Oracle® Intelligent Communication Orchestration Network

Integrating Microsoft Teams with Oracle ICON

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1 Contents

2 Revision History

Document Version	Description	Revision Date
1.0	Initial Draft	12-05-2025

3 Intended Audience

This document describes how to connect your MS Teams to Oracle ICON as a Service. This paper is intended for End Users, IT or telephony professionals.

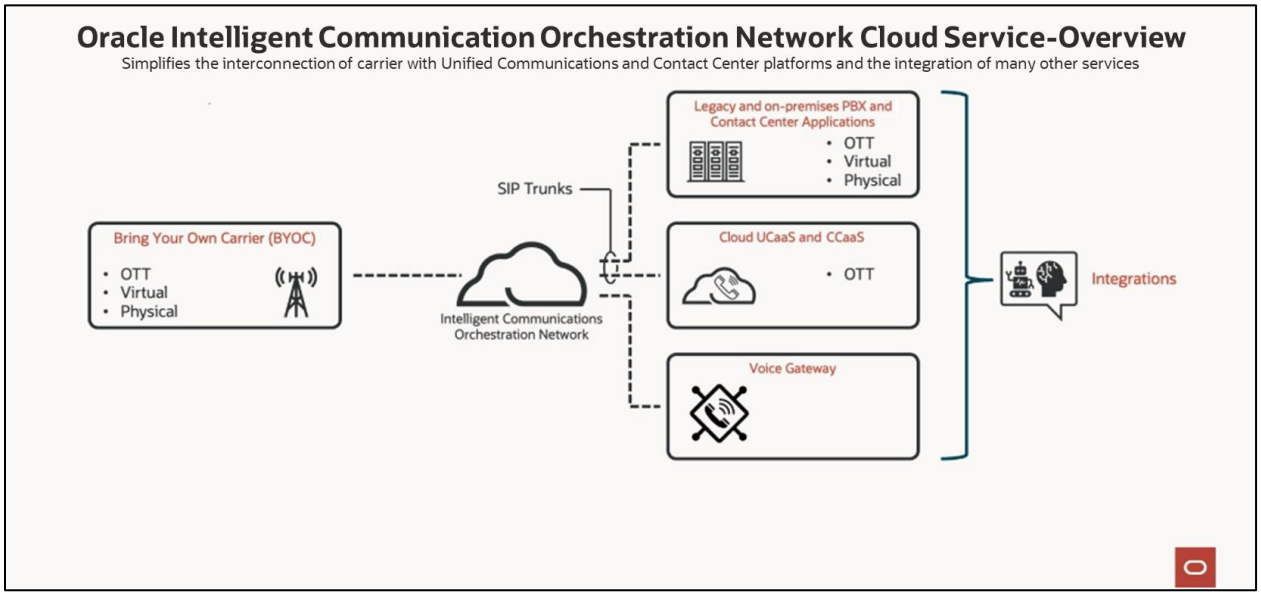
Note: To zoom in on screenshots of Web GUI configuration examples, press Ctrl and +.

4 Introduction

4.1 Oracle® Intelligent Communication Orchestration Network Overview

The Oracle® Intelligent Communication Orchestration Network enables enterprises and Managed Service Providers to connect Unified Communications (UC) and Contact Centers (CC) because the service supports connecting to both on-premises and SaaS based UC and CC solutions. The Oracle® Intelligent Communication Orchestration Network focuses on bringing voice communications services together in one place to relieve you from managing Carrier Service compatibility issues.

Oracle ICON provides numerous features to enable bringing voice communications services together with a single point of management rather than managing each of them independently. The following diagram shows how the features and services interact to provide voice services to the end customer.



Begin by connecting your PSTN services to Oracle® ICON, either virtually or physically. Once this connection is in place, integrate Microsoft Teams by configuring SIP trunks within the Oracle® Intelligent Communication Orchestration Network (ICON).
This enables seamless interoperability between MSFT Teams and the ICON system.

5 Related Documentation

5.1 Oracle Intelligent Communication Orchestration Network

- Configuration Process
- Add Sites
- Add Number Blocks Manually
- Connect Services

6 Oracle ICON Configuration

This section outlines the required steps to configure Oracle ICON for integration with MSFT Teams and Carrier services option. You will be guided through the configuration process, including initial setup and the essential parameters to ensure secure and reliable connectivity between MSFT Teams and Oracle ICON.

Note: It is assumed you have established your subscription, configured your account, and completed all required post activation tasks prior to proceeding.

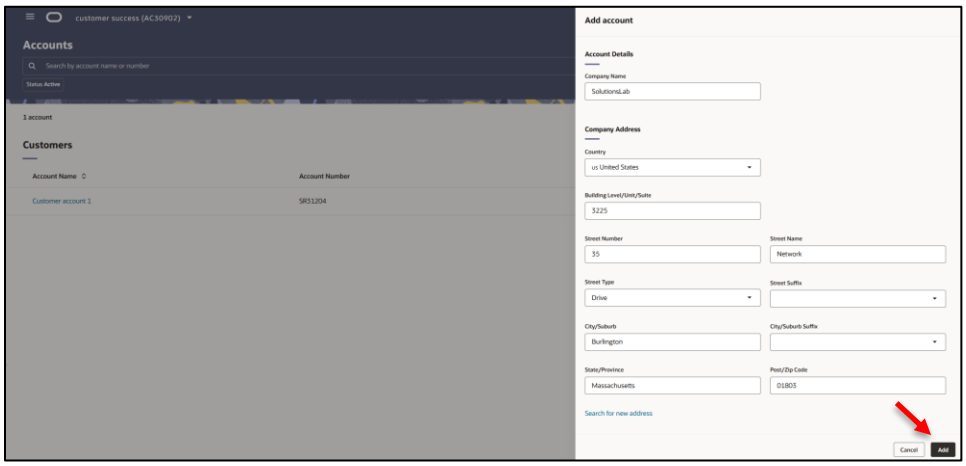
6.1 Customer Account

6.1.1 Add Sub Account

To begin the Oracle ICON configuration, the first step is to add a new customer account. This process establishes a secure and distinct environment for the customer's services and resources within Oracle ICON

Under Add Account, enter the following:

- Company Name
- Country
- Address (search or enter manually)



- Click Add at the bottom. When provisioning of the account is completed, click *Refresh* at the bottom of the page.
- You should now see the customer account you just created in the list:

6.1.2 Add Site

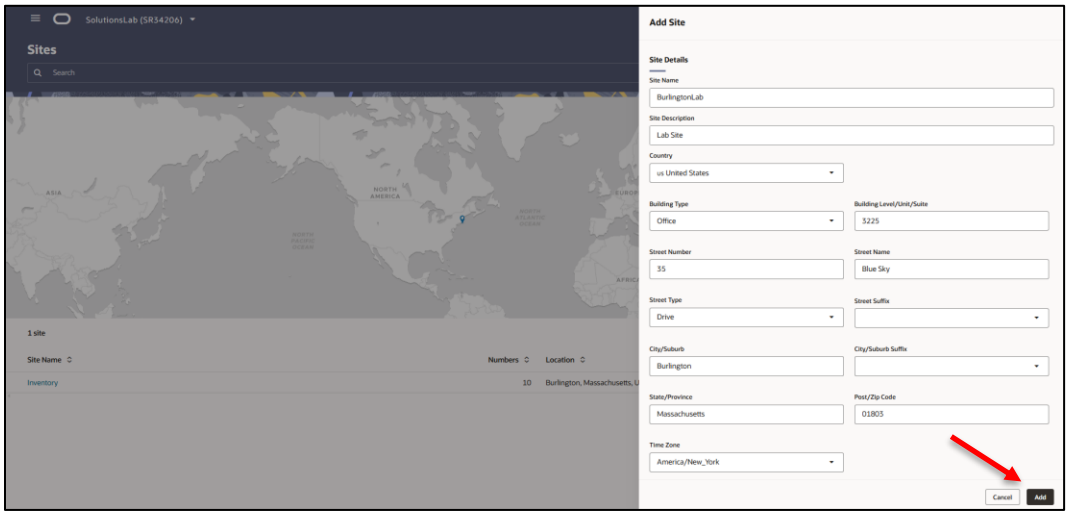
A site is an object you create in Oracle Intelligent Communication Orchestration Network that contains information about the physical location using the service. The Sites page lists the sites you create and provides tools for adding and managing sites.

- Top Left Burger Menu, select sites to get to the sites page.

- Top Right, Add Site:

Enter the following information to add a Site:

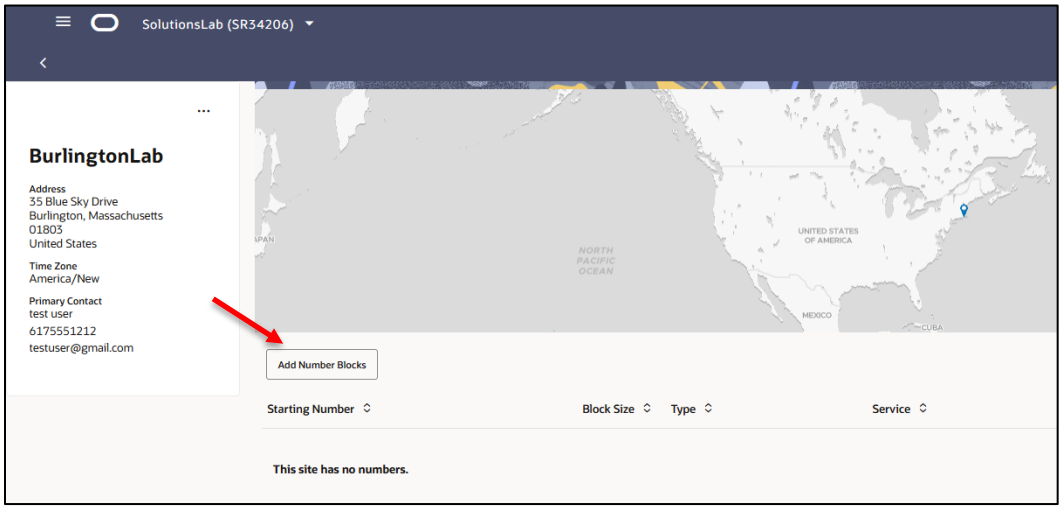
- Unique Site Name
- Description for the site
- Select a County
- Address (search or enter manually)
- Contact Information



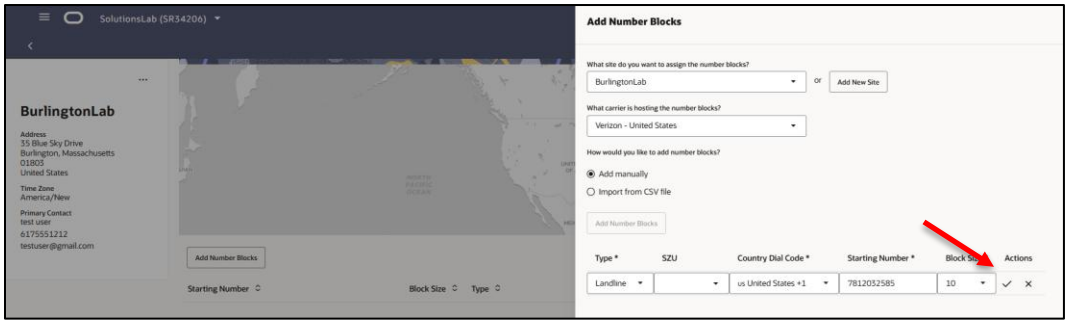
- Click Add at the bottom.

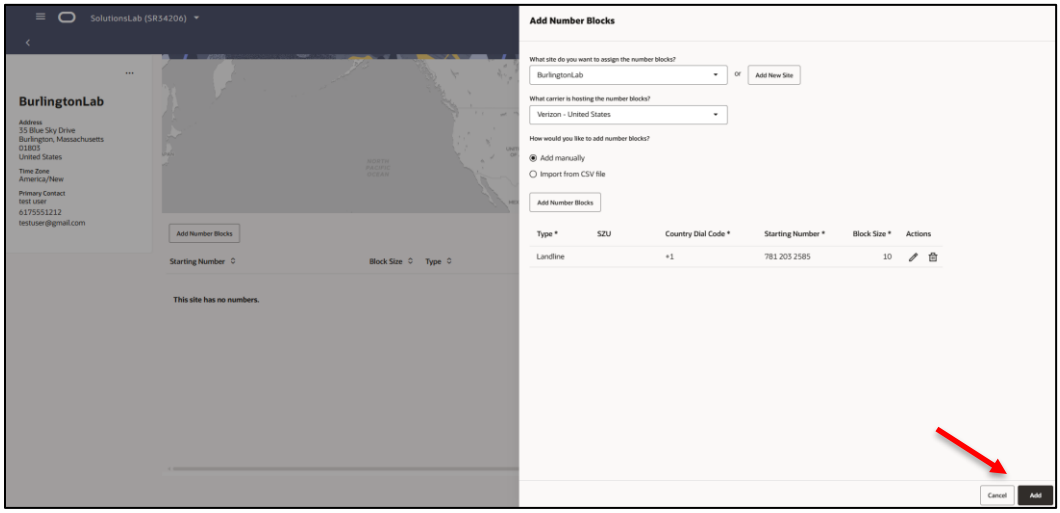
6.1.3 Add Number Blocks

After setting up accounts and sites, you can begin adding number blocks to Oracle ICON. The Numbers Blocks page displays the **Add Number Blocks** button, a table of your number blocks, and Search capability. You can add and manage number blocks from the page.



You can add number blocks by importing a .csv file or manually. For the purposes of this example, we're adding a block of 10 numbers manually to Oracle ICON



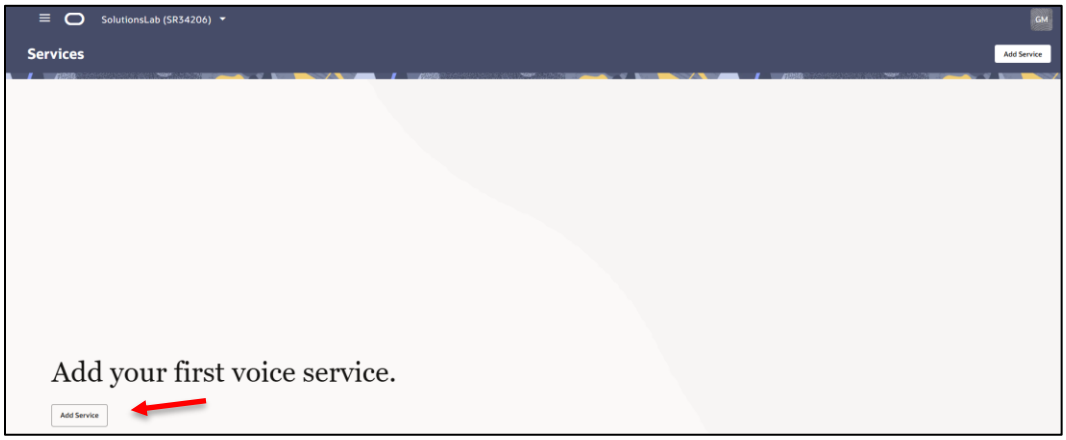


- Click add at the bottom.

