



Scnapper 4.0.0 User Guide



About this Guide

The Scnapper backup, recovery and EC2 runtime scheduler tool user guide is for administrators of the Scnapper backup and recovery tool. This user guide describes the basic and advanced features available on the tool. The following related documents for Scnapper backup and recovery tool are available:

- Release Notes, which describe the new and changed features and fixed problems in the latest version of the software

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Overview

Scnapper backup, recovery and runtime scheduling tool features scheduled backups of your AWS EBS volumes and EC2 instances and scheduled runtimes for your EC2 instances. The following are its features:

Backup and Recovery

- Backup your AWS resources - EBS volumes and EC2 instances
- Schedule backups by the hour, day, week, month or year
- Keep your costs low by efficient usage of cloud resources, enabled through customizable retention policies for your backups
- Easy and rapid recovery of your backups
- Don't loose track of your backups by using our easy to use backup navigation widget
- Ensure that your backups are happening as per schedule by choosing to receive notifications by Email or SMS
- Automatically kick start the execution of other processes by chaining Scnapper's notifications.

EC2 Scheduler

- EC2 instance costs contributes the most to your AWS bill
- Reduce your costs by more than 65% by automating the schedule of the runtime of your EC2 instances that do not have to be running 24/7
- Flexibility of scheduling the runtime of your EC2 instances each day and hour of the week
- Schedule your instances to be stopped during the weekend and non-office hours

- Ensure that your EC2 instances are started and stopped as per schedule by choosing to receive notifications by Email or SMS
- Automatically start the execution of other processes by chaining Scnapper's notifications.

General

- User management integrates with your AWS IAM user account
- Usage based pricing model which is not based on the number of resources being backed up
- Group your EC2 instances into logical groupings and simplify your EC2 runtime workflow
- Reduce cost by managing those snapshots and AMIs created outside of Scnapper

Prerequisites

You can access the web interface of Scnapper by pointing your web browser to `https://<hostname or IP address of the Scnapper server>/tool/`. The certificate is generated on the instance and self-signed, so the browser warns once.`https://<hostname`

Scnapper 4.0.0 is launched from the CloudFormation template published with the AMI. You choose the VPC and subnet, the CIDR block allowed to SSH in, a key pair, the instance type (t3.medium recommended) and the size of the data volume. The template creates everything else the instance needs:

1. The security group. Port 443 (the web interface) is open to the Internet and port 22 to the SSH block you gave; outbound access to the Internet lets Scnapper reach the AWS API.
2. The IAM role the instance runs with. You do not create a role or a policy by hand: the role grants only the EC2 snapshot, image, volume, instance and tag actions Scnapper uses, plus SNS publishing, and is listed in full in the template.

Direction	Ports	Source/Destination
Inbound	443	0.0.0.0/0 (the web interface)
Inbound	22	The SSH parameter of the stack
Outbound	443	0.0.0.0/0

3. A data volume (`/dev/sdb`, mounted at `/files`) holding the database, the configuration, the logs and the TLS material. It is encrypted and is not deleted when the stack is deleted, so an upgrade reattaches it to a new instance (see Upgrades). The root volume holds only the operating system and the application and is deleted with the instance.



The instance role is created by the CloudFormation template; nothing has to be configured in IAM. Acknowledge the "CAPABILITY_IAM" prompt when you create the stack.

First time setup

After the stack has been created, open the URL shown in its outputs (`https://<public IP>/tool/`). Accept the certificate warning once. You should see the following screen:`https://<ipaddress>`



Setup Profile

*AWS Account Number:  Important Note: Please review the AWS account number before saving, as you cannot edit this information later.

*Username:

*Setup token (the EC2 instance ID): 

*New Password:

*Re-enter New Password:

☐ By checking this box and clicking the "Save" button you agree to the terms and conditions of the license agreement at www.28-right.com/eula

Save >>

The following information must be entered:

1. AWS Account Number - the 12-digit number of the AWS account the instance runs in. It identifies this Scnapper installation and cannot be changed later.
2. Username - the name you will log in with (letters, digits and . _ @ -, up to 64 characters).
3. Setup token - the EC2 instance ID of the Scnapper instance, shown as the InstanceId output of the stack and in the EC2 console. Scnapper reads its own instance ID and accepts the setup only when the two match, so nobody outside your account can claim the instance.

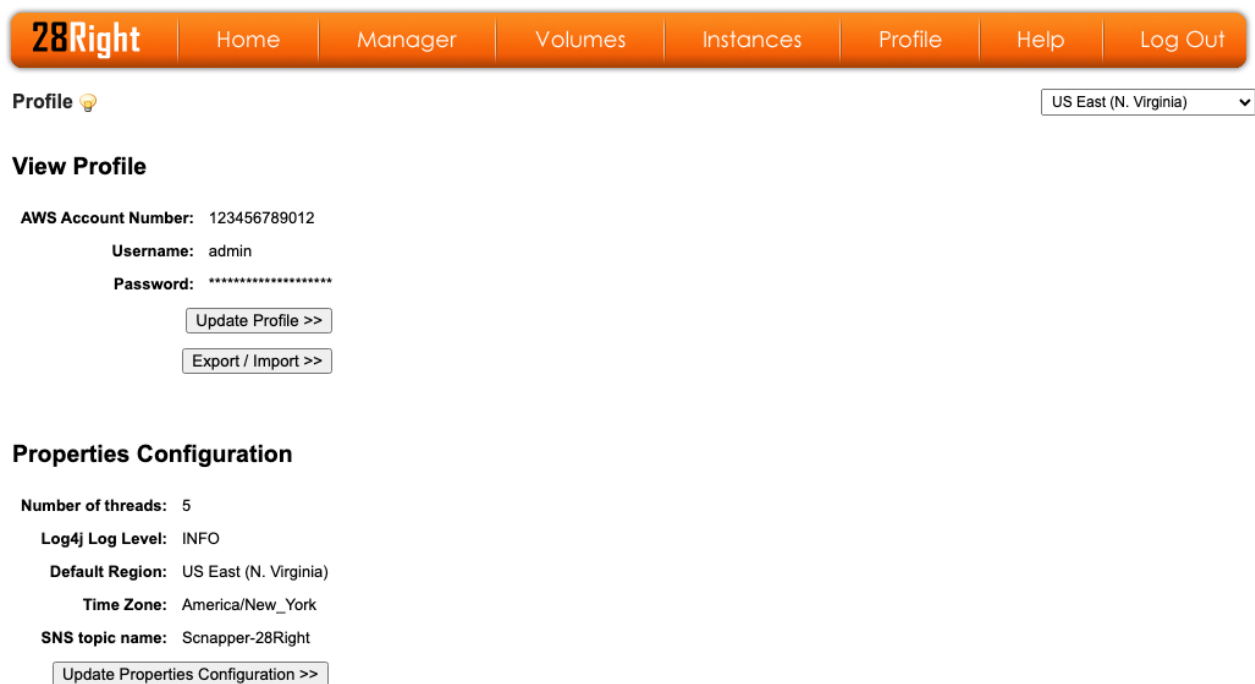


4. New Password - at least 8 characters, and not the instance ID.
5. Re-enter New Password - the same password again. Tick the licence agreement box and click Save; you are taken to the login page.

Profile

The Profile page shows the AWS account number and the username. From it you reach Edit Profile, Change Password, Properties Configuration and Export / Import (used when migrating from Scnapper 3.x; see Upgrades). Change Password asks for:

1. Old Password - your current password
2. New Password - at least 8 characters, and not the instance ID
3. Re-enter New Password - the same password again
4. Edit Profile lets you change the username and the customer name. The AWS account number cannot be changed.



The screenshot shows the 28Right web interface. At the top is an orange navigation bar with the 28Right logo and links for Home, Manager, Volumes, Instances, Profile, Help, and Log Out. Below the navigation bar, the 'Profile' section is active, indicated by a light blue header. On the right of this header is a dropdown menu showing 'US East (N. Virginia)'. The main content area is titled 'View Profile' and displays the following information: AWS Account Number: 123456789012, Username: admin, and Password: a masked string of asterisks. Below this information are two buttons: 'Update Profile >>' and 'Export / Import >>'. Further down, the 'Properties Configuration' section is shown, listing: Number of threads: 5, Log4j Log Level: INFO, Default Region: US East (N. Virginia), Time Zone: America/New_York, and SNS topic name: Scnapper-28Right. A button 'Update Properties Configuration >>' is located at the bottom of this section.

28Right | Home | Manager | Volumes | Instances | Profile | Help | Log Out

Profile ⓘ US East (N. Virginia) ▼

View Profile

AWS Account Number: 123456789012
Username: admin
Password: *****

[Update Profile >>](#)
[Export / Import >>](#)

Properties Configuration

Number of threads: 5
Log4j Log Level: INFO
Default Region: US East (N. Virginia)
Time Zone: America/New_York
SNS topic name: Scnapper-28Right

[Update Properties Configuration >>](#)

The following parameters are set in the "Properties Configuration" page:

1. Number of threads, log level, default region and time zone. Schedules are entered and shown in this time zone.
2. SNS topic name - the topic Scnapper publishes notifications to (see Scnapper Notifications). The default is Scnapper-28Right.



The screenshot shows the 28Right web application interface. At the top is an orange navigation bar with the 28Right logo and links for Home, Manager, Volumes, Instances, Profile, Help, and Log Out. Below the navigation bar, the 'Profile' section is active, showing a dropdown menu for the region set to 'US East (N. Virginia)'. The 'Properties Configuration' section is displayed below, listing several parameters: 'Number of threads' is 5, 'Log4j Log Level' is INFO, 'Default Region' is US East (N. Virginia), 'Time Zone' is America/New_York, and 'SNS topic name' is Scnapper-28Right. At the bottom of this section is a button labeled 'Update Properties Configuration >>'.

Note: AWS Account number once set cannot be changed, if you would like to manage a different AWS account, then a new installation of Scnapper must be used

Login

You can login to Scnapper by following the steps below:

1. Log in with the Username and Password you chose at first-time setup, as shown below. Scnapper 4.0.0 no longer uses AWS access keys: the instance acts through its IAM role.



