Developing Rules

for the enCloud™ Management System

Encore Networks' cloud management system, enCloud™, provides management of your connected Encore devices via a web portal. The enCloud management system supports Encore Networks' EN™ Routers (EN-400™, EN-1000™, EN-2000™, EN-3000™, and EN-4000™).

Rules are used to set conditions to monitor and report on activity. You can set rules for devices or for user activities.

Note: Some web browsers may not fully support the system. Google Chrome is the recommended browser. Make sure Javascript is enabled, and make sure your browser does not block the enCloud pop-up window.

See the following:

This guide is written for tier 1 users with administrator access in enCloud. Users with viewer access may not have the same capabilities.

4.1   About enCloud™ Rules

Rules in enCloud are developed at the tier 2 level. A tier 1 (value-added reseller) user with administrator access or a tier 2 (customer) user with administrator access can add rules to enCloud.

Rules monitor specified conditions. There are two types of rules:

- A **device rule** monitors device sensors (parameters) and device behavior. Device rules can apply to a single device, to several devices, or to all of a tier 2 customer's devices.

- A **user rule** monitors the activities of users within enCloud. These user activities include creating, editing, and deleting account entities such as devices, tier 3 groups, tier 2 customer accounts, or other users.

Rule conditions are checked each time a device checks into enCloud. (The check-in interval is the value in the data frequency field on the device-specific page; for an example, see Figure 5-9 and Figure 5-10 in the document *Tier 3 Groups and Labels*.)

When a rule's condition is triggered, an event is created. An event can itself be set to trigger a system alert, a notification, or a device task, or any combination of those (Figure 4-1).

Figure 4-1. Flow from Rules to Events to Optional Actions
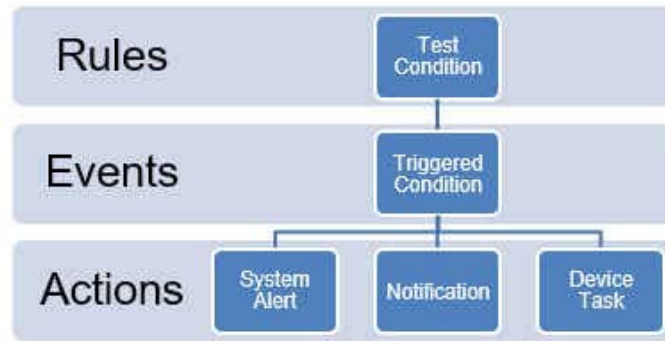
4.1.1   Developing Rules

A tier 1 administrative user can develop a rule within a tier 2 customer account. A rule can be applied to one or more specified devices or users.

4.1.2   Editing Rules

A rule's condition cannot be changed after it is created. Other items—such as a rule's name, actions, or notification recipients—can be edited.

4.1.3   Deleting Rules versus Disabling Rules

A rule can be deleted at any time; however, when a rule is deleted, all events and alerts created by the rule are also deleted. If a rule no longer needs to function, but its event and alert histories are important, the rule can be disabled; the histories will remain. Disabling a rule sets it to a passive state; the rule's condition is no longer checked when a device reports in.

Most rules in enCloud are created and maintained at the tier 2 customer level. Some Encore Networks administrators can also create global rules in enCloud. A global rule cannot be disabled or deleted except by an Encore Networks administrator. However, a tier 1 administrator or a tier 2 administrator can, within a tier 2 account, change notifications for a global rule.

Any enSite administrator can create enSite rules at the tier 2 level or at a global level.

4.2 Setting Up enCloud™ Rules

Before you create a rule, assign devices to one or more tier 2 customers. Within each tier 2 customer account, assign the devices to tier 3 groups. See the following documents in the *enCloud™ Account Development Module*:

- *Devices and Hardware Profiles*
- *Tier 3 Groups and Labels*

Then you can create a rule for devices in a tier 2 customer account.

The following steps outline the procedure for developing rules in a tier 2 account. The steps constitute a single procedure; they must be performed in the order listed, and the entire procedure must be completed before the rule can be saved.