6.2 Services

In Oracle ICON, you configure Services as logical objects that connect carriers to the voice, video, and media streaming services you use. The Services page provides tools to configure and manage SIP Trunk connections.

Burger Menu, top left, select Services to open the services page.

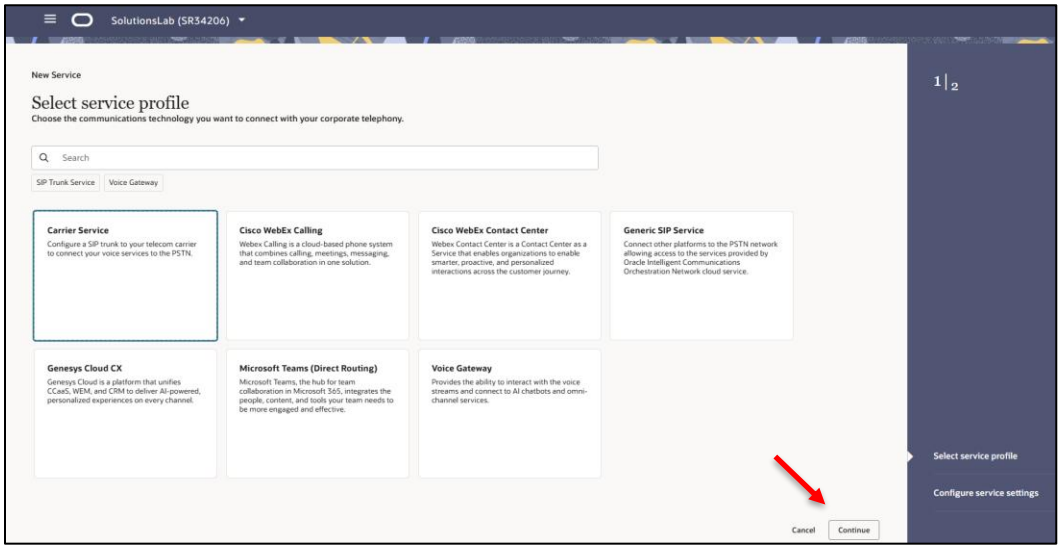


6.2.1 Connect the Carrier Service

To enable SIP trunking connectivity between Microsoft Teams and external networks, we'll use the carrier service profile. This integration allows secure and reliable voice traffic routing through Oracle ICON between your carrier service and your organization's Microsoft Teams environment.

Follow the guided set up workflow. Complete the steps provided in the navigation pane to the right of the set-up pane.

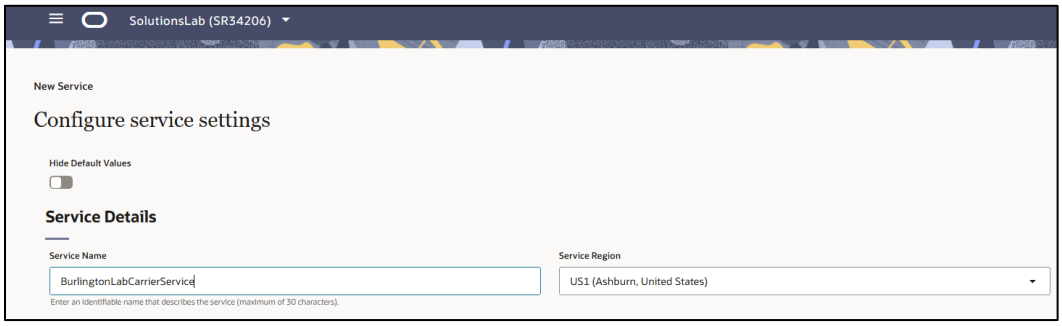
Each time you complete a step and click Continue, the workflow advances to the next step.



- Select Continue:

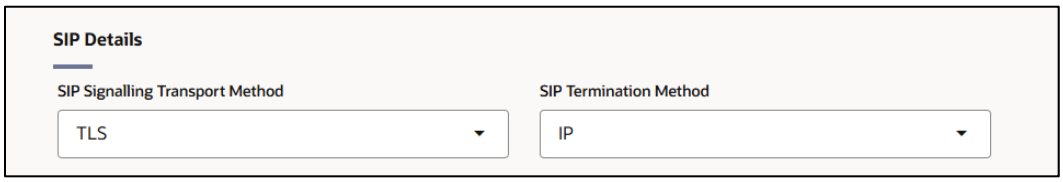
Under Service Settings in the Service Details section, enter the following information:

- Service Name: Assign a unique, descriptive name for your service.
- Service Region: Select the geographical region where the service will be hosted to ensure optimal performance and compliance.



Under SIP Details, provide the following information:

- SIP Signaling Transport Method: Select the protocol (such as TCP, UDP, or TLS) to be used for SIP signaling between Oracle ICON and your telephony equipment.
- SIP Termination Method: Specify how SIP sessions will be routed or terminated, such as to a specific IP address, FQDN, third party registration or authentication.



For the purposes of this example, we're using TLS as the transport method to secure traffic, and IP for Sip Termination Method.

Next, you need to configure ACL's for ICON to allow traffic into the platform. Use the (+) button to set the number of ACL's to use. You should add ACL's for both signaling and media traffic.

Note: You must define the Classless Inter-Domain Routing (CIDR) using the first IP address of the network. If you use any other IP within the sub net as the base for CIDR, Oracle ICON returns an error.

Example: Use

```
192.168.12.0/24
```

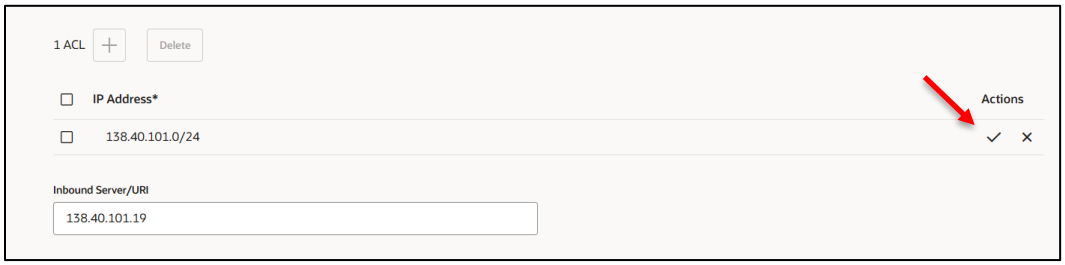
instead of

```
192.168.12.1/24
```

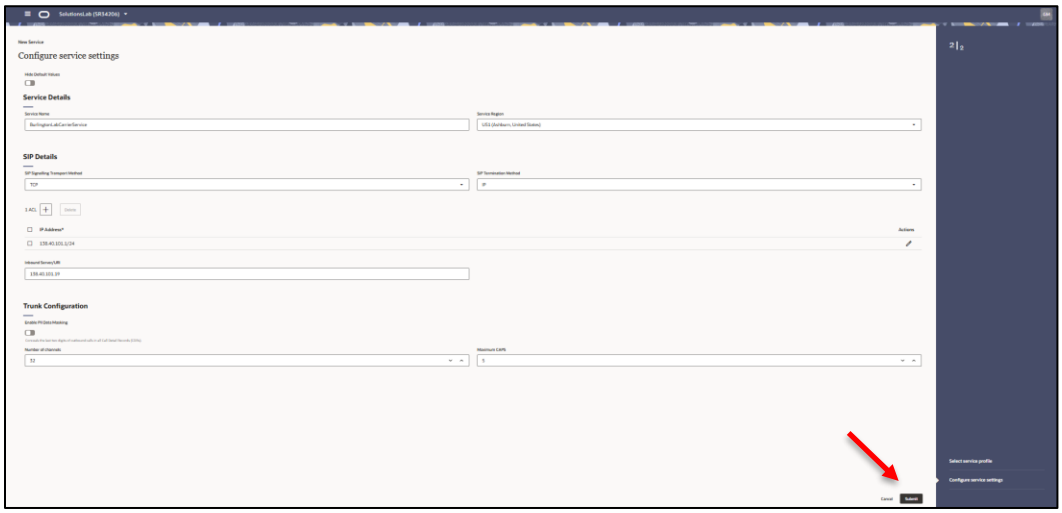
Format the CIDR with an IP address followed by the number of network address prefix bits after the slash. For example: 192.168.1.0/32.

In this example, our signaling and media IP are in the same subnet, so we'll add it to the allow list:

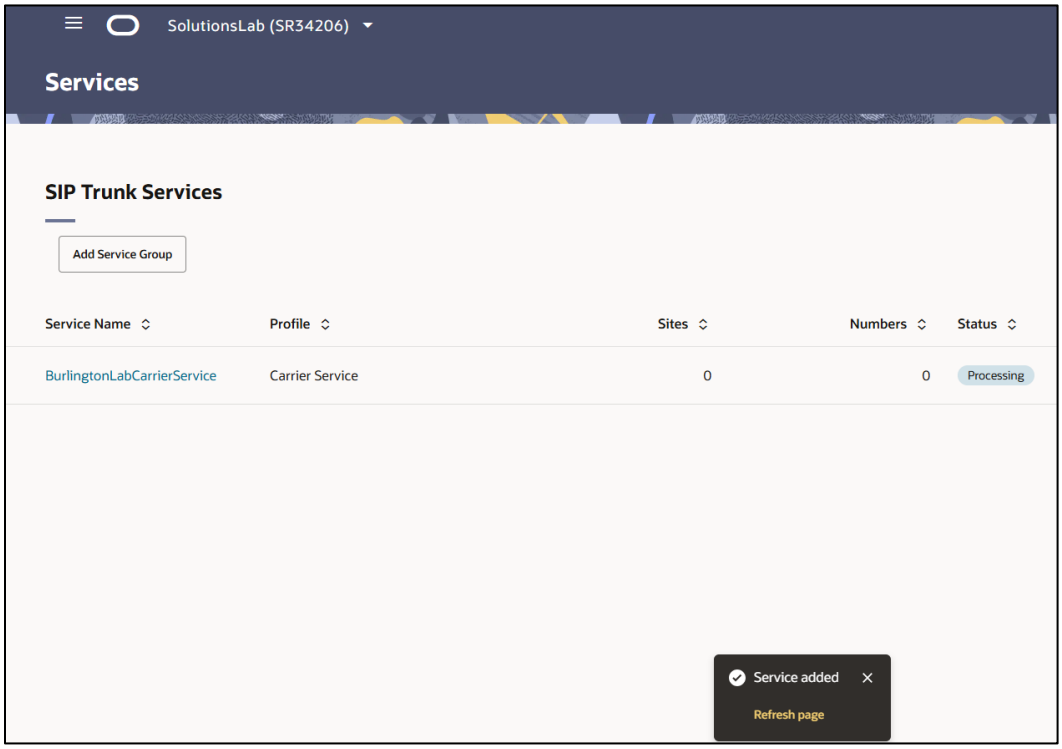
Select the check box next to IP Address to add it.



Also notice the Inbound Server/URI field. This is the endpoint address for incoming calls.

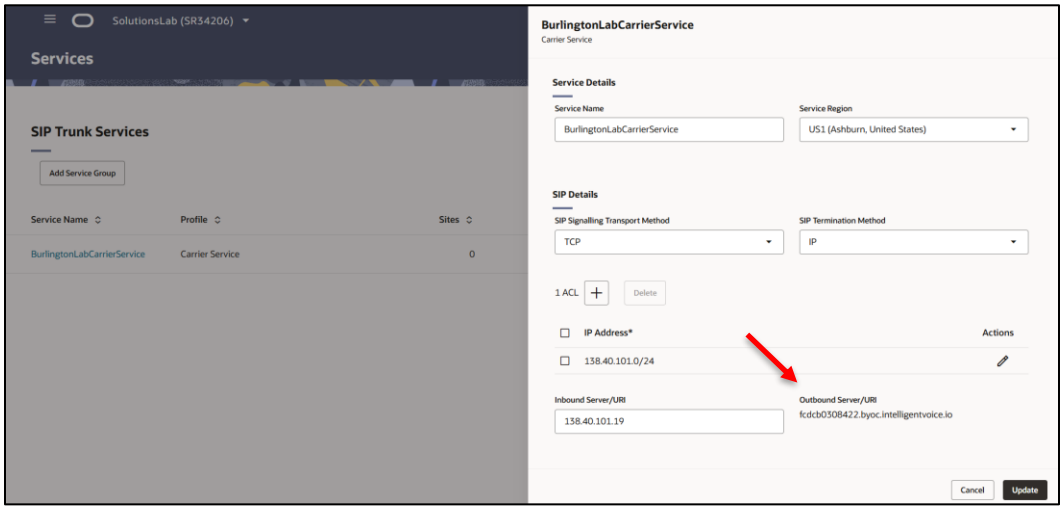


- Click submit at the bottom when completed.



Next, and this is very important:

- Click on the **Carrier Service** you just created to view its configuration details. In the **Outbound Server/URI** field, copy the provided FQDN. This needs to be provided to your Telco or PSTN Sip trunking provider, as it identifies the destination FQDN used for connecting to ICON.
- The Outbound Server URI is automatically assigned by Oracle Intelligent Communication Orchestration Network Cloud Service.



- This concludes the steps required to use the carrier service template in Oracle ICON to configure a connection to Microsoft Teams.
- Next, we'll use the Microsoft Teams Profile in ICON to connect MSFT Teams to the carrier service we just created.