Login

*Username:

*Password:

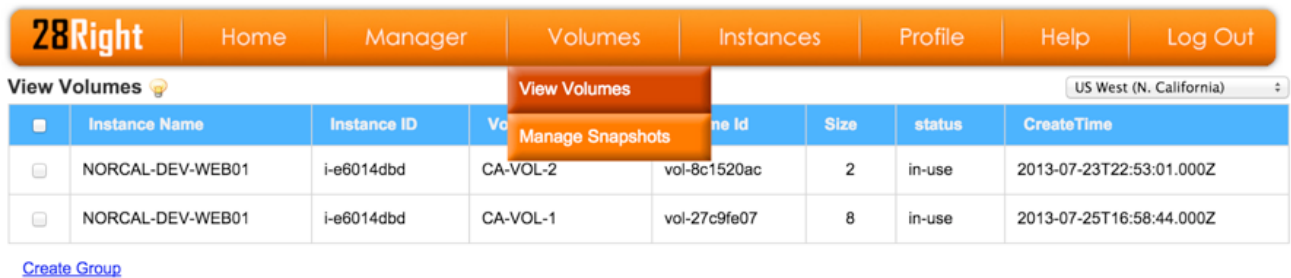
Login

EBS Volume backup

Grouping your EBS volumes

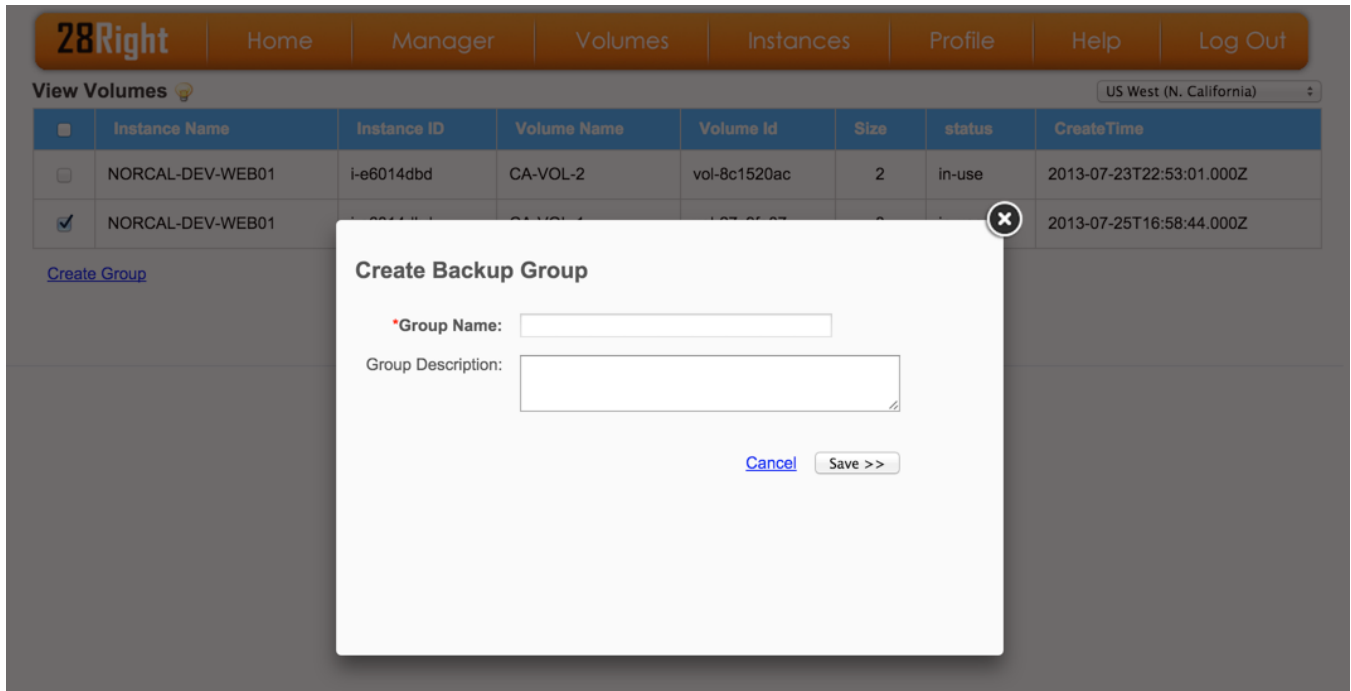
Grouping EBS volumes enables you to easily manage your backups by grouping those volumes that have similar backup and retention characteristics. Create a group of your volumes by following these steps:

1. Go to “View Volumes” by clicking on the “Volume” tab and selecting “View Volumes” as shown in the figure below.
2. This page lists all your volumes in the selected region
3. Select the volumes you would like to place in a group; examples could be Database volume group, Web application volume group, Critical application volume group, etc.
4. After selection of the EBS volumes, click on the “Create Group” hyperlink at the bottom of the page, as shown in the screenshot below:



Instance Name	Instance ID	Volume ID	Size	status	CreateTime
NORCAL-DEV-WEB01	i-e6014dbd	CA-VOL-2	2	in-use	2013-07-23T22:53:01.000Z
NORCAL-DEV-WEB01	i-e6014dbd	CA-VOL-1	8	in-use	2013-07-25T16:58:44.000Z

5. A pop-up will prompt you for Group information as shown in the screenshot below:



6. Enter the Group information and click the “Save” button.
7. Once the group is created you should be able to create a Backup Schedule by going to the “Manage Group” tab

Scheduling your EBS Volume backups

AWS provides the ability to save point-in-time snapshots of your EBS volumes to Amazon, Scnapper relies on this functionality to backup your EBS volumes. For more information on EBS and EBS snapshots and their functionality please refer to <http://aws.amazon.com/ebs>.

Scnapper provides great flexibility in scheduling your backups. You can schedule backups at the following intervals:

1. Hourly
2. Daily
3. Weekly
4. Monthly
5. Yearly

Retention policy

Associated with a schedule is the Retention policy of the backups. Retention policy enables you to manage your backups effectively and keep your costs down. You can specify the number of backups Scnapper should retain. The number of backups to be retained is associated to the frequency of the backups. If your schedule includes daily backups, then you should specify the number of daily backups you would like to retain. For example, if the retention policy of your daily backups is 10, then Scnapper will maintain 10 daily backups at any given time. An 11th backup will replace the oldest of the previous 10 backups. Continuing the example, a daily backup also enables you to retain weekly, monthly and yearly backups. Just specify the number of weekly, monthly and yearly backups you would like to retain and Scnapper will maintain them for you.

Note: If you have scheduled daily backups, then creating an hourly retention policy will create hourly backups every 24 hours, since the frequency of daily backup is lower than the frequency of hourly backups.

Scheduling backups

To schedule backups of your EBS volumes please follow these steps:

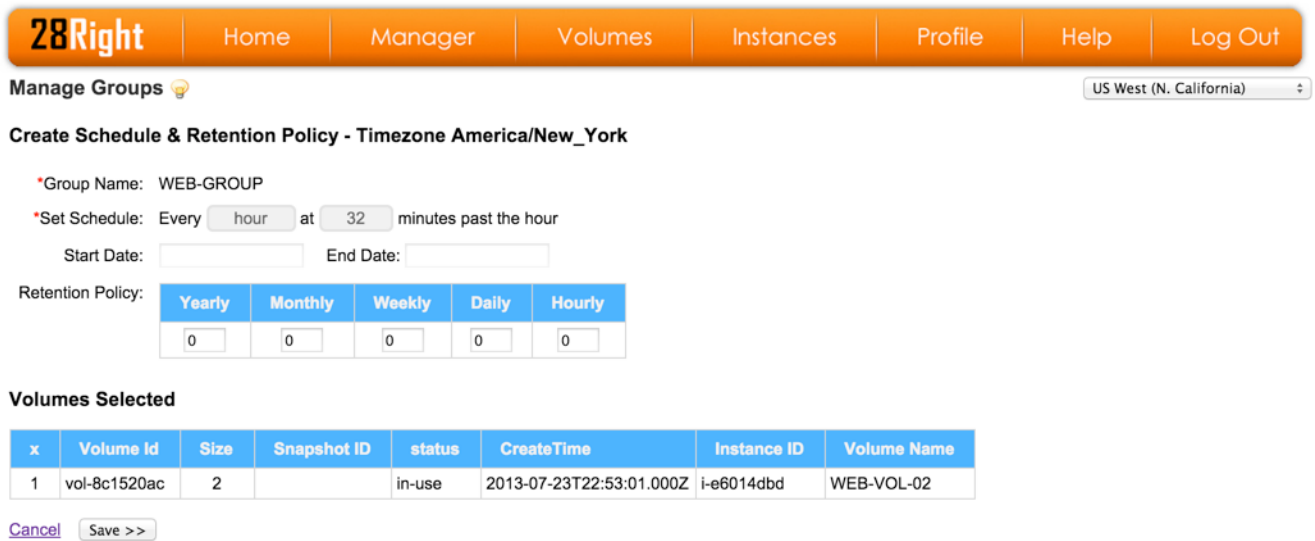
1. Go to the “Manage Groups” tab
2. Scroll to the group you want to schedule back up for, as shown in the screenshot here:



x		Group Name	Group Description	Type	Region	Resources	Backup Schedule	Instance Runtime Schedule	Created Date	Edit
1	☐	WEB-GROUP		Volumes	us-west-1	vol-8c1520ac	Create Schedule	N/A	Dec 20, 2014	Edit Group
2	☐	DB-GROUP		Volumes	us-west-1	vol-f0dc36ed, vol-f3dc36ee	Create Schedule	N/A	Dec 20, 2014	Edit Group

 [Delete Group\(s\)](#)

- Click on the “Create Schedule” link, which will take you to the page that will enable you to create a schedule to backup your volumes and specify your retention policy as shown in the following screenshot:



28Right Home Manager Volumes Instances Profile Help Log Out

Manage Groups  US West (N. California) ▾

Create Schedule & Retention Policy - Timezone America/New_York

*Group Name: WEB-GROUP

*Set Schedule: Every at minutes past the hour

Start Date: End Date:

Retention Policy:

Yearly	Monthly	Weekly	Daily	Hourly
0	0	0	0	0

Volumes Selected

x	Volume Id	Size	Snapshot ID	status	CreateTime	Instance ID	Volume Name
1	vol-8c1520ac	2		in-use	2013-07-23T22:53:01.000Z	i-e6014dbd	WEB-VOL-02

