

OESS Frontend

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1.0.0

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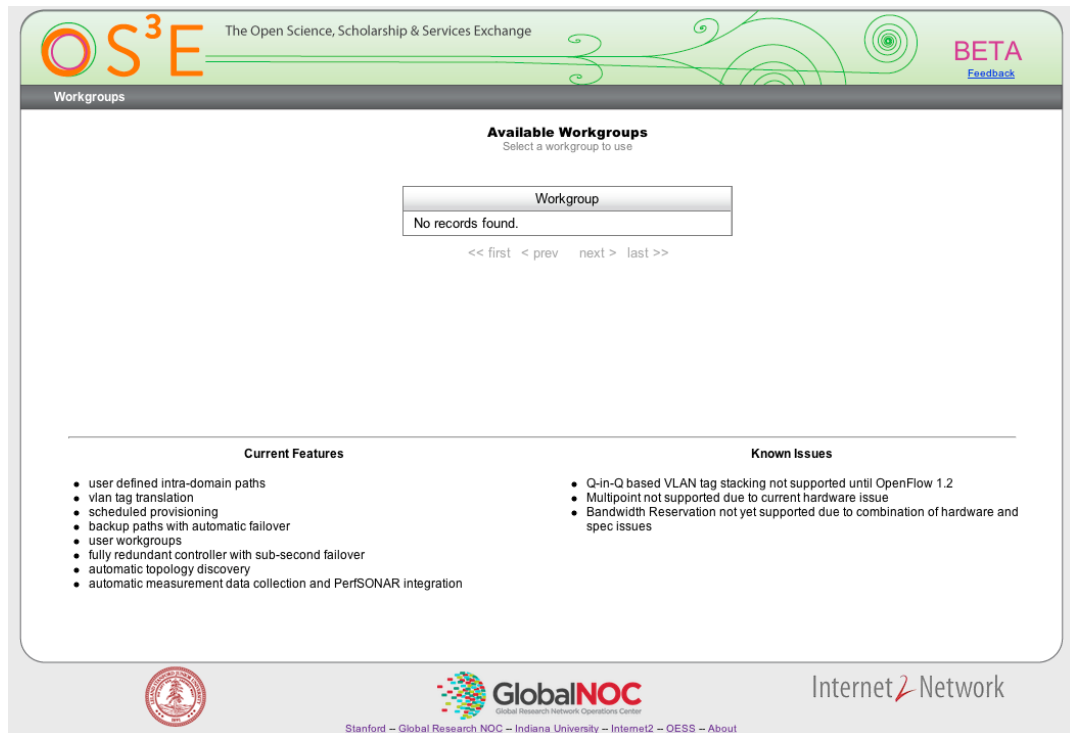
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Chapter 1. Introduction

The OESS frontend is designed to be an easy to use and intuitive point and click interface to creating and removing dynamic circuits on Openflow enabled switches. It is broken out into two main sections - the user interface and the admin interface - both of which are explained in detail in the following sections. This guide is primarily intended as a jumping off point for people that are new to using OESS and will cover initial set up as well as explaining the steps along the process of creating a circuit.

Chapter 2. Getting Started

This guide assumes that you have successfully installed the software and started the relevant services. If this is not the case, please refer to the included QUICK_START and/or README files in the code distribution for assistance. When visiting the frontend for the first time you should be presented with a page like the following.



This is the entry point to the user interface. At this point, there's not a whole lot you can do here. First we will need to visit the admin interface to configure users, workgroups, and to tell OESS about our network. In a typical install, the admin section is located at `<url_base>/admin/admin_index.cgi` and will have the username and password provided during the setup script.

Chapter 3. Admin Interface

When first visiting the admin interface it should look something like this.

The screenshot displays the OS³E (The Open Science, Scholarship & Services Exchange) Admin Interface. The header includes the OS³E logo, the text "The Open Science, Scholarship & Services Exchange", a "BETA Feedback" link, and a "Workgroup:" field. A left sidebar contains navigation links: Discovery, Network, Remote Links, Remote Devices, Users, and Workgroups. The main content area is titled "Discovered Network Elements Pending Confirmation" with a sub-header "Click to Assign Details and Confirm". It features two tables: "Devices" and "Links".

