

Delivering Consistency and Automation with Operational Runbooks

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 **Cloud**



International Technical Support Organization

**Delivering Consistency and Automation with
Operational Runbooks**

August 2016

Note: Before using this information and the product it supports, read the information in “Notices” on page v.

First Edition (August 2016)

This edition applies to IBM Alert Notification service Version 1.0, IBM Runbook Automation service Version 1.0 and IBM Netcool Operations Insight Version 1.4.

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Preface

There is a greater need today to integrate and unify IT delivery through tools that provide capabilities in advanced analytics and automation.

IBM® has recently introduced two integrated services on the software as a service (SaaS) model that effectively combine advanced analytics capabilities with automation. These two services are IBM Alert Notification service and the IBM Runbook Automation service. Both services are available to everyone including existing IBM Netcool® Operations Insight™ customers.

IBM Alert Notification is a separately available SaaS service to deliver alert notification. IBM Runbook Automation is also a new SaaS service to deliver Runbook Automation. IBM Runbook Automation is a hybrid service that is designed for both cloud and on-premises integrations.

This IBM Redpaper™ publication provides a technical overview of these two services and explains the concepts within the context of scenarios and use cases.

The target audience for this paper is network specialists, network operators, and network administrators.

Authors

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IBM Alert Notification (SaaS)

This chapter introduces IBM Alert Notification, a new, separately available software as a service (SAAS) service that delivers alert notification. IBM Alert Notification is available to everyone including existing Netcool Operations Insight customers.

This chapter starts with an overview of the product, and covers how it is installed, subscribed, and integrated with Netcool Operations Insight. It also provides sample scenarios to depict how Alert Notification can be used in various environments.

The chapter is divided into the following sections:

- ▶ Business challenges
- ▶ Product overview
- ▶ Integration with Netcool/OMNibus and Netcool/Impact
- ▶ Alert Notification on mobile
- ▶ Scenarios

1.1 Business challenges

The landscape of IT organizations is dramatically shifting in the field of infrastructure, tools, technologies, and processes. With the ever-increasing complexity, and recent trends in cloud, mobile, agile, and digital transformation, there is more pressure to keep everything up and running round the clock.

Recent research has shown that digital and business transformation are increasingly dependent on IT transformation. IT delivery organizations face the following challenges:

- ▶ Need to be proactive in delivery: There is an ever increasing need to be proactive in IT delivery and to reduce the mean time to repair (MTTR) and mean time between failures (MTBF) along with the need to effectively align IT and business priorities. Application downtimes are nowadays drastically impacting business costs. With increasing IT infrastructure complexities, it is a significant challenge for organizations to fix outages quickly.
- ▶ Sync between tools and organization: Multiple toolsets and isolated technology silos need close integration for information sharing and collaboration between multiple supporting teams.
- ▶ Process and communication failures: Fractured ways of working resulting from poor levels of communication between teams, lack of focus on process, and undocumented operating procedures lead to ineffective management of service performance and availability.
- ▶ Data overload, but no meaningful information: Organizations are using a wide range of tools and systems for monitoring, deployment, and incident management, and these systems continuously produce different types of data. The challenge is to convert this data overload into useful information that is meaningful to the business. IT Operations store information in multiple systems and silos. Some IT organizations have even started applying data analytics to specific operations data, but the challenge is to relate and bring contextual information to a problem by using data from multiple sources.

There is a greater need today to integrate and unify IT delivery through tools that give capabilities in advanced analytics and automation.

1.2 Product overview

IBM has recently introduced two integrated services on the SaaS model that effectively combine advanced analytics capabilities with automation. These two services are IBM Alert Notification Service and the IBM Runbook Automation service. These services are available to everyone including existing Netcool Operations Insight customers.

Figure 1-1 shows how IBM Runbook Automation and IBM Alert Notification compliment the Netcool Operations Insight portfolio.

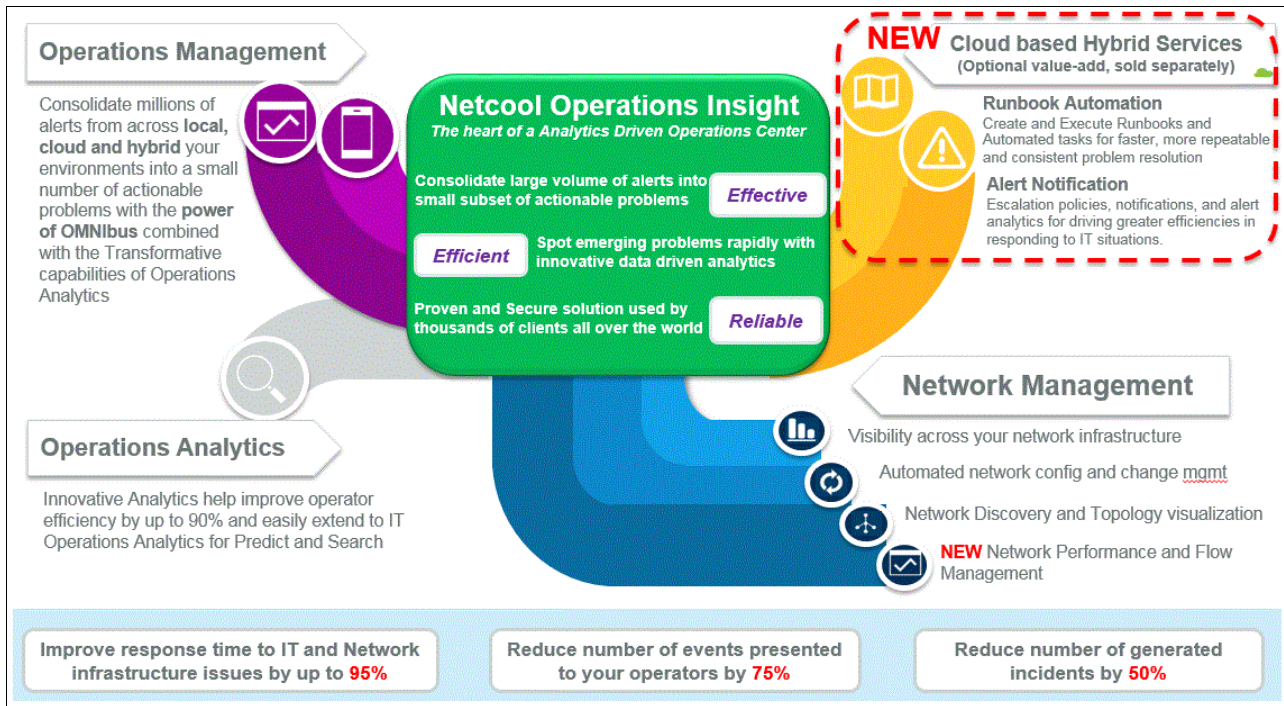


Figure 1-1 Delivering innovations in Analytics, Network Management and Cloud Based Services

IBM Alert Notification is covered in this chapter. For more information about IBM Runbook Automation, see Chapter 2, “IBM Runbook Automation (SaaS)” on page 47.

IBM Alert Notification is an easy to use, simple notification system. It meets the increasing demand for agility and efficient collaboration among IT operations team members that use multiple monitoring tools. It gives IT staff instant notification of alerts for any issues in your IT operations environment, which helps optimize your business performance, increase customer satisfaction, and protect revenue.

IBM Alert Notification is provided to the customers as a service, which means the required server infrastructure is installed and managed by IBM, reducing their time-to-value and offering low-maintenance ownership. IBM Alert Notification is a service provided by IBM on the Bluemix® platform. IBM Bluemix is a cloud platform as a service (PaaS) developed by IBM to host services, and to build, run, and deploy applications on the cloud. IBM Alert Notification service can work across both private and public clouds to give your IT staff the insights that they need to deliver reliable services throughout your organization.

1.2.1 Benefits of Alert Notification service

Clients use Alert Notification because they want to be alerted when events occur that require immediate attention or human intervention.

The following are the benefits of Alert Notification service:

- ▶ Never miss your actionable critical alerts: Instantly deliver notifications using automated communication methods such as email, SMS, and voice messaging.
- ▶ Immediately route alerts to the correct people: Use custom groups to send alerts to all the correct people for a problem or class of problem.
- ▶ Speeds alert response with automated escalation policies: Escalation policies can be put in place to ensure that notifications are answered in an expedient manner.

1.2.2 IBM Alert Notification features and their functions

The following lists the high-level IBM Alert Notification features and their functions:

- ▶ Notification: Send alerts to various channels (email, SMS, Voice) based on configuration (Notification Policies).
- ▶ User and group profiles: Can be configured to send alerts to individuals or groups.
- ▶ Escalation of notification: Provides functionality to escalate alerts if they are not acknowledged within stipulated time and are not responded to expediently.
- ▶ REST API: Provides ability to consume alerts through an API. The REST API can receive alert requests from any event source to the IBM Alert Notification Service to support hybrid cloud deployments.
- ▶ Mobile application (iOS and Android) support: Allows addition of mobile channels for notification.
- ▶ Simple controls on when to notify: For example, notify only when the same alert is received 10 times in 2 minutes, simple deduplication of alerts, and automatic archival of alerts after a set time.

Alert Notification currently provides integration with these applications:

- ▶ Any service or application that you attach through the REST API
- ▶ Any third-party event management application that can send to your REST API
- ▶ Netcool Operations Insight in a hybrid cloud environment
- ▶ Application Performance Manager SaaS

1.3 Integration with Netcool/OMNIBus and Netcool/Impact

The documentation for IBM Alert Notification can be found in the following link:

http://www.ibm.com/support/knowledgecenter/SSY487/com.ibm.netcool_OMNIBusaas.doc_1.2.0/concept/emaas_ins_overview.html

The procedure to integrate IBM Alert Notification with Netcool/OMNIBus and Netcool/Impact involves the following steps:

1. Select and register for the IBM Alert Notification service.
2. Select a free trial or configure and buy.
3. Integrate IBM Alert Notification with IBM Netcool/OMNIBus.
4. Integrate IBM Alert Notification with IBM Netcool/Impact (optional)

Note: Integration with IBM Netcool/OMNIBus or IBM Netcool/Impact does not depend on a specific version of those products.

1.3.1 Select and register for the IBM Alert Notification service

Perform the following steps:

1. Go to IBM Marketplace and register or sign in. Click the following URL to go to the IBM Alert Notification Service landing page:

<https://www.ibm.com/marketplace/cloud/alert-notification/us/en-us>

Figure 1-2 shows the landing page for the IBM Alert Notification Service in the IBM Marketplace.

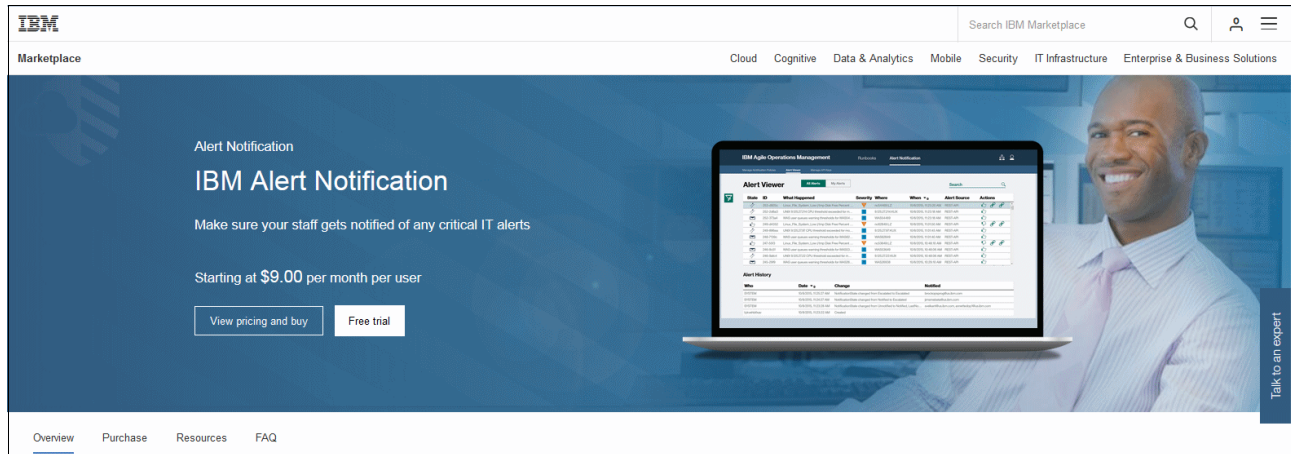


Figure 1-2 IBM Market place landing page - IBM Alert Notification service

2. Click the **Purchase** link to go to the Product Pricing page that gives you the option of **Free Trial** or **Subscription** as shown in Figure 1-3.