- Section 4.2.1, *Adding a Rule*, on page 3
- Section 4.2.2, *Defining the Rule's Condition*, on page 7
- Section 4.2.3, *Determining the Rule's Actions*, on page 19
- Section 4.2.4, *Defining (Creating) a System Alert*,[1] on page 21
- Section 4.2.5, *Sending a Notification*,[1] on page 25
- Section 4.2.6, *Sending a Device Task*,[1] on page 29
- Section 4.2.7, *Reviewing the Rule*, on page 34

Note: After a rule has been created, its actions can be revised, but its condition cannot be changed. If you need to change a rule's condition, create a new rule with the new condition; then disable (or delete) the prior rule.

4.2.1 Adding a Rule

1 Log into enCloud.

  » enCloud opens. Your Table of Tier 1 Accounts is displayed (Figure 4-2).

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1. Inclusion of a system alert, notification, or device task is optional. Those items are actions in response to a rule's triggered event. If one or more actions are needed, they can be developed during rule configuration or can be added later.

Figure 4-2. Table of Tier 1 Accounts

2   Rules for enCloud must be created within tier 2 (customer) accounts. Select the **Tier 2** tab in the enCloud menu (along the left side of the screen).

   » The Table of Tier 2 (Customer) Accounts is displayed (Figure 4-3, partial listing).

Figure 4-3. Table of Tier 2 (Customer) Accounts

Note: In enCloud, a separate rule must be created for each tier 2 customer, even if that rule is identical across tier 2 customer accounts.

In enSite, a global rule can be created, applying to all tier 2 accounts.

3   Select a tier 2 customer account by clicking on the customer's row in the table.

» The tier 2 customer's Table of Tier 3 Groups is displayed (Figure 4-4).

Figure 4-4. Table of Tier 3 Groups

4   Select the **Rules** tab in the enCloud menu (along the left side of the screen).

» The tier 2 customer's Table of Rules is displayed (Figure 4-5, partial listing).

Figure 4-5. Table of Rules

Note: To list only global rules, select the box for **Global Only** (above the middle of the table in Figure 4-5).

5   Select the button to **Add New Rule** (located above the right edge of the table).

» The panel to add a rule is displayed (Figure 4-6).

Figure 4-6. Panel to Add a Rule

Note: Sometimes a circle around a number at the top of a Rules Panel will be red. A red circle indicates that the panel is waiting for input before it can continue (or that an error has been made and is waiting for correction).

6   Continue to Section 4.2.2, *Defining the Rule's Condition*, on page 7.

4.2.2   Defining the Rule's Condition

Note: The procedure to develop a rule is not difficult, but the procedure is quite long. Figures for some panels might show unchecked boxes for items previously configured in the discussion, so that each figure will fit onto one page and remain legible.

However, **do not uncheck any item you have already configured**, unless you have determined that you no longer want that item to be in effect.

7   **Name** the rule (Figure 4-7). A brief **Description** is optional.

Figure 4-7. Panel to Add a Rule: Name the Rule

8   Then select the panel's button for the rule's **Next** stage.

» The panel displays the next stage for the rule. Figure 4-8 shows stage 2 (Scope and Timeframe) of rule development.

Figure 4-8. Panel to Add a Rule: Set Scope and Timeframe

9 Select the **Scope** Info Button 🛈 for information on setting the rule's scope (Figure 4-9).

Figure 4-9. Information about the Rule's Scope

10 If you want the rule to be limited to specified tier 3 groups, select the **Scope** checkbox (as in Figure 4-10).

Figure 4-10. Selecting Tier 3 Groups for the Rule

11 Whether the **Scope** checkbox is checked or unchecked: Select the parameter's field and, on the dropdown menu, select the tier 3 groups for this rule (as in Figure 4-10).

12 Read the Info Button 🛈 for **Timeframe** (Figure 4-11).

Figure 4-11. Information about Timeframe

13 To set the timeframe for the rule to be in effect, select the **Timeframe** checkbox. Then use the arrows for the hour **From** (as in Figure 4-12) to set the starting time.

