Overview of Cisco Optical Network Controller

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Cisco Optical Network Controller (Cisco ONC) is an SDN Domain Controller for Cisco optical networks. Cisco Optical Network Controller behaves as a Provisioning Network Controller (PNC) and performs the following functions.

- Collects information about the inventory and topology of the managed network.
- Monitors the physical or virtual topology of the network.
- Notifies of changes in topology and service changes.
- Supports optical path creation and deletion.

Cisco Optical Network Controller collects relevant data needed for optical applications. This data is also used to provide abstract network information to higher layer controllers, thus enabling a centralized control of optical network.

Some of the functions supported by Cisco Optical Network Controller are given below.

- Optical Domain Controller

  Cisco Optical Network Controller behaves as a domain controller for Cisco optical products. The domain controller feeds data into hierarchical controllers. Optical Network Controller has a North Bound Interface (NBI) based on the TAPI standard which enables it to connect to any hierarchical controller which has a TAPI compliant South Bound Interface (SBI) and provide its functions to the controller.

- Path Compute Engine (PCE)

PCE service provides optical path computation to ensure optically valid paths are provisioned within the supplied constraints. PCE uses the latest network status.

- Model Based Network Abstraction

  Cisco Optical Network Controller supports a standardized TAPI model which enables it to abstract the device level details from the hierarchical controller.

Note

- For more details on Cisco Optical Site Manager (COSM), see COSM Configuration Guide.
- For more details on Cisco Optical Network Planner (CONP), see CONP Configuration Guide.
- For further details about Cisco ONC, see the data sheet .

Log into Cisco Optical Network Controller

Before you begin

Use the following steps to log into Cisco Optical Network Controller:

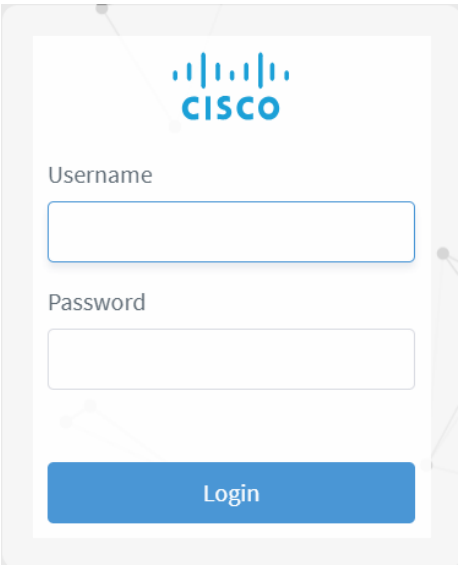
Step 1 In the browser URL field, enter **https://<virtual-ip:Port>/**

Login page is displayed.

Step 2 Enter the username and password.

Step 3 Click **Login**.

Figure 1: Log into Cisco Optical Network Controller



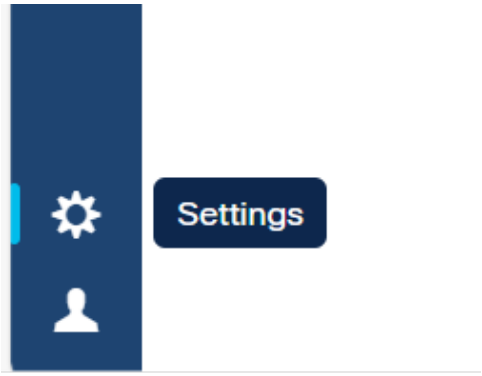
User Access in Cisco Optical Network Controller 3.1

You can manage the user access and permissions through Cisco ONC. It adds an additional layer of security and works as a Single Authentication Agent, thus sharing local, LDAP and SAML users.