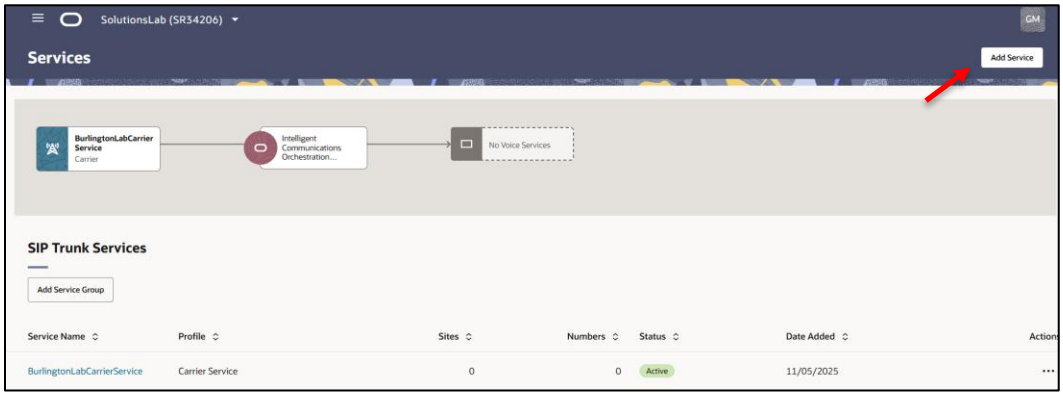
6.2.2 Microsoft Teams (Direct Routing)

This section outlines the necessary requirements to configure MSFT Teams for integration with Oracle ICON. Proper configuration ensures secure and reliable SIP trunk connectivity between MSFT Teams and the Oracle ICON service.

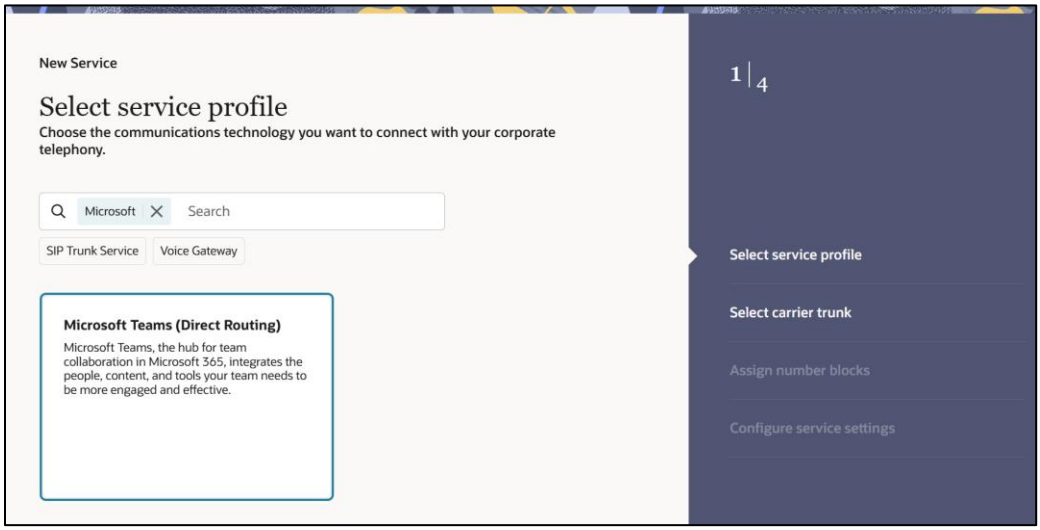
To connect a communications service for use with Oracle® Intelligent Communication Orchestration Network you must select the service, assign number blocks to the service, and configure the service settings.

6.2.2.1 Add Service

From the **Services** landing page, click the Add Service option in the top right:

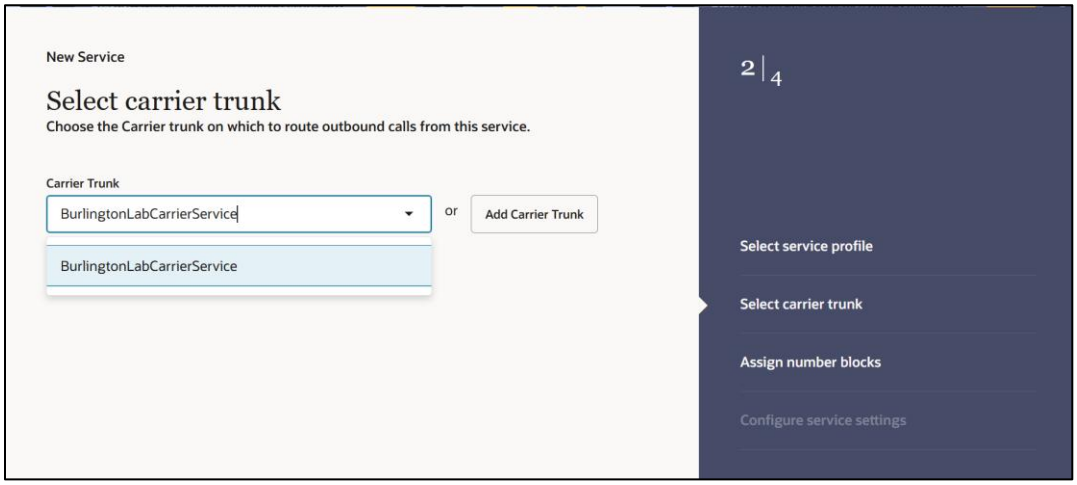


Choose **Microsoft Teams (Direct Routing)** on the Select Services profile Page:



- Select Continue at the bottom.

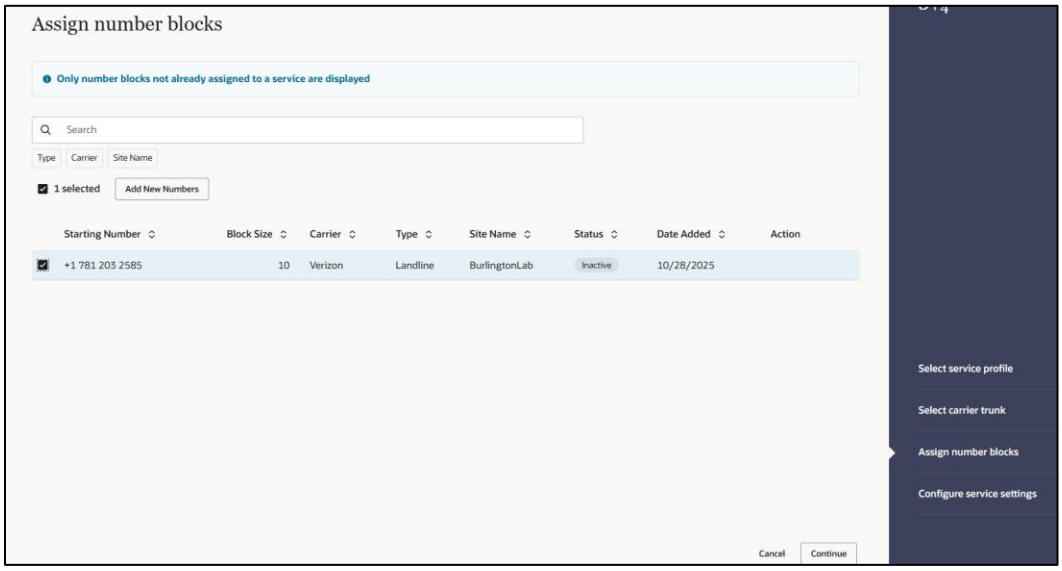
Next, under **Select Carrier trunk**, we'll choose the Carrier Trunk we created earlier in this chapter.



- Select Continue at the bottom.

6.2.2.2 Assign Number Blocks

For this example, we will assign the number block created earlier in the guide to MSFT Teams.

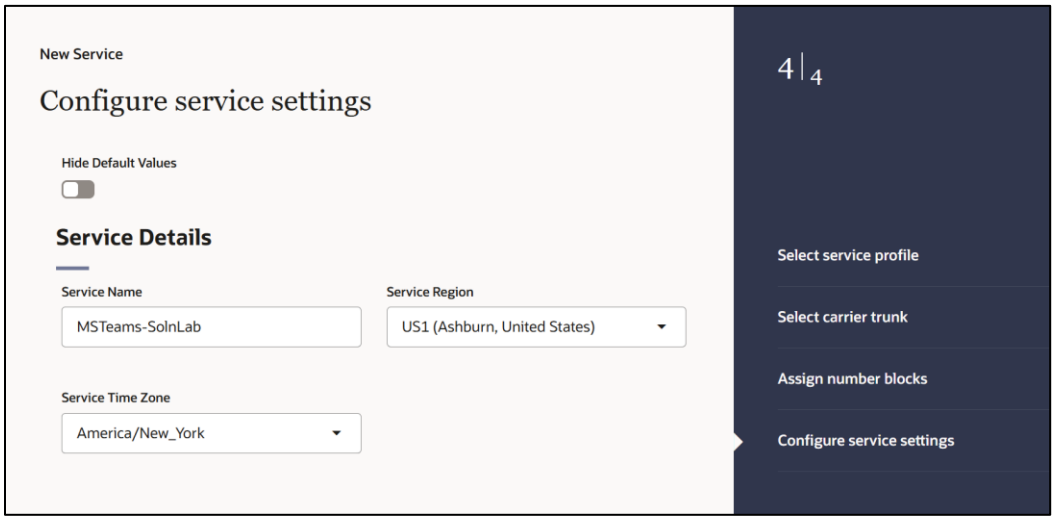


- Click Continue at the bottom.

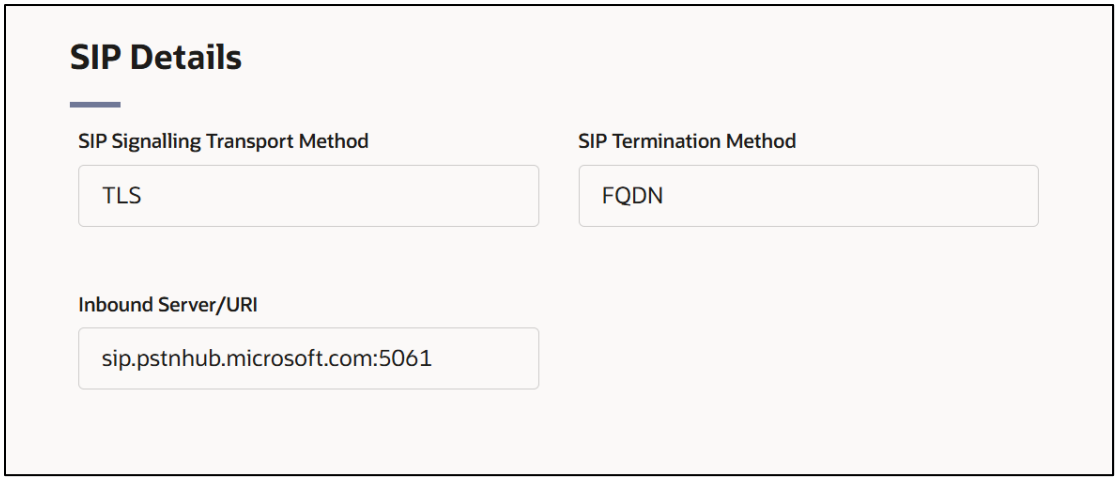
6.2.2.3 Configure Service Settings

Under **Service Details**, you need to configure the following:

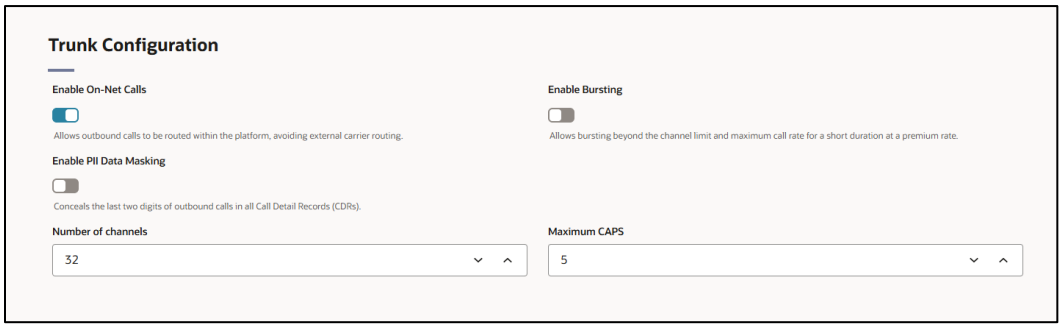
- Service Name: Enter the name you want for the service.
- Select a Region: Enter the geographic region where the service will operate.
- Select a Time zone: Select the time zone where the caller and callee are located, not necessarily the site time zone.



Under **SIP Details**, the following parameters are already populated for MS Teams according to the ICON pre-configuration.



Next, we'll move onto **Trunk Configuration**. For the purposes of this example, we'll leave these at default values. For more information about each of these configurable options, please see the Oracle ICON User Guide under the Services chapter.

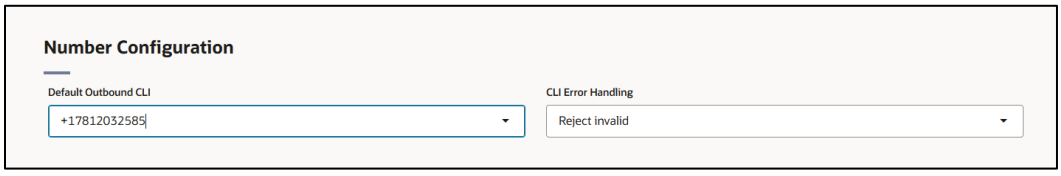


Under **Number Configuration**, configure the following:

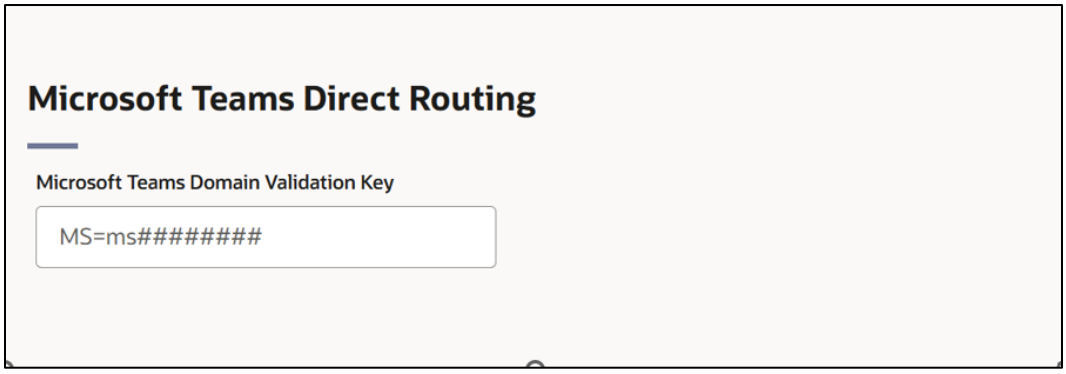
1. Default Outbound CLI: Enter the number you want for the default outbound calling line identifier.

