riverbed

Solution Guide

Riverbed Single-Click Deployment of SteelHead in Amazon Web Services (AWS) Solution Guide

Riverbed Single-Click Cloud SteelHead in AWS

Introduction

Riverbed SteelConnect Manager (SCM) provides the ability to orchestrate the deployment of virtual SteelConnect gateways and virtual SteelHeads directly into Amazon Web Services (AWS) virtual private clouds (VPCs) effectively linking branch offices, data centers, and headquarter (HQ) locations and VPCs, both in the same or different regions together. After integrating SCM with your AWS account (through Identity and Access Management [IAM] cross-account), the console automatically discovers and displays your subnets, in all VPCs and regions.

With SteelConnect's knowledge of your infrastructure, you can deploy virtual SteelConnect gateways and SteelHeads in all (or individual) VPCs and establish an automated VPN overlay through the internet while also benefitting from optimizing your applications over the WAN. This software-defined WAN automation interconnects VPCs using full-mesh VPN routing—with no manual configuration.

The Riverbed Single-Click Deployment of SteelHead in the Cloud is the solution to providing performance, security and resiliency in a hybrid cloud environment with AWS.

This Solution Guide will provide a step-by-step guide to connecting AWS VPCs with Riverbed SteelConnect and deploying the Single-Click Cloud SteelHead WAN optimization solution in AWS. Traffic can be optimized from your branch offices and data centers to your VPCs and/or directly between VPCs.

Detailed steps for the following topics and workflows are included:

- ⇒ Deploying Single-Click Cloud SteelHead in AWS
- ⇒ High Availability design options for AWS
- ⇒ Specifications for SteelConnect gateway and Single-Click Cloud SteelHead(throughput, connections)
- ⇒ Configuration requirements if using a physical (branch/HQ) site to connect to Single-Click Cloud SteelHead
- ⇒ Troubleshooting tips

Audience

This guide is written for security and network administrators who have basic familiarity with AWS and Riverbed SteelHead SD-WAN offerings. For further information on Riverbed WAN optimization please refer to the SteelHead User Guide.

The Challenge

Accessing and transferring data to/from the cloud presents a different set of challenges than moving data between physical branch and datacenter locations.

A *virtual private cloud* (VPC) is a virtual network dedicated to your AWS account. It is logically isolated from other virtual networks in the AWS cloud. You can create multiple VPCs within the same region or in different regions, in the same account or in different accounts. VPC's are not inherently connected together, and while various options exist, none of them provide a fully automated orchestration like SteelConnect does.

The challenge associated with accessing data in the public cloud is that the location(s) can be geographically distant from some or all of your branch offices. Combined with the first-come first-serve model of the public Internet, exchanging large files such as engineering documents or accessing applications from company offices can be slow and subject your users to varied results.

Lastly, data hungry applications egress costs from the AWS cloud could be significant. The fact that Single-

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Click Cloud SteelHead reduces data/bandwidth requirements helps reduce the data egress costs as well.

The Solution

Using SteelConnect to connect VPCs you get much more than an automated IPsec VPN connection. Additional security features include a stateful firewall, access control and built-in identity integration, all delivered in an orchestrated fashion with minimal configuration overhead.

In addition, SteelHead WAN optimization enhances your SteelConnect AWS deployment by automatically optimizing all TCP traffic to increase speed and reduce bandwidth over SteelConnect links. Now you can not only connect VPCs anywhere in AWS together (or bring the cloud closer by providing a direct path to your AWS applications from each branch) but also use SteelHead to boost performance and reduce traffic. Everything is controlled via a singular cloud console for a true hybrid-wan solution using the very latest in software-defined automation.

Solution Components

- ⇒ SteelConnect Management Console (SCM)
- ⇒ Single-Click Cloud SteelHead
- ⇒ SteelConnect virtual Gateway
- ⇒ Enterprise gateway/on-premises SteelHead (only needed if you have physical sites that you wish to connect to your AWS VPCs).

Deployment Steps

A sample organization with applications and services in AWS is shown below:

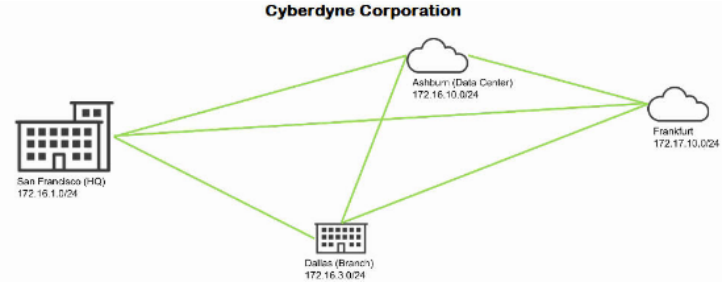

Fig. 1 Sample enterprise with distributed offices

The figure above shows a sample SteelConnect deployment at 4 sites – the Headquarters in San Francisco, branch office in Dallas plus two AWS deployments – one in US-East region (Ashburn) and one in EU-West (Frankfurt).