Users, Roles, and Permissions

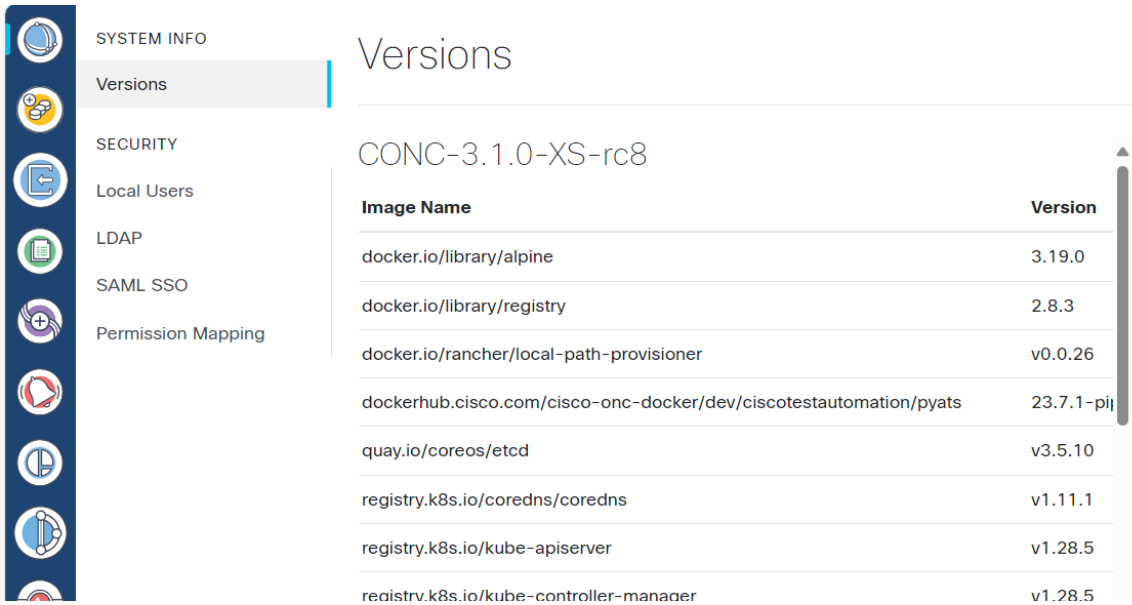
User can have have different permission levels. See *Set up Permission Mapping*. To allow access to Cisco ONC to a larger group of regular users, set the user authentication through LDAP or SAML SSO protocols. You can use both at the same time as well, depending on your environment.

Figure 2: Settings



Once you click **Settings** you will see the panel as given below.

Figure 3: Settings Options



The **System Info** section has the information about the latest versions of Cisco ONC and the related microservices.

The **Security** section is for access management and consists of the following options.

- **Local Users**: Here you can display, create and edit local users through the UI.
- **LDAP**: Here you can set LDAP settings for user authentication.
- **SAML SSO**: Here you can set SAML Single-Sign-On settings for user authentication
- **Permission Mapping**: Here you can handle permission management through the Cisco Policy Management Tool.

Add Local Users to Cisco Optical Network Controller 3.1

Before you begin

You will need access to Cisco Optical Network Controller 3.1 with admin user privileges.

Use the following steps to add local user accounts to Cisco Optical Network Controller 3.1.

Step 1 From the Cisco Optical Network Controller 3.1 home page click **Settings** .

Step 2 From the panel list, select **Local Users** tab and click **Add** .

Step 3 In the **Add User** screen, enter **Username*** .

Step 4 After entering the user name, enter **Password*** .

Step 5 Next confirm the password using **Confirm Password*** .

Step 6 Next enter the access permissions in the form of a comma separated list using **Access Permissions** and enter permission/admin as shown in the example below.

For example *permission/<admin>*

The **Description** and **Display Name** are optional fields.