Note: The number must be in the block you assigned to the service. When you use a number that is not in the block, the number will display unless you select Reject Invalid Number from CLI Call Handling.

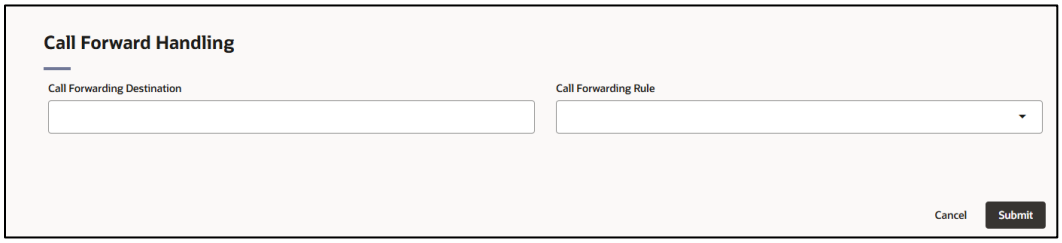
1. CLI Error handling: Select an error handling type from the drop-down list.
    - Values: Reject Invalid | Overwrite Invalid | Always.



We'll leave the **Microsoft Teams Domain Validation Key** field blank for now, as this key needs to be obtained from the O365 admin portal when creating the domain for Oracle ICON, using the outbound URI that will be provided at the end of this configuration.

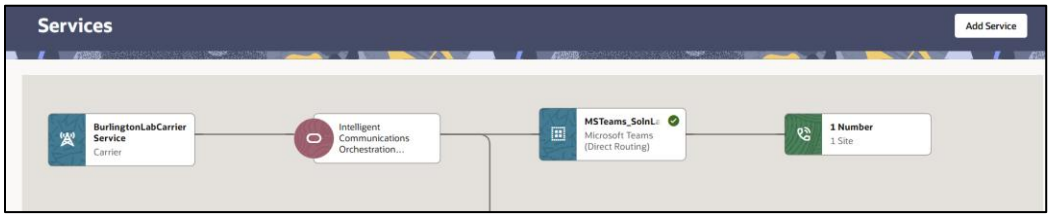


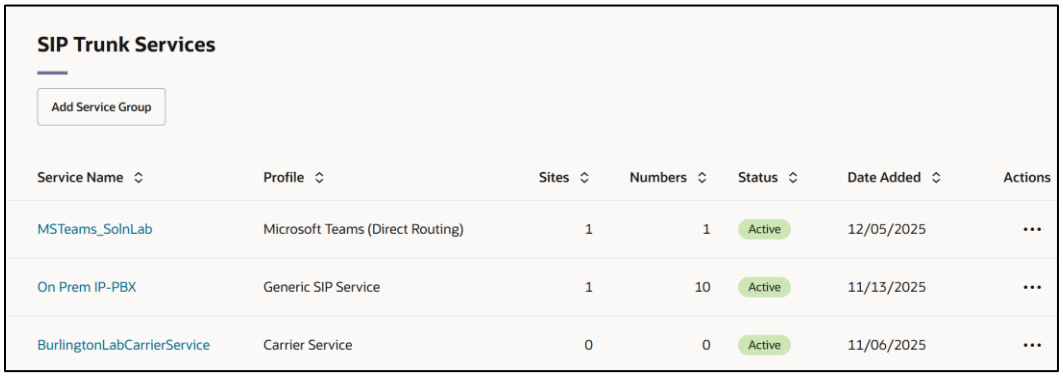
Leave the **Call Forward Handling** with default value for now.



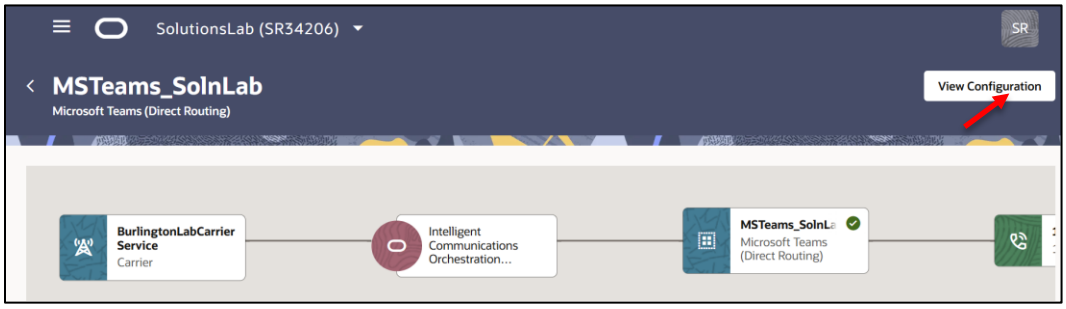
2. Click Submit at the bottom when finished.

You'll now be returned to the Services Display Page.

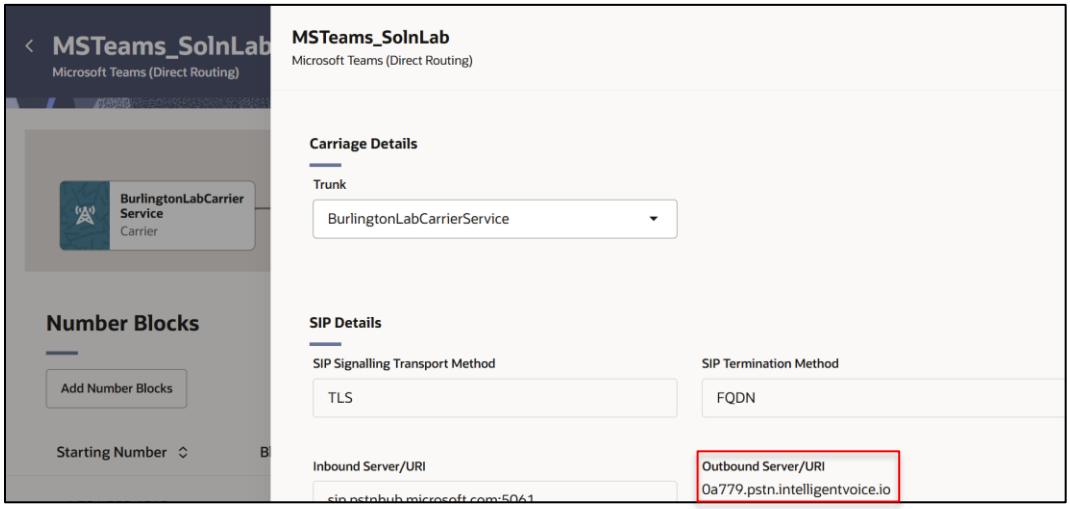




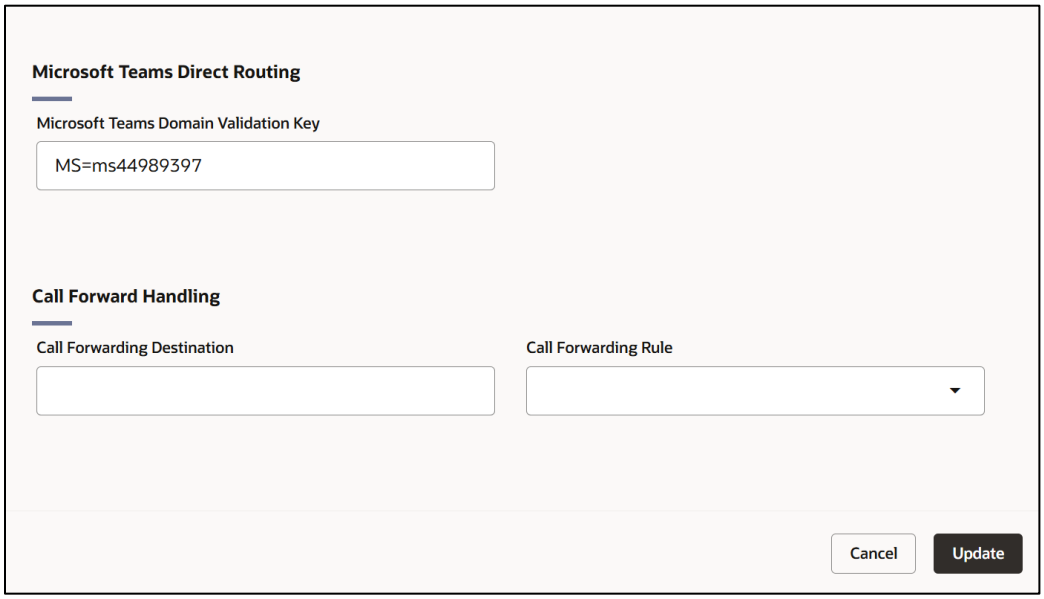
Next, click on the service we just created, MSTeams_SolnLab, then **View Configuration**.



This displays the settings drawer.



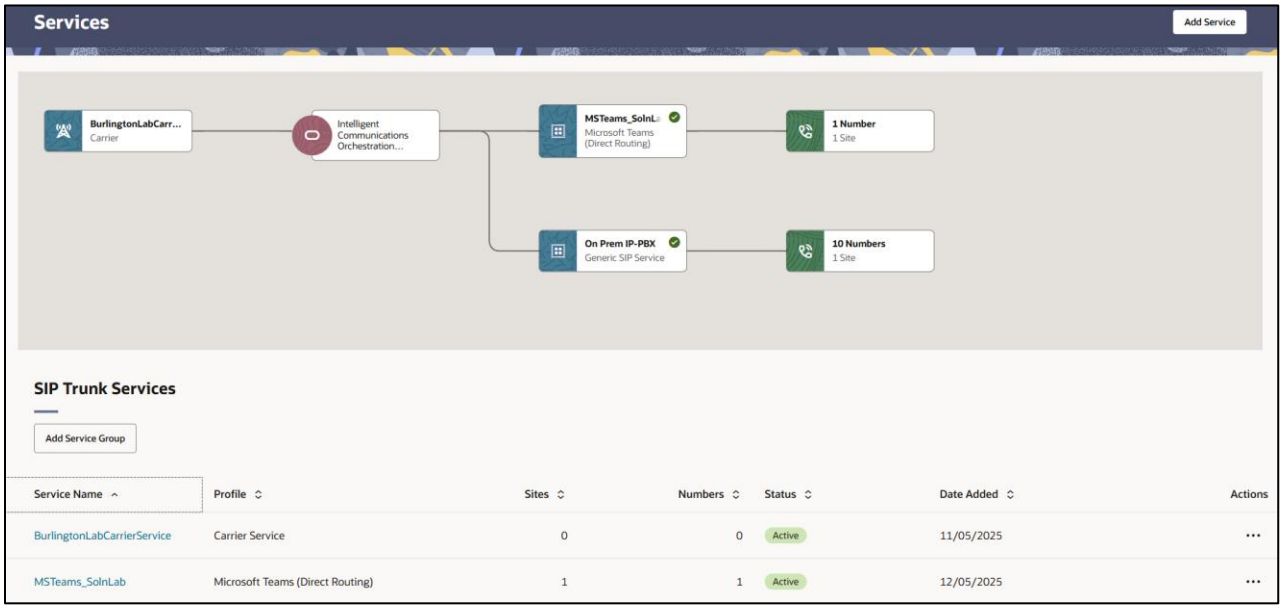
This is where you obtain the **Outbound Server URI** FQDN, which you'll need to register as a domain in the Microsoft Teams admin portal to retrieve the **MS Teams Domain Validation Key**. Detailed steps for configuring Microsoft Teams are provided in the following section of this Application Note. After obtaining the validation key, you will return to this screen to enter the key to complete domain ownership verification.



This completes the ICON configuration for both your Carrier Service and the Microsoft Teams environment. As mentioned, you will need the **Outbound Server URI** to establish the connection between your Carrier Service, Microsoft Teams, and Oracle ICON.

6.3 Services Page Display

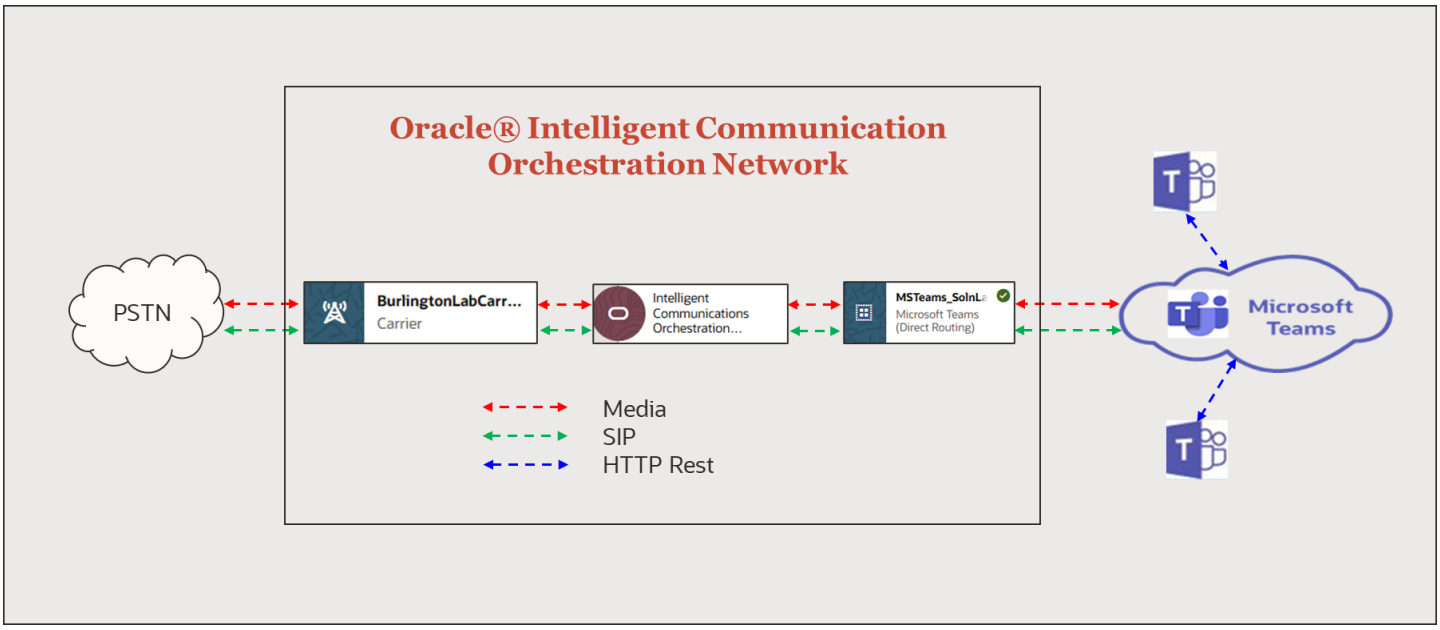
Initially, the **Services** page was empty since no services had been configured. After adding a carrier service and Microsoft Teams service, the page now displays a visual map and a table listing attributes for each configured service. Below is an example showing both the carrier service and Microsoft Teams. As you add additional components, such as media or other services, they will appear on the right, top, or bottom of your services map.