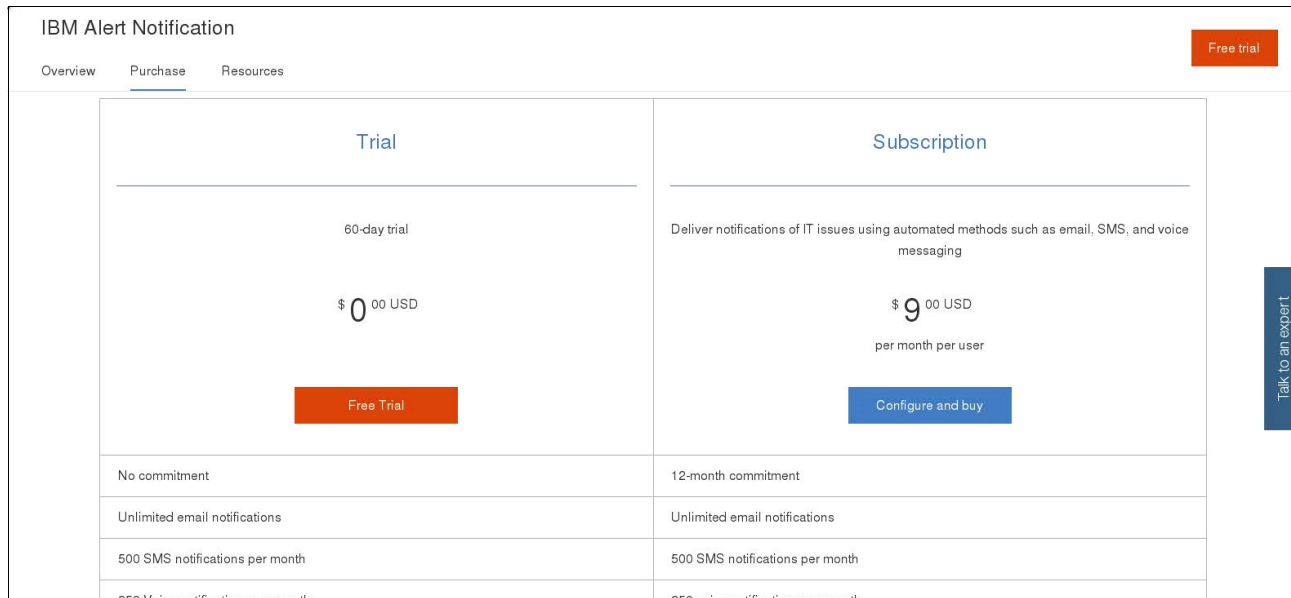


Figure 1-3 Subscription page for IBM Alert Notification

IBM Alert Notification Service license model: The licensing of Alert Notification Service service is based on a subscription model. The pricing is based on the number of users configured. As you can see in Figure 1-3 on page 5, subscription cost is USD 9.0 per month per user with a 12-month commitment. This subscription includes these services:

- ▶ Unlimited email notifications
- ▶ 500 SMS notifications per month
- ▶ 250 voice notifications per month

1.3.2 Select a free trial or configure and buy

This example uses the free trial option. To select it, complete these steps:

1. Click **Free Trial** to take you to the page where you need login if you already have an IBM ID. If you do not, register for a new one. At this point, you only need a valid email address for registration.
2. Figure 1-4 shows the Trial sign-up page for IBM Alert Notification. Enter a valid email address and then click **Submit**.

IBM

Search

Try IBM Alert Notification for 60 days free.

Already have an IBMID? [Sign in](#)

Email address

Select your country/region

Enter your email address, and we'll send you a confirmation code to enter below.

First name

Last name

Password

Confirmation code (check email) [Resend](#)

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I accept IBM's [Privacy statement](#) and [Terms and Conditions](#).

Never miss critical IT alerts
Make sure your staff gets notified of any critical IT alerts

Figure 1-4 IBM Alert Notification Trial sign-up page

3. You will receive a validation code at that email address. Enter that code into the **Confirmation Code** field as shown in Figure 1-5 and click **Sign Up**.

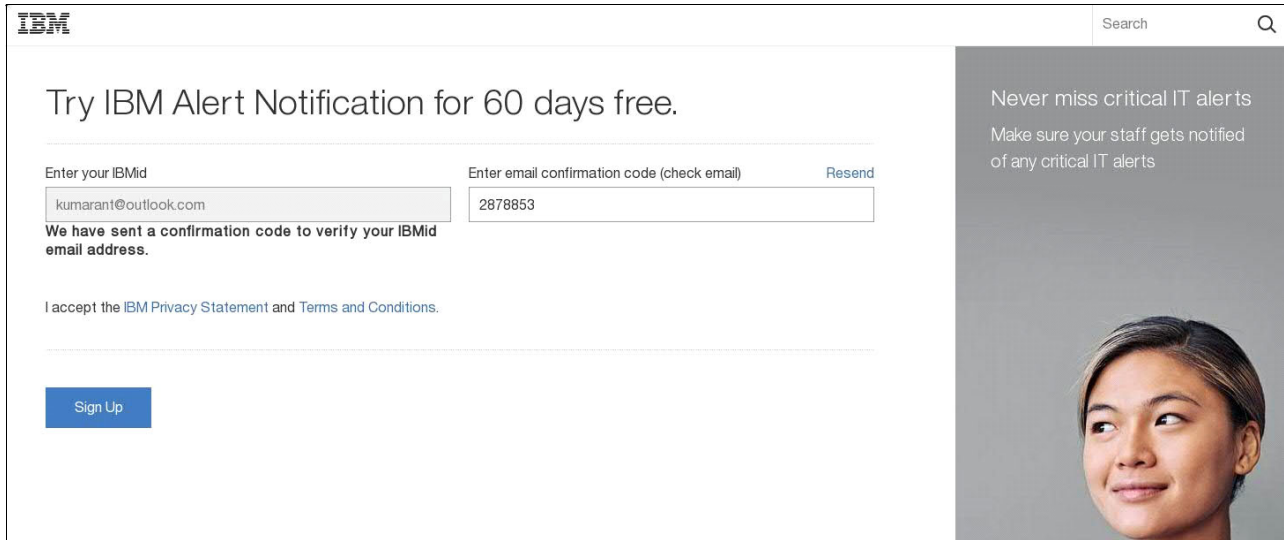


Figure 1-5 Confirmation Code

The IBM Alert Notification service will get provisioned and will appear in the Products and Services tab as shown in Figure 1-6.

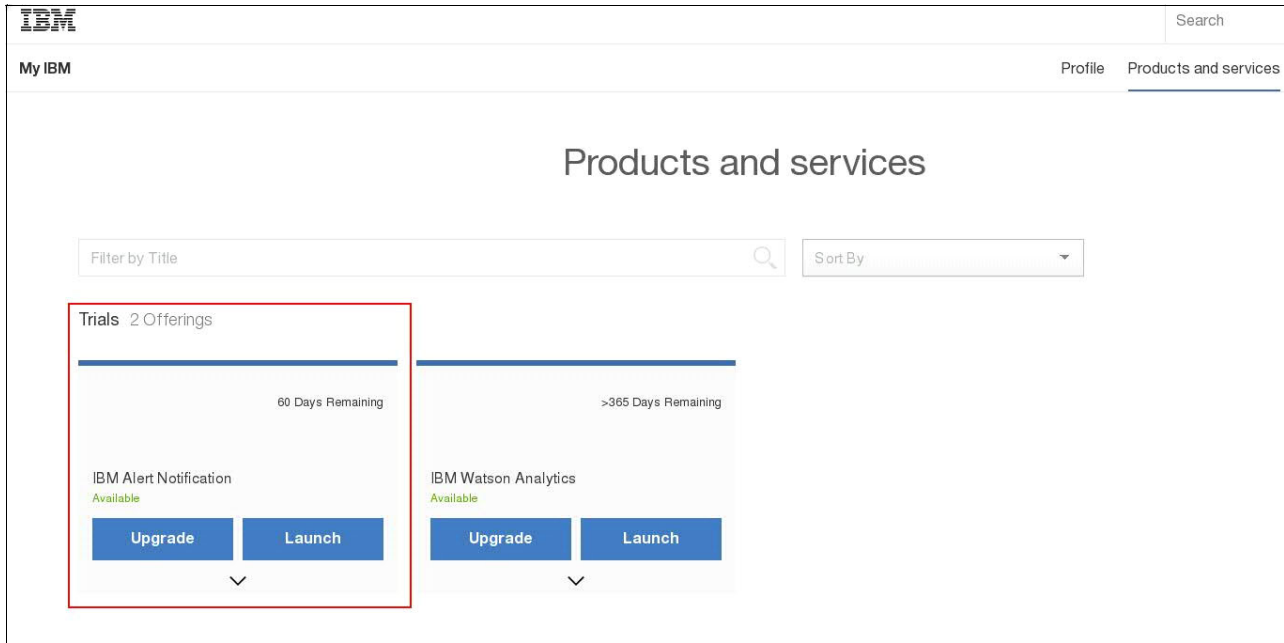


Figure 1-6 IBM Alert Notification Service provisioned and available

- After the Alert Notification service is provisioned, launch the service by clicking **Launch**, which opens the IBM Agile Operations Management - Alert Notification window as shown in Figure 1-7.

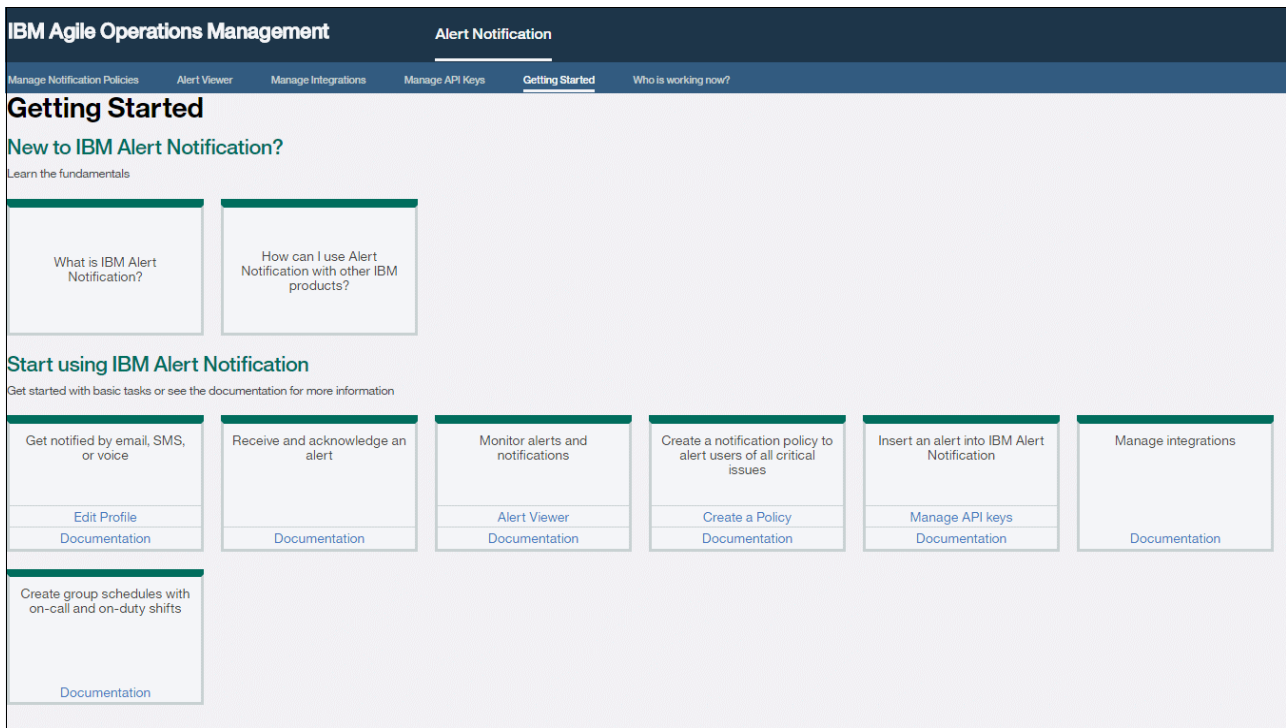


Figure 1-7 IBM Agile Operations Management - Alert Notification

1.3.3 Integrate IBM Alert Notification with IBM Netcool/OMNIBus

IBM Netcool/OMNIBus can be configured to filter and select alerts that require a notification to be sent to the user. Triggers in Netcool/OMNIBus are used to configure event forwarding to Alert Notification.