Figure 4: Local Users

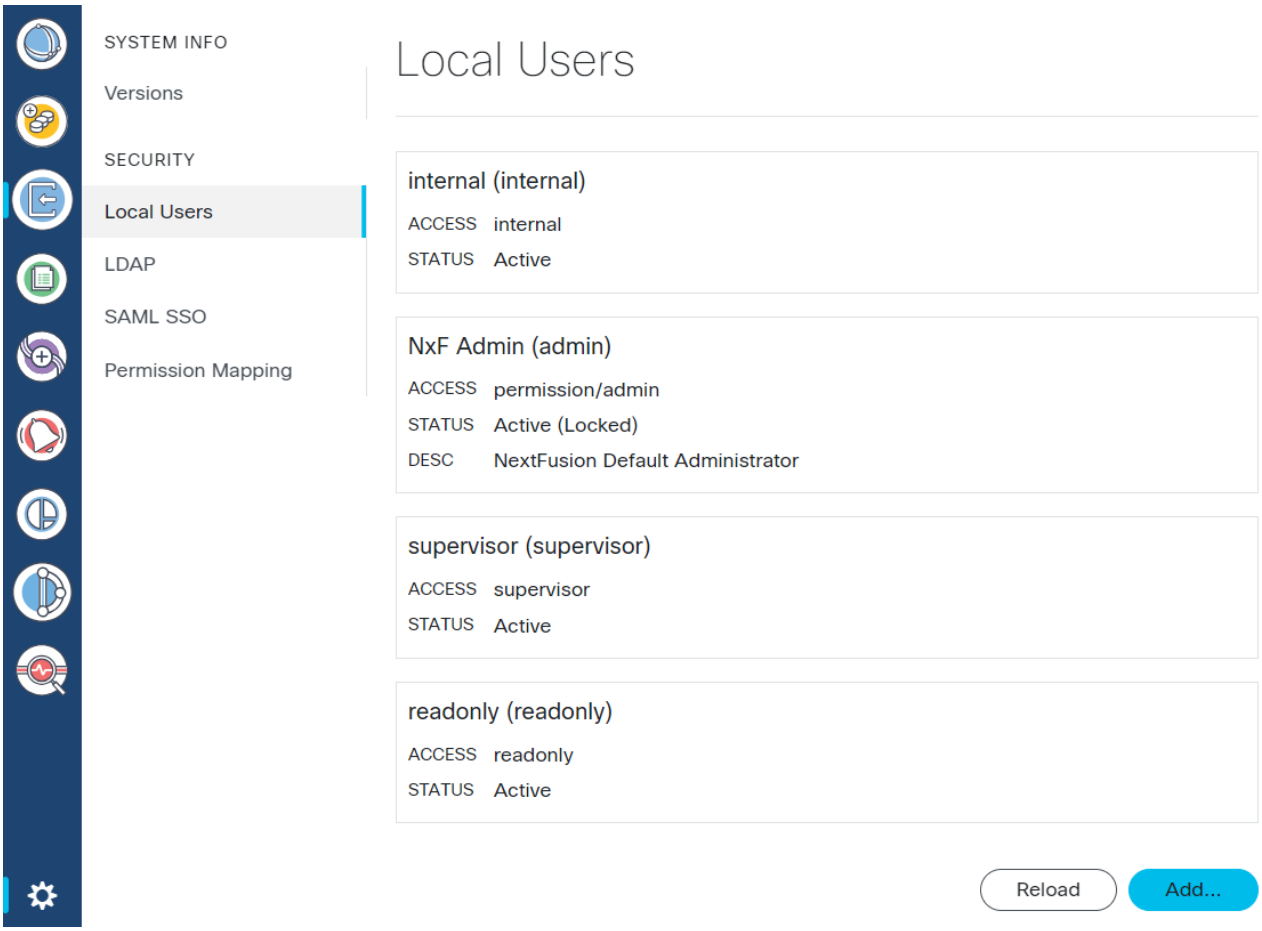