7 Microsoft Teams Configuration

With the Oracle ICON platform and carrier service profile configured, this chapter outlines the steps to integrate with Microsoft Teams. You'll register your **outbound server URI** as a domain in Office 365, verify domain ownership, and configure the SBC to enable secure communication between Oracle ICON and Teams. This section also covers setting up call routing and assigning users to establish connectivity between Microsoft Teams and Oracle ICON.

7.1 Network Diagram



7.2 Microsoft Teams Direct Routing

Microsoft Phone System Direct Routing lets you to connect a supported platform to Microsoft Phone System. With this capability, for example, you can use Public Switched Telephone Network (PSTN) connectivity with Microsoft Teams client.

With Direct Routing, you can connect your SBC to almost any telephony trunk or interconnect with third-party PSTN equipment. Direct Routing enables you to:

- Use virtually any PSTN trunk with Microsoft Phone System.
- Configure interoperability between customer-owned telephony equipment, such as a third-party private branch exchange (PBX), analog devices, and Microsoft Phone System.

7.2.1 Planning Direct Routing

When planning to configure MSFT Teams Direct Routing with the Oracle ICON,
the following prerequisites are required: Please read through the following information before proceeding.

- Microsoft Phone System Licensing
- Fully Qualified Domain Name for your Session Border Controller **(Outbound Server URI)**

7.2.2 Infrastructure Requirements

The table below shows the list of infrastructure prerequisites for deploying Direct Routing.

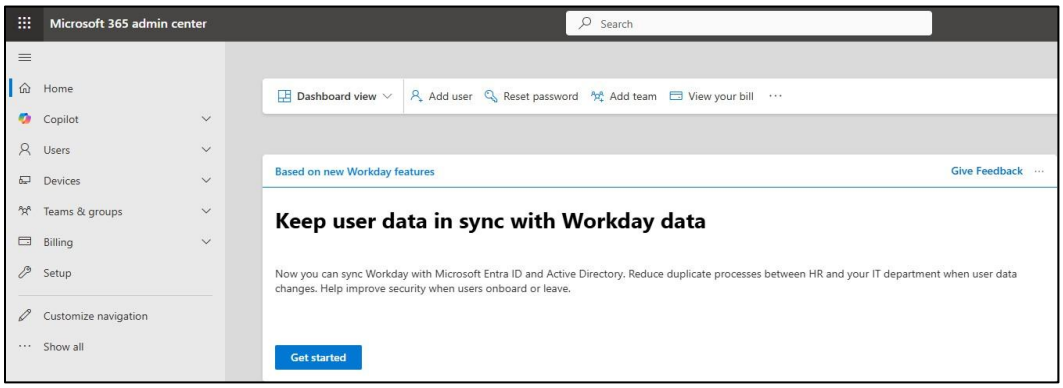
Infrastructure Prerequisite	Details
Certified Session Border Controller (SBC)	**See Microsoft's Plan Direct Routing document and Microsoft Trusted Root Program with Included CA Certificate List**
SIP Trunks connected to the SBC	
Office 365 tenant	
Domains	
Public IP address for the SBC	
Fully Qualified Domain Name (FQDN) for the SBC	
Public DNS entry for the SBC	
Public trusted certificate for the SBC	
Firewall ports for Direct Routing signaling	
Firewall IP addresses and ports for Direct Routing media	
Media Transport Profile	
Firewall ports for client media	

7.2.3 Adding the ICON Domain to Microsoft O365 admin center

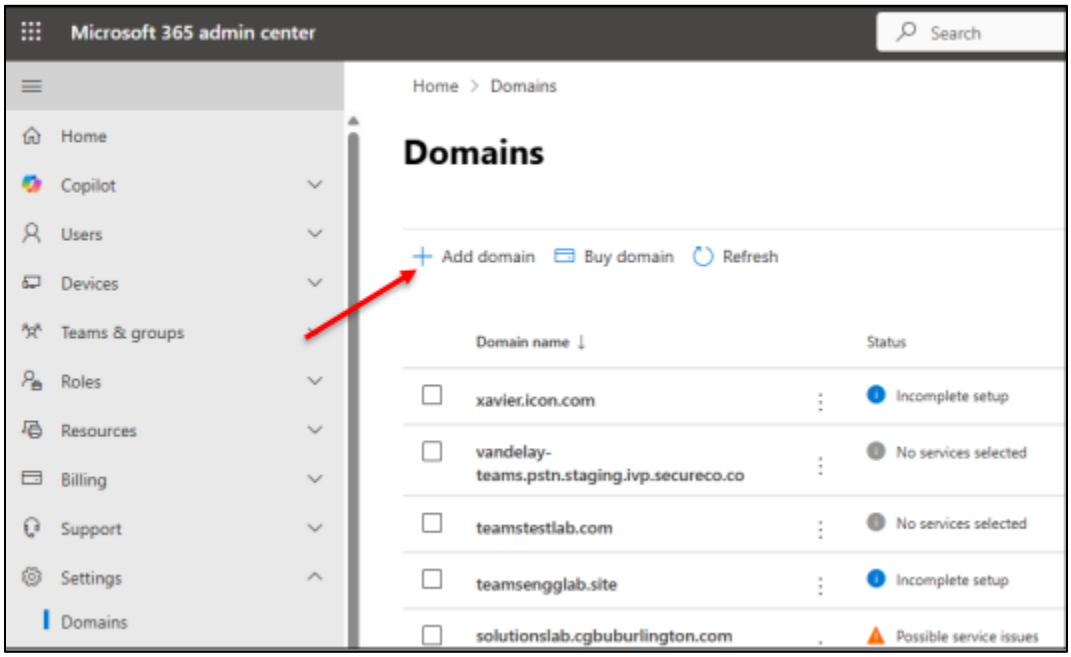
The steps below will walk you through adding/registering your Oracle ICON domain in Microsoft O365.

*To add, modify or remove domains you **must** be a **Global Administrator** of a business or enterprise plan. These changes affect the whole tenant, Customized administrators or regular users won't be able to make these changes*

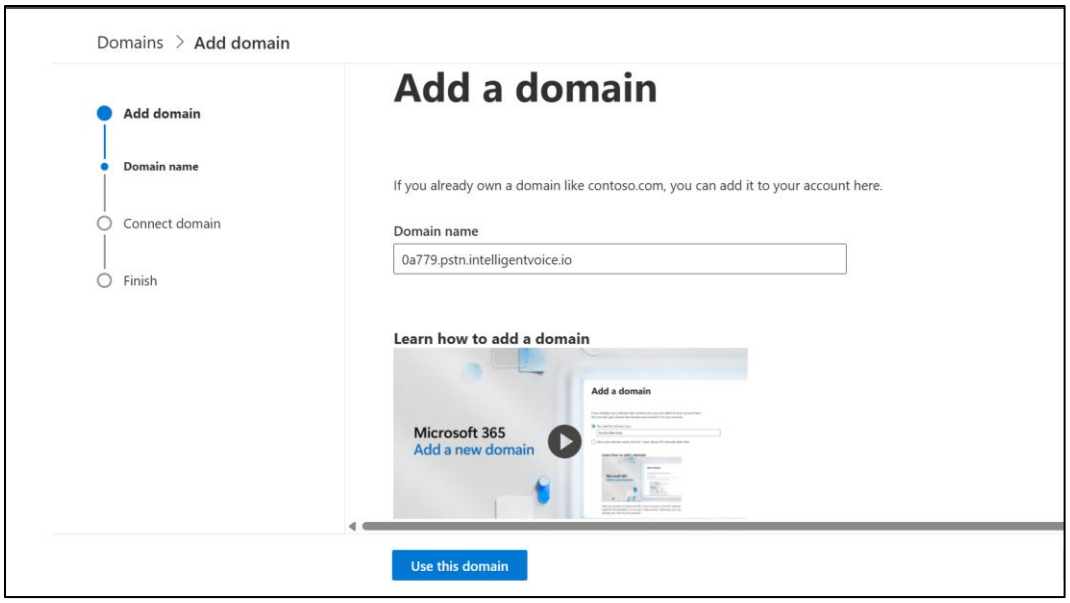
1. Go to the admin center at https://admin.microsoft.com. Enter your credentials to access the Microsoft 365 admin center.



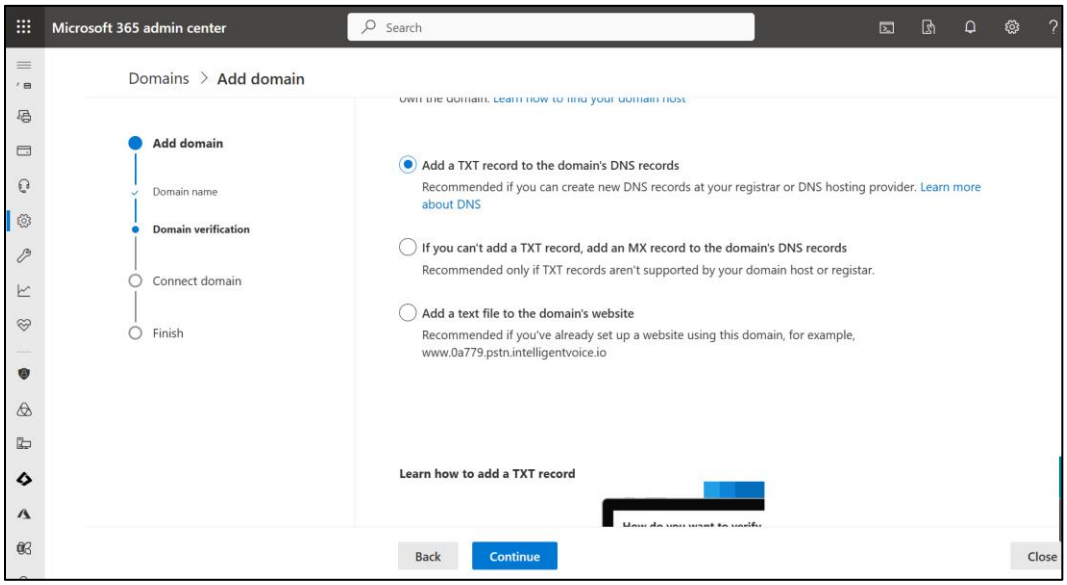
2. Go to the **Settings > Domain's** page, click **Add Domain**



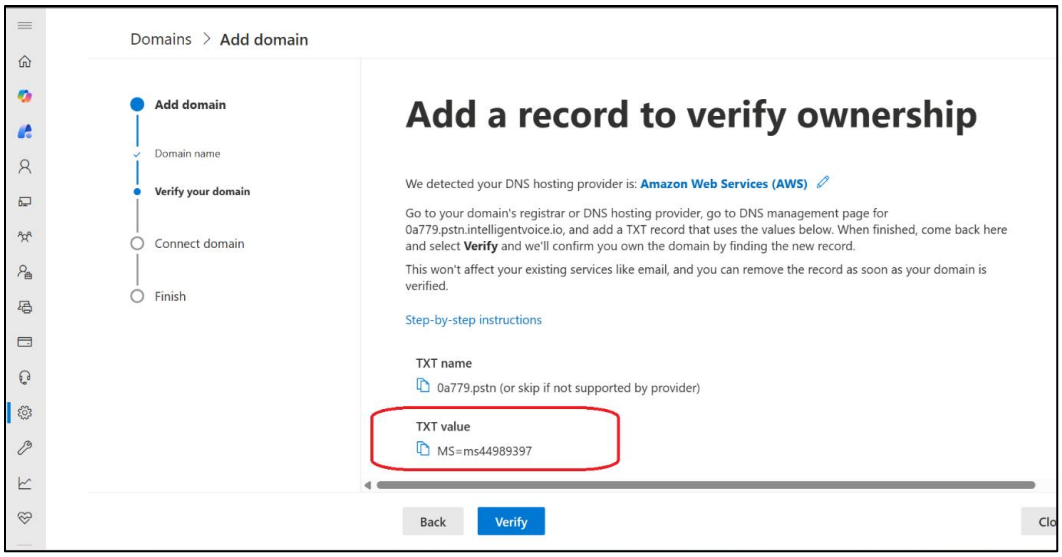
3. Enter the name of the domain (Outbound Server/URI) you want to add, then select “Use this domain” at the bottom.



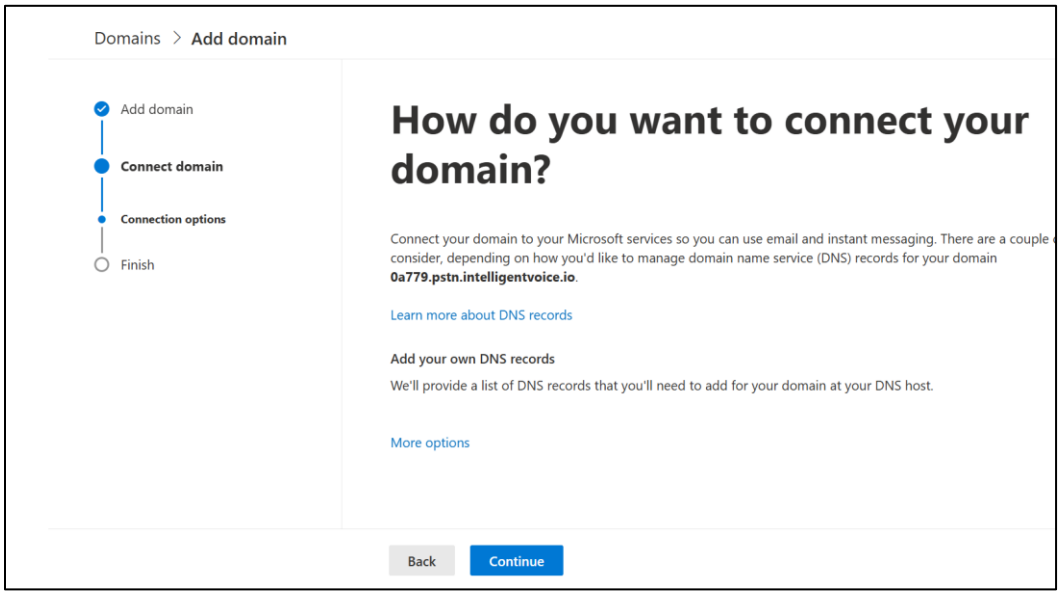
4. Next, choose how you want to verify that you own the domain. For the purposes of this example, we select “Add a TXT record” and select continue.