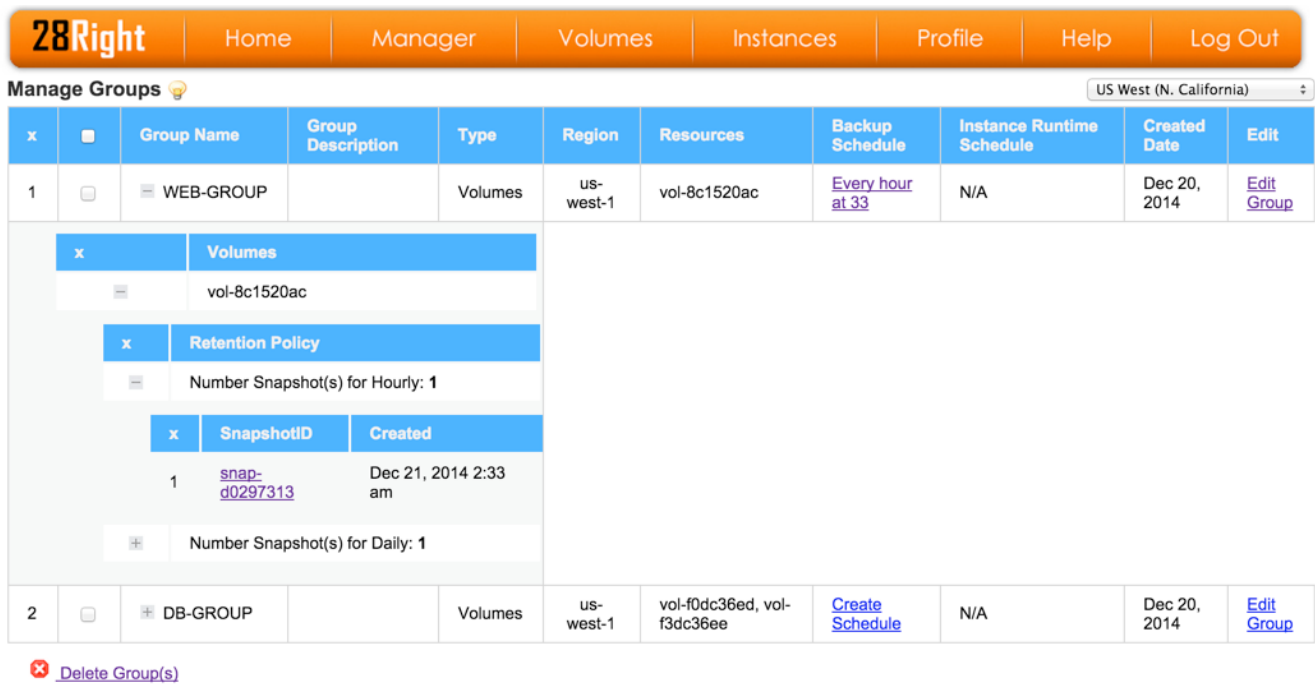
[Cancel](#)

- Set a schedule for the backup, you can select hourly, daily, weekly, monthly and yearly backup schedule.
- You have the option to specify a “Start Date” and “End Date” for the schedule
- The interpretation of leaving a “Start Date” blank is that you want the schedule to start immediately.
- The interpretation of leaving an “End Date” blank is that you intend the schedule to run indefinitely.
- Set the retention policy of the backup, by choosing how many snapshots you want to maintain. Please see the “Retention Policy” section for details on Retention Policy.
- Click the “Save” button to create the schedule

EBS Volume recovery

You can view the snapshots that Scnapper creates, and instantiate EBS volumes from them, by following these steps:

1. Go to “Manage Groups” page by clicking on the “Manager” tab.
2. Scroll to a group that is of type “Volumes” as shown in the following screenshot:



The screenshot shows the 28Right application interface. At the top is a navigation bar with tabs: Home, Manager, Volumes, Instances, Profile, Help, and Log Out. Below the navigation bar is the 'Manage Groups' section, which includes a dropdown menu set to 'US West (N. California)'. The main content is a table with columns: x, Group Name, Group Description, Type, Region, Resources, Backup Schedule, Instance Runtime Schedule, Created Date, and Edit. The first row shows a group named 'WEB-GROUP' of type 'Volumes' in the 'us-west-1' region, with resources 'vol-8c1520ac'. The backup schedule is 'Every hour at 33'. The group is expanded, showing a 'Volumes' section with a list of snapshots. The snapshots table has columns: x, SnapshotID, and Created. One snapshot is listed with ID 'snap-d0297313' and created on 'Dec 21, 2014 2:33 am'. Below the snapshots table is a section for 'Retention Policy' with a 'Number Snapshot(s) for Hourly: 1' and 'Number Snapshot(s) for Daily: 1'. The second row of the main table shows a group named 'DB-GROUP' of type 'Volumes' in the 'us-west-1' region, with resources 'vol-f0dc36ed, vol-f3dc36ee'. The backup schedule is 'Create Schedule'. The group is not expanded. At the bottom left, there is a red 'x' icon and a link 'Delete Group(s)'.

x	Group Name	Group Description	Type	Region	Resources	Backup Schedule	Instance Runtime Schedule	Created Date	Edit
1	WEB-GROUP		Volumes	us-west-1	vol-8c1520ac	Every hour at 33	N/A	Dec 20, 2014	Edit Group
x Volumes vol-8c1520ac x Retention Policy Number Snapshot(s) for Hourly: 1 x SnapshotID Created 1 snap-d0297313 Dec 21, 2014 2:33 am Number Snapshot(s) for Daily: 1									
2	DB-GROUP		Volumes	us-west-1	vol-f0dc36ed, vol-f3dc36ee	Create Schedule	N/A	Dec 20, 2014	Edit Group

 [Delete Group\(s\)](#)

3. Expand the volume, by clicking on the “+” sign to the left of the Group Name and it will display your snapshots, by id, grouped by the frequency of your backups, as defined in your retention policy.
4. You can instantiate an EBS volume from the snapshot, by clicking on the snapshot hyperlink.



Note: Scnapper will copy the tags that have been configured on the volume to the snapshot. When a volume is restored from the snapshot, the tags on the snapshot are copied to the new volume.

EC2 Instance backup

Grouping your EC2 Instances for scheduling backups

Grouping Instances allows you to easily manage your backups by grouping those instances that have similar characteristics. Create a group of your instances by doing the following:

1. Go to “View Instances” by clicking the Instances tab and selecting the “View Instances” tab as shown in the following screenshot:



Name	Instance	AMI ID	Role	Type	State	Security Groups
NORCAL-DEV-WEB01	i-e6014dbd	ami-3ffed17a	ebs	t1.micro	stopped	quick-start-1
NORCAL-DEV-DB01	i-5795bd9d	ami-4b6f650e	ebs	t2.micro	running	default

1. This page lists all your Instances in the selected region.
2. Select the instances you would like to place in a particular group; examples could be Database Instance group, Web Application instance group, Critical application instance group, etc.
3. After selection of the instances, click on the “Create Group” at the bottom of the page
4. Once the Group is created you should be able to create a Backup Schedule by navigating to the “Manage Group” tab

Note: You can reuse a group you create for runtime scheduling for backup scheduling and vice versa.

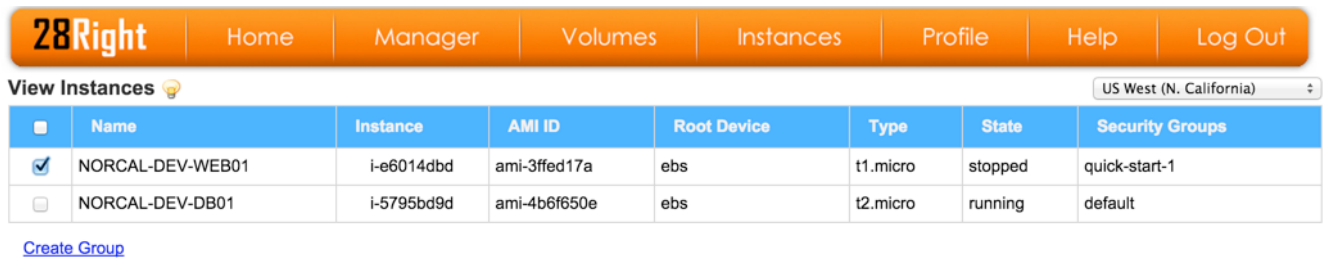
Backup of your EC2 Instances

An Amazon Machine Image (AMI) provides the information required to launch an EC2 instance, which is a virtual server in the cloud. You can customize the instance that you launch from a public AMI and then save that configuration as a custom AMI for your own use.

Scnapper relies on this AWS provided functionality to automate the creation of AMIs for your EC2 instances. For more information on AMI and its functionality please refer to <http://docs.aws.amazon.com/AWSEC2/latest/UserGuide/AMIs.html>.

You can create AMIs of your Instances by scheduling the creation of Amazon Machine Images (AMIs) at regular intervals, by doing the following:

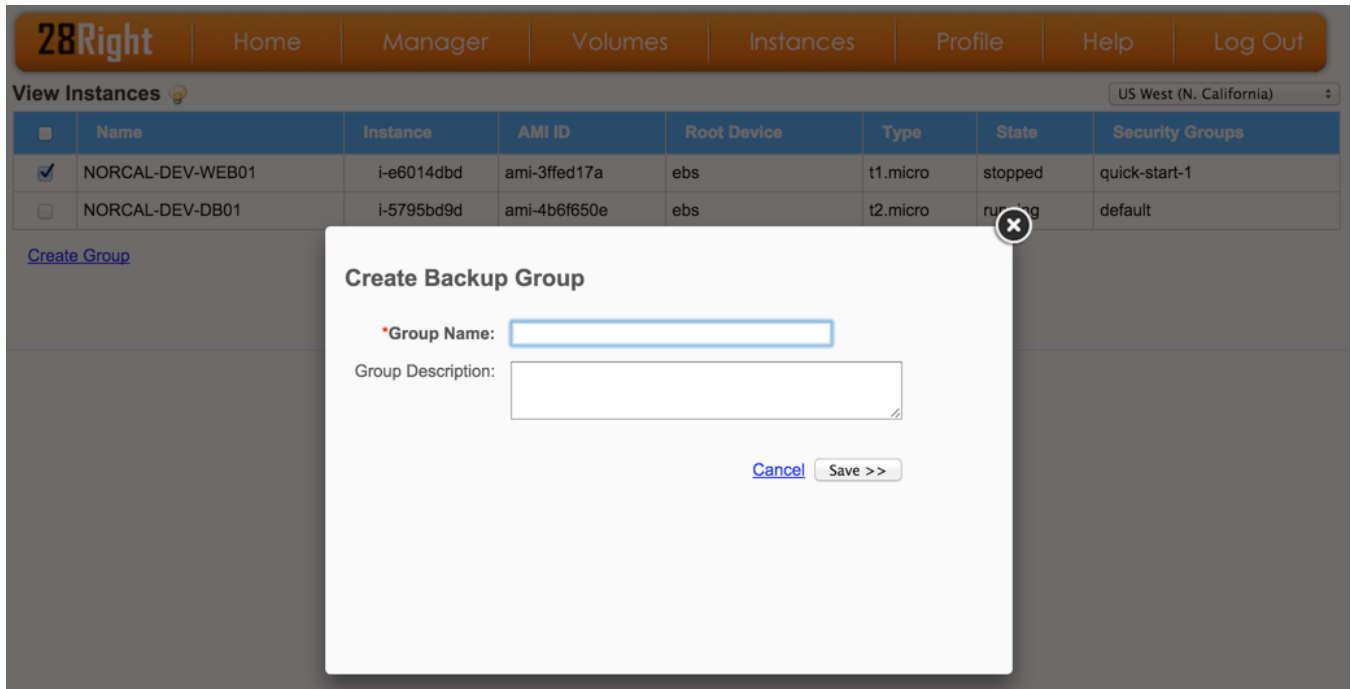
1. Go to View Instance page, it will list all your instances in the selected region, both running and stopped instances
2. Group your instances by selecting the instances that belong in that group and click “Create Group” to create the group, as shown below:



	Name	Instance	AMI ID	Root Device	Type	State	Security Groups
☒	NORCAL-DEV-WEB01	i-e6014dbd	ami-3ffed17a	ebs	t1.micro	stopped	quick-start-1
☐	NORCAL-DEV-DB01	i-5795bd9d	ami-4b6f650e	ebs	t2.micro	running	default

[Create Group](#)

3. Enter the Group information and click the “save” button, as shown below:



- Once the group is created you should be able to create a Backup Schedule by going to the “Manage Group” tab.

Scheduling your EC2 Instance backups

Scnapper provides great flexibility in scheduling your backups. You can schedule backups at the following intervals:

- Hourly
- Daily
- Weekly
- Monthly
- Yearly

Retention policy

Associated with a schedule is the Retention policy of the backups. Retention policy enables you to manage your backups effectively and keep your costs down. You can specify the

number of backups Scnapper should retain. The number of backups to be retained is specified by frequency of the backups. If your schedule includes daily backups, then you should specify the number of daily backups you would like to retain. For example, if the retention policy of your daily backups is 10, then Scnapper will maintain 10 daily backups at any given time. An 11th backup will replace the oldest of the previous 10 backups.

Continuing the example a daily backup also enables you to retain weekly, monthly and yearly backups. Just specify the number of weekly, monthly and yearly backups you would like to retain and Scnapper will maintain them for you.

Note: If you have scheduled daily backups, then creating an hourly retention policy will not do anything since the frequency of your backup is lower than the frequency of hourly backups.

Scheduling backups

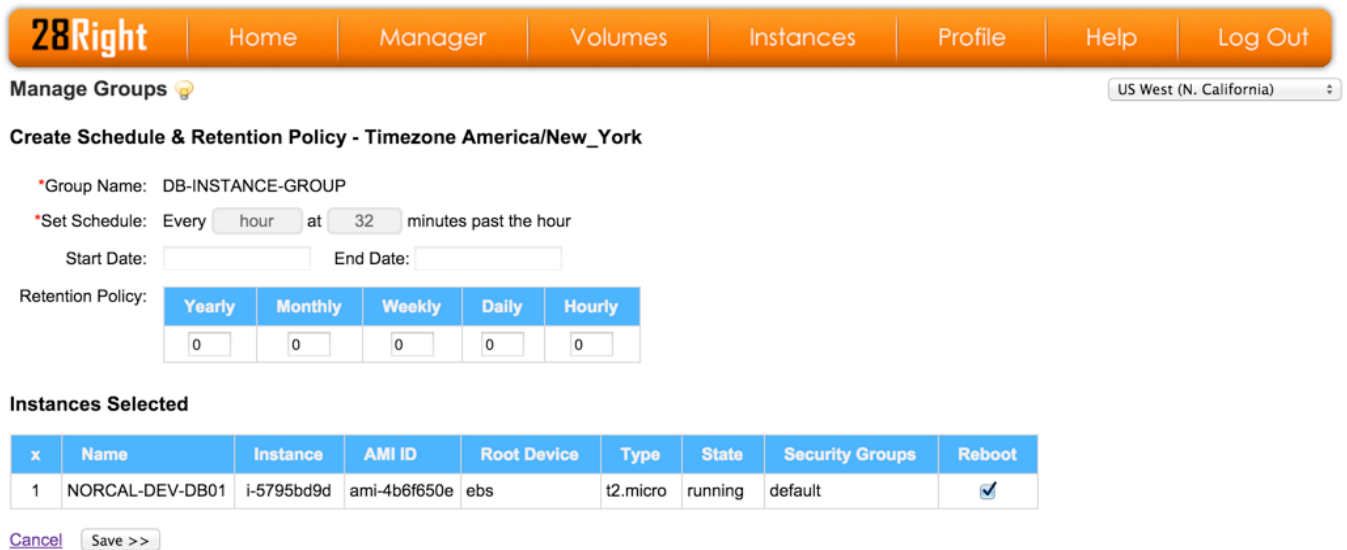
To schedule backups of your instance please follow these steps:

1. Go to the “Manage Groups” under the “Manager” tab.
2. Scroll to the group of type “Instances” that you would like to schedule backups for, as shown in the following screenshot:

 Home Manager Volumes Instances Profile Help Log Out										
Manage Groups 										US West (N. California) 
x	☐	Group Name	Group Description	Type	Region	Resources	Backup Schedule	Instance Runtime Schedule	Created Date	Edit
1	☐	 DB-INSTANCE-GROUP		Instances	us-west-1	i-5795bd9d	Create Schedule	Create Runtime Schedule	Dec 21, 2014	Edit Group
2	☐	 WEB-GROUP		Volumes	us-west-1	vol-8c1520ac	Every hour at 33	N/A	Dec 20, 2014	Edit Group
3	☐	 DB-GROUP		Volumes	us-west-1	vol-f0dc36ed, vol-f3dc36ee	Create Schedule	N/A	Dec 20, 2014	Edit Group

 [Delete Group\(s\)](#)

- Click on the “Create Schedule” link, that should display a pop-up, which will enable you to create a schedule to backup your instances and specify your retention policy, as shown in the following screenshot:



28Right | Home | Manager | Volumes | Instances | Profile | Help | Log Out

Manage Groups  US West (N. California) ▾

Create Schedule & Retention Policy - Timezone America/New_York

*Group Name: DB-INSTANCE-GROUP

*Set Schedule: Every at minutes past the hour

Start Date: End Date:

Retention Policy:

Yearly	Monthly	Weekly	Daily	Hourly
0	0	0	0	0

Instances Selected

x	Name	Instance	AMI ID	Root Device	Type	State	Security Groups	Reboot
1	NORCAL-DEV-DB01	i-5795bd9d	ami-4b6f650e	ebs	t2.micro	running	default	☒

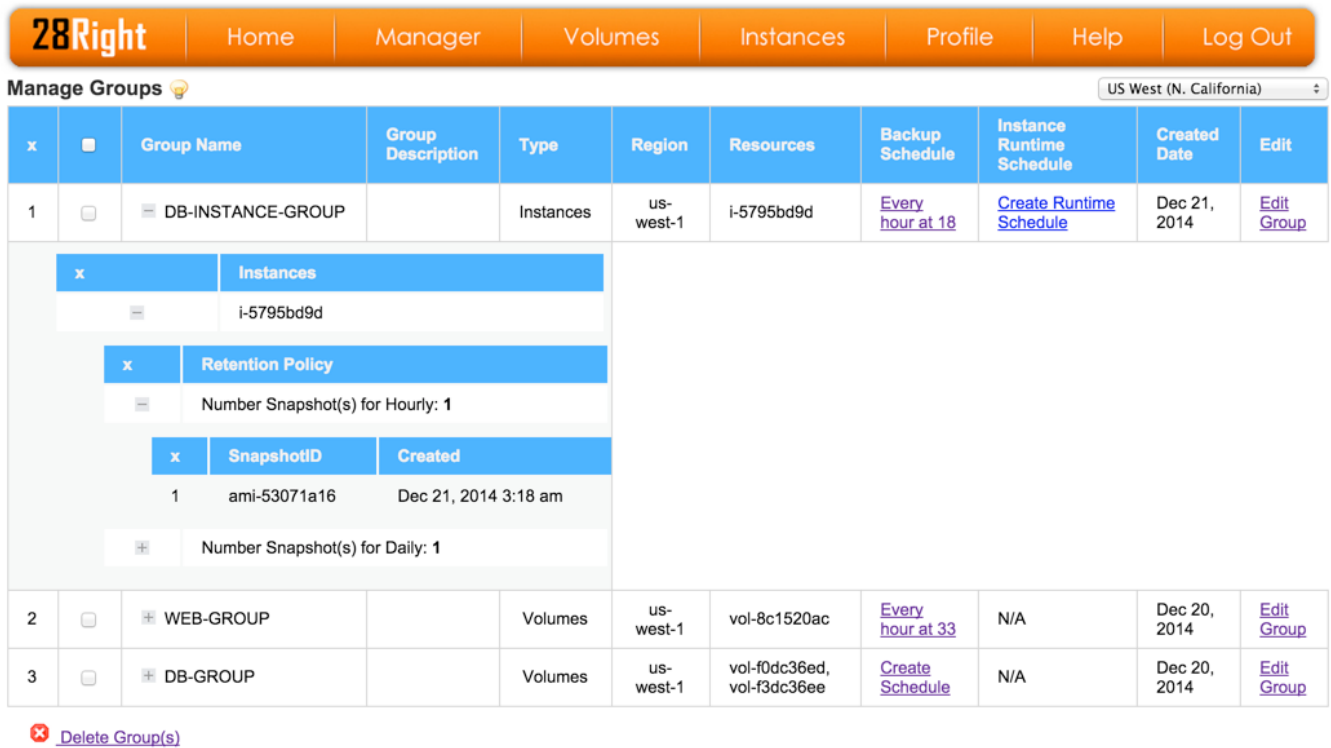
[Cancel](#) [Save >>](#)

- Against each instance in this group, there is a “Reboot” check box, which is checked by default, which means the instance will be rebooted when the AMI is taken. If you want the instance to not reboot, please uncheck this flag.
- Set a schedule for the backup, you can select hourly, daily, weekly, monthly and yearly backup schedule.
- You have the option to specify a “Start Date” and “End Date” for the schedule
- The interpretation of leaving a “Start Date” blank is that you want the schedule to be started right away
- The interpretation of leaving a “End Date” blank is that you want the schedule to run indefinitely
- Set the retention policy of the backup, by choosing how many AMIs you want to maintain. Please see the “Retention Policy” section for details on Retention Policy.
- Click the “Save” button to create the schedule