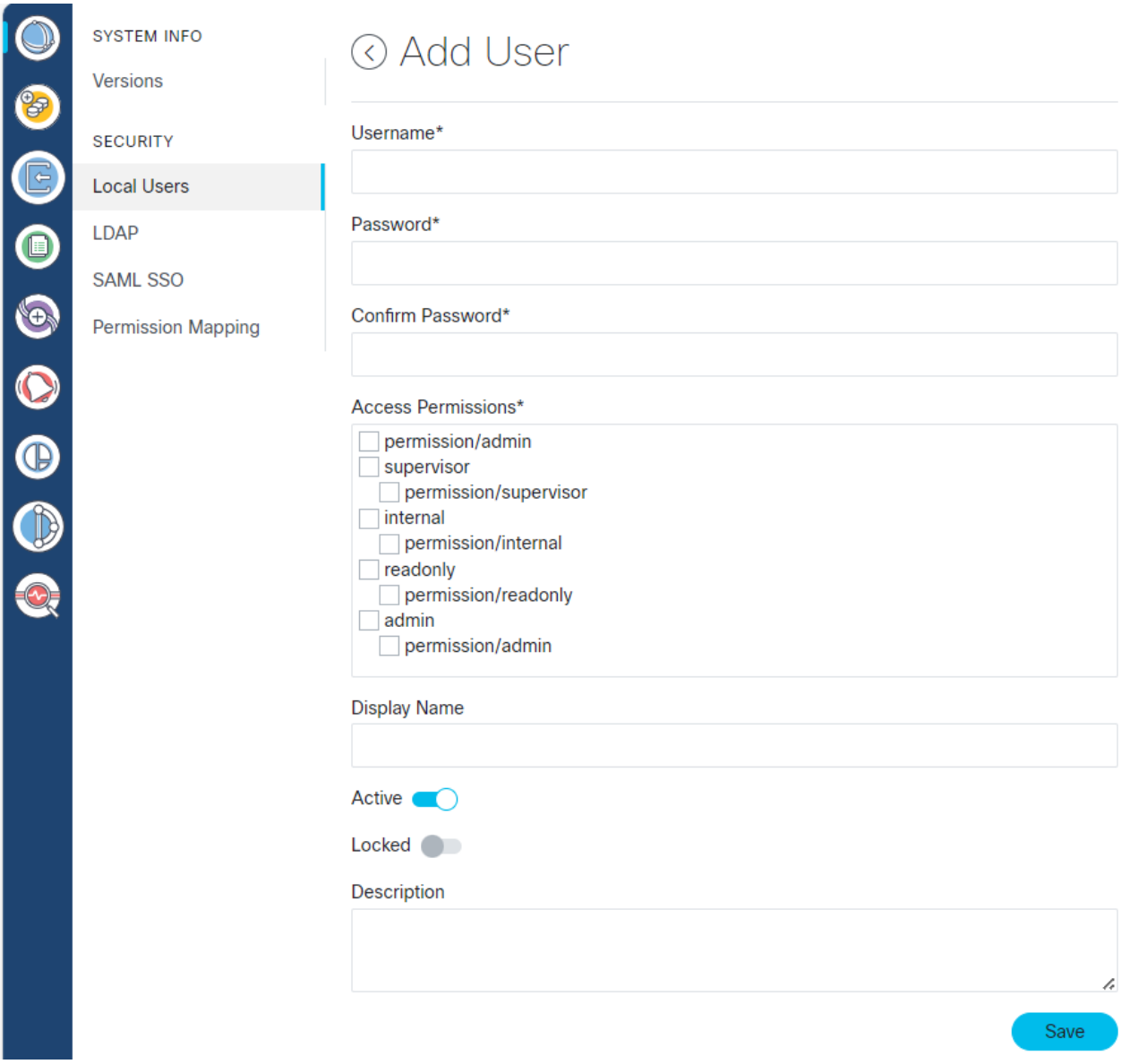