Name	Datapath ID	IPv4 Address
atla.foo.bar.net	aaaa	10.0.0.1
chic.foo.bar.net	aaac	10.0.0.3

Navigation: << first < prev 1 next > last >>

Endpoint A	Endpoint Z
No records found.	

Navigation: << first < prev next > last >>

The footer contains logos for Stanford University, GlobalNOC (Global Research Network Operations Center), and Internet2 Network, along with a list of partner institutions: Stanford - Global Research NOC - Indiana University - Internet2 - OESS - About.

Discovery

Discovery is the process through which OESS learns about the network automatically. Any Openflow device that is configured to use the OESS host as its controller should automatically be picked up. When OESS discovers a new node or link, the software puts it into a "Pending Confirmation" state. A user with access to the admin interface can then go and confirm that this node is available to the software and set its relevant information.

If you have already configured your Openflow devices to be talking to the OESS host, you should see that the OESS software has discovered them. When a node is detected it will attempt to do a DNS lookup to determine the name for you automatically, but if that does not succeed or you simply would prefer a different name you can change it while confirming. The geographic coordinates are only important as to where it will show up on the interactive map.

Discovered Network Elements Pending Confirmation
Click to Assign Details and Confirm

Devices		
Name	Datapath ID	IPv4 Address
atla.foo.bar.net	aaaa	10.0.0.1
chic.foo.bar.net	aaac	10.0.0.3

Details for Device: aaac ✕

Name:

Latitude: Longitude:

No records found.

<< first < prev next > last >>

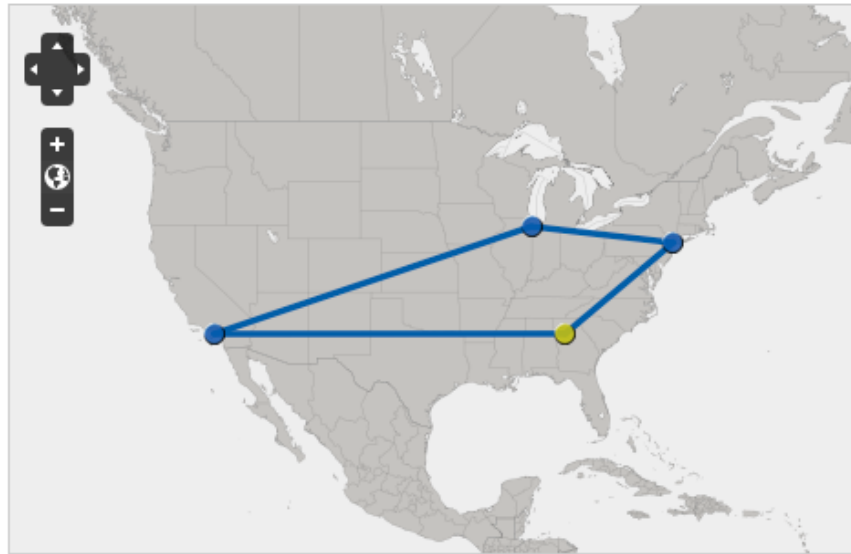
Once two or more nodes have been confirmed, OESS will attempt to discover links between them. When these are discovered they will appear in the table below nodes and will also be waiting for confirmation. The name for a link is only to be useful to humans.

Network

The Network section shows the interactive map of all currently active devices and links in your network. By clicking any of these we can adjust their properties such as name, geographic coordinates, or decommission it from the network.

Active Network Elements

Click to Edit Details or Remove



Details for Network Element: atla.foo.bar.net ✕

Name:

Latitude: Longitude:

Update Device

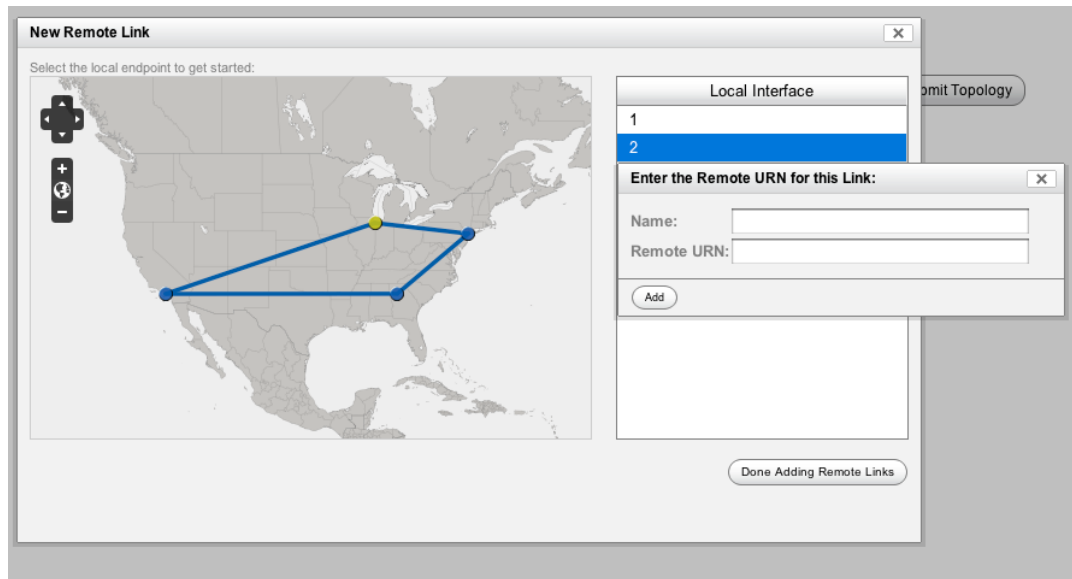
Decommission Device

IMPORTANT If you have registered your topology with a remote Topology service and rename or decommission a node or link, you will have to resubmit the topology to update the service or OESS will not understand a request coming in with the old name.

Remote Links

The Remote Links section allows you to configure which parts of your network have connections to other networks. It also allows you to submit your network's topology to the remote topology service configured during the setup script. If you are not planning on using interdomain aspects you can ignore this section.

To configure a remote link, simply click the New Remote Link button. A popup will appear showing you the current active network. Choose which endpoint on your network has the connection to the remote network. A list of interfaces on that node should appear next to the map. Choose which interface has the connection to the other network and you will be prompted to enter the information for this remote link.



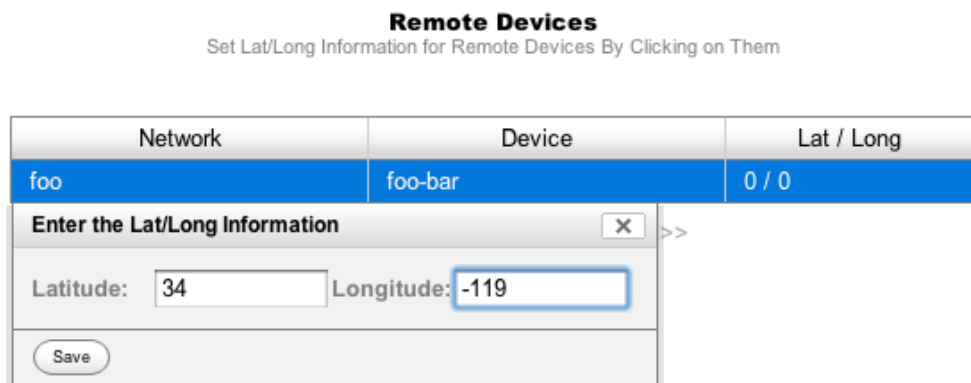
The remote URN is in the form "urn:ogf:network:domain=foo:node=bar:port=biz:link=bam" and must match what the other network has configured as identifying this link. The name is the name of this link and what the other network will use in their topology to identify you in the "link=bam" part of their URN.

Once you are in a position where you are satisfied with the topology, you can click the "Submit Topology" button to upload your topology to the server you configured during the setup script.

Remote Devices

The Remote Devices section allows you to configure geographical coordinates for devices in other networks that have been imported. The sole purpose of this is to make the interactive maps more useful and realistic when dealing with remote nodes. If you are not using interdomain aspects of the software you can ignore this section.

To set a latitude and longitude for a remote device, simply click the corresponding row and enter the desired values in the popup.



Users

The Users section lets you configure what users are known in the system. Before a person can use the software they must have a user entry in this section. There are two special users:

Table 3.1. Special Users

System	The user that the internal software uses when scheduling actions and doing interprocess communication.
OSCARS	Not included by default, needs to be added if you are going to be using interdomain. The user that all remote initiated provisioning actions will use.