EC2 Instance recovery

You can view the AMIs that Scnapper creates by going to “Manage Groups” page

1. Select a group that is of type instances.
2. Expand the group and select an instance.
3. Expand the instance and it should display your AMIs grouped by the frequency of your backups, defined in your retention policy, please see following screenshot:



The screenshot shows the 28Right web interface. At the top is a navigation bar with links: Home, Manager, Volumes, Instances, Profile, Help, and Log Out. Below this is the 'Manage Groups' section, which includes a dropdown menu set to 'US West (N. California)'. The main content is a table with columns: x, checkbox, Group Name, Group Description, Type, Region, Resources, Backup Schedule, Instance Runtime Schedule, Created Date, and Edit. The first row, 'DB-INSTANCE-GROUP', is expanded. This expansion shows a sub-table for 'Instances' with one entry 'i-5795bd9d'. Below this is a 'Retention Policy' section with a table for 'Number Snapshot(s) for Hourly: 1' showing a single snapshot 'ami-53071a16' created on 'Dec 21, 2014 3:18 am'. At the bottom of the expansion is a section for 'Number Snapshot(s) for Daily: 1'. Below the main table, there are two more rows: 'WEB-GROUP' and 'DB-GROUP'. At the bottom left of the screenshot is a red 'X' icon followed by the text 'Delete Group(s)'.

x		Group Name	Group Description	Type	Region	Resources	Backup Schedule	Instance Runtime Schedule	Created Date	Edit
1	☒	DB-INSTANCE-GROUP		Instances	us-west-1	i-5795bd9d	Every hour at 18	Create Runtime Schedule	Dec 21, 2014	Edit Group
x Instances i-5795bd9d x Retention Policy x SnapshotID Created 1 ami-53071a16 Dec 21, 2014 3:18 am + Number Snapshot(s) for Daily: 1										
2	☐	WEB-GROUP		Volumes	us-west-1	vol-8c1520ac	Every hour at 33	N/A	Dec 20, 2014	Edit Group
3	☐	DB-GROUP		Volumes	us-west-1	vol-f0dc36ed, vol-f3dc36ee	Create Schedule	N/A	Dec 20, 2014	Edit Group

 [Delete Group\(s\)](#)

4. Note the AMI id, and you can instantiate the AMI from your AWS Management console

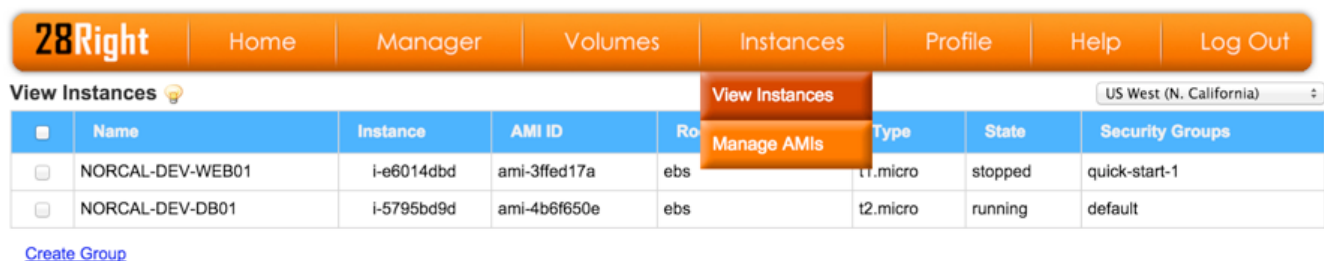
EC2 Runtime Scheduler

EC2 Runtime Scheduler of Scnapper is a feature that enables you to save on your AWS cost by scheduling the start and stop times of those EC2 instances that do not have to run 24/7/365. As with Volume and Instance backup schedule, you can group your EC2 instances into groups and simplify the management of your Runtime Schedules.

Grouping your Instances for scheduling runtime

Grouping Instances allows you to easily manage your Runtime Scheduler by grouping those instances that have similar characteristics. Create a group of your instances by doing the following:

1. Go to “View Instances” page under the Instance tab.
2. This pages lists all your Instances in the selected region as shown below:



	Name	Instance	AMI ID	Role	Type	State	Security Groups
☐	NORCAL-DEV-WEB01	i-e6014dbd	ami-3ffed17a	ebs	t1.micro	stopped	quick-start-1
☐	NORCAL-DEV-DB01	i-5795bd9d	ami-4b6f650e	ebs	t2.micro	running	default

[Create Group](#)

3. Select the instances you would like to place in a particular group; examples could be Development Instance group, Production instance group, Staging instance group, etc.
4. After selection of the instances, click on the “Create Group” at the bottom of the page
5. Once the Group is created you should be able to create a Runtime Schedule by going to the “Manage Group” under the “Manager” tab.

Note: You can reuse a group you create for instance runtime scheduling for instance backup scheduling and vice versa.

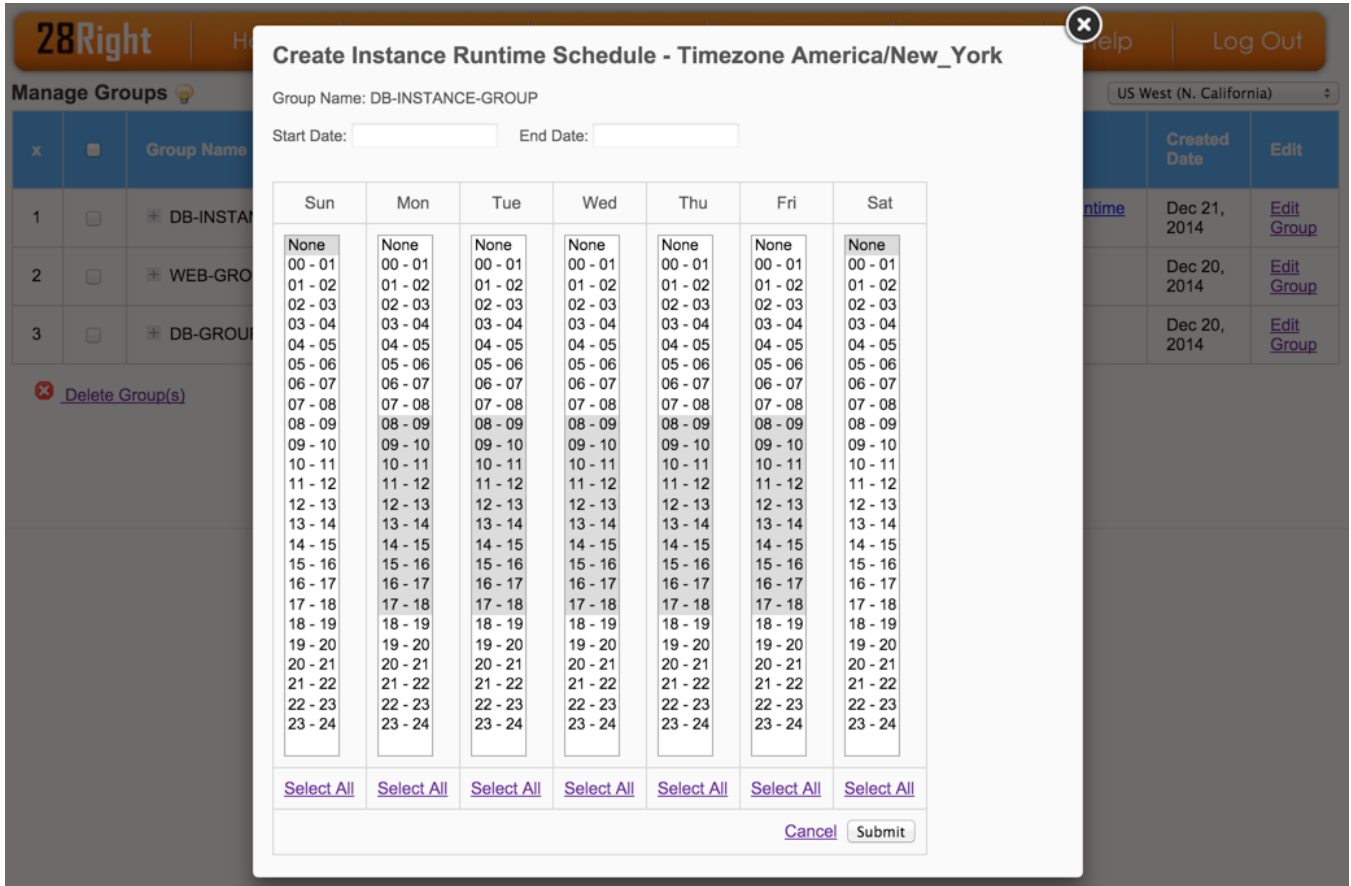
Scheduling your Instance runtime

You can create a schedule by the week to start and stop your EC2 instances:

- The granularity is by the hour, to match AWS's hourly billing policy for EC2 instances.
- You can create a schedule by selecting the hours of a day the EC2 instance must run.
- Picking an hour of the day and dragging the mouse pointer by clicking on the CTRL/COMMAND key will select multiple hours.
- The “None” selection at the top of each day will clear the hours of day.
- The “Select All” hyperlink at the bottom selects all the hours of that day.