Figure 5: Add User



Step 7 Use radio buttons to set the user status. You can make both radio buttons disabled or enabled at the same time

- **Active enabled**: Allows the user to log in to Cisco ONC.
- **Active disabled**: Forbids the user to log in Cisco ONC.
- **Locked enabled**: Prevents deleting the user.
- **Locked disabled**: Allows removal of the user

Step 8 Click **Save**.

Set up Authentication through LDAP

The Security Assertion Markup Language (SAML) SSO feature allows to gain single sign-on access based on the protocol SAML.

Step 1 From the Cisco Optical Network Controller 3.1 home page click **Settings**.

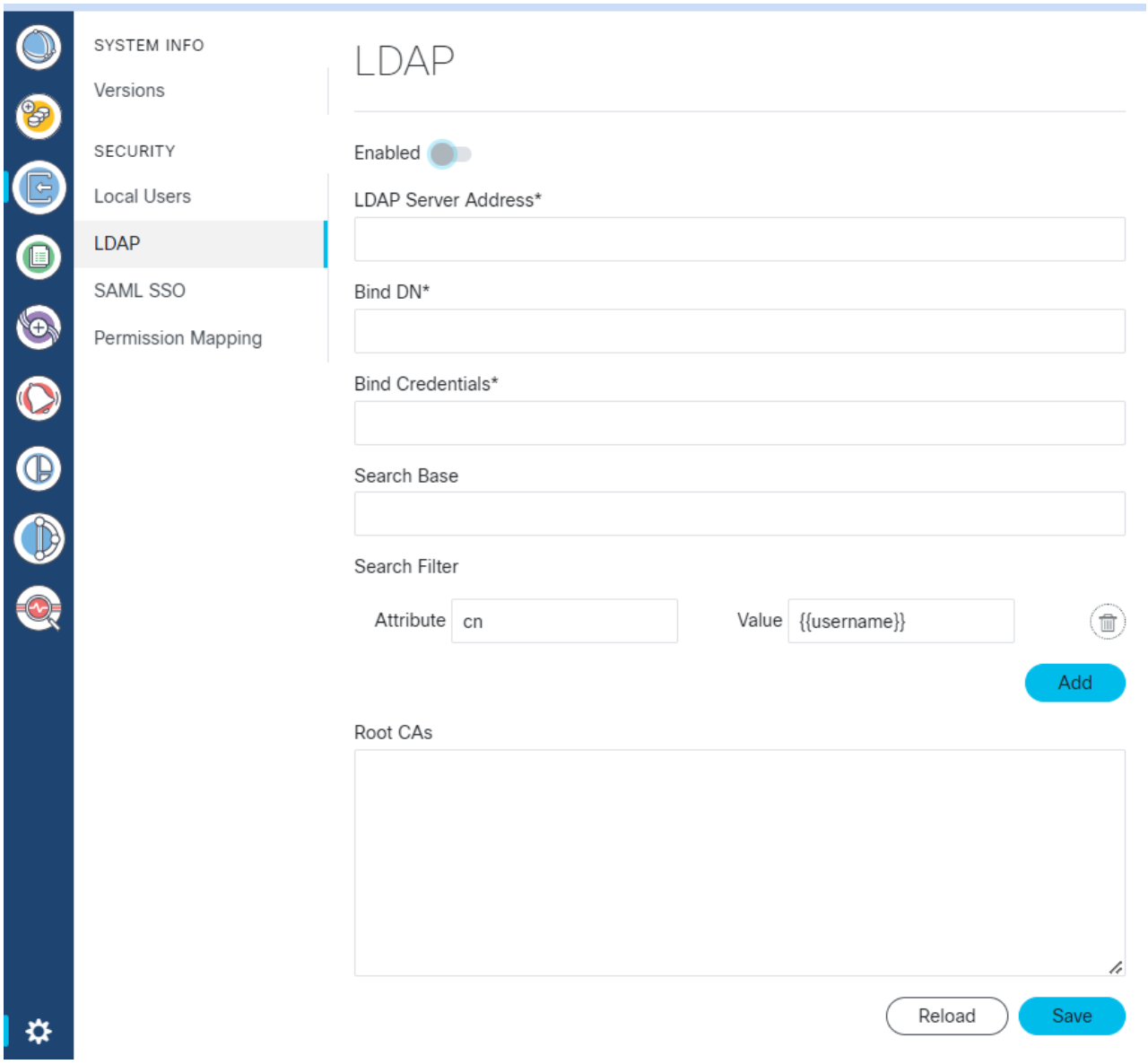
Step 2 Click **LDAP**.

Step 3 Click the **Enabled** radio button.

Step 4 Fill in the mandatory fields that are marked with an asterisk (*): **LDAP Server Address**, **Bind DN** and **Bind Credentials**. The **Search Filter**, **Search Base** and **Root CAs** are optional.

Step 5 Click **Save**.

Figure 6: LDAP



Set up Authentication through SAML SSO

The Security Assertion Markup Language (SAML) SSO feature allows you to gain single sign-on access based on the SAML protocol.