To add a new user, click the "New User" button. To edit an existing user, select their name from the list. The process for adding or editing a user is the same. Fill out the popup provided with the information for the user and click "Save". The "Username(s)" field should be filled out with the username that the user will log in with through whatever security layer is used at the Apache level (basic auth, single sign on, kerb auth, etc). This is basically what the REMOTE_USER environment variable will be set to. If desired, multiple usernames can be associated to a single user account by separating each with a comma. This is to allow, for example, authentication mechanisms such as OpenID if so desired.

The screenshot shows a web interface titled "Existing Users". It contains a table with three columns: "Name", "Username", and "Email Address". The table has one row with the following data: Name: Dan Doyle, Username: dandoyale, Email Address: daldoyale@gnoc.iu.edu. Below the table, there is a "User Details" popup window. The popup has a close button (X) and a "Save" button. It contains the following fields: First Name (Dan), Last Name (Doyle), Email Address (daldoyale@gnoc.iu.edu), and Username(s) (comma separated) (dandoyale).

Workgroups

Workgroups are groups of users with access to a certain subset of the local network. For a user to be able to do anything with OESS, they must be associated to at least one workgroup. In a new installation there will be no workgroups so one will have to be created.

To create a new workgroup, simply click the "New Workgroup" button, choose a name for it, and click "Save". The name, excluding the one special workgroup mentioned below, serves the sole purpose of identifying it to humans.

To edit a workgroup, select it from the list presented. At this point you will be presented with a table of users in the workgroup as well as a listing of which edge ports they are allowed to create circuits to and from. From here you can add users to the workgroup by clicking the "Add User to Workgroup" button and selecting the desired users from the table provided or remove them by clicking the "Remove" link next to their name. You can also add and remove allowed edge ports in a similar fashion. When adding an edge port, first click the node on the map, then select the port from the table of options.

Users in Workgroup

Name	Remove
Dan Doyle	<button>Remove</button>

<< first < prev 1 next > last >>

Add User to Workgroup

workgroup1

Allowed Edge Ports

Endpoint	Interface	Remove
atla.foo.bar.net	2	<button>Remove</button>
chic.foo.bar.net	2	<button>Remove</button>

<< first < prev 1 next > last >>

Add Edge Port

Done

There is one special workgroup: "OSCARS IDC". Similar to the "OSCARS" user described in the "Users" section, this is the workgroup that all remotely provisioned circuits will be associated with. This workgroup is not created by default so it will need to be if you are planning to use interdomain aspects and the OSCARS user will need to be a part of it as well as any ports that you would like it to be able to provision to.

Chapter 4. User Interface

The user interface of OESS is designed to allow users to quickly and easily provision circuits across the Openflow network to meet their needs. It also provides a means to interact with OSCARS to provision interdomain circuits, or circuits that span multiple networks.

When a user that has been properly configured and is part of a workgroup goes to the OESS home page and selects which workgroup they would like to work in, they will be presented with a page like the following:

The screenshot shows the OESS (The Open Science, Scholarship & Services Exchange) interface. The header includes the OS³E logo and a 'BETA Feedback' link. The breadcrumb trail is 'Workgroups > Home'. The main heading is 'Workgroup Home' with the subtitle 'View existing circuits or create new ones'. A 'New Circuit' button is in the top right. Below is a search bar and a table with columns: Identifier, Description, Bandwidth, Endpoints, and Status. The table contains the message 'No records found.' and pagination links '<< first < prev next > last >>'. Statistics on the right show 'Total Circuits: 0' and 'Total Bandwidth: 0 Mbps'. The footer features logos for Stanford, GlobalNOC, and Internet2 Network, along with a list of links: 'Stanford - Global Research NOC - Indiana University - Internet2 - OESS - About'.

From this page, users can select an existing active circuit from the table provided to see up to date network statistics as well as being able to edit or remove the circuit. New circuits can also be created by clicking the "New Circuit" button.

New Circuit

The first step in creating a new circuit is to provide the OESS software with some basic details about the circuit. When these have been filled out, click the Proceed to Step 2 button.