Before you begin, make sure that the following prerequisites are in place:

- ▶ Object server needs to be running under the Process Agent and be configured for running external commands.
- ▶ The system must have the `nco_cur1` command line utility installed. See this website for more information:
http://www.ibm.com/support/knowledgecenter/SSY487/com.ibm.netcool_OMNIBusaas.doc_1.2.0/task/emaas_ins_omnibus.html
- ▶ The system must have connectivity to `ibmnotify.mybluemix.net`.
- ▶ You need to decide which alerts need to be notified unless you want to use the default, which is to create alerts for Major or Critical alarms that occurred in the last 60 seconds.

Configure IBM Alert Notification

Complete the following steps to configure IBM Alert Notification:

1. Log in and launch the Alert Notification. Click the **Manage API Keys** option as shown in Figure 1-8.

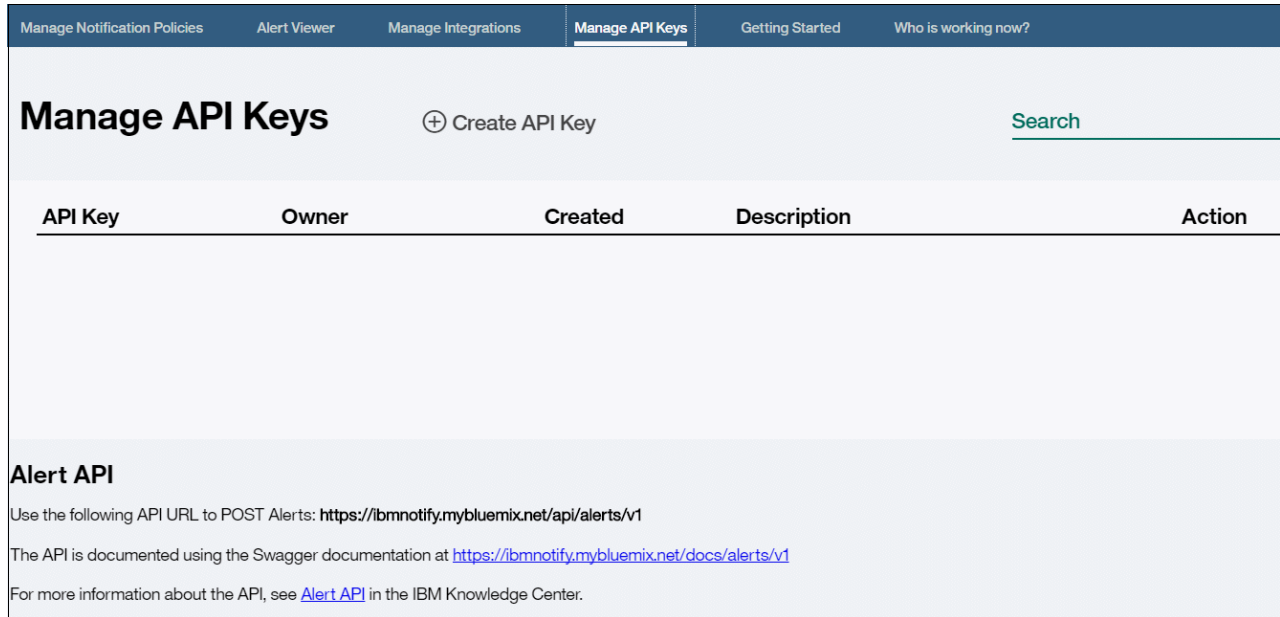


Figure 1-8 Manage API Keys

2. Click **Create API Key** and enter a description of what the key will be used for as shown in Figure 1-9.

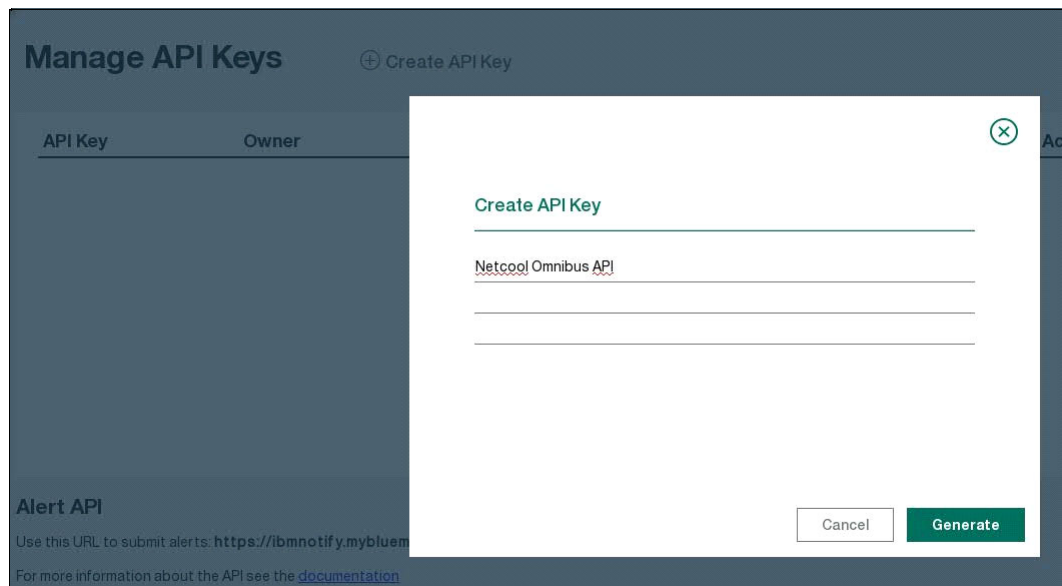


Figure 1-9 Create API Key

3. Click **Generate** to generate the key. The name and password of the API Key are displayed as shown in Figure 1-10. Copy the password and store it securely. You will not be able to retrieve it again.

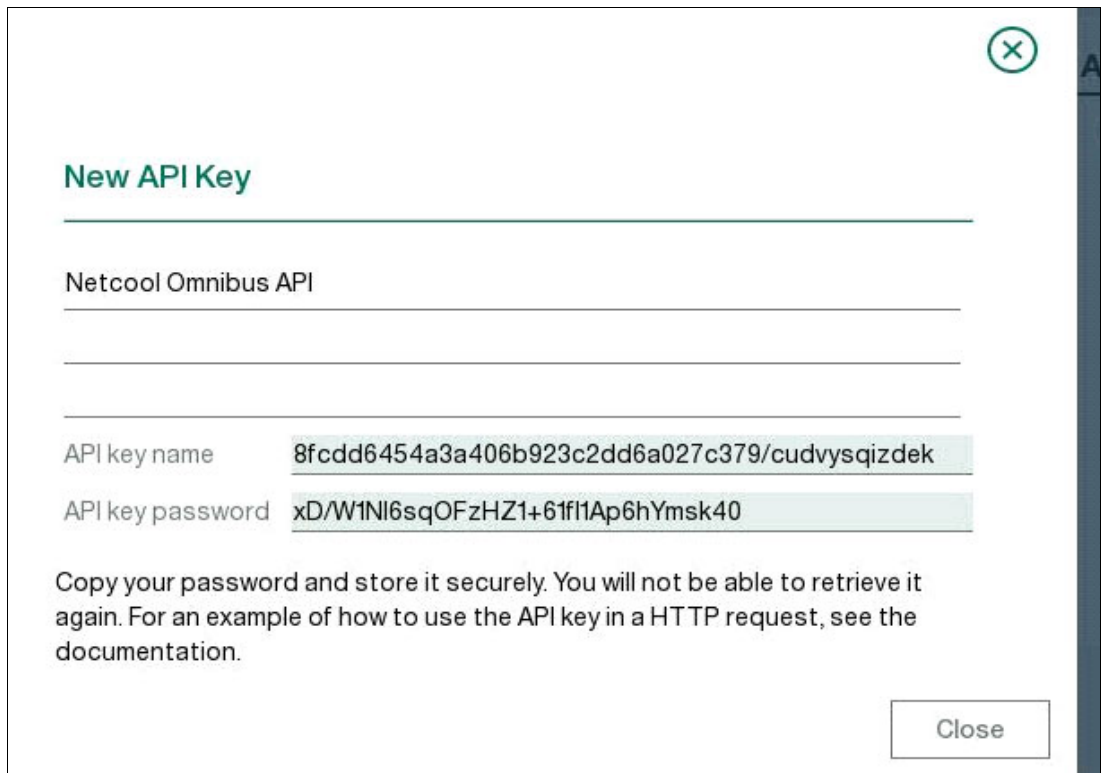


Figure 1-10 Generate API Key name and password

4. Copy these Netcool/OMNIBus service credentials. They will be required in the Netcool/OMNIBus triggers.

Netcool/OMNIBus configurations

You need to modify the trigger to use the credentials created for Netcool/OMNIBus in , "Configure IBM Alert Notification" on page 9. To do so, complete the following steps:

1. Open the configuration Manager by using the following command:

```
nco_config &
```


- To configure the trigger in the Object Server, click **Automation** → **Triggers** → **send_alert_to_an (trigger_name)** as shown in Figure 1-11.

Configuration of AGG_P on Omni_A.swg.be.ibm.com:4100

Name	Group	Kind	Priority
re_remove_dangling_parentE...	ibm_re_triggers	Temporal	20
registry_new_probe	registry_triggers	Database	10
registry_probe_disconnect	registry_triggers	Signal	10
registry_reinsert_probe	registry_triggers	Database	10
registry_update_probe	registry_triggers	Database	10
reset_user	security_watch	Signal	1
resync_complete	primary_only	Signal	1
resync_finished	gateway_triggers	Signal	1
scala_insert	scala_triggers	Database	20
scala_reinsert	scala_triggers	Database	20
security_watch_security_failure	security_watch	Signal	1
send_alert_to_an	primary_only	Temporal	10
send_res_to_an	primary_only	Database	10
service_insert	default_triggers	Database	1
service_reinsert	default_triggers	Database	1
service_update	default_triggers	Database	1
severity_from_causetype	itnm_triggers	Database	1
sm_block_events_from_gatew...	self monitoring qr...	Database	1

Figure 1-11 OMNibus Trigger Modification

- Click the Action tab of the filter and configure the trigger to select events of interest. By default any major or critical alert that occurs in the last 60 seconds is selected as the trigger, excluding the OMNibus self-monitoring alarms (Class = 99999). The where clause used is:

```

alert.LastOccurrence >= ( getdate() - 60 ) and alert.Class != 99999 and
alert.Severity >= 4

```

- Set the API key user name and password that you created in Service Credentials. Replace the following strings in the trigger with the new credentials as shown in Figure 1-12.