With Single-Click Cloud SteelHead, traffic can be optimized between all these sites (Enterprise Branch/HQ to AWS cloud and AWS cloud (US) to AWS cloud (Europe) for example.

At a high-level, there are 4 steps involved to deploy Single-Click Cloud SteelHead include:

1. Go to the AWS marketplace and associate your AWS account(s) to Riverbed SteelConnect Gateway and SteelConnect SteelHead WAN-optimization so they can be launched by SCM.
2. Log in to your SCM console and enter your AWS IAM details
3. Import your VPCs and connect subnets into SteelConnect
4. Deploy SteelConnect gateways and SteelHeads in your virtual network

Let's explore these steps in further detail below.

First, you need to subscribe to the Riverbed SteelConnect Gateway and SteelConnect SteelHead WAN-Optimization products in the AWS Marketplace. This is a one-time operation per

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Riverbed Single-Click Cloud SteelHead in AWS

product.

i) From the AWS Marketplace “subscribe” to SteelConnect Gateway and SteelConnect SteelHead WAN optimization:

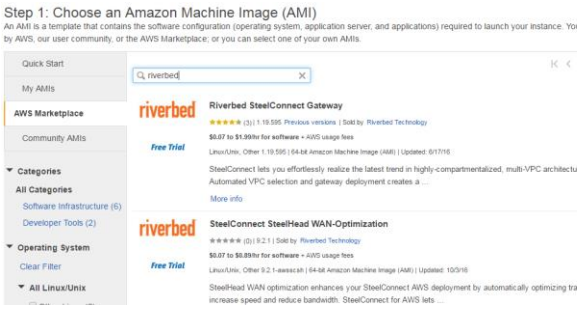

Fig. 2 Riverbed product subscription on AWS Marketplace

ii) If you already have an SCM, then you simply “accept the terms” from AWS and proceed to step ix) on page 5 below. If you do not have an SCM yet then continue to step iii).

iii) Select the Manual Launch tab and accept software terms.

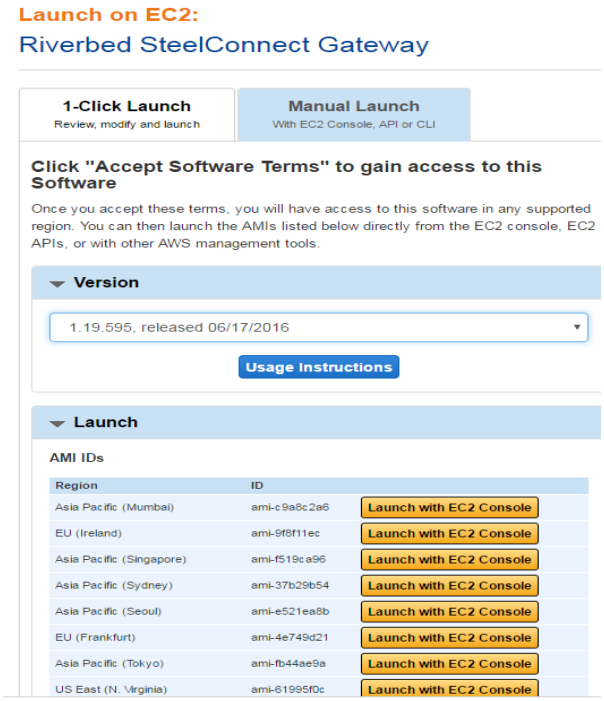

Fig. 3 AWS launch steps – selecting region

Choose the AWS region where you want to deploy the SteelConnect gateway and Single-Click Cloud SteelHead.

iv) Choose an Instance Type to meet the resources needed for your environment. For additional detail on Single-Click Cloud SteelHead requirements, please refer to the ‘Specifications’ section later in this document.

v) Click ‘Review & Launch’ and then ‘Launch’.

vi) You are then prompted to create a new key pair for if you ever needed to directly access the instance for troubleshooting. You can also use one of your existing key pairs.

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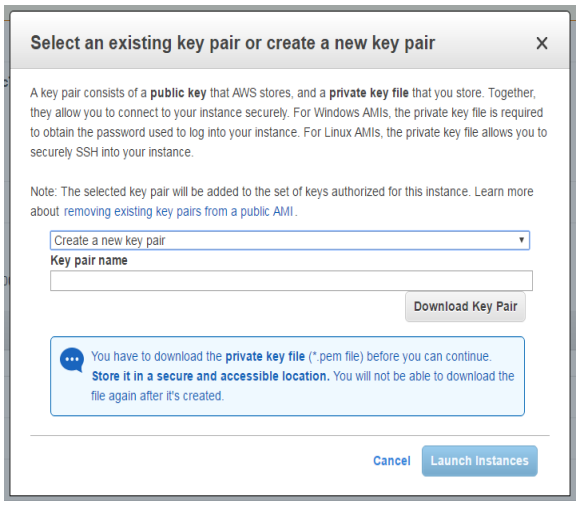