The screenshot shows the 'Basic Details' form in the OESS interface. The breadcrumb trail is 'Workgroups > Home > Details > Endpoints > Primary Path > Backup Path > Scheduling > Provisioning'. The main heading is 'Basic Details' with the subtitle 'Add Information'. A 'Proceed to Step 2: Endpoints' button is in the top right. The form includes: a 'Description' text field; a 'Reserved Bandwidth' field with a slider and a value of '0 Mbps'; 'Tagging' options with 'Point to Point' selected; and 'Type of Circuit' options with 'Local Domain' selected.

Table 4.1. Details

Description	The human readable description for this circuit. It has no special meaning outside of uniquely identifying it to users.
Reserved Bandwidth	**Not supported in Openflow 1.0** The amount of bandwidth that circuit created will be guaranteed to have access to. Currently this does nothing with local Openflow domain circuits, however it will be passed to an OSCARS instance for doing interdomain circuits.
Tagging	**Q-in-Q not supported in Openflow 1.0** The type of circuit to create. In Point to Point the ingress and egress point match 1 tag and output 1 tag. For interdomain circuits, this must be Point to Point.
Type of Circuit	Whether this circuit is only on the local domain or is an interdomain circuit. Please note that currently when creating an interdomain circuit it will be put into the OSCARS IDC special workgroup since the request will ultimately wind up coming from an OSCARS instance.

Endpoints

This section will behave a little differently depending on whether Interdomain or Local Domain was selected during the details component. The purpose of either, however, is to choose where the circuit will begin and terminate. In the local domain greater than two endpoints are supported, though not fully recommended due to limitations on certain switches. In interdomain, you must have exactly two endpoints.

To get started in Local Domain, you will see the interactive map of your network. Choose endpoints by first clicking the node you want to terminate on and then the port from the list provided. If there are no ports available, it is possible that your workgroup does not have access to any ports on this device. This will need to be configured in the admin interface by someone with the appropriate authentication. Once you have selected the interface you will be prompted to enter a VLAN tag for traffic at this end, or you may uncheck the box to allow untagged traffic.

OS³E The Open Science, Scholarship & Services Exchange

BETA Feedback

Workgroups > Home > Details > Endpoints > Primary Path > Backup Path > Scheduling > Provisioning

Workgroup: workgroup1

Intradomain Endpoints
Pick at least two endpoints from the map below.

Summary

Description
example

Bandwidth
0 Mbps

Type
Local

Status
Planning

Endpoints

Interface	VLAN	Delete
No records found.		

Map

Legend:

- Circuit Endpoint
- Available Endpoint
- Endpoint Being Viewed
- Primary Path
- Secondary Path
- Available Link
- Down Link

VLAN Tag for Interface 2

VLAN Tag:

Tagged: ☒

Add Tag

Repeat this process for any additional endpoints. If you make a mistake or decide to change an endpoint, you may delete it from the Endpoints table by clicking the "Delete" button next to the appropriate entry.

When doing Interdomain circuits, the OESS software must first query the Topology service to get a listing of all the endpoints that are available. This may take several seconds depending on the complexity of the total topology in the service. When it has finished you will be presented with a tree view of all the networks. Expanding a network will show you all of the edge ports available. Selecting an edge port will prompt you for a desired tag exactly the same as the Local Domain section. You must choose exactly two endpoints.

OS³E The Open Science, Scholarship & Services Exchange

BETA Feedback

Workgroups > Home > Details > Endpoints > Primary Path > Backup Path > Scheduling > Provisioning

Workgroup: workgroup1

Interdomain Endpoints
Pick at least two endpoints from the map below.

Summary

Description
example

Bandwidth
50 Mbps

Type
Interdomain

Status
Planning

Endpoints

Interface	VLAN	Delete
No records found.		

Available Networks

- hep.fiu.edu
- internet2.sc10.org
- ion.internet2.edu
 - ion.internet2.edu-rtr.atla - ae8 - ae8.10
 - ion.internet2.edu-rtr.atla - ge-6/0/0 - ge-6/0/0.0

VLAN Tag for Interface ge-6/0/0

VLAN Tag:

Tagged: ☒

Add Tag

ion.internet2.edu-rtr.atla - ge-7/1/1 - *

ion.internet2.edu-rtr.atla - ge-7/1/2 - phoebebus

ion.internet2.edu-rtr.atla - ge-7/1/2 - *

ion.internet2.edu-rtr.atla - xe-0/0/0 - xe-0/0/0.0

ion.internet2.edu-rtr.atla - xe-0/0/1 - *

ion.internet2.edu-rtr.atla - xe-0/0/2 - ampath

ion.internet2.edu-rtr.atla - xe-0/1/1 - *

Legend:
 ● Circuit Endpoint ● Available Endpoint ● Endpoint Being Viewed
 ■ Primary Path ■ Secondary Path ■ Available Link ■ Down Link