To create a runtime schedule please follow these steps:

1. Go to “Manage Groups” page and pick the Instance group that you want to create a runtime schedule for.
2. Click on the “Create Runtime Schedule” link to create a runtime schedule
3. You will see a pop, shown below, that displays a tabular form, displaying each hour of a day, grouped by the day of a week, as shown in the following screenshot:



Create Instance Runtime Schedule - Timezone America/New_York

Group Name: DB-INSTANCE-GROUP

Start Date: End Date:

Sun	Mon	Tue	Wed	Thu	Fri	Sat
None	None	None	None	None	None	None
00 - 01	00 - 01	00 - 01	00 - 01	00 - 01	00 - 01	00 - 01
01 - 02	01 - 02	01 - 02	01 - 02	01 - 02	01 - 02	01 - 02
02 - 03	02 - 03	02 - 03	02 - 03	02 - 03	02 - 03	02 - 03
03 - 04	03 - 04	03 - 04	03 - 04	03 - 04	03 - 04	03 - 04
04 - 05	04 - 05	04 - 05	04 - 05	04 - 05	04 - 05	04 - 05
05 - 06	05 - 06	05 - 06	05 - 06	05 - 06	05 - 06	05 - 06
06 - 07	06 - 07	06 - 07	06 - 07	06 - 07	06 - 07	06 - 07
07 - 08	07 - 08	07 - 08	07 - 08	07 - 08	07 - 08	07 - 08
08 - 09	08 - 09	08 - 09	08 - 09	08 - 09	08 - 09	08 - 09
09 - 10	09 - 10	09 - 10	09 - 10	09 - 10	09 - 10	09 - 10
10 - 11	10 - 11	10 - 11	10 - 11	10 - 11	10 - 11	10 - 11
11 - 12	11 - 12	11 - 12	11 - 12	11 - 12	11 - 12	11 - 12
12 - 13	12 - 13	12 - 13	12 - 13	12 - 13	12 - 13	12 - 13
13 - 14	13 - 14	13 - 14	13 - 14	13 - 14	13 - 14	13 - 14
14 - 15	14 - 15	14 - 15	14 - 15	14 - 15	14 - 15	14 - 15
15 - 16	15 - 16	15 - 16	15 - 16	15 - 16	15 - 16	15 - 16
16 - 17	16 - 17	16 - 17	16 - 17	16 - 17	16 - 17	16 - 17
17 - 18	17 - 18	17 - 18	17 - 18	17 - 18	17 - 18	17 - 18
18 - 19	18 - 19	18 - 19	18 - 19	18 - 19	18 - 19	18 - 19
19 - 20	19 - 20	19 - 20	19 - 20	19 - 20	19 - 20	19 - 20
20 - 21	20 - 21	20 - 21	20 - 21	20 - 21	20 - 21	20 - 21
21 - 22	21 - 22	21 - 22	21 - 22	21 - 22	21 - 22	21 - 22
22 - 23	22 - 23	22 - 23	22 - 23	22 - 23	22 - 23	22 - 23
23 - 24	23 - 24	23 - 24	23 - 24	23 - 24	23 - 24	23 - 24
Select All	Select All	Select All	Select All	Select All	Select All	Select All

[Cancel](#) [Submit](#)

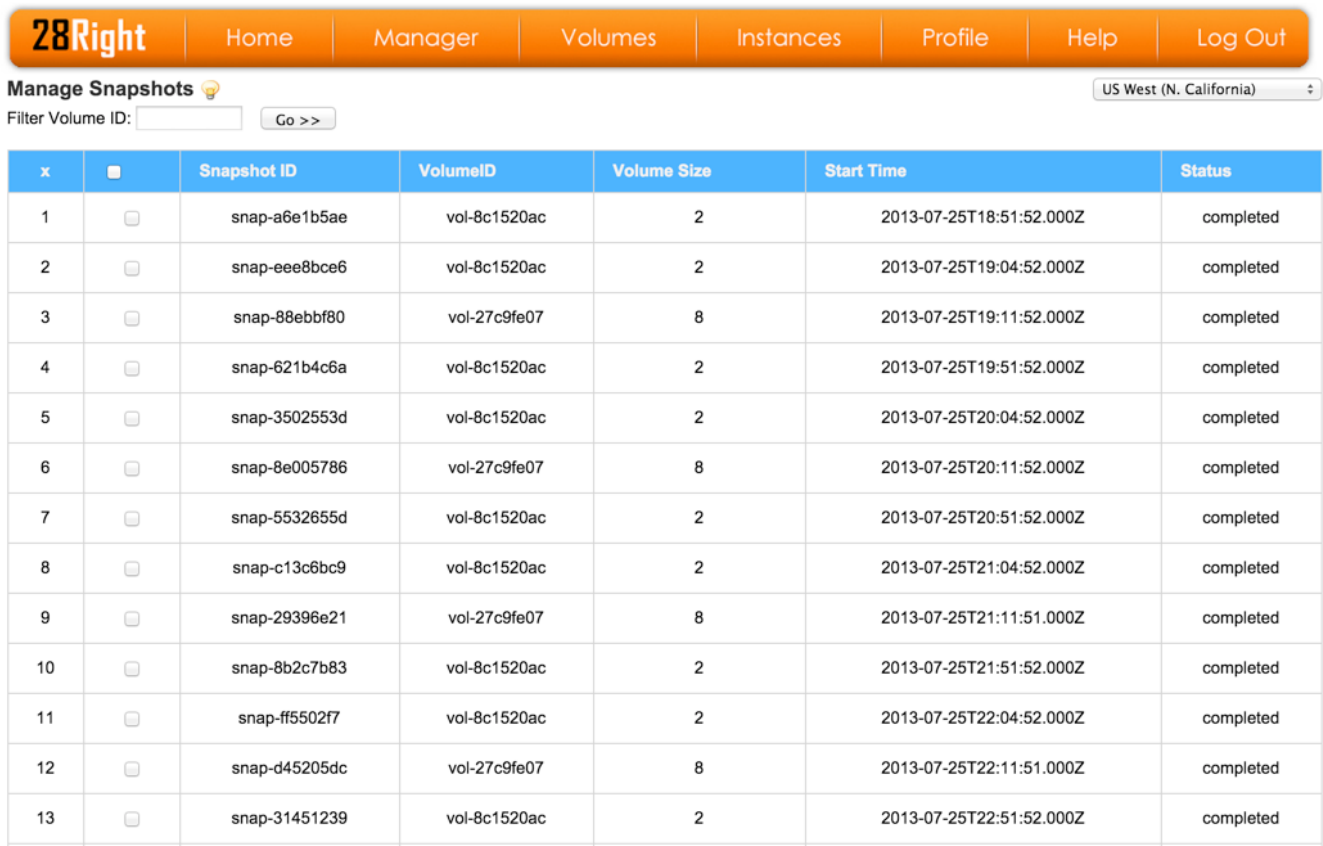
- By default 8am - 5pm of each weekday (US Weekday - Monday thru Friday) is pre-selected.
- You can modify the schedule according to your needs; by selecting the hours you want the EC2 instance(s) to run.
- You can also select the “Start Date” and “End Date” of the schedule.
- A blank “Start Date” indicates that you want the schedule to take effect immediately
- A blank “End Date” indicates that you want the schedule to be active indefinitely
- Create the schedule by clicking on the “Submit” button.

Note: Please select an “End Date” that is past your selected runtime hours of the first week, the schedule will error out if you select an “End Date” that is prior or in between the hours selected, in the first week.

Manage your EBS Volume Snapshots

If you have a large number of snapshots in your AWS account, Scnapper provides an easy to use method to bulk delete your older snapshots that you may no longer need and save on AWS costs. You can delete your older snapshots by doing the following:

1. Go to “Manage Snapshots” page, as shown in the following screenshot:



x		Snapshot ID	VolumeID	Volume Size	Start Time	Status
1	☐	snap-a6e1b5ae	vol-8c1520ac	2	2013-07-25T18:51:52.000Z	completed
2	☐	snap-eee8bce6	vol-8c1520ac	2	2013-07-25T19:04:52.000Z	completed
3	☐	snap-88ebbf80	vol-27c9fe07	8	2013-07-25T19:11:52.000Z	completed
4	☐	snap-621b4c6a	vol-8c1520ac	2	2013-07-25T19:51:52.000Z	completed
5	☐	snap-3502553d	vol-8c1520ac	2	2013-07-25T20:04:52.000Z	completed
6	☐	snap-8e005786	vol-27c9fe07	8	2013-07-25T20:11:52.000Z	completed
7	☐	snap-5532655d	vol-8c1520ac	2	2013-07-25T20:51:52.000Z	completed
8	☐	snap-c13c6bc9	vol-8c1520ac	2	2013-07-25T21:04:52.000Z	completed
9	☐	snap-29396e21	vol-27c9fe07	8	2013-07-25T21:11:51.000Z	completed
10	☐	snap-8b2c7b83	vol-8c1520ac	2	2013-07-25T21:51:52.000Z	completed
11	☐	snap-ff5502f7	vol-8c1520ac	2	2013-07-25T22:04:52.000Z	completed
12	☐	snap-d45205dc	vol-27c9fe07	8	2013-07-25T22:11:51.000Z	completed
13	☐	snap-31451239	vol-8c1520ac	2	2013-07-25T22:51:52.000Z	completed

2. At the bottom of the page select the number of snapshots, using the “Display #” dropdown, you would like to view in a page, as shown in the screenshot below:


[Home](#)
[Manager](#)
[Volumes](#)
[Instances](#)
[Profile](#)
[Help](#)
[Log Out](#)

Manage Snapshots 
US West (N. California) ▾

Filter Volume ID: [Go >>](#)

x		Snapshot ID	VolumeID	Volume Size	Start Time	Status
1	☐	snap-a6e1b5ae	vol-8c1520ac	2	2013-07-25T18:51:52.000Z	completed
2	☐	snap-eee8bce6	vol-8c1520ac	2	2013-07-25T19:04:52.000Z	completed
3	☐	snap-88ebbf80	vol-27c9fe07	8	2013-07-25T19:11:52.000Z	completed
4	☐	snap-621b4c6a	vol-8c1520ac	2	2013-07-25T19:51:52.000Z	completed
5	☐	snap-3502553d	vol-8c1520ac	2	2013-07-25T20:04:52.000Z	completed
6	☐	snap-8e005786	vol-27c9fe07	8	2013-07-25T20:11:52.000Z	completed
7	☐	snap-5532655d	vol-8c1520ac	2	2013-07-25T20:51:52.000Z	completed
8	☐	snap-c13c6bc9	vol-8c1520ac	2	2013-07-25T21:04:52.000Z	completed
9	☐	snap-29396e21	vol-27c9fe07	8	2013-07-25T21:11:51.000Z	completed
10	☐	snap-e882d5e0	vol-27c9fe07	8	2013-07-26T01:11:51.000Z	completed

 [Delete](#)

Display # ▾

- The page is sorted by the age of the snapshots, older snapshots are displayed first
- Select the snapshots you want to delete and delete them by clicking on “Delete” at the bottom of the page.

Note: If you select a large number of snapshots to delete (in the 1000s), please allow some time for AWS to process the deletion of those snapshots. We recommend deleting 1000 or fewer snapshots at a time.