Fig. 4 Key-pair creation in AWS

vii) When the instance is launched, you can see it running in EC2:

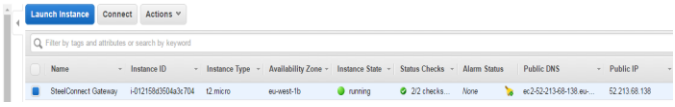

Fig. 5 SteelConnect gateway in EC2

viii) For new SCM customers (i.e you do not have a SCM console currently) you are provided with the trial SCM login information when you first attempt to launch the instance. The info for your trial SCM is displayed if you open the instance IP using a browser or via SSH. (SSH output below).

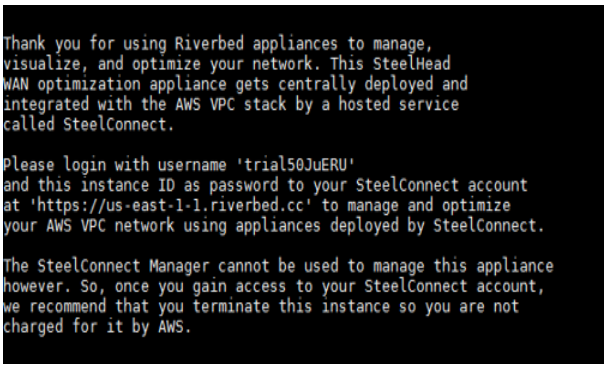

Fig. 6 Trial SCM login information

Open another browser tab and access your new SCM trial with the information provided. Note that your password to the trial SCM will be the unique instance ID you've launched. After you login to the SCM, continue with step ix) now to provide SCM with your AWS account credentials.

ix) If you are an existing SCM customer, after accepting the terms of the product(s), just go login to your SCM Console and navigate to the AWS menu under 'Network Design':

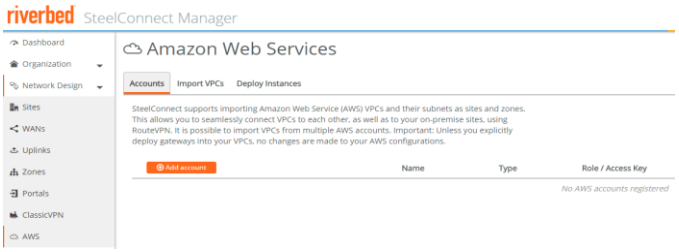

Fig. 7 AWS menu in Riverbed SteeclConnect Manger

Click 'Add account'. Follow the process to create a secure IAM role to permit SCM access to your AWS infrastructure, then return and enter the account name, account type and role ARN as described in the SCM console.

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Riverbed Single-Click Cloud SteelHead in AWS

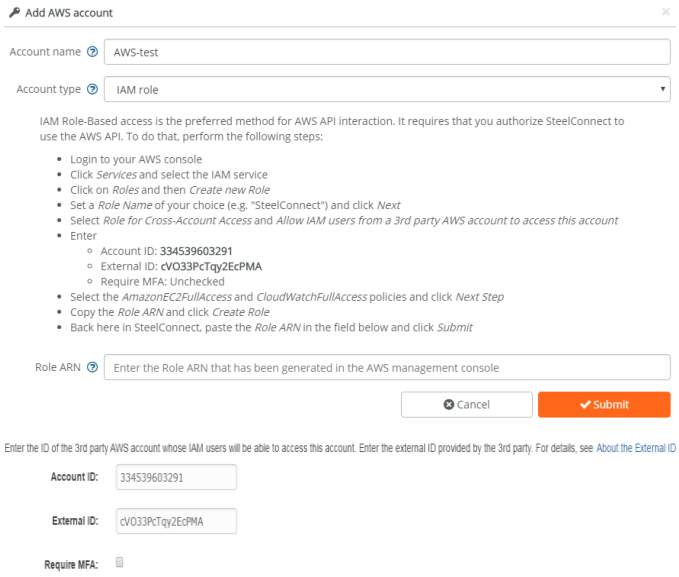

Fig. 8 AWS credentials entry in SCM

After your copy the 'Role ARN' from AWS and paste it into your SCM, you will see the 'subscribed' message in SCM 'Marketplace' field:

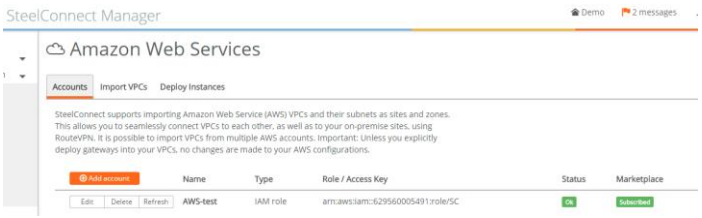

Fig. 9 SCM shows AWS successfully subscribed

Under 'Import VPCs' you will see the entire list of VPCs in your AWS network. There are currently 12 AWS regions worldwide. Note that AWS uses the same default VPC IP address and subnets in all regions worldwide. AWS expects that you will create your own specific IP address for each region. Thus, the recommendation is to create a new VPC in each region where you want to deploy Single-Click Cloud SteelHead, prior to deploying any instances, to avoid overlapping subnets when you connect things together.