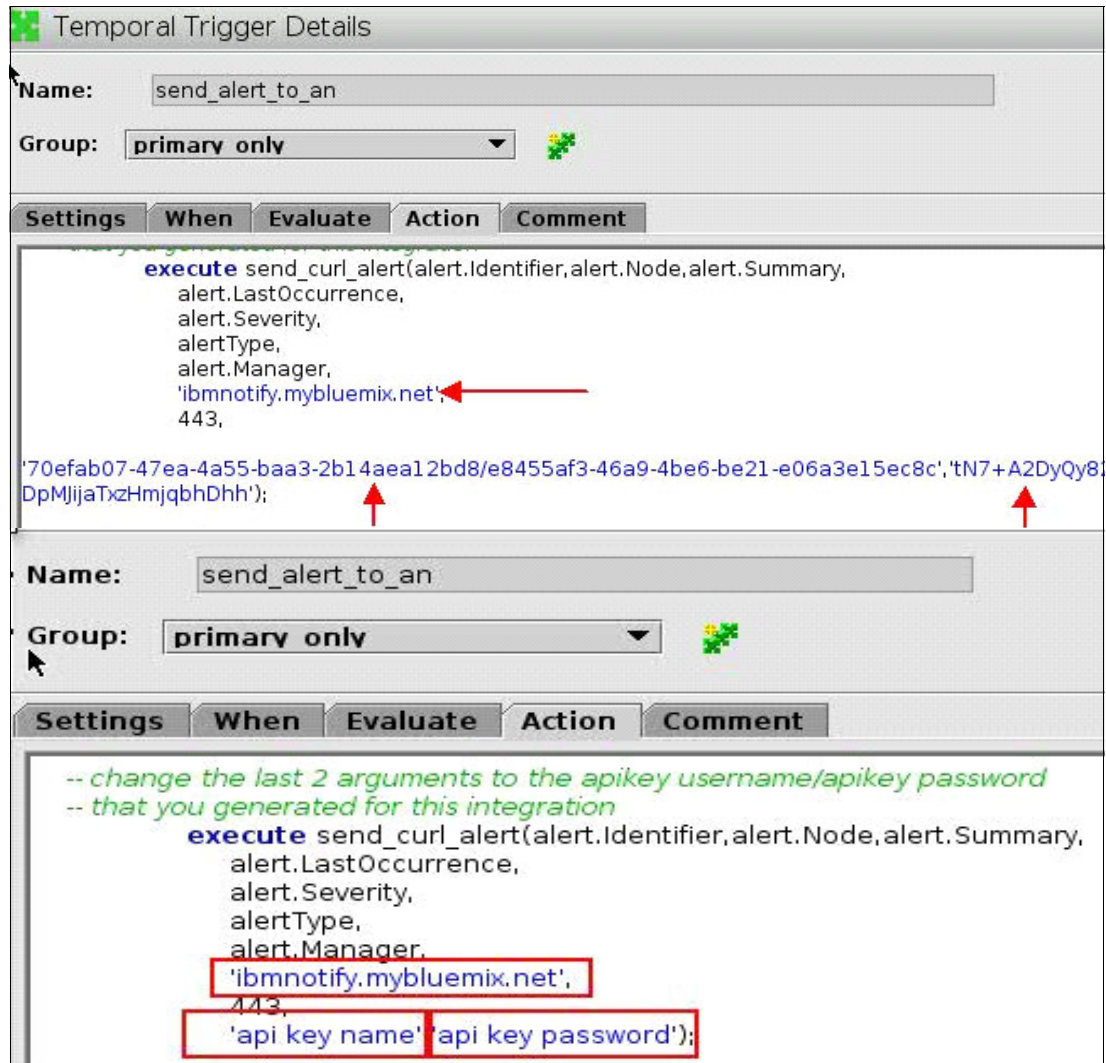


Figure 1-12 OMNIbus Trigger modifications

- Confirm that the trigger syntax is correct and save the trigger.
- Perform similar changes on the resolution trigger `send_res_to_an`.
- Test the automation by Inserting a test event into the ObjectServer that matches the criteria of the trigger. If you are using the trigger used in this example, the following insert will create an alert that is forwarded to the Alert Notification service and be visible in the Alert Viewer:

```
insert into alerts.status (Identifier, Severity, Node, Summary, Manager, Type, LastOccurrence)values ('TEST-event-ANS1', 4, 'Node1','Test alert to check Alert Notification AlertNotificationsTestService', 'OMNIbus', 1 , getdate());
```

Figure 1-13 shows the Alert Viewer with the test alert visible.

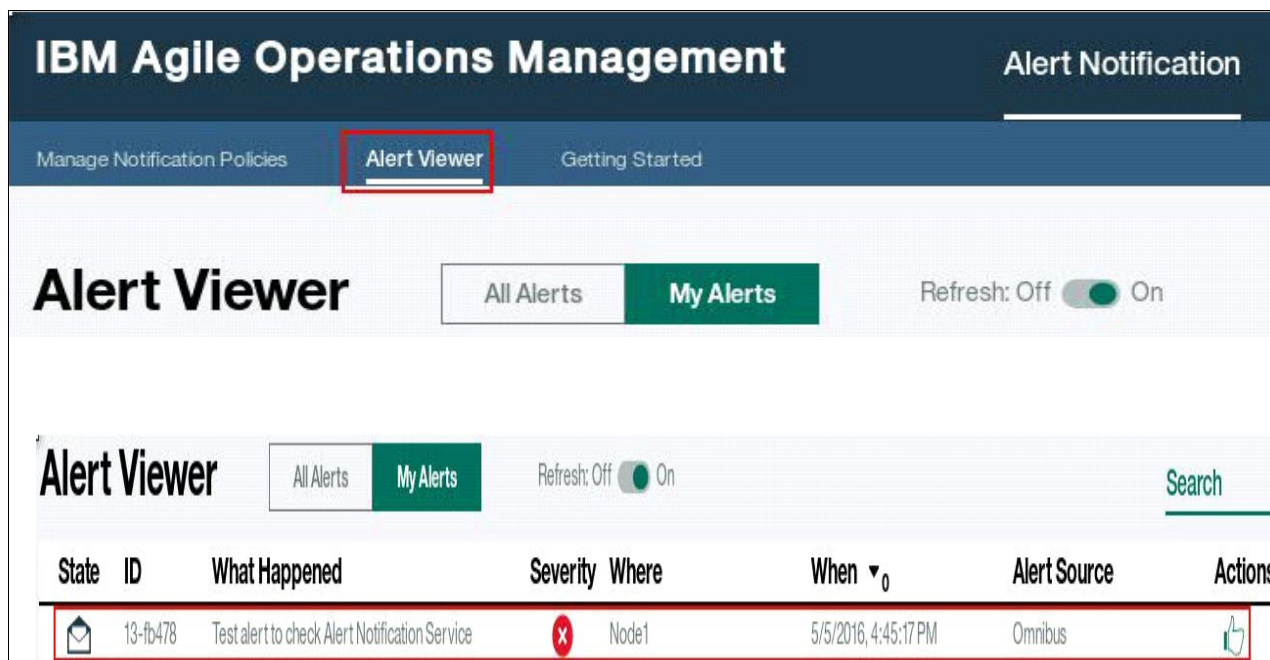


Figure 1-13 IBM Alert Notification - Alert Viewer

If you configured SMS alert notification in your user ID profile, you should receive the event notification within 30 seconds. You should also receive the event notification at the email address that is defined in your user ID profile.

You can test multiple occurrences by changing the filter condition in the trigger and validating the alert received in Alert Notification service.

1.3.4 Integrate IBM Alert Notification with IBM Netcool/Impact

IBM Tivoli Netcool/Impact is enterprise and network management software that automates the support of business-critical functions. Tivoli Netcool/Impact enhances the functions of Netcool/OMNibus by collecting and injecting contextual details into events, incidents, and problems. It can correlate and display information from multiple sources to enable administrators to make quick decisions or take action. It can initiate or automate action based on the current state of events and logical policies. In a customer environment that has Tivoli Netcool/Impact implemented, ANS can be integrated with Netcool/Impact for notifications.

Files are provided for download from IBM developerWorks® that you can use to create a trigger in Netcool/Impact that will forward events to Alert Notification. You can configure this trigger to select the events that you want to be notified of.

Before you begin, make sure that the following prerequisites are in place:

- ▶ Check that the Impact server is up and running and processing events.
- ▶ Edit the default policy to ensure the filter that is used to select events for notification matches your criteria.
- ▶ Ensure that the user with which Impact was installed, has access to Alert Notification tar files to be able to push them into Impact.

Download and extract anexport2.tar at:

<https://ibm.biz/BdrXsw>

Import package contents to Netcool/Impact

Perform the following steps to import the package contents to Netcool/Impact:

1. Download and extract the package anexport2.tar.
2. Import the extracted package contents into Netcool/Impact by using the following command:

```
$IMPACT_HOME/bin/nci_import NCI /<location of extracted package_contents>
```

where NCI is your Netcool/Impact instance name.
3. If a message regarding locks is displayed, run the following command to unlock, followed by the previous command:

```
./nci_version_control NCI uncoall ""
```

Import CA certificates to Netcool/Impact truststore

Perform the following steps to Import CA certificates to Netcool/Impact truststore:

1. Download add_common_certificates.zip from the following URL:
<https://ibm.biz/BdrXst>
2. Extract add_common_certificates.zip to a temporary location and ensure proper permissions to the script file:

```
chmod u+x add_common_certificates.sh
```
3. Import the CA certificates to Netcool/Impact truststore by using the following command:

```
add_common_certificates.sh <IMPACT_HOME_DIR> NCI <IMPACT_ADMIN_PASS>
```
4. Restart the Netcool/Impact application and check for any errors in impactserver.logs.

Tip: Importing CA certificates to Netcool/Impact truststore also works with Impact servers that use customer-specific signed certificates.

Configure IBM Alert Notification

See “Configure IBM Alert Notification” on page 9 for the procedure. You can create the API Key and password by using the mentioned procedure for Netcool/Impact.

Netcool/Impact configurations

For Netcool/Impact configurations follow these steps:

1. Open the Netcool/Impact toolbar and select **Alert Notification** from the project drop-down list as given in Figure 1-14.

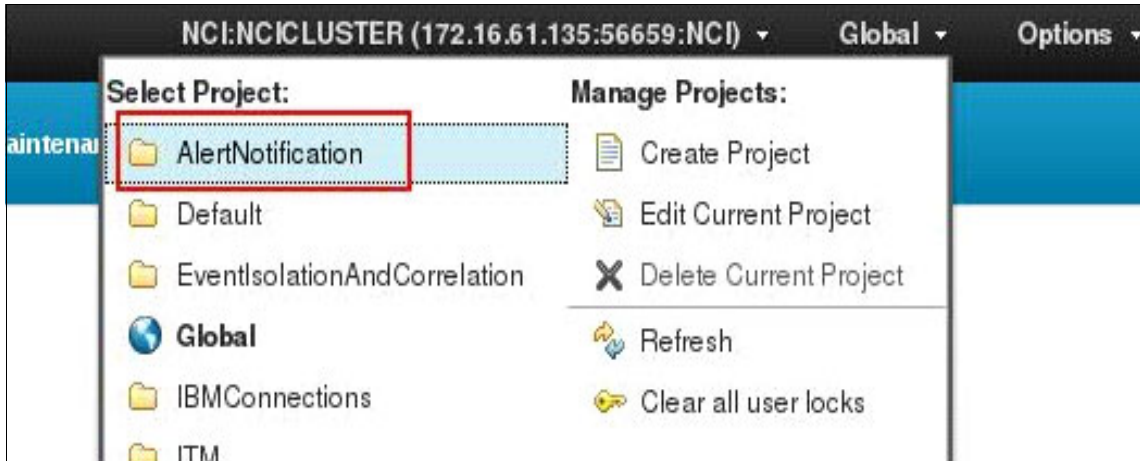


Figure 1-14 Netcool/Impact Project drop-down list

2. From the Policies tab, click the JavaScript policy named **SendAlertsToAlertNotification** as shown in Figure 1-15.

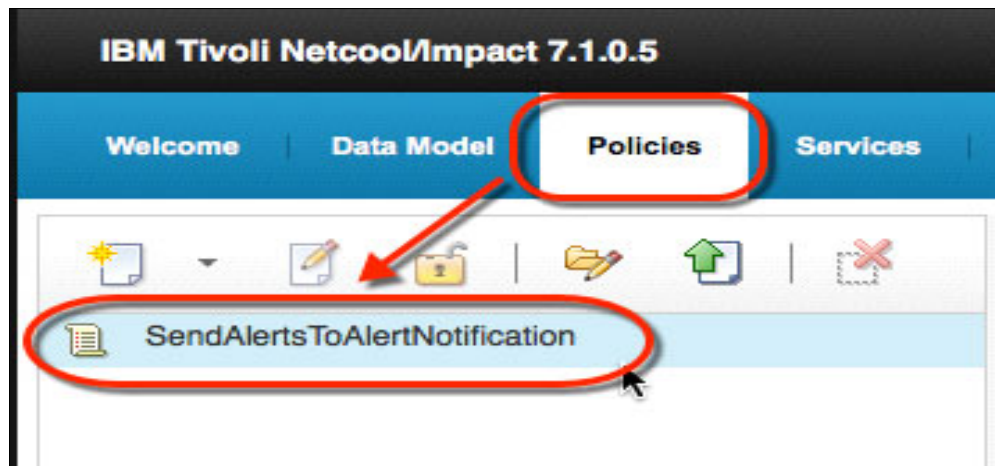


Figure 1-15 Netcool/Impact JavaScript policy

3. Complete the API key values (Name/Password) received on creating credentials for Netcool/Impact in Alert Notification as shown in Figure 1-16. Do not remove the single quotation marks that surround the text string.

```
*10 /* Update your apikey and password */
11 var an_apikey = '';
12 var an_apikeypass = '';

Change to:
*10 /* Update your apikey and password */
11 var an_apikey = '70efab07-47ea-4a55-baa3-2b14aea12bd8/6961d160-8e43-40f8-bb12-bb452f64cad4';
12 var an_apikeypass = 'jSd+RqtL4hysteUI7tNcGmwPTOKXMOPuI';
13
```

Figure 1-16 Netcool/Impact JavaScript modification

4. Replace the `an_host` value in line 23 (`an_host`) with the text string `ibmnotify.mybluemix.net`. Do not remove the single quotation marks that surround the text string as shown in Figure 1-17.

```
21 // Environment Configuration
22 var an_protocol = 'https';
23 var an_host = 'ibmnotify.mybluemix.net';
24 var an_port = 443;
25 var an_path = '/api/alerts/v1';
```

Figure 1-17 `var an_host` parameter modification

Tip: Note that Impact Server needs connectivity to Bluemix. Also, Impact server needs to resolve the host name.