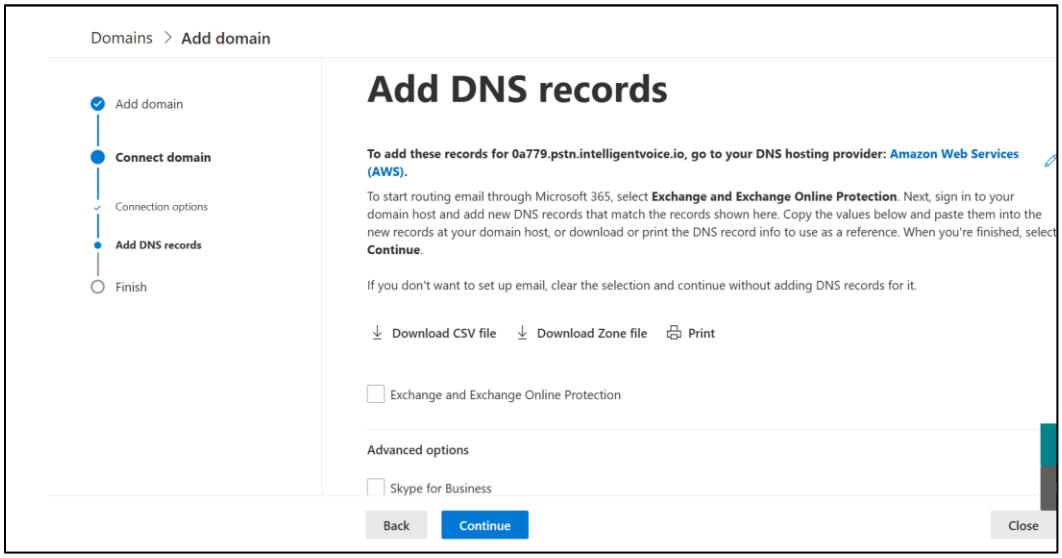
5. Copy this TXT value and add it to your Oracle ICON Microsoft Teams config under **Microsoft Teams Domain Validation Key.**

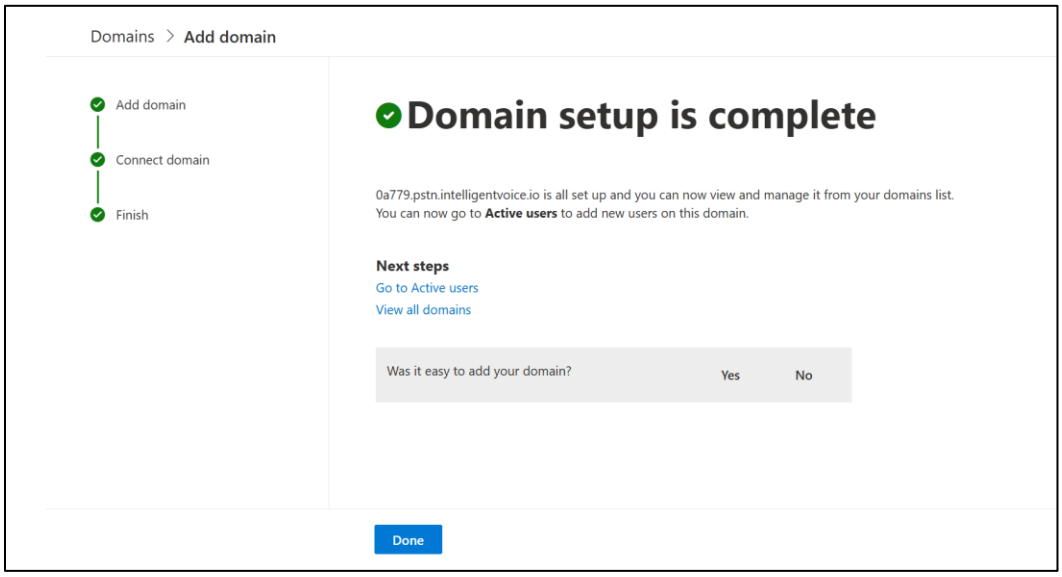


6. After entering the **Microsoft Teams Domain Validation Key** into the corresponding field in ICON, click **Verify** to confirm ownership of the domain.
7. Once the domain has been successfully validated, select **Continue** to proceed to the next screen and complete the configuration.



8. Deselect the Exchange and Exchange Online Protection options before continuing.





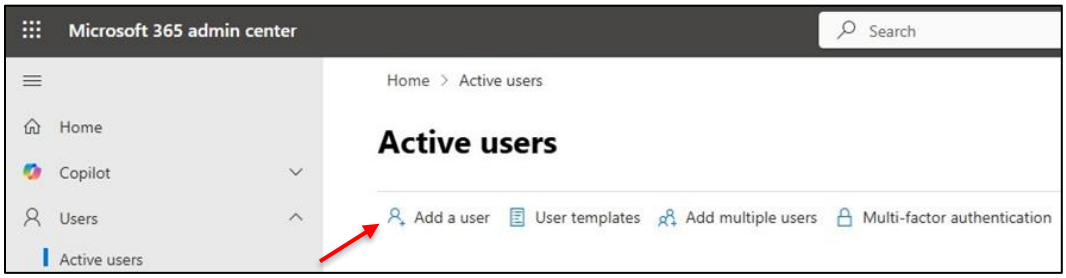
This concludes the required steps to register your Oracle ICON Domain (Outbound Server/URI) with Microsoft O365. Next, we'll create a user and assign required licenses.

7.2.4 Creating a User in Microsoft O365

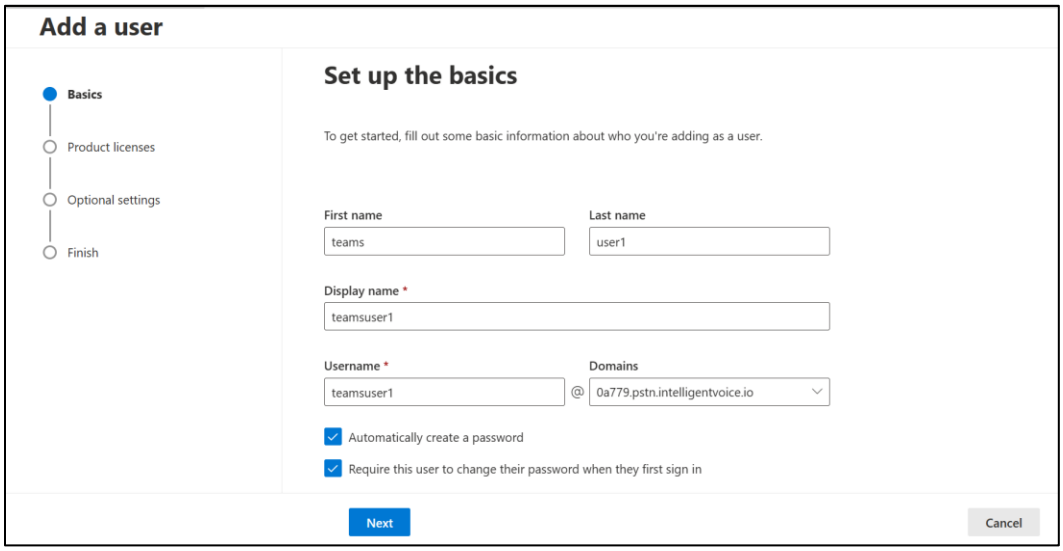
After your Domain has been added and verified in Microsoft O365, the domain must be activated by adding at least one licensed user with the SIP address matching that registered domain.

The steps below will outline how to add a user and assign privileges and licenses to that user.

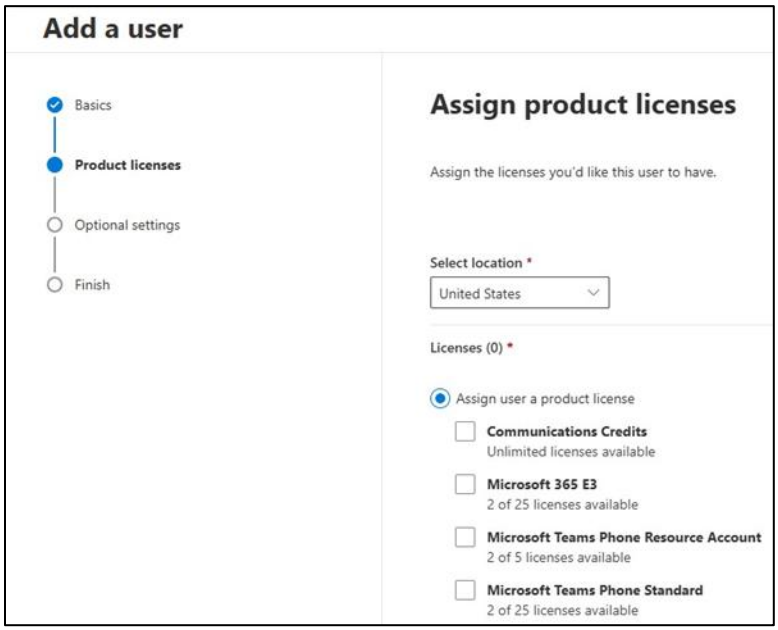
1. In the [Microsoft 365 admin center], go to **User management**, and select Add user.



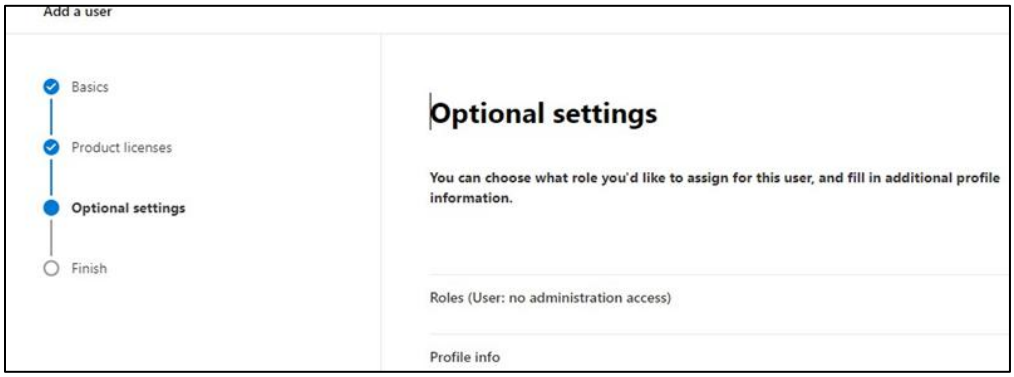
2. Fill in the required fields for basic information of the user, select Next



3. Assign the user a product license. To allow for Microsoft Teams Direct Routing, the following licenses must be assigned to users.
    - Microsoft 365 Phone System
    - Office 365 E3



4. Finally, select Roles and add any additional Profile info to the user account. Select next and follow the on-screen instructions to complete the addition of the user.



7.3 Connect Oracle ICON to the Teams Tenant

The following describes how to configure your Teams tenant to accept a connection from the ICON. It will also cover how to enable your users for Direct routing, and the basics on how to setup call routing.

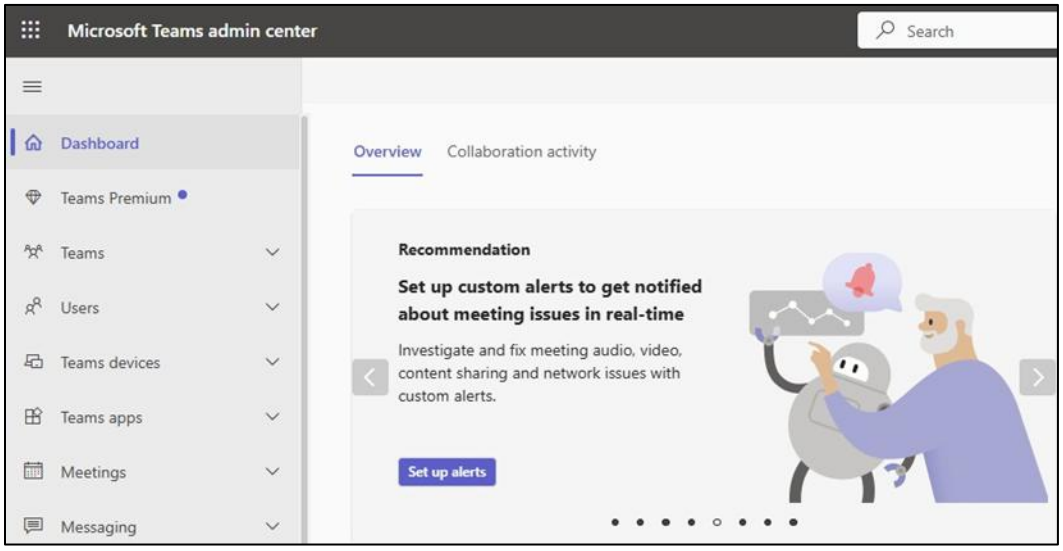
There are two ways to configure Microsoft Teams to accept a connection from the ICON, using the Microsoft Teams admin center GUI, or by using the CLI in PowerShell.

In this example, we'll use the Teams Admin Center and provide some examples of a basic configuration.