To deploy a gateway in one or more of these VPC's, click 'Connect' for whichever subnets you want to link.

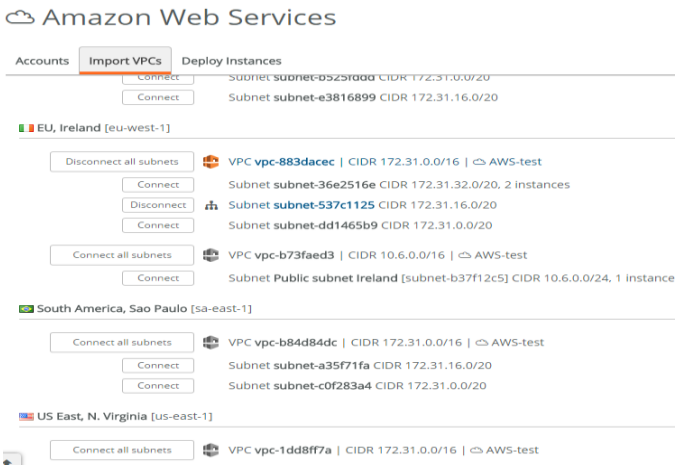

Fig. 10 Connect VPC subnets in SCM

This step prepares the necessary updates and configurations locally on SteelConnect Manager, but does not yet propagate anything to your AWS infrastructure.

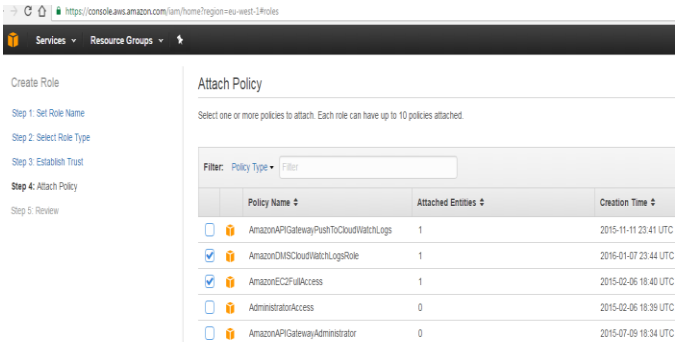

Fig. 11 AWS Policy view

To add Single-Click Cloud SteelHead WAN optimization to your deployment, you must subscribe to that product as well so it can be orchestrated from SteelConnect Manager. Go back to the AWS marketplace and click on SteelConnect SteelHead WAN-optimization now to subscribe (if you have not done so already as listed in step i) above).

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Riverbed Single-Click Cloud SteelHead in AWS

In the SCM console, now that you have ‘connected’ the subnets in the VPCs, you’re ready to deploy gateways and SteelHeads into your virtual network. When you click on ‘Deploy Instances’ you are presented with the option to deploy a SteelConnect Gateway and a SteelHead into a VPC you have connected in the previous step.

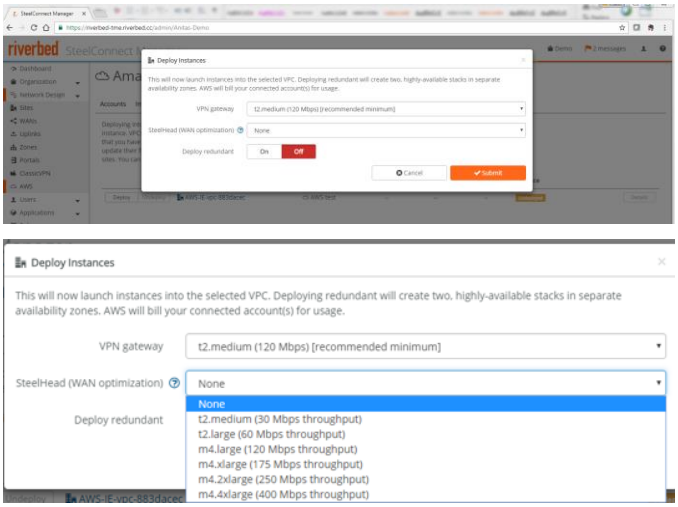

Fig. 12 Gateway & Single-click Cloud SteelHead deployment in SCM

You also have the option to ‘deploy redundant’ VPN gateway/WAN optimization stacks for high availability (HA) across multiple availability zones in AWS. To avoid creating a single point of failure, it is strongly recommended you use redundancy.(This will be discussed later in this document.)