Figure 4-12. Time of Day to Start Testing for Rule's Condition

14 Also select the timeframe for the hour **To** (set the time of day for the rule to stop testing).

15 Read the Info Button 🛈 for Rule **Expiration** (Figure 4-13).

Figure 4-13. Information about Rule Expiration

16 You can let the rule run without expiring, if you choose. However, if you want the rule to end on a certain date, select the **Expiration** checkbox. Set the hour and minute; then, on the dropdown calendar, select the date for the rule to expire (Figure 4-14).

Figure 4-14. Rule Expiration

17 On the calendar, select the button to **Submit** the information.

» The panel indicates the selections (Figure 4-15).

Figure 4-15. Scope and Timeframe Selections

18 Select the button for the rule's **Next** stage.

» The panel's 3rd stage (**Event**) is displayed (Figure 4-16).

Figure 4-16. Panel to Add a Rule: Event Resulting from Device Activity

19 On the panel, do the following:

a Choose which type of activity the rule will monitor:

• **Device Activity** (as shown in Figure 4-16): This monitors the sensor value (parameter) reported by the device (for example, cell signal strength) or the device's calculated conditions (for example, an offline state).

• **User Activity** (as shown in Figure 4-17): This monitors activities performed by a user (for example, creating a tier 2 customer account or adding a user).

» Parameters for the chosen activity are displayed under the heading **Condition** and its subheading **Source** (for Device Activity, Figure 4-16) or **Entity** (for User Activity, Figure 4-17).

Figure 4-17. Panel to Add a Rule: Event Resulting from User Activity

20 The procedure in this discussion develops rules for device activity. Select **Device Activity** (recall Figure 4-16).

Note: Device rules must specify a hardware profile, because different hardware profiles have different sensors. To manage sensor data common to the hardware profiles, you will need to create a similar rule for each hardware profile.

a After you select **Device Activity**, select the dropdown menu under Figure 4-16's
   HW Profile (**Hardware Profile**), and select the profile (**EN400**, **EN1000**, **EN2000**,
   EN2000DS, **EN3000**, or **EN4000**) for your Encore Networks device (Figure 4-18).

Figure 4-18. Panel to Add a Rule: Set Device Profile to Test

b Then do one of the following:

- Select the radio button (the circle) beside the field **All Devices** (as in Figure 4-18,
  above). The rule will apply to all devices of the chosen hardware profile in the tier 2
  customer account.

  or

- Select the radio button beside the field to **Select Device(s)**. The rule will apply to
  devices you select in the field's dropdown menu (Figure 4-19). You can select more
  than one device in the dropdown menu.

  Note: Only devices of the hardware profile specified in substep a (above) are
  available for selection. The devices must already have been assigned to the tier 2
  customer account.

Figure 4-19. Panel to Add a Rule: Select All Devices or Single Devices

This procedure develops a rule to govern **All Devices** in the tier 2 customer's inventory (recall Figure 4-18).

21 If you want the rule to test for more than one condition, select **Multiple Conditions** (as shown in Figure 4-20).

Figure 4-20. Test for Multiple Conditions

Note: enCloud rules can use multiple conditions, but:

- All connectors must be **AND**,
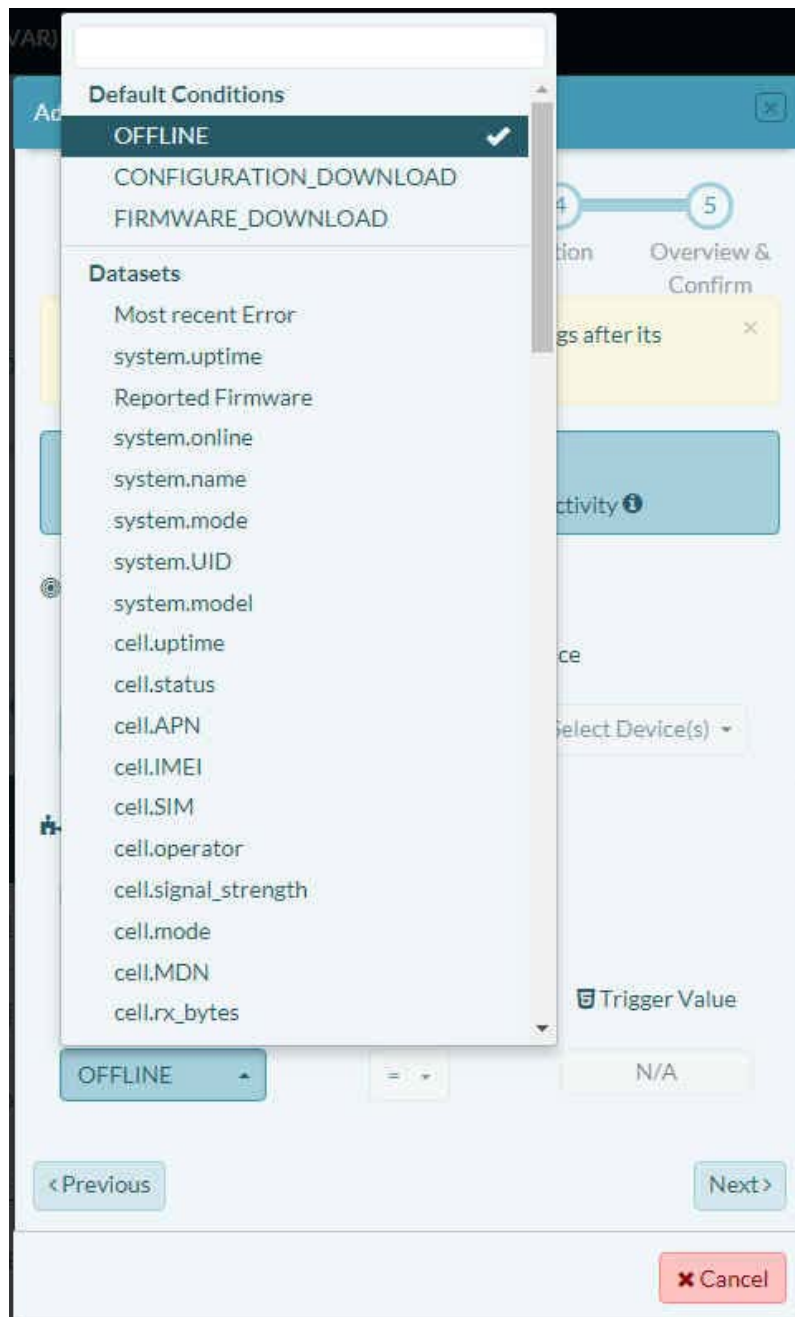
  or

- All connectors must be **OR**.

A combination of **AND** and **OR** cannot be used.

22 For each condition that you wish to test, do all of the following:

a Select the field box under the **Condition** heading **Source**.

» The dropdown menu is displayed, listing sensors for the chosen hardware profile (Figure 4-21, partial listing).

Figure 4-21. Panel to Add a Rule: Select Condition to Test

Note: The list contains sensors reported by the hardware, as well as a few default conditions. Default conditions are calculated by enCloud, not reported by the device. For example, the system sets the parameter **OFFLINE** after a device fails to check in at the appropriate interval.

b Select one sensor for the rule to test.

For sensor descriptions, see *Sensors for Rules*.

Figure 4-22. Panel to Add a Rule: Selected Condition for Test

c Then, in the box under the heading **Operator**, select the test for the sensor.

Note: Data for some sensors (for example, **cell.tx bytes**) might fluctuate continuously, rarely remaining equal to a specific value. Encore Networks, Inc., recommends, instead of using the operator "equal to" (**=**), which will test only for the exact value specified, that the condition test be set to use the operator "greater than or equal to" (**>=**) or the operator "less than or equal to" (**<=**), depending on whether the trigger for a condition is above or below a given value.

d Under the heading **Trigger Value**, set the value that will trigger the rule to create an event (Figure 4-23).

Note: The **Trigger Value** is the value that the condition tests for.