In order you use Powershell to connect to your Teams tenant, you must first follow the step outlined in Set up your computer for Windows Powershell

7.3.1 Teams Admin Center Configuration

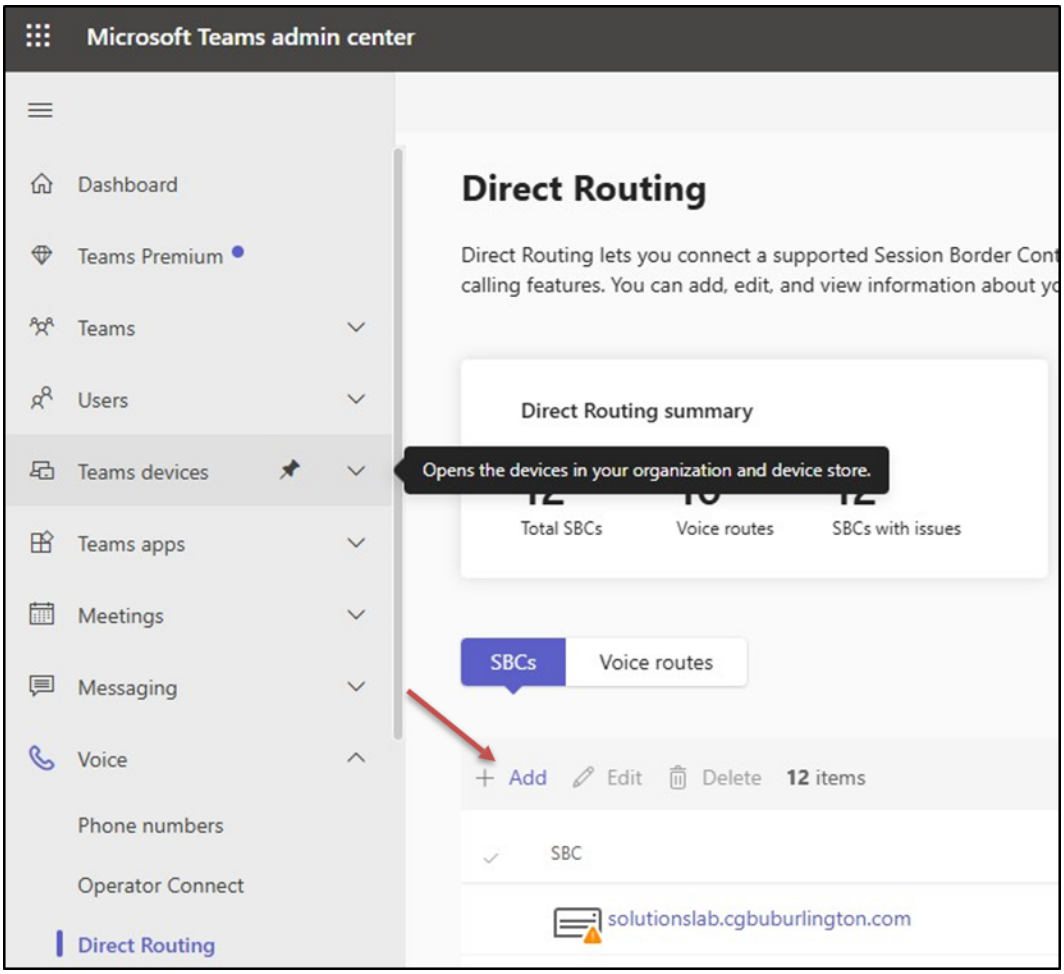
1. Go to the Teams admin center at https://admin.teams.microsoft.com/dashboard and enter your credentials when prompted.



7.3.2 Connect Oracle ICON

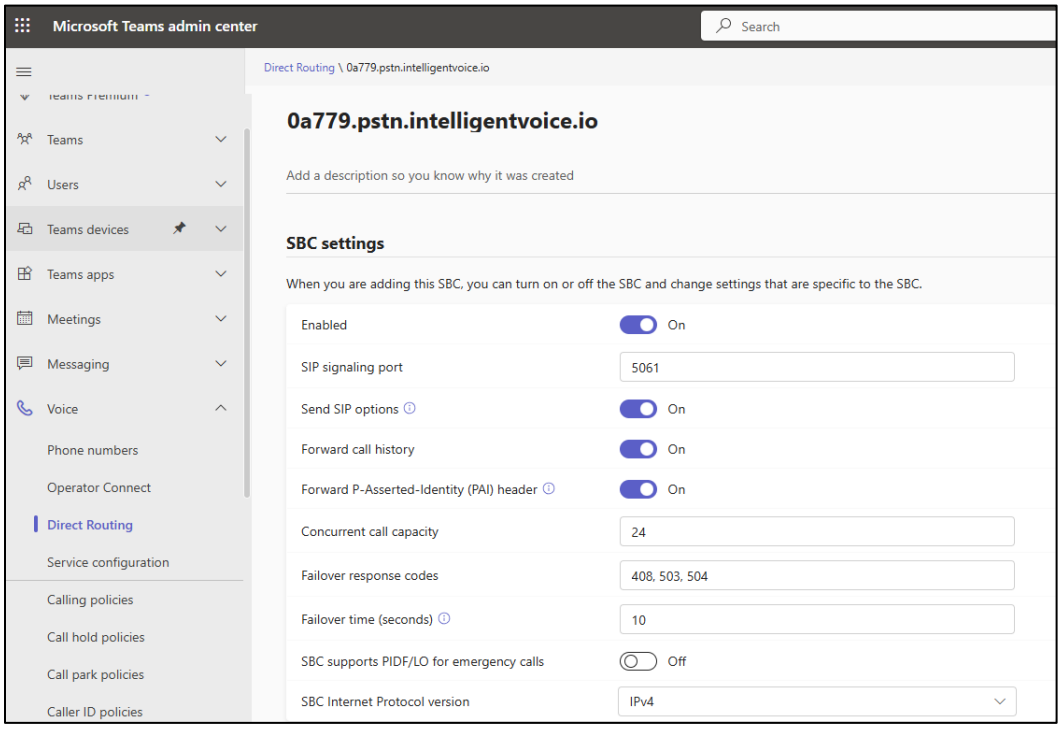
1. In the left navigation, go to **Voice > Direct Routing**, and then select the **SBCs** tab.
2. Select **Add**.
3. Enter an FQDN for the SBC.

   Make sure the domain name portion of the FQDN matches a domain that's registered in your tenant.
4. Configure the settings for the SBC, based on your organization's needs. For details on each of these settings, see SBC settings.
5. When you're done, select **Save**.



To enable connectivity between your Microsoft Teams SBC and Oracle ICON, please ensure the following configuration settings:

- Enabled: On
- SIP Signaling Port: 5061
- Send SIP OPTIONS: On
- Forward Call History: On
- Forward P-Asserted-Identity (PAI) Header: On

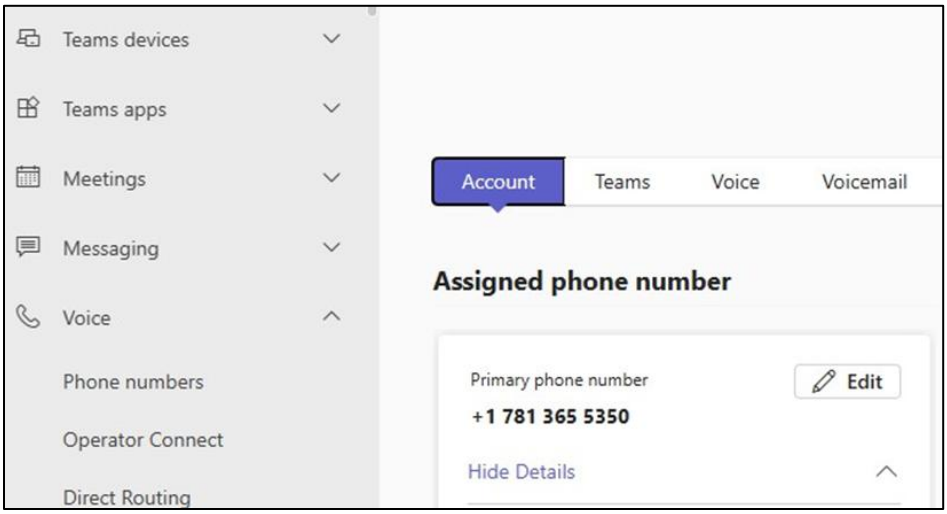


Note: To support call forwarding and certain transfer call flows between Microsoft Teams and Oracle ICON, both **Forward P-Asserted-Identity (PAI)** and **Forwarded Call History** must be enabled on the Teams Tenant SBC for Direct Routing

7.3.3 Configuring User Online Voice Settings

Earlier is the application note, we created a user and assigned that user the proper licenses. The next step is to configure the user's online phone settings.

1. Go to **Users** > **Manage users**.
2. Select a user.
3. Under **Account** > **General information**, select **Edit**.
4. Under **Assign phone number**, from the **Phone number type** drop-down menu, select **Direct Routing**
5. Enter an assigned phone number and a phone number extension if applicable.
6. Select **Apply**.



The account's general information now shows the assigned phone number and displays Direct Routing as the phone number type.

It's recommended, but not required, that the phone number used is configured as a full E.164 phone number with country code

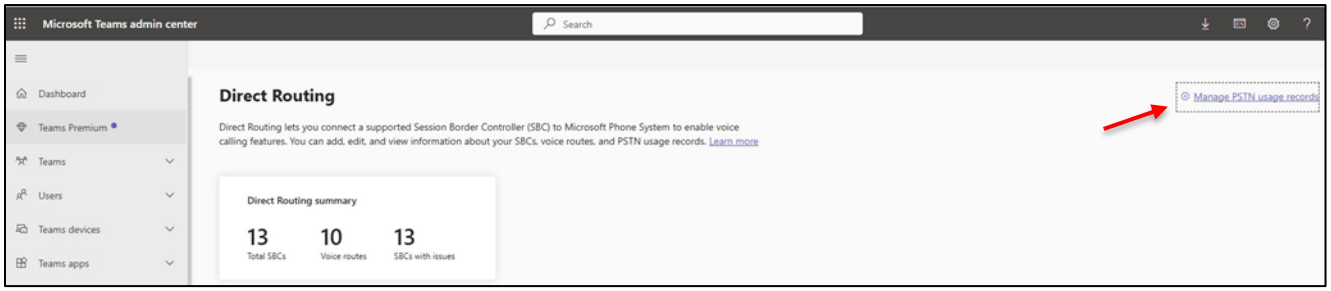
7.3.4 Configure Voice Routing for Direct Routing

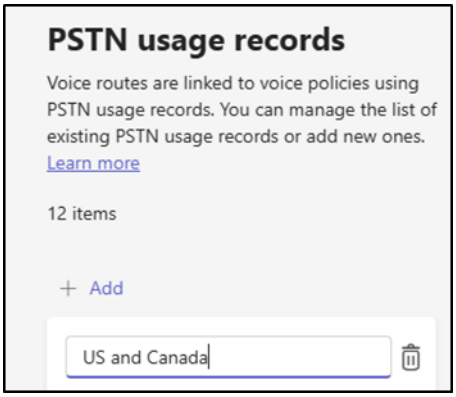
We'll now go through how to configure voice routing for Phone System Direct Routing.

Please see "Configure Voice Routing for Direct Routing" for more details and in depth examples.

7.3.4.1 Create the "US and Canada" PSTN usage

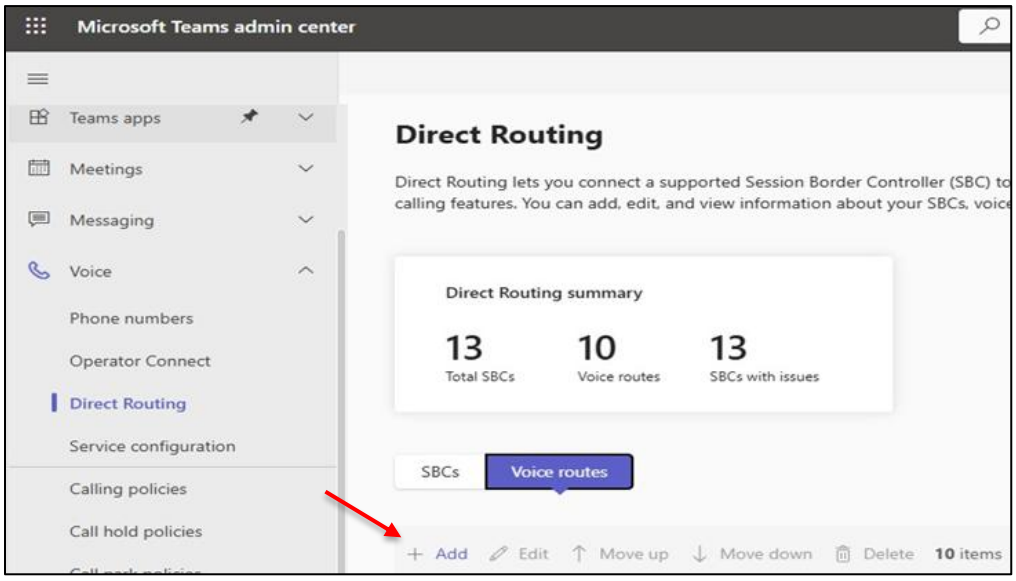
1. In the left navigation of the Microsoft Teams admin center, go to **Voice** > **Direct Routing**, and then in the upper-right corner, select **Manage PSTN usage records**.
2. Select **Add**, type **US and Canada**, and then select **Apply**.