When you deploy, the orchestration will stand up a SteelConnect stack in the selected VPC. This includes the creation of dedicated Uplink/Downlink subnets, assignment of an elastic IP to the gateway, and the instances themselves. Your existing AWS infrastructure will not be affected, and all operations are logged both in the SCM and in AWS CloudTrail (which you should already have enabled).

After a short time the instances will show as ‘deployed’:

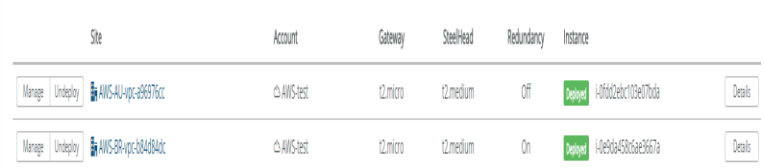

Fig. 13 successfully deployed Single-Click Cloud SteelHeads in SCM

There is a SteelHead tab in the Appliance menu providing information such as the serial number, IP address etc.

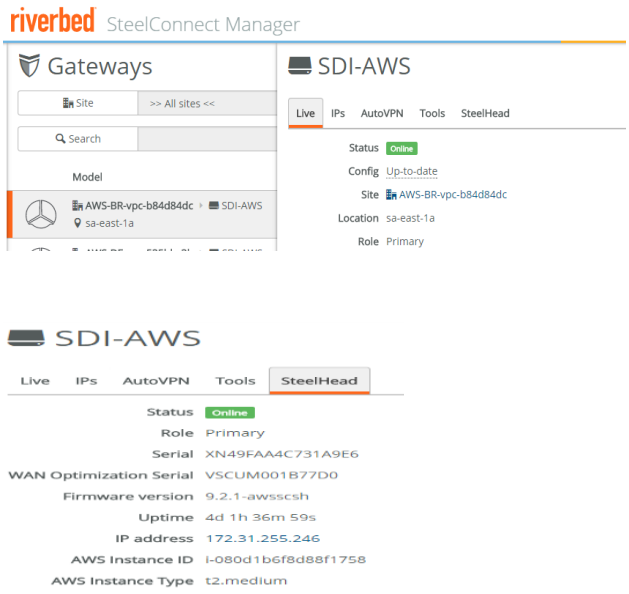

Fig. 14 Single-Click Cloud SteelHead information in SCM

While not required, if you need to make specific configuration changes to the Single-Click Cloud SteelHead, you can login to it from the browser of a jump host (Windows/Linux) in your VPC by navigating to its private IP in the downlink subnet. The initial logon credentials for the SteelHead is user ‘admin’ and your specific ‘Instance-Id’ as password.

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Riverbed Single-Click Cloud SteelHead in AWS

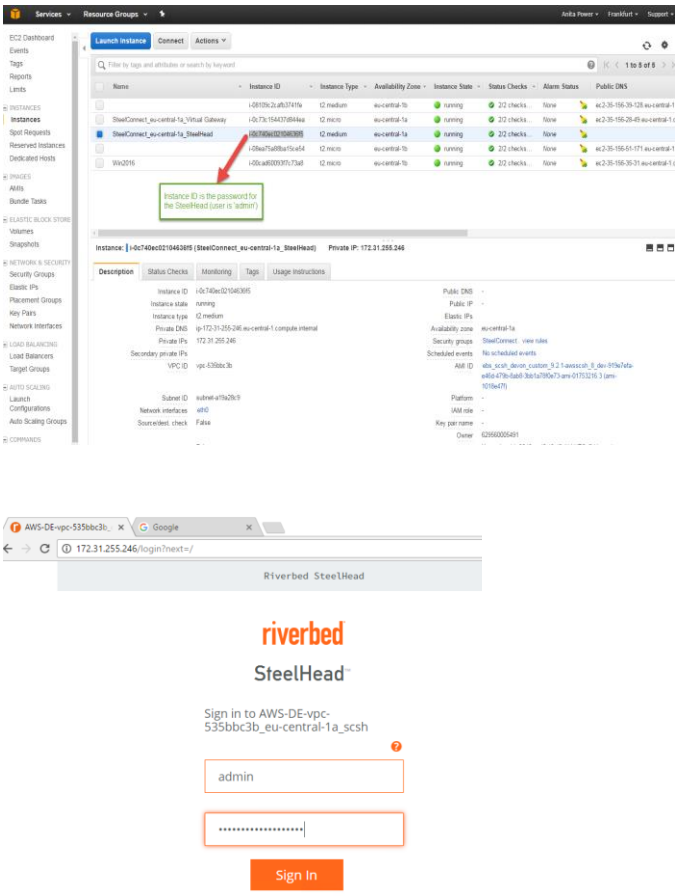

Fig. 15 SteelHead login screen – Instance ID as password

Route-Tables

When using automatic routing, the connected subnets route-table is modified by SCM automatically to control the way traffic is routed to other SteelConnect sites.