Step 1 In the CWM, go to the outermost navigation menu on the left

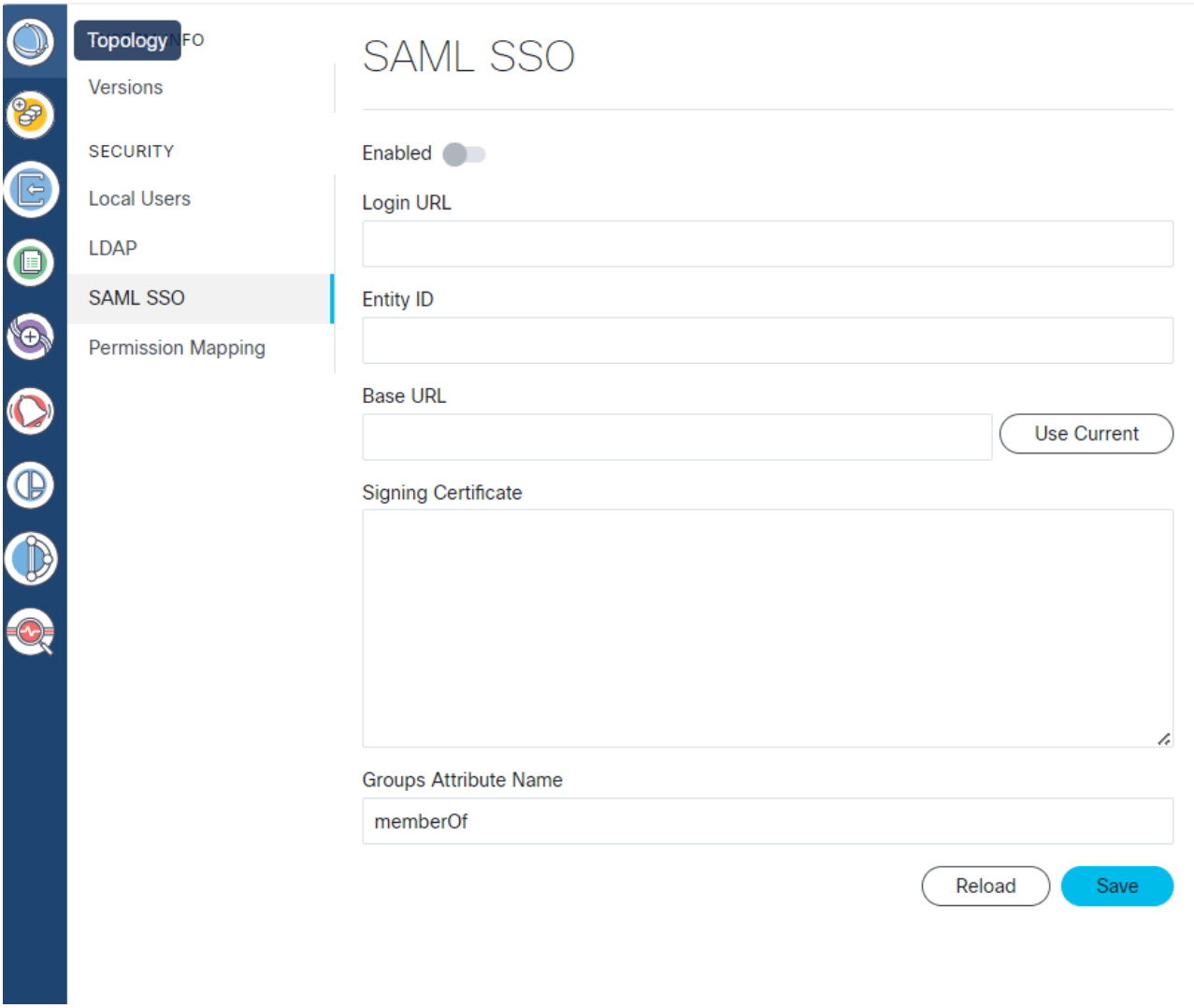
Step 2 From the Cisco Optical Network Controller 3.1 home page click **Settings** and navigate to **SAML SSO** tab.

Step 3 Click the **Enabled** radio button.

Step 4 Fill in the fields: **Login URL**, **Entity ID**, **Base URL**, **Signing Certificate** and **Groups Attribute Name**.

Step 5 Click **Save**.

Figure 7: SAML SSO



Set up Permission Mapping

You can give specific permissions to a group of users using this option.

Step 1 From the Cisco Optical Network Controller 3.1 home page click **Settings**.

Step 2 Navigate to **Permission Mapping**.

Step 3 Click **Add**.

Step 4 In the **Add Permission Mapping** panel, choose one **Mapping Type** from the dropdown menu: **SAML User**, **SAML Group**, **LDAP User**, or **LDAP Group**.

Step 5 Fill in the **Match** field.

Step 6 Select the appropriate **Access Permission**.

Step 7 Click **Save**.