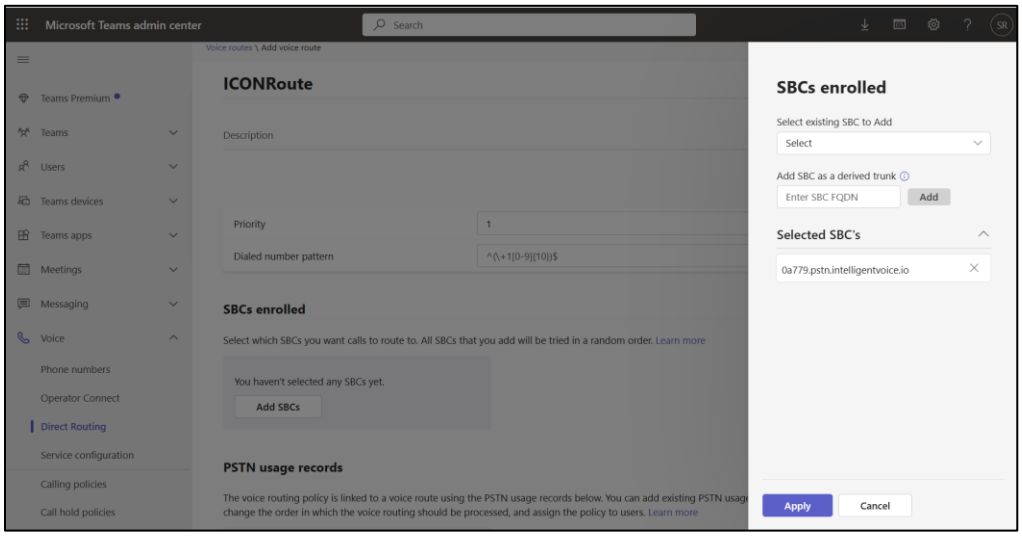




7.3.4.2 Create a Voice Route

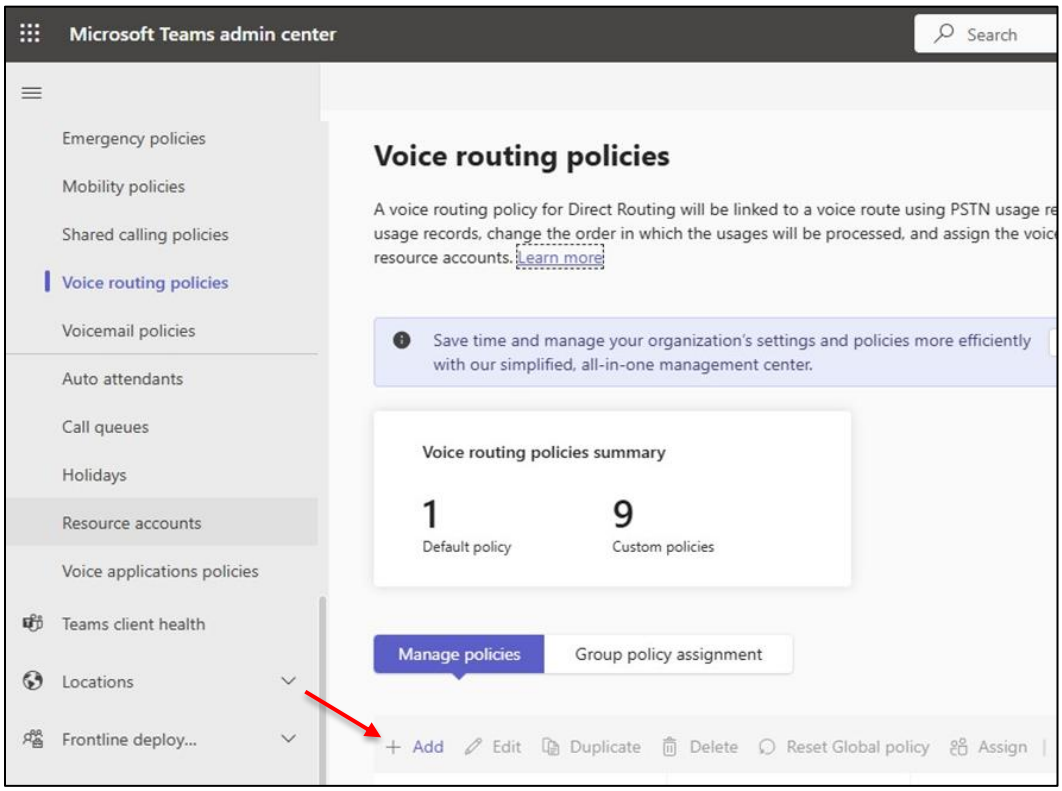
1. In the left navigation of the Microsoft Teams admin center, go to **Voice** > **Direct Routing**, and then select the **Voice routes** tab.
2. Select **Add**, and then enter a name and description for the voice route.
3. Set the priority and specify the dialed number pattern.
4. To enroll an SBC with the voice route, under **SBCs enrolled (optional)**, select **Add SBCs**, select the SBCs you want to enroll, and then select **Apply**.
5. To add PSTN usage records, under **PSTN usage records (optional)**, select **Add PSTN usage**, select the PSTN records you want to add, and then select **Apply**.
6. Select **Save**.

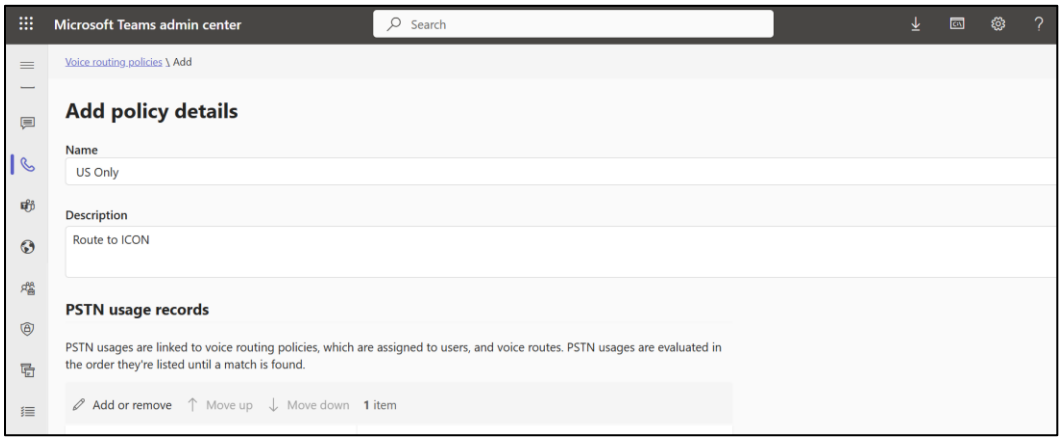




7.3.4.3 Create a voice routing policy

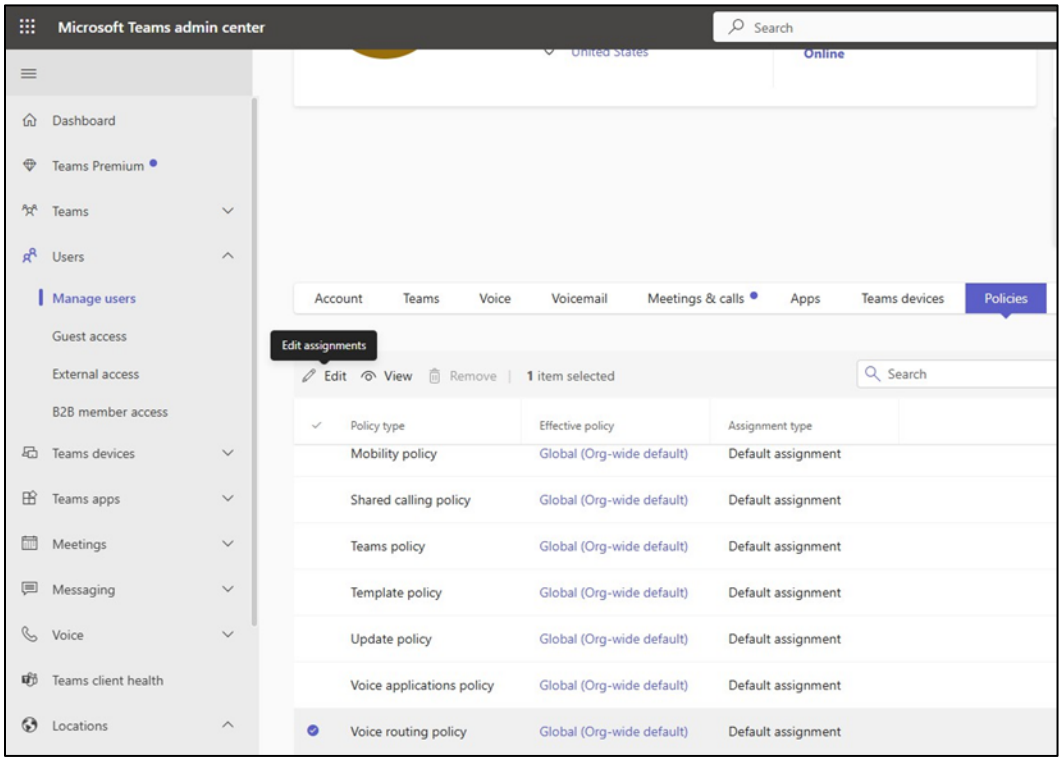
1. In the left navigation of the Microsoft Teams admin center, go to **Voice** > **Voice routing policies**, and then select **Add**.
2. Type **US Only** as the name and add a description.
3. Under **PSTN usage records**, select **Add**, select the "US and Canada" PSTN usage record, and then select **Apply**.
4. Select **Save**.

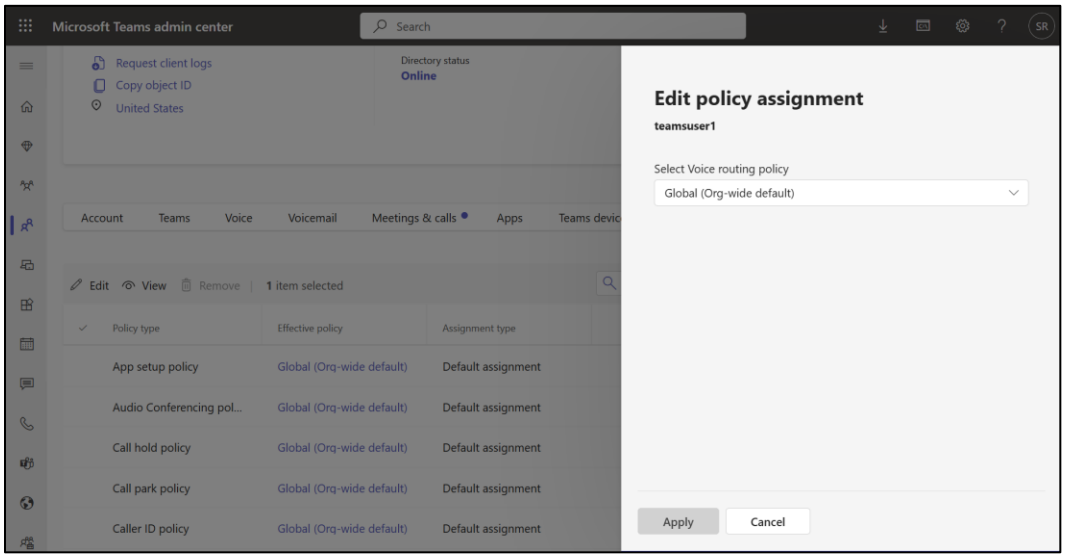




7.3.4.4 Assign the voice routing policy to user.

1. In the left navigation of the Microsoft Teams admin center, go to **Users**, **Manage Users** and then select the user.
2. Select **Policies**, and then next to **Assigned policies**, select **Edit**.
3. Under **Voice routing policy**, select the "US Only" policy, and then select **Apply** and **Save**.





- This concludes the basic setup in Microsoft Teams tenant to pair the ICON and assign DID's to users and create voice routing for Phone System Direct Routing.

8 Syntax Requirements for SIP Invite and Sip Options

Microsoft Teams Hybrid Voice Connectivity interface has requirements for the syntax of SIP messages.
This section covers high-level requirements to SIP syntax of Invite and Options messages. The information can be used as a first step during troubleshooting when calls don't go through. From our experience most of the issues are related to the wrong syntax of SIP messages.

8.1 Terminology

- Recommended – not required, but to simplify the troubleshooting, it is recommended to configure as in examples as follow
- Must – strict requirement, the system does not work without the configuration of these parameters.

8.2 Requirements for Invite

Picture 1 Example of INVITE and 200OK Message

```
INVITE sip:17815551345@sip.pstnhub.microsoft.com:5061;user=phone;transport=tls SIP/2.0
Via: SIP/2.0/TLS 10.1.3.4:5061;branch=z9hG4bKcm87o2205o1rkbb1vnp0.1
Max-Forwards: 65
From: "Test" <sip:+17815551212@9f70543760a6.pstn.intelligentvoice.io:5060;user=phone>;tag=19fc69fc0a020100
To: <sip:+17815551345@sip.pstnhub.microsoft.com:5061;user=phone>
Call-ID: 1-19fc69fc0a020100.318f0133@68.68.117.67
CSeq: 2 INVITE
Contact: <sip:+17815551212@9f70543760a6.pstn.intelligentvoice.io:5061;user=phone;transport=tls>;sip.ice
Allow: ACK, BYE, CANCEL, INVITE, OPTIONS, PRACK, REFER
User-Agent: T7100/3.0
Supported: 100rel
Content-Type: application/sdp
Content-Length: 550
```

SIP/2.0 200 Ok
FROM: <sip:+ 17815551212@10.1.2.4:5060;user=phone>;tag=e520638effffffff2c68c
TO: <sip:+ 17815551345@telechat.o-test06161977.com:5060;user=phone>;tag=19ec632b0a020100
CSEQ: 1 INVITE
CALL-ID: 1-19ec632b0a020100.74184225@68.68.117.67
VIA: SIP/2.0/TLS 52.114.32.169:5061;branch=z9hG4bKf74789d
Contact: <sip:+17815551345@9f70543760a6.pstn.intelligentvoice.io:5061;user=phone;transport=tls>;sip.ice
Allow: ACK, BYE, CANCEL, INVITE, OPTIONS, PRACK, REFER
Server: T7100/1.0
Content-Type: application/sdp
Content-Length: 477
Supported: timer,replaces
Session-Expires: 1800; refresher=uas

8.2.1 Contact Header-Invite and Final Response

- Must have the FQDN sub-domain name of a specific Teams tenant for media negotiation in both requests and final responses.
- Syntax: Contact:: <phone number>@< subdomain FQDN >:<SBC Port>;<transport type>
- MSFT Direct Routing will reject calls if not configured correctly.

9 Appendix A

9.1 Oracle ICON Source IP Addresses by Region

9.1.1 Sip Addresses

We send SIP traffic from the following IP addresses depending on the region.

Sip Addresses	United States	United Kingdom	Europe
Elastic SIP Trunking	• 141.148.94.123 • 141.148.19.91 • 141.148.19.207	• 132.226.133.10 • 141.147.102.157 • 130.162.174.170	• 158.180.40.23 • 79.76.125.226 • 92.5.45.176
BYOC SIP Trunks	• 157.151.185.240 • 129.80.163.26 • 129.80.237.143	• 141.147.93.137 • 79.72.90.134 • 79.72.74.167	• 141.144.252.12 • 152.70.25.132 • 92.5.21.254

9.1.2 RTP Address

We use the following IPv4 addresses to anchor media in each IVP Region:

RTP Addresses	United States	United Kingdom	Europe
RTP Addresses	• 152.70.194.115 • 129.158.41.18 • 129.80.0.17 • 141.148.65.154 • 129.80.168.72 • 129.153.11.4	• 145.241.255.210 • 145.241.215.174 • 141.147.86.5 • 141.147.72.109 • 193.123.190.92 • 141.147.108.181	• 92.5.74.51 • 92.5.81.148 • 89.168.85.244 • 89.168.101.27 • 129.159.31.17 • 138.2.190.141

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