Manage your AMIs

If you have a large number of AMIs in your AWS account, Scnapper provides an easy to use method to bulk delete your older AMIs that you may no longer need and save your AWS costs. You can delete your older AMIs by doing the following:

1. Go to “Manage AMIs” on the “Instances” tab, it will display the list of your current AMIs for the selected region, as shown in the following screenshot:

28Right Home Manager Volumes Instances Profile Help Log Out						
Manage AMIs 						US West (Oregon) 
x		AMI Name	AMI ID	Source	Status	Root Device
1	☐	Scnapper 2.0 build with latest tool code	ami-1b2d907b	627815531379/Scnapper 2.0 build with latest tool code	available	ebs
2	☐	2016-JAN-14-WINDEV-04	ami-4ef2e82f	627815531379/2016-JAN-14-WINDEV-04	available	ebs
3	☐	DEV-05-snapper-2016-JAN-14	ami-65f9e304	627815531379/DEV-05-snapper-2016-JAN-14	available	ebs
4	☐	WINDEV-02-2016-JAN-14	ami-6df9e30c	627815531379/WINDEV-02-2016-JAN-14	available	ebs
5	☐	WINDEV-04-2016-Jan-14	ami-83c5dfe2	627815531379/WINDEV-04-2016-Jan-14	available	ebs
6	☐	i-5b623050-01_21_2015_04_32	ami-a9782699	627815531379/i-5b623050-01_21_2015_04_32	available	ebs
7	☐	i-dd02b9d712_13_2014_07_32	ami-a97f2e99	627815531379/i-dd02b9d712_13_2014_07_32	available	ebs
8	☐	i-26ef4b2c12_19_2014_16_32	ami-a980d099	627815531379/i-26ef4b2c12_19_2014_16_32	available	ebs
9	☐	i-dd02b9d7-01_22_2015_00_32	ami-a982dc99	627815531379/i-dd02b9d7-01_22_2015_00_32	available	ebs
10	☐	i-5b623050-01_26_2015_15_32	ami-a992cb99	627815531379/i-5b623050-01_26_2015_15_32	available	ebs
11	☐	i-4c9b137912_14_2014_02_32	ami-a997c699	627815531379/i-4c9b137912_14_2014_02_32	available	ebs
12	☐	i-4c9b137912_14_2014_03_32	ami-a999c899	627815531379/i-4c9b137912_14_2014_03_32	available	ebs

2. At the bottom of the page select the number of AMIs you would like to view in a single page, as shown in the following screenshot:


[Home](#)
[Manager](#)
[Volumes](#)
[Instances](#)
[Profile](#)
[Help](#)
[Log Out](#)

Manage AMIs 
Asia Pacific (Singapore) ▾

x	☐	AMI Name	AMI ID	Source	Status	Root Device
1	☐	i-f45cec39-01_15_2017_04_12	ami-3e48e35d	627815531379/i-f45cec39-01_15_2017_04_12	available	ebs
2	☐	i-f45cec39-01_15_2017_07_12	ami-664de605	627815531379/i-f45cec39-01_15_2017_07_12	available	ebs
3	☐	i-f45cec39-01_15_2017_06_12	ami-9749e2f4	627815531379/i-f45cec39-01_15_2017_06_12	available	ebs
4	☐	i-f45cec39-05_17_2015_19_12	ami-f896a8aa	627815531379/i-f45cec39-05_17_2015_19_12	available	ebs

 [Delete](#)

Display # 20 ▾

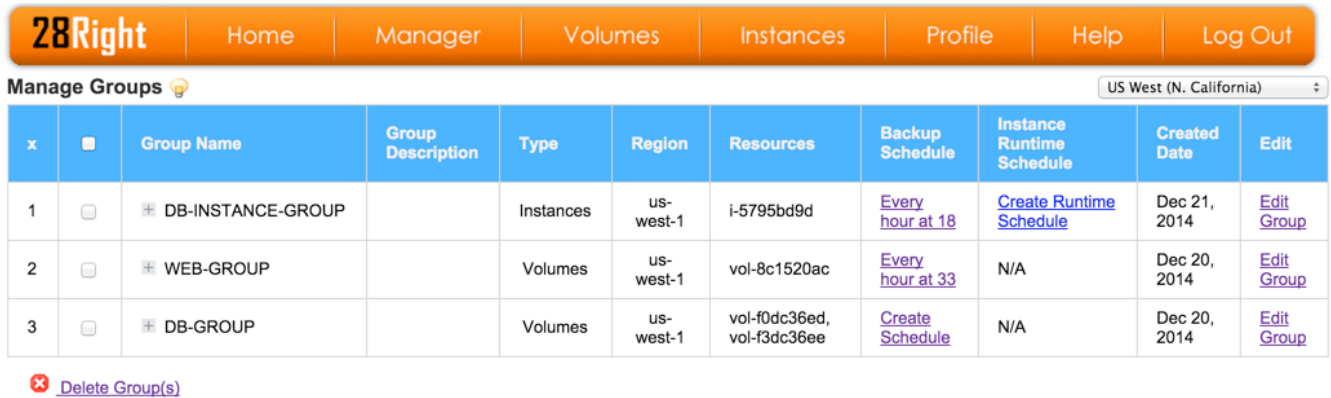
- Unlike the “Manage Snapshots” page, “Manage AMIs” page is NOT sorted by the age of the AMIs.
- Select the AMIs you want to delete and delete them by clicking “Delete” at the bottom of the page.

Note: If you select a large number of AMIs to delete (in the 1000s), please allow some time for AWS to process the deletion of those AMIs.

Modifying a group

You can modify the composition of a volume or instance group by doing the following:

1. Go to “Manage Groups” page and select the group you are interested in modifying and click on “Edit Group” hyperlink on the right, as shown in the following screenshot:



x		Group Name	Group Description	Type	Region	Resources	Backup Schedule	Instance Runtime Schedule	Created Date	Edit
1	☐	DB-INSTANCE-GROUP		Instances	us-west-1	i-5795bd9d	Every hour at 18	Create Runtime Schedule	Dec 21, 2014	Edit Group
2	☐	WEB-GROUP		Volumes	us-west-1	vol-8c1520ac	Every hour at 33	N/A	Dec 20, 2014	Edit Group
3	☐	DB-GROUP		Volumes	us-west-1	vol-f0dc36ed, vol-f3dc36ee	Create Schedule	N/A	Dec 20, 2014	Edit Group

[Delete Group\(s\)](#)

2. You will be taken to a page displaying the list of volumes or instances in the selected region. There will be a check box against volumes or instances that are already part of the group, as shown in the following screenshot:


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Manage Groups 
US West (N. California)

*Group Name:

Group Description:

*Select Volumes

☐	Volume Id	Size	Snapshot ID	status	CreateTime	Instance ID	Volume Name
☐	vol-8c1520ac	2		in-use	2013-07-23T22:53:01.000Z	i-e6014dbd	WEB-VOL-02
☐	vol-27c9fe07	8	snap-02d78b0b	in-use	2013-07-25T16:58:44.000Z	i-e6014dbd	WEB-VOL-01
☐	vol-a0dc36bd	10		in-use	2014-12-21T02:59:18.016Z	i-5795bd9d	DB-VOL-01
☒	vol-f0dc36ed	15		in-use	2014-12-21T02:59:18.114Z	i-5795bd9d	DB-VOL-02
☒	vol-f3dc36ee	8	snap-14cff4d5	in-use	2014-12-21T02:59:18.201Z	i-5795bd9d	DB-VOL-03

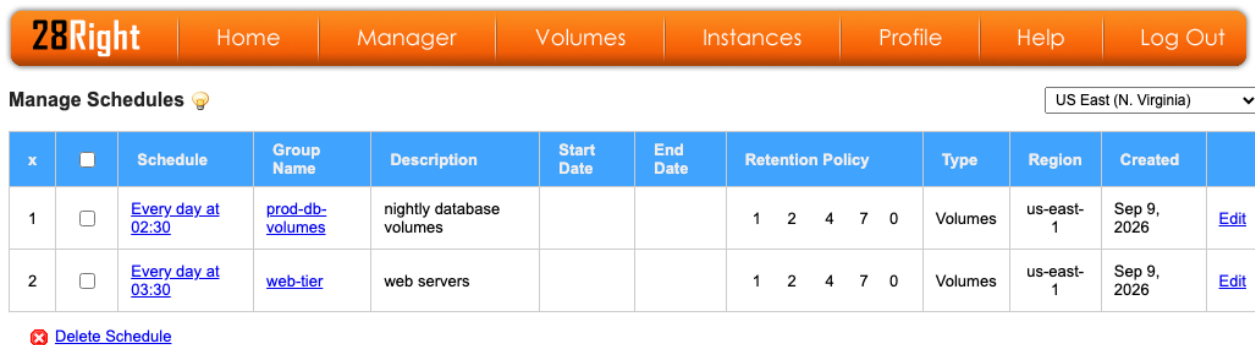
<< Cancel
Save >>

- You can then either select new volumes or instances to add to the group or deselect volumes or instances to remove from the group.
- Click on the “Save” button to save your modifications to the group.

Modifying a schedule

A schedule can be edited in place. You can modify an existing schedule by doing the following:

1. Go to "Manage Schedules" and click "Edit" on the schedule's row, as shown in the following screenshot. The schedule's detail page has the same "Edit Schedule" link.



x		Schedule	Group Name	Description	Start Date	End Date	Retention Policy	Type	Region	Created	
1	☐	Every day at 02:30	prod-db-volumes	nightly database volumes			1 2 4 7 0	Volumes	us-east-1	Sep 9, 2026	Edit
2	☐	Every day at 03:30	web-tier	web servers			1 2 4 7 0	Volumes	us-east-1	Sep 9, 2026	Edit

 [Delete Schedule](#)

2. The form opens pre-filled with the current schedule, the start and end dates, the retention policy and, for instance groups, the reboot flags, all in your configured time zone.
3. Change what you need and click "Update".
4. The schedule is re-registered within a minute. Existing snapshots and AMIs are kept, and the retention policy you saved applies from the next run.

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Manage Schedules 

US East (N. Virginia) ▼

Edit Schedule & Retention Policy - Timezone America/New_York

*Group Name: prod-db-volumes

*Set Schedule: Every at :

Start Date: End Date:

Retention Policy:

Yearly	Monthly	Weekly	Daily
1	2	4	7

Volumes Selected

x	Volume Id	Size	Snapshot ID	status	CreateTime	Instance ID	Volume Name
1	vol-7710e4d8bb4aa218f	100		available	2026-09-09T23:54:18+00:00		prod-db-01

[Cancel](#)

- To replace a schedule entirely, delete it (see Deleting a schedule) and create a new one from "Manage Groups".