Figure 8: Permission Mapping

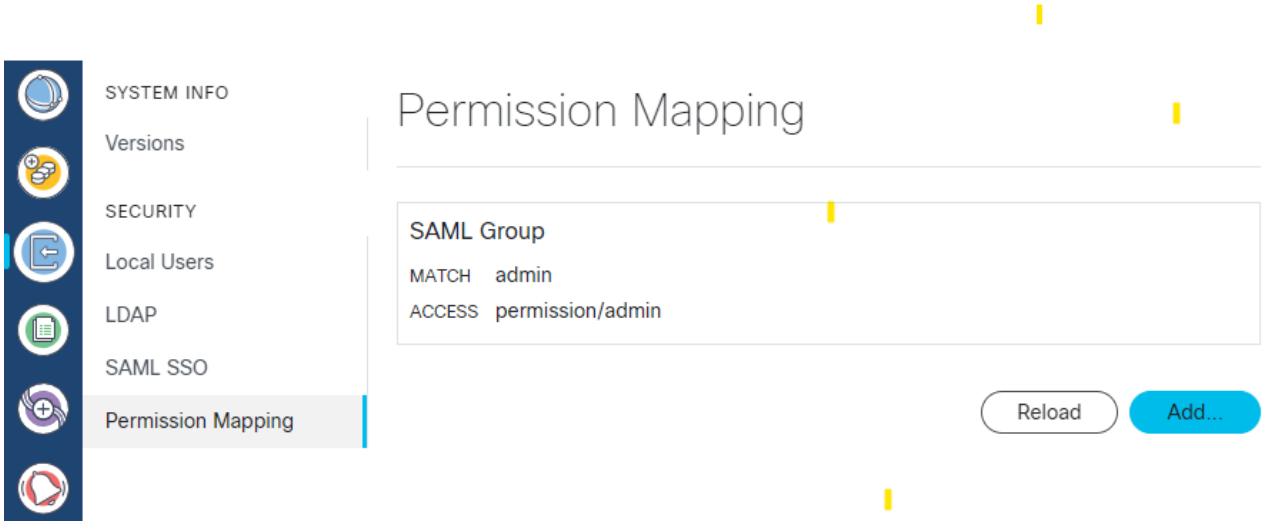
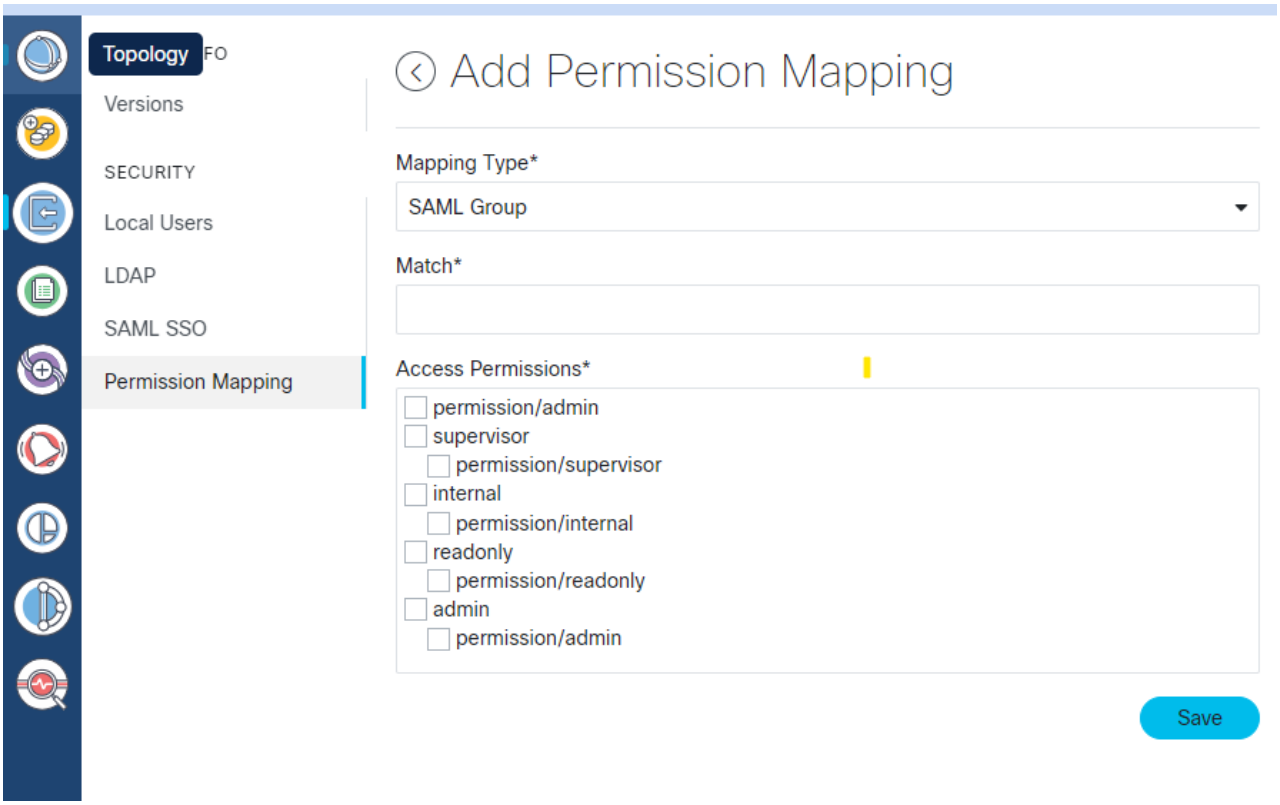