5. Save the **SendAlertsToAlertNotification** policy to continue. Click the **Save** icon at the top of the script workspace as shown in Figure 1-18.

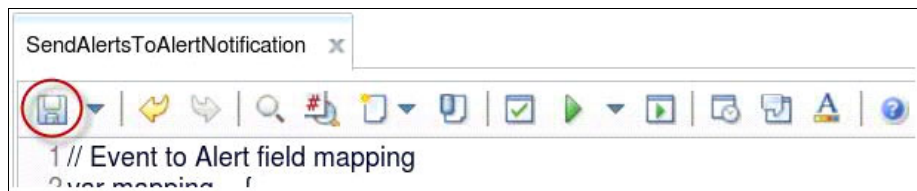


Figure 1-18 Save the `SendAlertsToAlertNotification` policy

6. Now you can configure the Alert Notification service that you have imported in earlier sections. Open the Services tab and double-click the **AlertNotificationService** event reader entry. See Figure 1-19.



Figure 1-19 Configure the Alert Notification service

7. Select **Starts automatically** when server starts.

8. Select the **Event Mapping** tab as shown in Figure 1-20.

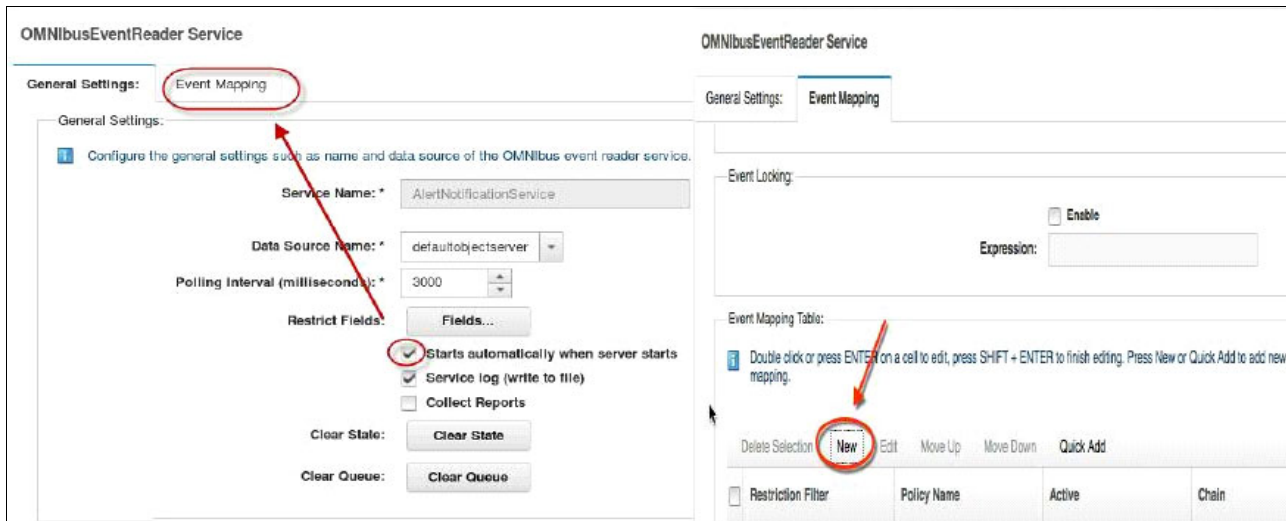


Figure 1-20 Select the Event Mapping tab

9. Click **New** in the table and create a filter criteria.

10. Complete the criteria that you want to use to select alerts for notification as shown in Figure 1-21.

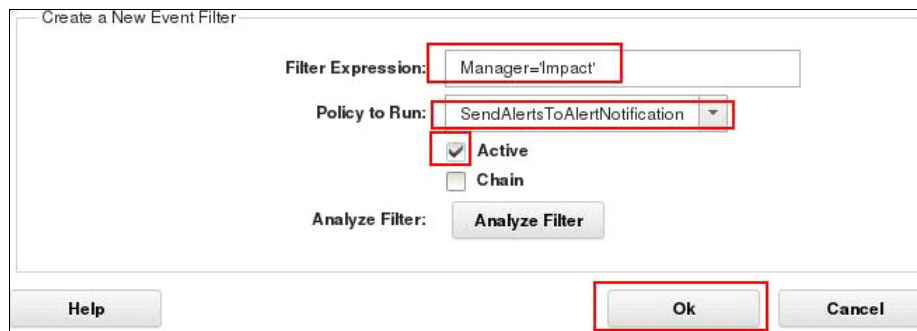


Figure 1-21 Complete the criteria that you want to use

All configured Event Mapping criteria must be visible as active in Event Mapping Table section. See Figure 1-22.



Figure 1-22 Event Mapping criteria must be visible as active

11. Save the changes to the service configuration. Click the **Save** icon at the upper left of the workspace.

12. Enable the service. Right-click **AlertNotificationService** and select **Start**, as shown in Figure 1-23.

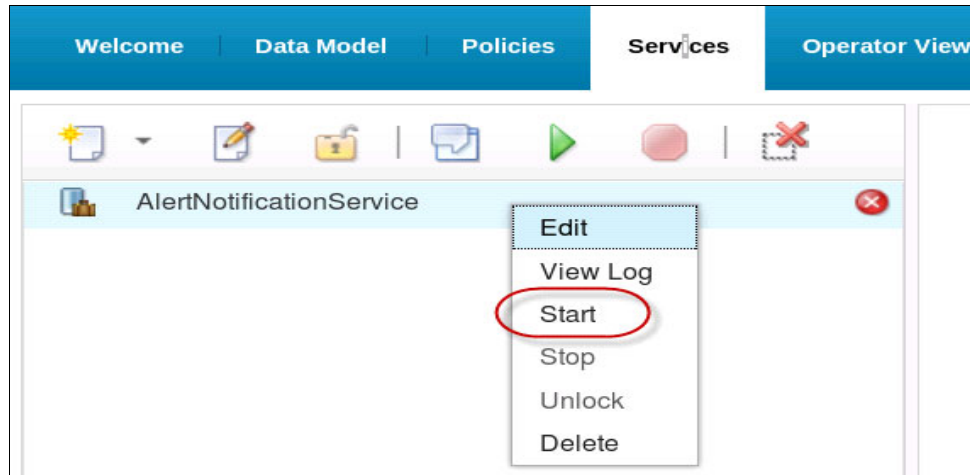


Figure 1-23 Starting AlertNotificationService in Impact

1.3.5 Testing the Alert Notification policies

Because you are using the same environment to test the Impact integration, make sure that the triggers created while integrating Netcool/OMNIBus (in the earlier scenario) are disabled before you test Impact's ability to process events and trigger notification through policy. Complete these steps:

1. Send a test alert with an AlertGroup value of PLMN and Manager as Impact. Enter the following commands:

```
insert into alerts.status (Identifier, Severity, Node, Summary, Manager,
AlertGroup, Type) values ('an-test-event', 4, 'PLMNNode', 'Test event1 for the
Impact alert notification service', 'Impact', 'PLMN', 1 );
```

2. Switch to Alert Notification console and click the Alert Viewer tab. You should see the alert in the alert console and receive notifications within 30 seconds as shown in Figure 1-24.

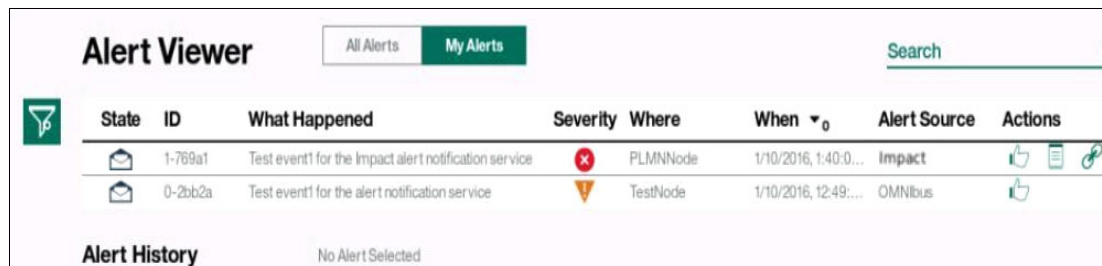


Figure 1-24 Alert as seen in Alert Viewer

1.4 Alert Notification on mobile

IBM Alert Notification enables your IT operations teams to automate alert communication with features like Escalation policies, notifications, and alert analytics for driving greater efficiencies in responding to IT situations. The IBM Alert Notification mobile app is part of the SaaS IBM Alert Notification service that is offered on IBM Cloud Marketplace and

IBM Bluemix. The Mobile application provides notification and escalation capabilities to mobile devices.

One of the methods by which Alert Notification Service notifies is by using SMS. SMS consists of the least required details of an alert to identify an alert and accept it by acknowledging the alert. Figure 1-25 shows a small sample of SMS messages received for a Link down event in Alert Notification.

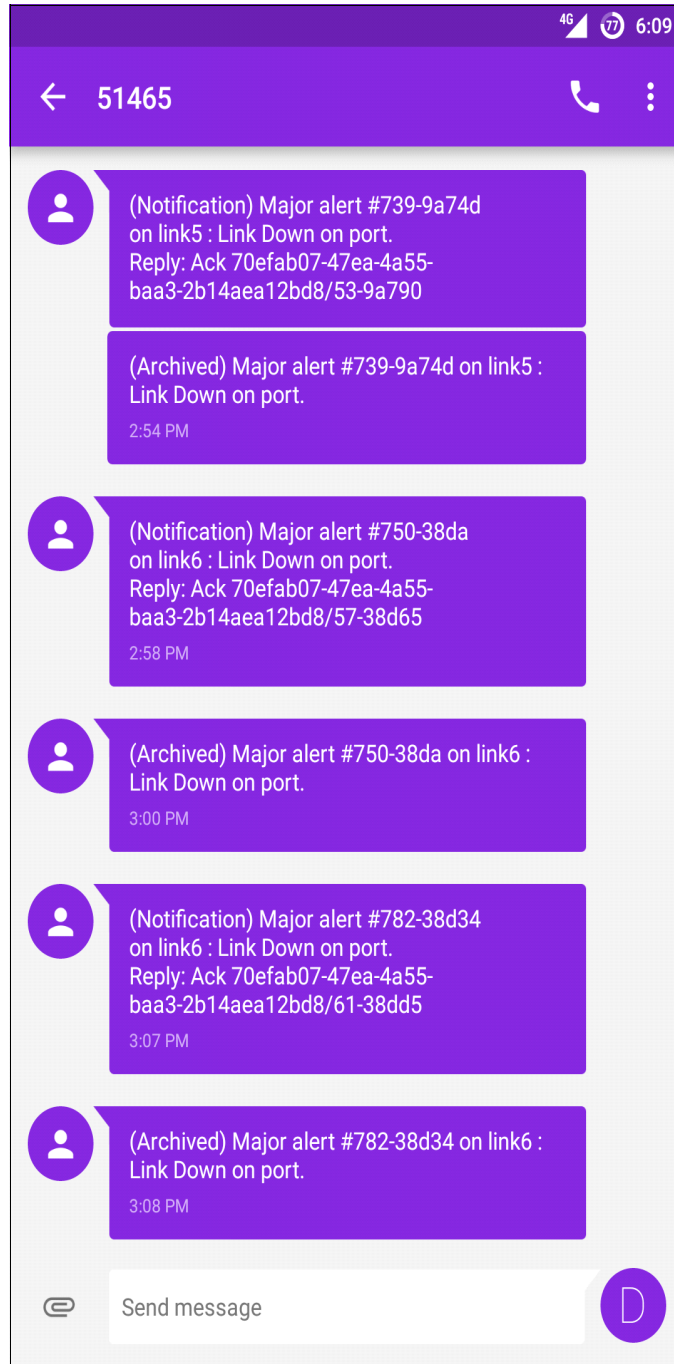


Figure 1-25 Sample of SMS alert using IBM Alert Notification Service

SMS also allows you to acknowledge an alert by replying using the syntax provided in the primary information SMS. For the first case above, the text message for acknowledging the alert would be:

```
<Ack 70efab07-47ea-4a55-baa3-2b14aea12bd8/53-9a790>
```

Note: This string comes as part of SMS, so the user can copy and paste the string to reply.