Primary Path

** This section is only relevant to Local Domain circuits.**

The Primary Path section lets you pick the path of the circuit by clicking on links between nodes. The software can also choose a path for you if you click the "Suggest Shortest Path" button. In the case of an intranode circuit, an empty path is allowable. In any other case, the path must connect all the endpoints.

Backup Path

The Open Science, Scholarship & Services Exchange

[Workgroups](#) > [Home](#) > [Databs](#) > [Endpoints](#) > [Primary Path](#) > **Backup Path** > [Scheduling](#) > [Provisioning](#)
Workgroup: workgroup1

Backup Path
Choose a backup path from the map below by clicking on links between nodes. This path should be as physically redundant as possible.
Proceed to Step 5: Scheduling

Summary
Description
example
Bandwidth
0 Mbps
Type
Local
Status
Planning

Endpoints

Interface	VLAN
atla.foo.bar.net - 2	100
chic.foo.bar.net - 2	300

Backup Path
Atla-Newy
Chic-Newy

Suggest Shortest Backup Path

● Circuit Endpoint
● Available Endpoint

■ Primary Path
■ Secondary Path
■ Available Link
■ Down Link

Scheduling

The Scheduling section lets you choose when the provisioning and removal of this circuit will happen. The defaults are "Now" for provisioning and "Never" for removal, simply meaning that the software will not automatically remove it at a given date but it can be removed manually at any time. If you would like to have either or both of these actions happen at a later time, choose the "Later" option which will reveal a calendar to select the day and a time selector for the time. Please note that it is possible for scheduled actions to fail if the conditions under which they were scheduled have changed significantly, such as the removal of a node.

OS³E The Open Science, Scholarship & Services Exchange BETA [Feedback](#)

Workgroups > Home > Details > Endpoints > Primary Path > Backup Path > **Scheduling** > Provisioning Workgroup: workgroup1

Scheduling
Choose when this circuit should be created and removed. Proceed to Step 6: Provisioning

Summary

Description example

Bandwidth 0 Mbps

Type Local

Status Planning

Endpoints	
Interface	VLAN
atla.foo.bar.net - 2	100
chic.foo.bar.net - 2	300

When would you like to provision this circuit?
☒ Now ☐ Later

When would you like to remove this circuit?
☐ Never ☒ Later

Time Selection

< January 2012 >

Su	Mo	Tu	We	Th	Fr	Sa
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	1	2	3	4
5	6	7	8	9	10	11

09 : 45 UTC Select

Map Legend:
● Circuit Endpoint ● Available Endpoint
— Primary Path — Secondary Path — Available Link — Down Link

Provisioning

The Provisioning section is essentially a summary of the preceding sections where you may examine all the choices made before actually asking the software to make changes to the network. As with the Endpoints section, the behavior here is slightly different depending on whether you are provisioning a local circuit or an interdomain one.

In Local Domain mode, clicking the "Submit Circuit Request" button will fire off a request to the OESS software backend to provision or schedule the circuit. You should get a notification of the outcome of this action very quickly. If the action was to provision the circuit now and the provisioning was successful, you will be redirected to the active circuit details page where you can view traffic or make any edits just as if you had selected the circuit from the workgroup home page.

In Interdomain mode, clicking the "Submit Circuit Request" button will send a request to the OSCARS instance to begin provisioning an interdomain circuit. During this time you will see a popup that shows the current status in OSCARS of your circuit. The time for OSCARS to complete can vary greatly depending on the complexity of the circuit, such as how many domains it passes through, as well as how complex its total topology is. Once the circuit has provisioned successfully, you will be redirected to the active circuit details page.

Circuit Details

The Circuit Details section shows up to date information about an active circuit. The network map in the bottom left shows current path information which is updated periodically, meaning that if a network event happens and a circuit reprovisions across a backup path it will be reflected here. Additionally there will be a live updating graph showing traffic across this circuit. From here you can opt to edit the circuit or remove it.