Figure 9: Add Permission Mapping



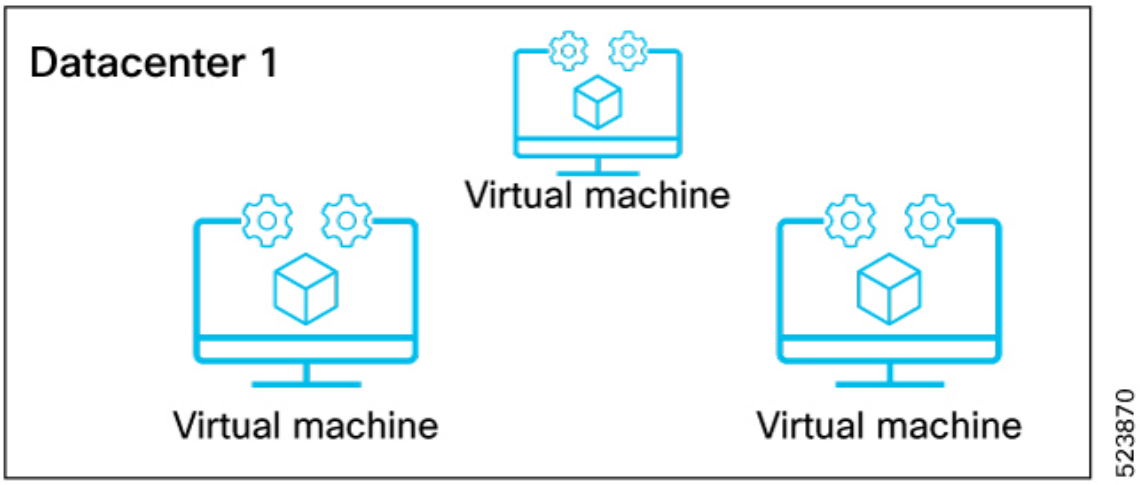
Note User can have different levels of permission mapping.

- **Admin**: No restrictions.
- **Supervisor**: Similar to admin but with restrictions on user management and log checks.
- **Readonly**: Can only check but provisioning is not allowed.
- **Internal**: To be used in case of any triage or troubleshooting to collect commands. It is recommended to use it only under supervision of Cisco Technical Assistance Center (TAC).

High Availability

Cisco ONC provides High Availability (HA) with distributed micro-service architecture. It provides an Active-Standby HA architecture. Cisco ONC HA cluster requires three VMs which are called primary, secondary and tertiary VMs. The primary and secondary VMs run the micro-service applications. The tertiary VM will be used for decision making on HA. One of the primary or secondary VMs is an active VM, while other is the standby one. Only the active VM's micro-services control the software. The standby VM's micro-services are activated only when the active VM fails, and this process is referred to as a switchover event.

Figure 10: Highly Available



There are three types of switchover events.

- User triggered: You can trigger a switchover and assign any VM to be the active VM.
- Application failure: Cisco ONC detects any critical micro-services application failure and initiates the switchover to take place automatically.
- Node failure: This switchover happens when the active VM crashes or is switched off.

  These are the commands related to HA.

  - `kubectl describe project onc | head`

    This command refers to the VM which is active and running an instance.
  - `'sedo ha switchover`

    This command triggers the manual switchover in Cisco ONC.

Figure 11: HA Switchover