant characters are hexadecimal and colon.

Cisco Group-Based Policy Analytics supports both IPv4 and IPv6 addresses for endpoints. You can search and filter the endpoints using an IPv4 or IPv6 address.

- The following characters can be used to search and filter IPv4 addresses:
 - Numbers (0-9)
 - Dot (.)

You can enter up to 15 characters in the filter field.

- The following characters can be used to search and filter IPv6 addresses:
 - Numbers (0-9)

- Lowercase and uppercase alphabetic characters (a-f, A-F)
- Colon (:)

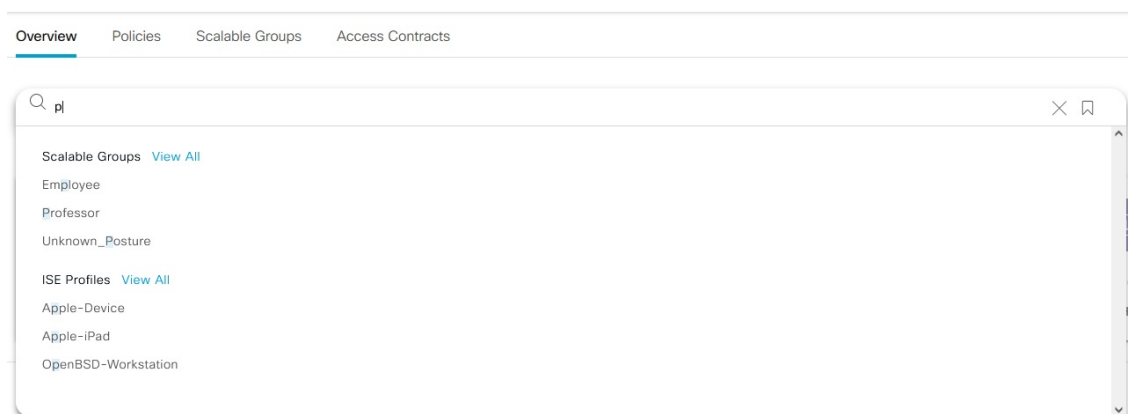
You can enter up to 39 characters in the filter field.





Note

- The **Search Results** window does not open until you click the **View All** link.
- A read-only user cannot search for an IP address or a MAC address. See [Role-Based Access Control](#) for more information.

Figure 4: Search Window





From the **Focus** drop-down list, choose the required option to change your search criteria.

The filter icon () is used in advanced filtering, and is available only when you search for a MAC address or an IP address. When you click the  icon, each column is provided with a search field on top of the column name.

For each column, you can enter up to three search criteria. When entering more than one criterion per column, you can specify an OR operation or an AND operation. The resultant query performs an AND operation across the columns.

Click the  icon and use the **Save Current Search** option to save the current displayed search.

To delete a saved search, click the  icon. Hover your cursor over the name of the saved search and click the  icon. Click **Yes** in the **Delete Saved Filter** dialog box to permanently delete the filter.

Role-Based Access Control

Cisco Group-Based Policy Analytics supports Role-Based Access Control. It differentiates between a read-write user and a read-only user. However, because Cisco Group-Based Policy Analytics is primarily based on visibility, which does not make any changes to the system, there are only a few limitations for a read-only user:

- A read-only user cannot save search queries.
- A read-only user cannot make changes in the [Initial Configuration of Cisco Group-Based Policy Analytics, on page 16](#) window.
- A read-only user cannot export data because exporting data is an HTTPS POST operation.
- A read-only user can only perform search by group and is restricted from other search functions as they involve HTTPS POST operations.