The Single-Click Cloud SteelHead will automatically use the SteelConnect Gateway as its upstream exit point, and when present the routes will point to the SteelHead interface, that traffic is routed through the SteelHead before being forwarded to the SteelConnect Gateway for transit.

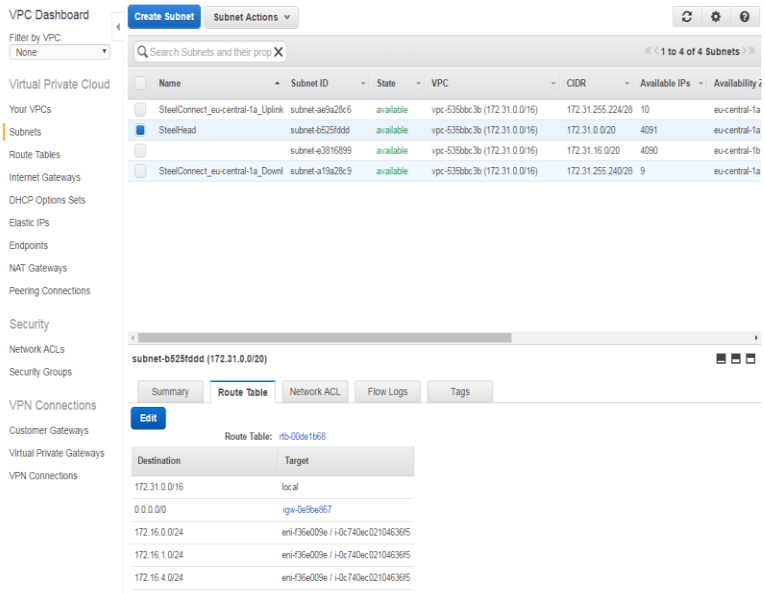

Fig. 16 AWS route-tables

You can also see the message in the EventLog to verify that traffic is being routed through the SteelHead:

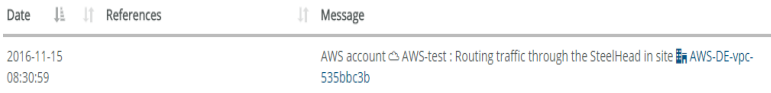

Fig. 17 SCM event log

The ‘downlink’ subnet is created in AWS by Riverbed to house SteelConnect instances and infrastructure without interfering with your cloud infrastructure in any way -it is displayed in SCM for clarity and there is no need to change anything there, nor should you deploy your own AWS instances in this subnet.

The subnets menu in AWS show that SteelConnect Gateway and Single-Click Cloud SteelHead reside on the ‘downlink’ subnet. The ‘uplink’ subnet is used for traffic going out over the IPsec VPN tunnel established by SteelConnect to rest of the SteelConnect sites.

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Riverbed Single-Click Cloud SteelHead in AWS

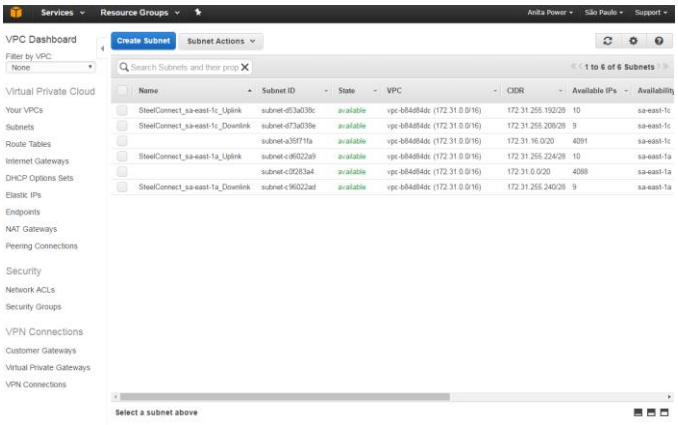

Fig. 18 AWS subnets menu

Security Groups

In AWS Security Groups, the default rule will usually permit outgoing traffic and incoming traffic for only a select amount of services. To permit additional traffic, you will need to add rules to permit traffic to ingress from SteelConnect sites (and vice versa). SteelConnect does NOT adjust the security groups of connected subnets, for security reasons you must do this yourself.

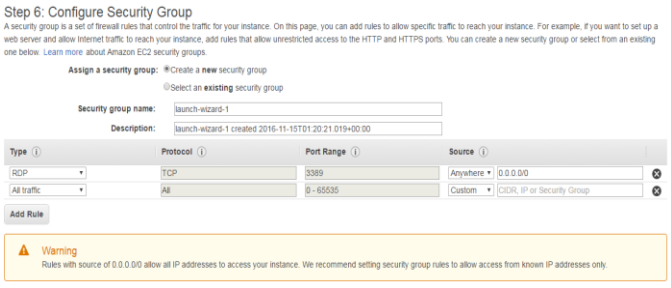

Fig. 19 Security Group modification in AWS

Firewall Rules

SCM also has a fully integrated firewall that is presented as a rules engine you can configure. Depending on your architecture and design, you may wish to fully open your AWS security groups and control SteelConnect traffic via our policy engine, or open the SteelConnect firewall fully and rely on AWS security groups. Maintaining two separate firewalls between connected zones is redundant and creates extra points of configuration for no real security benefit.