Note: Editing a schedule keeps the snapshots and AMIs it has created. Deleting a schedule removes its retention policy, but the snapshots and AMIs created under it are preserved and can be managed from the "Manage Snapshots" and "Manage AMIs" pages.

Deleting a schedule

You can delete a schedule by doing the following:

1. Go to “Manage Schedules” page; select one or more schedules to delete.
2. Delete the selected schedule(s) by clicking on “Delete Schedule” at the bottom of the page, as shown below:


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Manage Schedules 
US West (N. California) ▾

x	☐	Schedule	Group Name	Description	Start Date	End Date	Retention Policy	Type	Region	Created
1	☒	Every day at 03:58	NORCAL-DB-VOLUMES				2 12 52 7 0	Volumes	us-west-1	Dec 21, 2014
2	☐	Every hour at 18	DB-INSTANCE-GROUP				0 0 0 3 3	Instances	us-west-1	Dec 21, 2014
3	☐	Every hour at 33	WEB-GROUP				0 0 0 2 3	Volumes	us-west-1	Dec 20, 2014

 [Delete Schedule](#)

3. The schedule(s) as well as the Retention policy(s) associated with it is deleted.

Deleting a Group

You can delete a group by doing the following:

4. Go to “Manage Groups” page.
5. Select the group(s) you would like to delete.

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Manage Groups 
US West (N. California) 

x		Group Name	Group Description	Type	Region	Resources	Backup Schedule	Instance Runtime Schedule	Created Date	Edit
1	☐	NORCAL-DB-VOLUMES		Volumes	us-west-1	vol-a0dc36bd, vol-f0dc36ed	Create Schedule	N/A	Dec 21, 2014	Edit Group
2	☒	DB-INSTANCE-GROUP		Instances	us-west-1	i-5795bd9d	Every hour at 18	Create Runtime Schedule	Dec 21, 2014	Edit Group
3	☒	WEB-GROUP		Volumes	us-west-1	vol-8c1520ac	Every hour at 33	N/A	Dec 20, 2014	Edit Group
4	☐	DB-GROUP		Volumes	us-west-1	vol-f0dc36ed, vol-f3dc36ee	Create Schedule	N/A	Dec 20, 2014	Edit Group

 [Delete Group\(s\)](#)

6. Click “Delete Group(s)” at the bottom of the page.
7. The selected group(s) and their associated schedule(s) are deleted.

Note: Though the group is deleted, Scnapper does not delete the snapshots/AMIs that were associated with the group, you can access them in the AWS Management console.

SSH to Scnapper EC2 instance

Ssh into your instance of Scnapper, using userid “snapusr” and the key that you selected when launching the Scnapper instance. The command to ssh is:

- `ssh -i <key> snapusr@<hostname or ip address>`

SSL Certificate

Upload your ssl certificate and key by following these steps:

1. Upload the certificate (*.crt) and key (*.key) file, using sftp, to the directory "/files/ssl-cert/" and name them server.crt and server.key. They replace the self-signed pair generated at first boot and survive upgrades with the data volume.
2. The command to sftp is:
`sftp -i <key> snapusr@<hostname or IP address>`
3. Restart the web server with "sudo systemctl restart apache2", or reboot the instance from the AWS Management Console.

Scnapper logs

You can access Scnapper logs by browsing to the "/files/logs" directory: scnapper-backend.log is the scheduler's log and mysql-error.log the database's. Web server logs are under /var/log/apache2.

Scnapper Notifications

You can choose to receive a notification every time a schedule is executed. Scnapper can schedule the following:

- EBS Volume backup
- Instance backup
- Instance runtime (Start, Stop)

If you choose, Scnapper will notify you when any of the above scheduled events is triggered. You will receive a status of the event, whether it succeeded or failed. Failed events will contain details of the failure.

Scnapper uses AWS SNS to deliver notifications. The first time it publishes in a region it creates the topic named in Properties Configuration (Scnapper-28Right unless you changed it) itself; you only add the subscriptions:

1. Log in to your AWS account through the AWS Management Console.
2. Select the region in which your volumes and instances reside. If you have resources in several regions, repeat these steps in each of them.
3. Select the SNS service and open the Scnapper topic. It appears after the first scheduled event in that region; you can also create it yourself beforehand, with exactly the name set in Properties Configuration (the name is case sensitive).
4. Create the subscription(s) you want: HTTPS, HTTP, Email, Email-JSON, SMS, SQS or an application endpoint, and confirm them.
5. Scnapper publishes a message for every scheduled event, saying whether it succeeded or failed.

Note: For more details on AWS SNS service, please visit the SNS page on Amazon Web Services - <http://aws.amazon.com/sns/>

Upgrades

Upgrades are delivered as new AMIs with a new CloudFormation template. From 4.0.0 onwards the data volume carries everything, so an upgrade reattaches it to a new instance and your users, groups and schedules are kept:

1. Take a snapshot of the data volume (the DataVolumeNote output of the stack names it). This is the rollback point.
2. Note the volume's Availability Zone, then delete the old stack. The data volume is kept: it is not deleted on termination.
3. Confirm in the EC2 console that the volume shows as available.
4. Create a new stack from the new version's template with ExistingDataVolumeId set to that volume, and a Subnet in the same Availability Zone. Leave DataVolumeSize at its default; it is ignored.
5. First boot applies any pending database changes and comes up with your existing users, groups and schedules. There is no export or import.
6. If an Elastic IP was associated with the previous instance, associate it with the new one.
7. Upgrading from Scnapper 3.x: a 3.x data volume cannot be reattached (Scnapper 4.0.0 runs MySQL 8, which cannot open a 3.x database). Install the export patch on the 3.x instance, export, launch 4.0.0 with a new data volume, complete first-time setup, then import the file on the Profile page under Export / Import. The full procedure and the patch download are in the listing's upgrade notes.

Upgrading from Scnapper 3.x

This is a one-time migration. A Scnapper 3.x data volume cannot be attached to a 4.0.0 instance: 4.0.0 runs MySQL 8, which cannot open the 3.x database. If one is attached anyway nothing is destroyed; first boot sets the old database aside on the volume and a banner in the web interface asks you to import. Your groups, schedules, retention policies, runtime schedules and backup history move as one export file. Your AWS credentials do not: 4.0.0 acts through the instance role and never stores keys.

On the 3.x instance

4. Take a snapshot of the 3.x data volume (the one mounted at /files). This is your rollback point.
5. Install the export patch. Scnapper 3.x has no export feature; the patch adds one (two files, no database changes, read-only queries). Log in to the 3.x instance over SSH as snapusr with its key pair and run the commands below from the home directory you land in. The Scnapper webroot is /opt/bitnami/apache2/htdocs/tool; it belongs to the web server and is not readable by snapusr, which is why the installer runs under sudo and copies the two files there itself. Do not cd into the webroot and do not change its permissions. snapusr has passwordless sudo, so nothing prompts for a password.

```
curl -O https://scnapper-getting-started.s3.amazonaws.com/scnapper-export-patch-1.1.tar.gz
```

```
sha256sum scnapper-export-patch-1.1.tar.gz    # must print  
e3ad48e50e3ab7996c84b106ecde89951e5092178b4ffd2d56cd6ef46617db01
```

```
tar xzf scnapper-export-patch-1.1.tar.gz && cd scnapper-export-patch-1.1 && sudo sh  
install.sh
```

The installer refuses to run on anything that is not a Scnapper webroot and never overwrites a file.

6. Export. The easy way is the browser: logged in to 3.x, open `https://<3.x address>/tool/maint/export` and it downloads `scnapper-export-<date>.json` to your computer. No sudo or shell is involved. Keep it safe: it lists every volume, instance and AMI you manage.

Or export from the same SSH session. Bitnami's PHP is not on the PATH and the webroot is not readable by `snapusr`, so the command names both in full and runs under `sudo`; `index.php` changes to its own directory itself, so there is nothing to `cd` into:

```
sudo /opt/bitnami/php/bin/php /opt/bitnami/apache2/htdocs/tool/index.php maint export /tmp/scnapper-export.json
```

```
sudo chown "$USER" /tmp/scnapper-export.json
```

Then copy the file to your computer:

```
scp -i <key>.pem snapusr@<3.x address>:/tmp/scnapper-export.json .
```

In AWS

7. Launch Scnapper 4.0.0 from the AWS Marketplace listing with the CloudFormation option. Choose a NEW data volume (leave `ExistingDataVolumeId` empty), a subnet that belongs to the VPC you selected, the CIDR block allowed to SSH in, a key pair and the instance type, and acknowledge the IAM capability.
8. Complete the first-time setup at the URL shown in the stack outputs: the AWS account number, a username, the setup token (the instance ID, also an output of the stack) and a password. Log in.
9. On the Profile page, open Properties Configuration and set the default region, the time zone and the SNS topic name. The topic name must match the `SnsTopicName` parameter of the stack (both default to Scnapper-28Right).

Import and verify

10. On the Profile page click Export / Import and upload the JSON file. Every imported schedule is registered again by the scheduler within a minute.
11. Verify: the groups, schedules, runtime schedules and retention history are all present; the schedules leave the pending state; the next scheduled snapshot happens; the legacy-database banner, if one was shown, is gone.
12. Only then retire the 3.x instance. Keep the snapshot from step 1 until you are certain, and delete the old volumes by hand afterwards.

Note: an export file is a full data dump. The 3.x export carries no credentials, but it still lists every resource you manage; an export taken from a 4.0.0 instance also contains the login's password hash. Move export files over scp, not e-mail, and delete them once the migration is verified.

From 4.0.0 onwards this migration is not needed again: the next version's stack takes your data volume through the ExistingDataVolumeId parameter and your users, groups and schedules carry over (see Upgrades).

Support

Do you need Support on an issue with our product or need a quick question answered, please open a support ticket by visiting our [Support Ticket](#) page.

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Definitions

Term	Description
AMI	Amazon Machine Image - Provides the information required to launch and instance, which is a virtual server
AWS	Amazon Web Services - Infrastructure as a Service provider
EBS	Elastic Block Storage - Persistent block level storage volumes
EC2	Elastic Compute Cloud - Is a web service that provides resizable compute capacity in the Cloud
INSTANCE	An Instance of EC2
RUNTIME	Runtime of an EC2 instance - When an EC2 instance starts and stops
S3	Amazon Simple Storage Service - A secure, durable and highly scalable object store
SCHEDULE	Pre-determined time at which backups or runtimes are initiated
SNAPSHOT	Point-in-time snapshot of EBS volumes to S3
SNS	Simple Notification Service - Is a fully managed push messaging service
VOLUME	Is a single accessible storage area with single file system