Apart from SMS, Android and iOS operating system users also have an option to have a subset of IBM Alert Notification functions to be used through an app. The app is available for download from Google Play store:

<https://play.google.com/store/apps/details?id=com.ibm.systems.alertnotification&hl=en>

You can also download it from the Apple AppStore:

<https://itunes.apple.com/us/app/ibm-alert-notification/id1060625229?mt=8>

You can receive notifications and work with alerts through the app. Configuration tasks, such as requesting API keys and creating and editing notification policies, can be performed only from the desktop version of Alert Notification.

1.4.1 Logging in for the first time

Complete the following steps to authenticate your subscription on the mobile app:

1. Download the mobile app onto mobile device. It can be downloaded from the Apple App Store or Google Play, as shown in Figure 1-26.

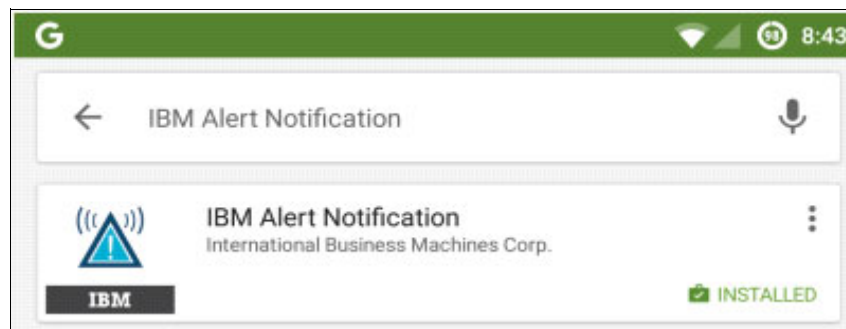


Figure 1-26 Mobile App installed

2. To add a subscription to the mobile app, access your IBM Alert Notification subscription URL from your mobile device's browser and log in. You only need to do this once. The subscription URL for the mobile app is the same as the subscription URL for the desktop browser. The person who created the subscription is sent the URL in an email alerting them that the service is ready. Request the URL for the subscription from the creator, or use the URL in the welcome email if you received one.

Figure 1-27 shows the subscription window.

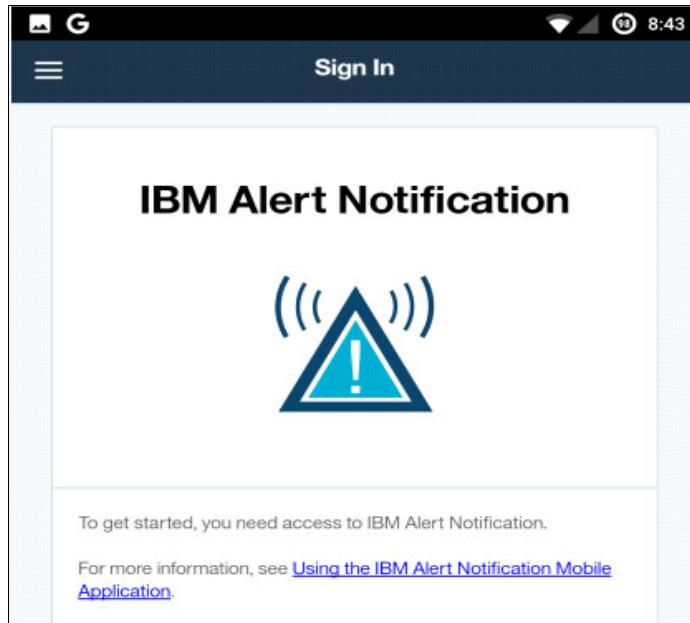


Figure 1-27 Mobile App Subscription

3. Click **Add subscription to mobile app** as shown in Figure 1-28. This action launches the mobile app.

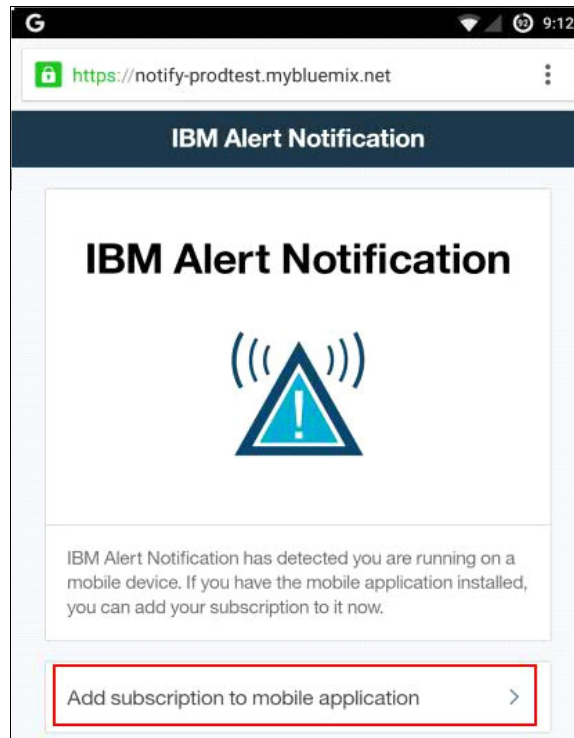


Figure 1-28 Add subscription on the mobile app

4. Add a name for the subscription in the field provided as shown in Figure 1-29. The name will be used in the future for this subscription on the device.

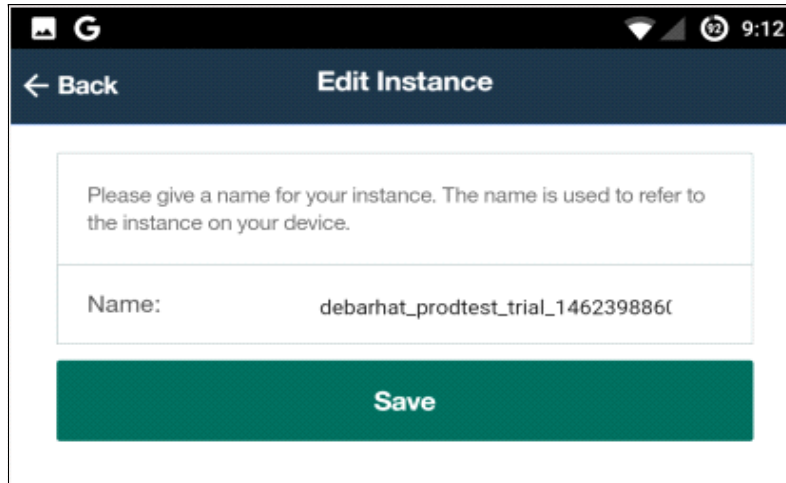


Figure 1-29 Subscription Mobile App

5. Click **Save**. The subscription will be available for login under Available subscriptions, as seen in Figure 1-30.

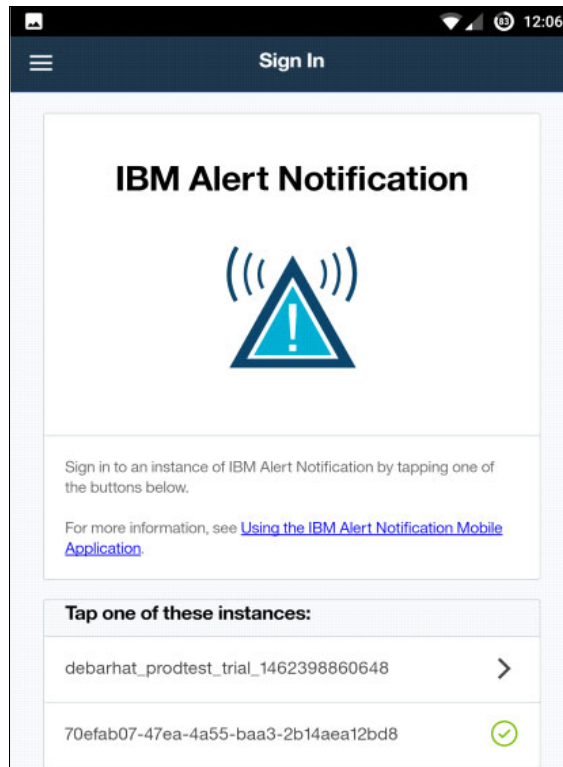


Figure 1-30 Available subscriptions

6. After the user logs in to Subscription, they will have Alert Notification features available through a mobile app. As shown in Figure 1-31, Alerts Overview page would have two tabs: One for My Alerts and other for All Alerts.

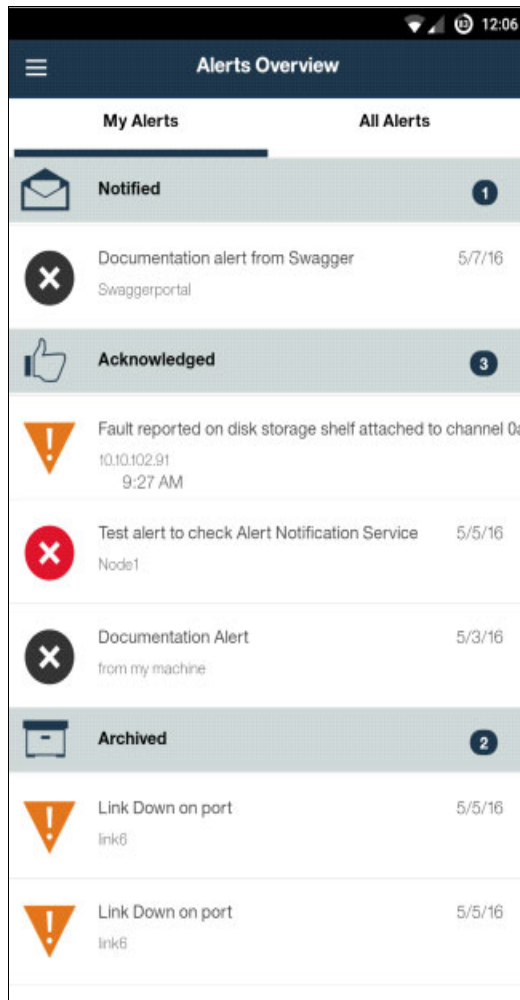


Figure 1-31 Alert Notification service Alerts Overview page

Alerts are categorized by the following notification states:

- **Notified:** Alert Notification has matched the alert to a notification policy and triggered a notification, which was sent to the users or groups defined in the notification policy. No notification recipient has yet acknowledged the alert. Indicates that no one is working on an alert.
- **Escalated:** A time period specified in the notification policy has passed without the alert being acknowledged. An escalation notification has been sent to the users or groups defined in the notification policy.
- **Acknowledged:** Indicates to Alert Notification that the alert is being worked on. A contact has acknowledged the alert, either from the notification or in the Alert Viewer. Alerts can switch between the acknowledged and unacknowledged states, for example, if an alert was mistakenly acknowledged.

You can use these techniques to sort the results:

- Click the **Menu** to show only alerts with a particular notification status.
- Click an **Alert** to open the Alert Details window for that alert. Here you can acknowledge or unacknowledge the alert. You can also see the alert history and any links that are defined in the alert payload. Click the **Back** button to return to the Alerts Overview.
- Users can acknowledge the alert by clicking the **Acknowledge** button. Figure 1-32 shows that the alert has been acknowledged.