Sensor values are measured in different units. Most sensor units are automatically indicated when you select the **Source** field. For example, **lan.rx_bytes** is measured in bytes (as shown in Figure 4-23). Rules might also use input masks (for example, **1 kbyte** instead of **1024 bytes**).

Figure 4-23. Panel to Add a Rule: Condition Test (Operator and Value)

Note: When a condition test triggers a rule, it creates an event. After you have finished developing the rule, you can select the **Events** tab in enCloud's lefthand menu to see the Table of Events.

23 Continue to Section 4.2.3, *Determining the Rule's Actions*, on page 19.

4.2.3 Determining the Rule's Actions

24 After you have defined the rule's condition, select the button for the rule's **Next** stage.

» The rule panel displays stage 4 (**Action**), as in Figure 4-24.

Figure 4-24. Panel to Add a Rule: Stage 4 (Optional Action)

The panel displays a choice:

- To **Create Event without Action** when the rule's condition is met (Figure 4-25)

Figure 4-25. Create Event without Action

> **Note:** If you select **Create Event without Action**, go to Section 4.2.7, *Reviewing the Rule*, on page 34.

or

- To **Add Action for the Event** when the rule's condition is met (Figure 4-26)

» Available actions are listed:

System Alert: You can set a system alert (Section 4.2.4, *Defining (Creating) a System Alert*, on page 21).

Notification: You can specify messages to be sent to persons who can address the event (Section 4.2.5, *Sending a Notification*, on page 25).

Device Task: You can instruct the device to perform an action—for example, to reboot—that may resolve the event (Section 4.2.6, *Sending a Device Task*, on page 29).

Figure 4-26. Panel to Add a Rule: Add One or More Actions

Note: If you select **Add Action for the Event**, continue to Section 4.2.4, *Defining (Creating) a System Alert*, on page 21.

4.2.4   Defining (Creating) a System Alert

A system alert can have four states—any combination of the following statuses:

Resolved or **Unresolved**

and

Acknowledged or **Unacknowledged**

The statuses have the following values:

- **Unresolved:** The rule's condition is true. (That is, the rule has been triggered.)
- **Resolved:** The rule's condition is no longer true.
- **Unacknowledged:** The user has not acknowledged the alert.
- **Acknowledged:** The user has acknowledged the alert on the Table of Alerts (under the column heading **Acknowledged**).

A system alert can be set to resolve itself, or you can resolve alerts as you review the Table of Alerts.

Note: By default, acknowledgment status is hidden.

The procedure in this discussion lists an event and causes actions when the rule's condition is met.

25 To add a system alert, do the following:

a Select **System Alert**.

» The action's criteria are displayed along the left side of the panel (Figure 4-27):

- **Severity**
- **Auto Resolve**
- **Create Alert**
- **Threshold**

Note: Some criteria have Info Buttons ⓘ to guide development. Select an Info Button to see detailed instructions.

Figure 4-27. Panel to Add a Rule: System Alert

b Select the field for **Severity**.

» The field's dropdown menu lists levels of severity (Figure 4-28).

Figure 4-28. Panel to Add a Rule: System Alert Severity

c Select the severity of the alert:

- **Critical**

- **High**

- **Medium**

- **Low**

d If you want the resolution status to change when the triggered state has been resolved, select the checkbox for **Auto Resolve**.

Auto Resolve sets the status of an alert to **Resolved** if the opposite of the rule's condition becomes true. For example, the condition **cell signal <= -80** will automatically resolve if the cell signal reports a value higher than -80. (The alert status is shown in the Table of Alerts, under the column heading **Solved**.)

Note: Some conditions do not have opposites; such conditions cannot automatically resolve.

e In the **Create Alert** field, select one of the following to determine when the rule will create an alert:

- **Once:** The alert will be created on the initial rule trigger. Additional rule triggers will not send an alert.

- **Every Trigger:** A new alert instance will be created each time the rule is triggered.

- **Once Every:** An alert will be created on the first trigger, and the interval period will begin. This alert instance will be updated by each additional trigger within the interval period. After the interval has passed, the next rule trigger will create a new alert instance, and the interval period will begin again. This instance will be updated during the interval period.