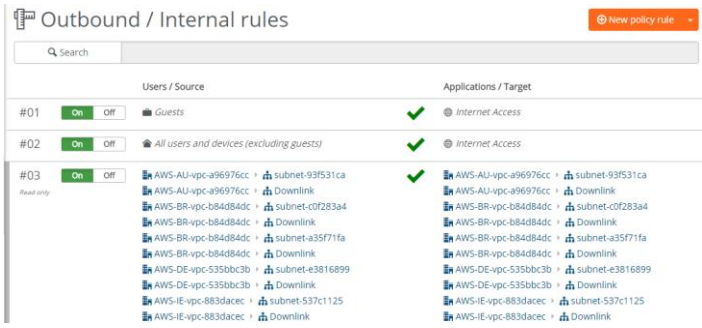

Fig. 20 SCM firewall rules

SteelHead WAN optimization

Auto-discovery is enabled on the Single-Click Cloud SteelHeads so no additional configuration is necessary from a SteelHead management perspective; the SteelHeads will ‘discover’ each other as soon as traffic is initiated from a client/server behind the SteelHead. You can see the communicating SteelHead under ‘Peers’ in the SteelHead GUI.

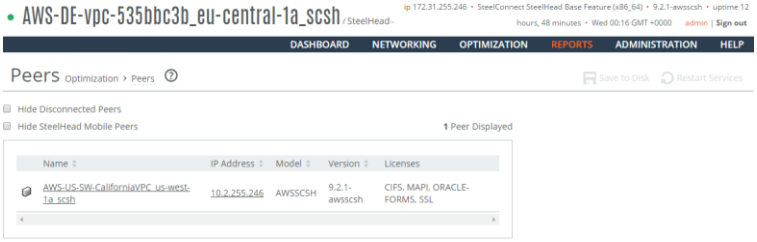

Fig. 21 Single-Click Cloud SteelHead AWS (Germany) peering with a Single-Click Cloud Steelhead in AWS (California)

To test WAN optimization performance, you can launch, for example, a Windows client in one region and connect

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Riverbed Single-Click Cloud SteelHead in AWS

to a Windows server in another region. The following example shows the SMB3.1 protocol being optimized with Single-Click Cloud SteelHead. The test here is a file transfer over the WAN from Windows Server 2016 to Windows Server 2016:

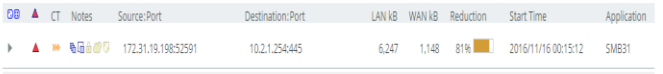

Fig. 22 81% bandwidth reduction with Single-Click Cloud SteelHead for this SMB3.1 file transfer

High Availability

To avoid creating a single point of failure, you should enable high availability when deploying into your connected VPCs. High availability is available for SteelConnect gateway-only deployments and for those that include Single-Click Cloud SteelHead WAN optimization.

When you choose high availability, SteelConnect will create fully redundant stacks in different availability zones, place your desired appliances, and monitor for their health. Currently, one of the stacks will be set as the primary while the other is running and standing by, ready to step in should the stack be declared unviable.. You can determine the current role of a deployed appliance (primary or secondary) by viewing its role in the appliance details page.

Note: It will be possible in an upcoming update to have traffic utilize both links when combined with a “manual routing” setup.

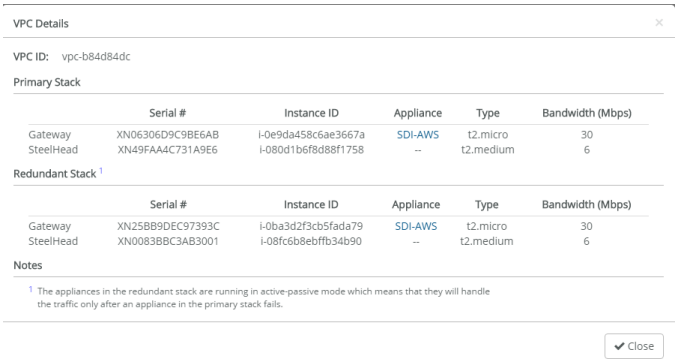

Fig. 23 High-Availability deployment

You have full freedom to modify a deployed stack at any time. For example, if you decide to first deploy a SteelConnect Gateway but don’t need redundancy for testing, you can add a redundant gateway at a later time. You can also choose to add-in the SteelConnect SteelHead at a later time. You perform these tasks by selecting “manage” on a deployed VPC.