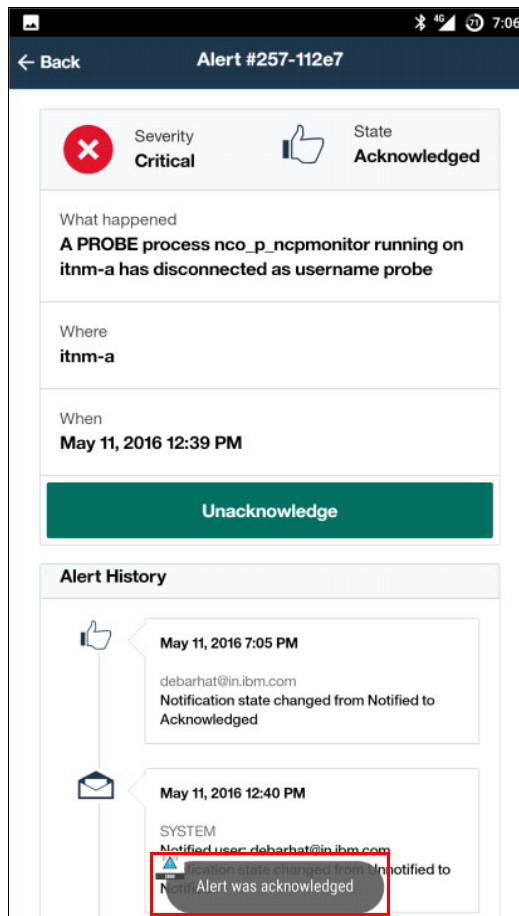


Figure 1-32 Alert acknowledged

- Swiping the alert to left from Alert Viewer also acknowledges an alert.

Alerts can have the following severity levels:

- **Fatal:** A service-terminating condition has occurred. Immediate action is required.
- **Critical:** A service-affecting condition has occurred, and corrective action is immediately required. For example, a device has gone out of service and needs to be restored.
- **Major:** A service-affecting problem occurred. Corrective action is urgently required. For example, a severe degradation occurred in the capability of a device and full capability must be restored.

- **Minor:** A non-service affecting problem occurred. Take corrective action to prevent alerts of higher severity. For example, a problem occurred on a device but it does not impair the capacity or performance of the device.
 - **Warning:** Potential or impending problems were detected. Further investigation is needed to prevent alerts of higher severity.
 - **Indeterminate:** The severity level cannot be determined from the device.
7. When a user configures an instance in the mobile application, they automatically receive IOS and Android push notifications to that device with no additional configuration required. When a user uninstalls the application, the push notifications are unregistered. Select the **Alert** to open the alert notification mobile app UI. Alert details about that particular alert are displayed as shown in Figure 1-33.

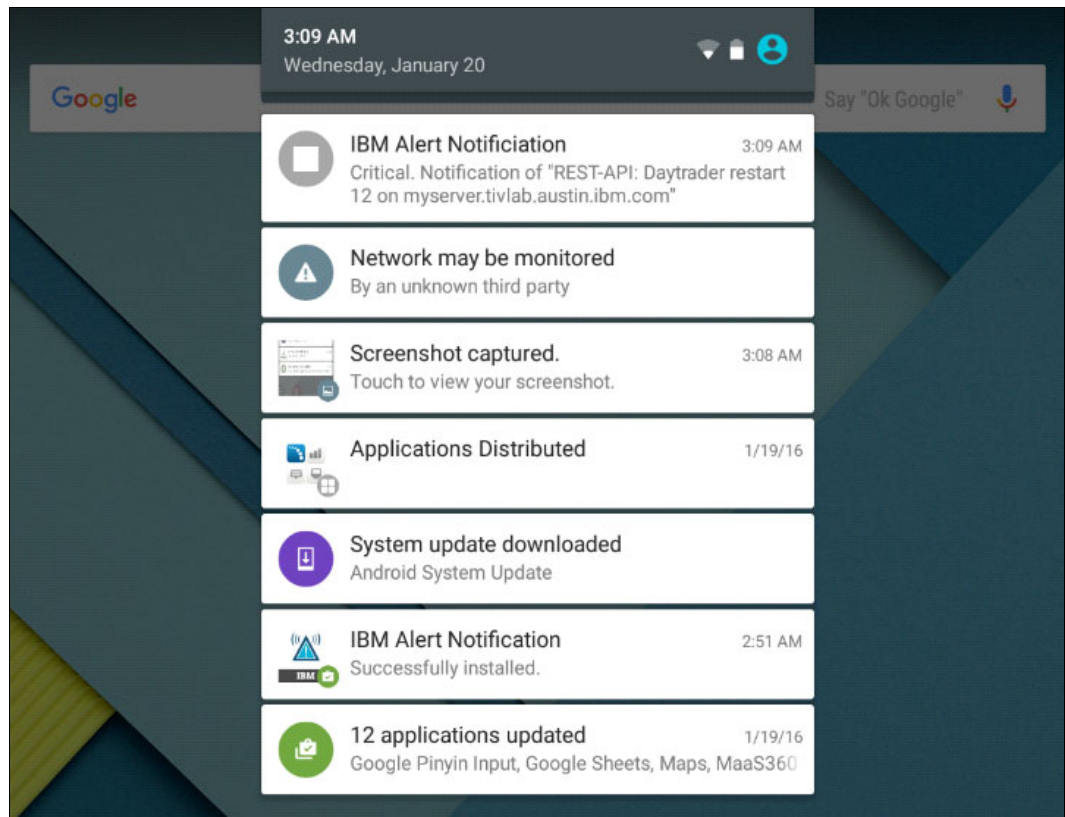


Figure 1-33 Alert details

1.5 Scenarios

In the world of managed IT services, proactive management of issues and a strategic approach are recommended for improving operations and simultaneously cutting expenses. The timely flow of information has an indispensable role in these processes.

Any outage or downtime due to unawareness or delay in flow of information incurs a heavy revenue loss. It makes a great impact not only in terms of money, but credibility, reputation, customer retention, employee satisfaction, and overall confidence.

Following factors can help calculate the impact of a downtime:

- ▶ Revenue losses
- ▶ Impact on cash flow
- ▶ Productivity loss
- ▶ Compliance and reporting penalties
- ▶ Penalties and loss of discounts
- ▶ Impact to customer and strategic partners
- ▶ Employee morale and employee confidence in IT
- ▶ Damage of reputation and goodwill

If we can see a service affecting outage unfold in front of your eyes, you can resolve the issue faster.

This scenario covers the idea of identifying a hardware or operating system alert and notifying the concerned team to take action on it. Acknowledgment of an alert indicates that the issue has been identified and accepted, and that the responsible personnel have started working towards its resolution.

1.5.1 Scenario 1: Notifications for hardware alerts

A typical hardware system while in operation sends event related to the performance of its parts such as fans, power supplies, chassis, hard disk drives, UPS and so on. Similarly, an operating system generates alerts for its performance such as hard disk status, volume available, CPU usage, and memory usage.

Alerts about the performance of these parts are separated into four sections. Figure 1-34 shows information for a power supply.

Description	Severity	System Status
Power Supply Faulty	Major	Up
Power Supply Failure	Critical	Up, running on secondary supply
Power Supply Failure Shutdown	Critical	Down
Power Supply Repaired	Clear	Up

Figure 1-34 Power Supply example

A mission critical hardware system reports a suspected issue with the power supply and generates an alert to Netcool. Further events are reported and generated if the preliminary warning alert is not handled in a specified amount of time.

If a device alert is properly communicated and catered to by field engineers in a timely manner, the system can be saved from crashing. A delay of a few hours might lead to system crash or unexpected shutdown, leading to interruption of service to the customers.

A solution needs to be put in place for such issues to be handled and managed in a timely manner. IBM Alert Notification is handy for handling such cases based on priority and engaging the right person at the right time to resolve the issue before a crash occurs.

This section shows how you can use IBM Alert Notification Service to help prevent outages.

Step-by-step implementation

The solution explained here was performed in a test environment that was connectivity to IBM Alert Notification through the Internet. Netcool Operations Insight was installed on the virtual images to connect to Alert Notification. The following components of Netcool Operations Insight are used:

- ▶ Netcool/OMNIBus V 8.1
- ▶ Netcool/OMNIBus WebGUI V 8.1
- ▶ Netcool/Impact V 7.1

Figure 1-35 shows the logical configuration that is used for this scenario.

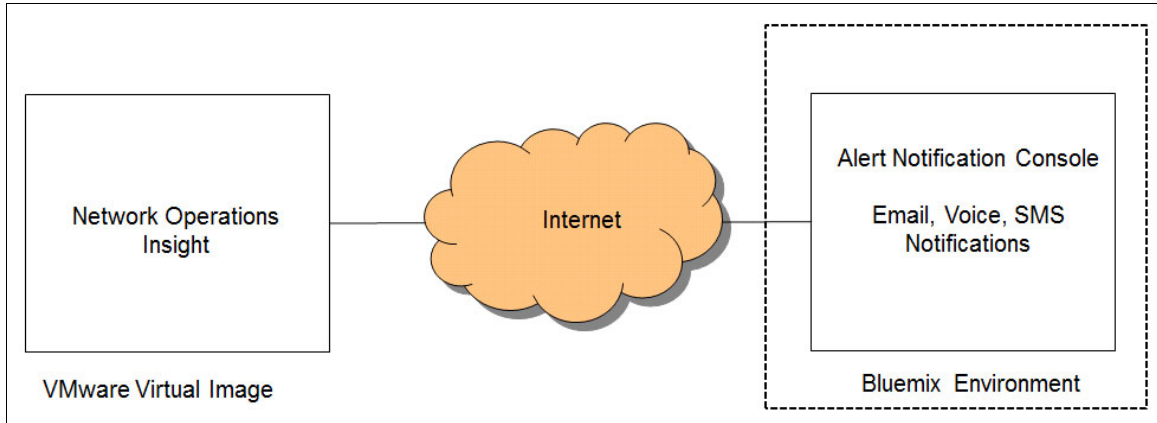


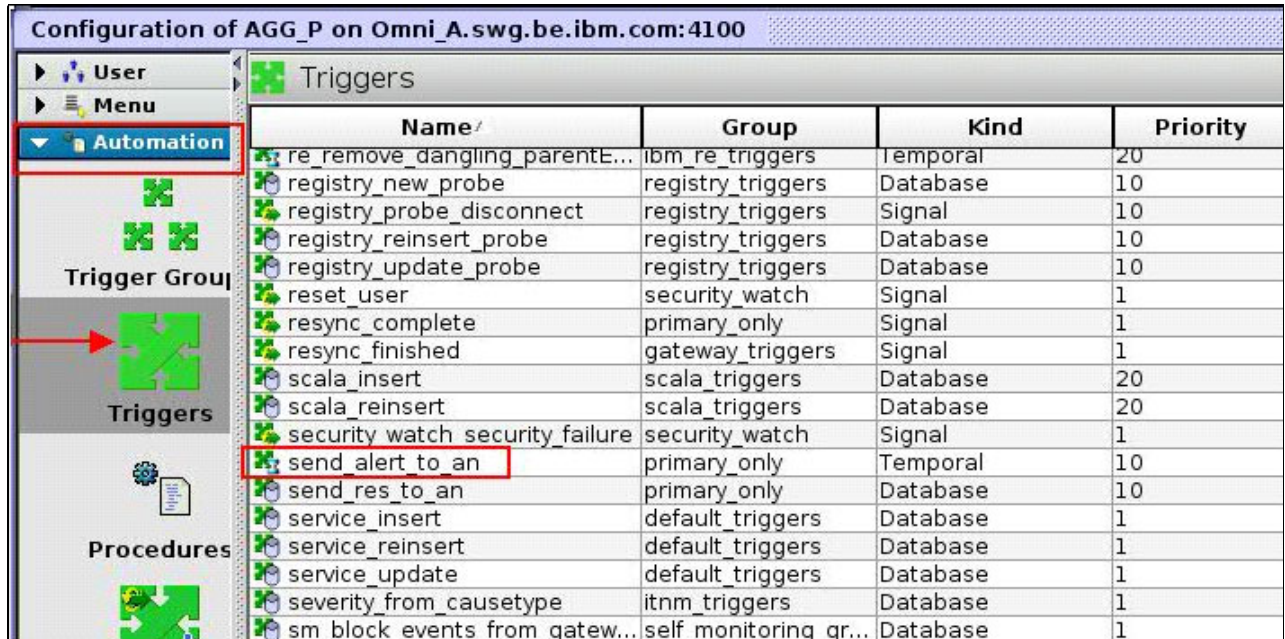
Figure 1-35 Logical diagram

The issue can be properly handled by completing the steps in the following sections to configure notification.