  » If you select **Once Every**, interval options are displayed (Figure 4-29).

f Select the interval unit (for example, **Days**) and the number of those units (for example, **3**, to indicate to create an alert once every three days).

Figure 4-29. Panel to Add a Rule: System Alert Frequency

g Set the **Threshold** to indicate the number of consecutive times the rule's condition must be true before the Alert action is performed.

26 Continue to Section 4.2.5, *Sending a Notification*, on page 25.

4.2.5 Sending a Notification

Warning: Do not uncheck any item you have already configured.

If you have configured a **System Alert**, leave that item checked, so that you do not lose its configuration.

For this discussion, **System Alert** has been unchecked in Figure 4-30, to allow the screen to fit onto the printed page in a legible size, and to allow the discussion to focus on **Notification**.

Again: Do **not** uncheck any item you have already configured.

27 To add a notification to the event, do the following:

   a Select **Notification**.

   » The action's criteria are displayed along the left side of the panel (Figure 4-30):

   • **Notification Type**

   • **Recipients**

   • **Send Notification**

   • **Threshold**

Figure 4-30. Panel to Add a Rule: Number of Occurrences to Cause System Alert

b Select the field to **Select Type(s)**.

> » The available notification type is displayed (Figure 4-31):
>
> • **E-mail**: Send notification to the e-mail addresses of the specified users and contacts.

Figure 4-31. Panel to Add a Rule: Notification Type

c Select the field box in the row for **Recipients**. In the field's dropdown list, select one or more users to receive e-mail (Figure 4-32).

Figure 4-32. Panel to Add a Rule: Notification Recipients (Users)

Note: Users have access to the enCloud management system. **Contacts** do not have access to enCloud. enCloud can send notification of events to contacts, so that they can be made aware of device conditions.

d In the panel's **Send Notification** field, select one of the following to determine when the rule will send a notification:

- **Once:** The notification will be sent only on the initial rule trigger. Additional rule triggers will not send a notification.

- **Every Trigger:** A new notification will be sent each time the rule is triggered.

- **Once Every:** A notification will be created on the first trigger, and the interval timer will begin. After the interval has passed, the next rule trigger will send a new notification, and the interval period will begin again.

» If you select **Once Every**, interval options are displayed (Figure 4-33). Select the Info Button 🛈 for **Send Notification** to see detailed information.

Figure 4-33. Panel to Add a Rule: Notification Frequency (Screen 1)

e Select the interval unit (for example, **Days**, as shown in Figure 4-34) and the number of those units (for example, **3**, to indicate to send notification once every three days).

Figure 4-34. Panel to Add a Rule: Notification Frequency (Screen 2)

    f Set the **Threshold** to indicate the number of consecutive times the rule's condition must be true before the notification is sent.

28 Continue to

4.2.6   Sending a Device Task

A device task is an automated action that can be sent to one or more devices. Each device that receives the task will perform the action.

Only one device action can be sent per rule trigger. A device must be on line and must have compatible firmware to receive device tasks from enCloud.

  Warning: Do not uncheck any item you have already configured.

  If you have configured a **System Alert** or a **Notification**, leave each such item checked, so that you do not lose its configuration.

  For this discussion, **System Alert** and **Notification** have been unchecked in Figure 4-35, to allow the screen to fit onto the printed page in a legible size, and to allow the discussion to focus on **Device Task**.

Again, do **not** uncheck any item you have already configured.

29 To add a device task to the event, do the following:

a Select **Device Task**.

» The action's criteria are displayed along the left side of the panel (Figure 4-35):

• **Task**

• **Send Device Task**

• **Threshold**

Note: Select the Info Buttons 🛈 for detailed information.

Figure 4-35. Panel to Add a Rule: Device Task

b Select the field for **Task**.

» A dropdown list displays the tasks (Figure 4-36, partial listing). Examples of tasks include the following:

• **Reboot:** Reboots the device.

• **Configuration Backup:** The device creates a configuration backup and stores it in the cloud.

• **Set Data Frequency:** Sets how often the device reports in.