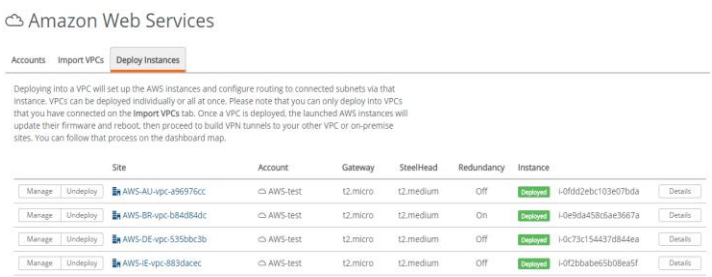

Fig. 24 Modify deployed stack at any time from SCM

Specifications

The following table lists the currently available models for SteelConnect gateways and SteelConnect SteelHeads. The performance numbers are observed throughputs during benchmarking, and can be higher or lower depending on factors like the currently-available bandwidth in a region. As such, your real-time results may fluctuate. SteelConnect does not restrict or limit

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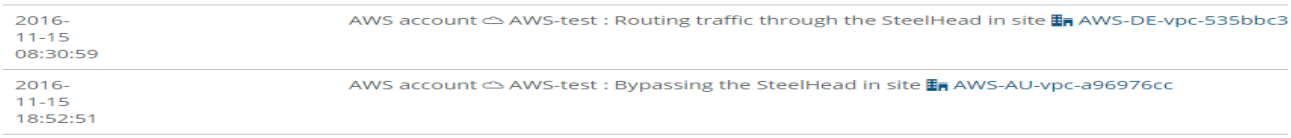
bandwidth in any way; bigger instances with their increased resources are allocated more network throughput and hardware, resulting in faster speeds across the SteelConnect links.

SCGW		SCSH		
AWS Instance Type	SCGW Specs	AWS Instance Type	SCSH Specs Throughput	SCSH Specs Max Conns
t2.micro	30Mbps	t2.medium	30Mbps	1,500
t2.small	60Mbps	t2.large	60Mbps	1,500
t2.medium	120Mbps	m4.large	120Mbps	1,500
c4.large	200Mbps	m4.xlarge	175Mbps	9,000
t2.large	300Mbps	M4.2xlarge(TBD)	250Mbps	30,000
c4.xlarge	450Mbps	m4.4xlarge	400Mbps	30,000

Fig. 25 SteelConnect Gateway and Single-Click Cloud SteelHead specifications

Troubleshooting

i) The Event Log in SCM provides a log of all events including whether traffic is successfully being routed through the SteelHead. Filter on keyword 'SteelHead' to search.



ii) If you forget to subscribe to the AWS Marketplace prior to deploying SteelConnect/SteelHead in SCM, the deployment will show as 'deployed with errors', for example:

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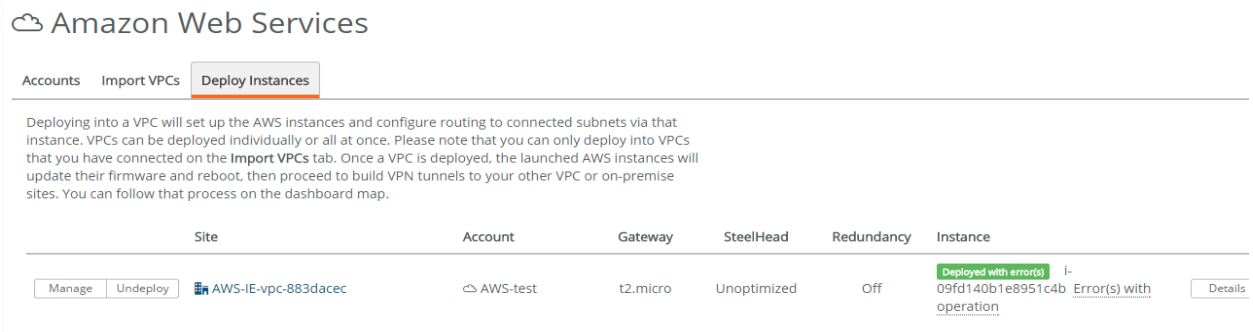

iii) If you are connecting two or more AWS regions, ensure that you create a new VPC to prevent overlapping IP's. AWS default IP's are the same in all regions, so you don't want to use the default VPC for that reason.

About Riverbed

Riverbed, at more than $1 billion in annual revenue, is the leader in application performance infrastructure, delivering the most complete platform for the hybrid enterprise to ensure applications perform as expected, data is always available when needed, and performance issues can be proactively detected and resolved before impacting business performance. Riverbed enables hybrid enterprises to transform application performance into a competitive advantage by maximizing employee productivity and leveraging IT to create new forms of operational agility. Riverbed's 27,000+ customers include 97% of the *Fortune* 100 and 98% of the *Forbes* Global 100.

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