• **Reset Data Configuration:** Resets the configuration to default settings.

Note: The device tasks listed on this panel are the same tasks available on the device detail screen. Additional tasks might be included in the task list when firmware updates occur.

The device task will be sent to the device or devices that trigger the rule. In order to function, a device task must be supported by the device hardware and firmware.

Figure 4-36. Panel to Add a Rule: Device Task Selection

c In the **Send Device Task** field, select one of the following to determine when the rule will add a task to the queue to send to the device:

- **Once:** The task will be queued on the initial rule trigger only. Additional rule triggers will not queue additional tasks.

- **Every Trigger:** A task will be queued each time the rule is triggered.

- **Once Every:** A task will be queued on the first trigger, and the interval will begin. After the interval has passed, the next rule trigger will queue a new task, and the interval will begin again.

» If you select **Once Every**, interval options are displayed (Figure 4-37).

Figure 4-37. Panel to Add a Rule: Device Task Frequency

d Select the interval unit (for example, **Days**, as shown in Figure 4-37) and the number of those units (for example, **3**, to send the device task once every three days).

e Set the **Threshold** to indicate the number of consecutive times the rule's condition must be true before the device task is sent to the device (Figure 4-38).

Figure 4-38. Panel to Add a Rule: Number of Occurrences to Cause Device Task to be Sent

30 Continue to Section 4.2.7, *Reviewing the Rule*, on page 34.

4.2.7   Reviewing the Rule

31 When you have finished developing the rule, select the button for the rule's **Next** stage.

» The rule's review panel is displayed (Figure 4-39).

Figure 4-39. Panel to Review a Rule

32 Review the rule. Do one of the following:

a If you need to revise a setting, select the button for the **Previous** screen.

b If the rule is satisfactory, select the button to **Add Rule**.

» The rule is added to the tier 2 customer's Table of Rules (Figure 4-40).

Figure 4-40. Table of Rules, after Adding Rule

4.3   Editing enCloud™ Rules

In the previous section, we created a new rule to test the amount of data the LAN port receives. But we didn't give it a meaningful name (**rule_101**). We can change the rule name. We can also edit the rule's actions. (We cannot change the rule's condition test.)

1   At the end of the row for the rule named **rule_101** in the Table of Rules (), select the **Actions** button. On that button's dropdown menu, select **Edit**.

Figure 4-41. Table of Rules (Rule for Revision Highlighted)

» The Panel to Edit a Rule is displayed (Figure 4-42).

Figure 4-42. Panel to Edit a Rule

2 Rename the rule to something more descriptive (Figure 4-43).

Figure 4-43. Renamed Rule

Note: You may also type information into the **Description** field, or you may leave that field blank.

3 Select the button to edit the rule's **Next** stage.

» The rule's next stage is displayed (Figure 4-45).

Figure 4-44. Panel to Edit a Rule: Scope and Timeframe

4   If needed, change the **Scope** (the devices monitored) and the **Timeframe** to suit your organization's schedule.

5   Select the button to edit the rule's **Next** stage.

   » The rule's next stage is displayed (Figure 4-45).

Figure 4-45. Panel to Edit a Rule: Action

6   If you need to revise one or more actions, do so. You may also add or disable actions.

7 If there are no changes for actions, or if you have completed changes for actions, select the button to edit the rule's **Next** stage.

» The rule's next stage is displayed (Figure 4-46).

Figure 4-46. Panel to Review an Edited Rule

8 Review the edited rule. Do one of the following:

a If you need to revise a setting, select the button for the **Previous** screen.

b If the rule is satisfactory, select the button to **Save Changes**.

» The rule is revised, and the tier 2 customer's Table of Rules is redisplayed (Figure 4-47).

Figure 4-47. Table of Rules, after Revising Rule Name

4.4 More enCloud™ Account Information

See the following documents for additional information to set up your enCloud account:

- *Account Registration and Log-In*
- *Developing Accounts*
- *Tier 3 Groups and Labels*
- *Devices and Hardware Profiles*
- *Establishing Users and Contacts*
- *Subscriptions*