Configure Trigger on Netcool/OMNibus

Perform the following steps to configure the trigger:

1. Open the Netcool/OMNibus Object Server trigger as shown in Figure 1-36.

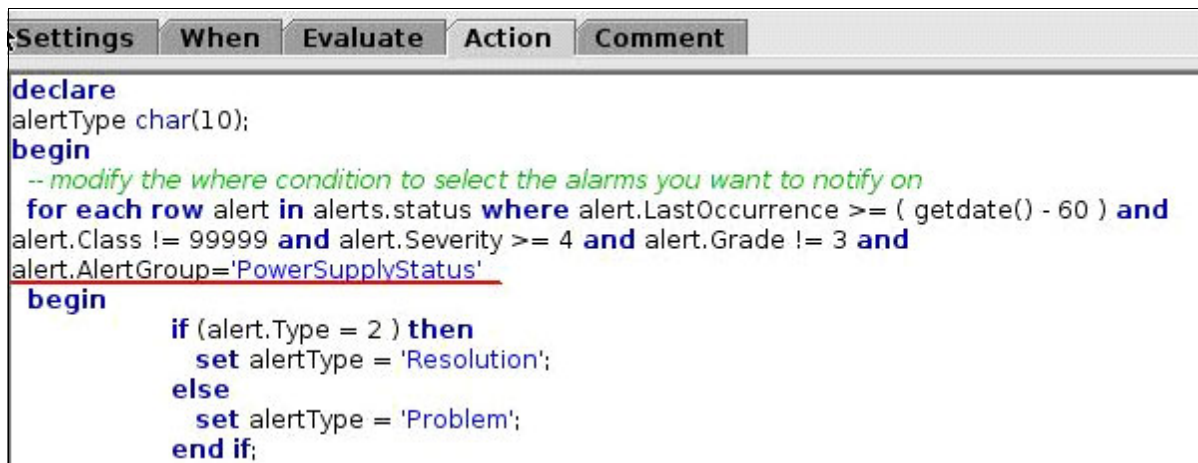


Configuration of AGG_P on Omni_A.swg.be.ibm.com:4100

Name	Group	Kind	Priority
re_remove_dangling_parentE...	ibm_re_triggers	Temporal	20
registry_new_probe	registry_triggers	Database	10
registry_probe_disconnect	registry_triggers	Signal	10
registry_reinsert_probe	registry_triggers	Database	10
registry_update_probe	registry_triggers	Database	10
reset_user	security_watch	Signal	1
resync_complete	primary_only	Signal	1
resync_finished	gateway_triggers	Signal	1
scala_insert	scala_triggers	Database	20
scala_reinsert	scala_triggers	Database	20
security_watch_security_failure	security_watch	Signal	1
send_alert_to_an	primary_only	Temporal	10
send_res_to_an	primary_only	Database	10
service_insert	default_triggers	Database	1
service_reinsert	default_triggers	Database	1
service_update	default_triggers	Database	1
severity_from_causetype	itnm_triggers	Database	1
sm block events from gatew...	self monitoring gr...	Database	1

Figure 1-36 OMNibus Object Server trigger

2. Configure the trigger to select power supply alerts as shown in Figure 1-37.



```
Settings  When  Evaluate  Action  Comment
declare
alertType char(10);
begin
-- modify the where condition to select the alarms you want to notify on
for each row alert in alerts.status where alert.LastOccurrence >= ( getdate() - 60 ) and
alert.Class != 99999 and alert.Severity >= 4 and alert.Grade != 3 and
alert.AlertGroup='PowerSupplyStatus'
begin
    if (alert.Type = 2 ) then
        set alertType = 'Resolution';
    else
        set alertType = 'Problem';
    end if;
end if;
```

Figure 1-37 Trigger modification

Configure the IBM Tivoli Netcool/OMNibus Simnet Probe to simulate power supply alerts. For more information about the probe, see:

https://www.ibm.com/support/knowledgecenter/SSSHTQ/omnibus/probes/simnet/wip/concept/sim_intro.html

Tip: Alternatively, you can use an sql insert statement to generate this event.

Configure Alert Notification service

Perform the following steps to configure the Alert Notification service:

1. Log in and start the Alert Notification service.
2. Go to **Manage Users and Groups**.
3. Add a user as manager to be notified when issue has to be escalated as shown in Figure 1-38.



The screenshot shows the 'Create User' form with the following fields and options:

- User** (selected tab)
- Notifications
- Vasfi Gucer
- vasfi@us.ibm.com
- vasfi@us.ibm.com
- Mobile Phone
- Add a group
- Add a role (dropdown menu)
 - Manager (highlighted with a red box)
- Cancel
- Save (highlighted with a red box)

A red arrow points from the 'Manager' role selection to the 'Save' button.

Figure 1-38 Add a user

4. Under Notifications, make sure that SMS is also selected as a mode of notification for all users as shown in Figure 1-39.

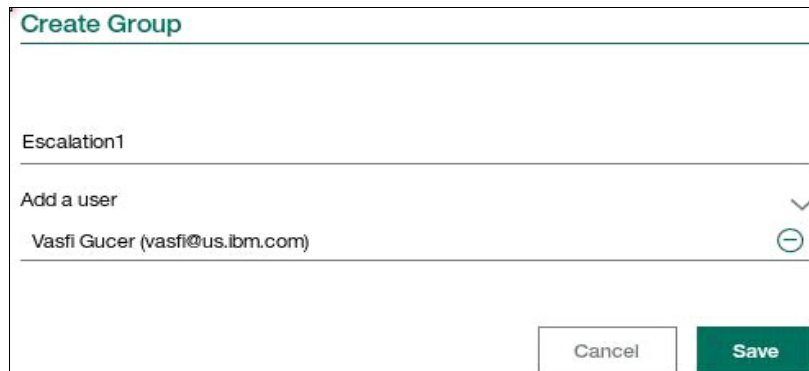


The screenshot shows the 'Create User' form with the following fields and options:

- User** (selected tab)
- Notifications
- Notification method (dropdown menu)
 - Email
 - SMS (selected)
- Cancel
- Save

Figure 1-39 Notification methods

5. Create a group for escalation if the reported notification is not acknowledged quickly enough and add manager as a member of Escalation group as shown in Figure 1-40.



Create Group

Escalation1

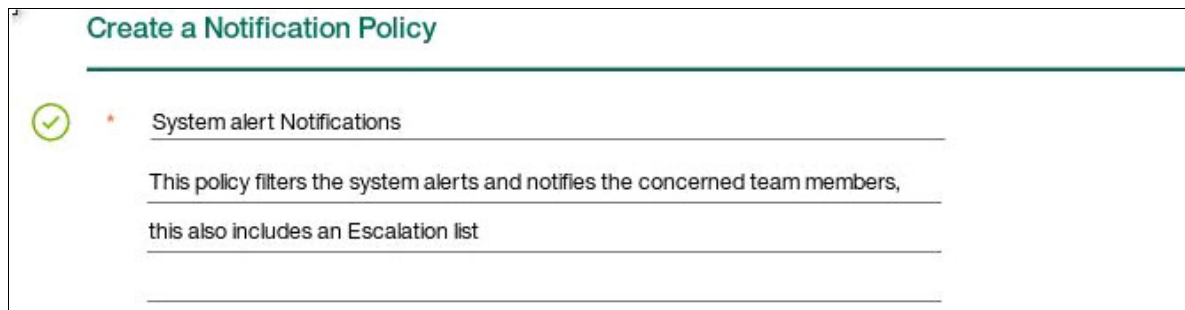
Add a user

Vasfi Gucer (vasfi@us.ibm.com)

Cancel Save

Figure 1-40 Creating escalation groups

6. Create a policy to select policy for sending notifications for Power Supply alerts as shown in Figure 1-41.



Create a Notification Policy

✓ System alert Notifications

This policy filters the system alerts and notifies the concerned team members,
this also includes an Escalation list

Figure 1-41 Create Notification policy

- Write rules to best match the alert for the Power Supply. You can select from the existing predefined rules or add a custom rule. See Figure 1-42.

Note: The “What happened” attribute corresponds to the **Alert.Summary** field in Netcool/OMNIbus.

Figure 1-42 Adding a rule

- Add a field engineer's user profile under recipient list and add **Escalation Group** to be notified in case of escalation.
- Set the amount time to wait before sending an escalated message.
- Review the policy details. If they are correct, click **Save** as shown in Figure 1-43.

Figure 1-43 Rules for Notification

11. Save the policy and enable it through the Manage Notification Policies window shown in Figure 1-44.



Figure 1-44 Enabled Alert Notifications

The enabled policy filters the incoming events in Alert Notification service and selects events that are related to power failure. It then sends a notification to a designated user about the issue.

If the user acknowledges the notification by sending ACK to Alert Notification service, it changes the event status to acknowledged.

If the alert is not resolved or acknowledged within the escalation time frame, an escalation notification is sent to manager notifying that person that no action has been taken on the notification. The workflow is shown in Figure 1-45.

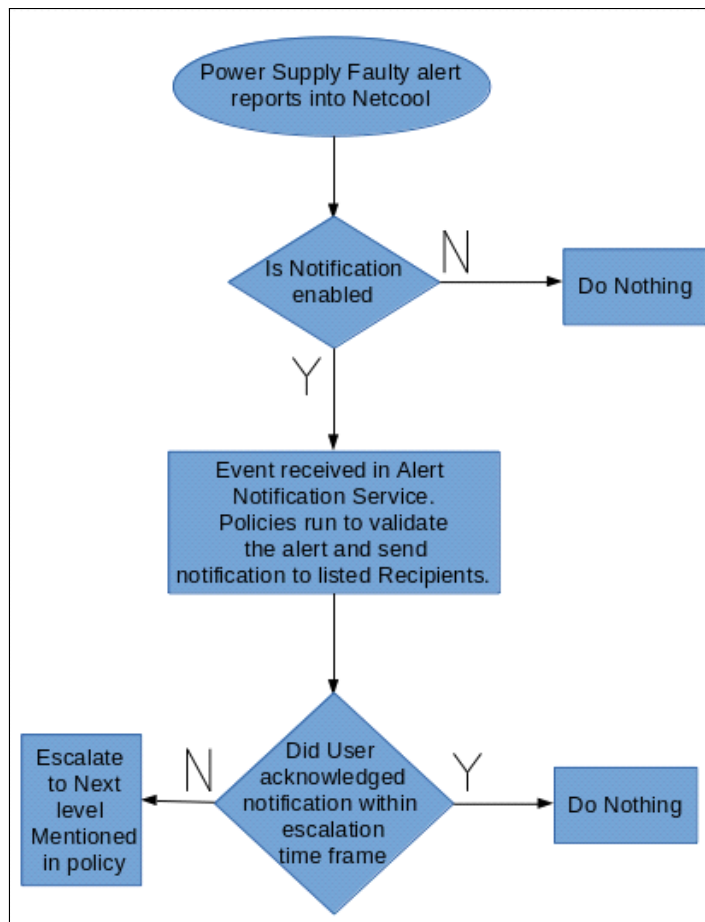


Figure 1-45 Escalation workflow

Power Supply alert in Netcool/OMNIBus

Complete these steps to get the Power Supply alert in Netcool/OMNIBus:

1. When a Power Supply alert reports in Netcool/OMNIBus, it is parsed by the Object Server trigger or can have a Netcool/Impact policy selecting the same. See Figure 1-46.

t

Sev	Ack	Node	Alert Group	Summary	First Occurrence	Last Occurrence	Count	Type	ExpireTime	Agent	Manager
No	No	10.11.102.91	PowerSupplyS...	Power Supply Fault (45005) reported on disk storage shelf attac...	5/11/16, 8:53 PM	5/11/16, 8:53 PM	1	Problem	Not Set	SNMP Probe	SNMP Probe

Figure 1-46 Active Event List alert view

2. The `nco_cur1` command forwards the alert to IBM Alert Notification Service. The alert must be visible in the Alert Viewer. See Figure 1-47.

State	ID	What Happened	Severity	Where	When	Alert Source	Actions
(icon)	1294-97eed	Power Supply Fault (45005) reported on disk stor...	Major (icon)	10.11.102.91	5/11/2016, 8:53:22 PM	SNMP Probe	(icon)

Figure 1-47 Alert Viewer

3. The policy runs on the alert and validates the alert for notification to be sent.
4. After policy validation, the alert would be notified to the recipient list Mail Notification. See Figure 1-48.

Summary	
Where: 10.11.102.91	State: Notified (icon)
Date: 2016-05-11T15:23:22.000Z	Severity: Major (icon)
Id: 1294-97eed	
Power Supply Fault (45005) reported on disk storage shelf attached to channel 0a. Check fans, power supplies, disks, and temperature sensors.	
Actions	
Acknowledge this alert	Full URL: https://ibmnotifybm.mybluemix.net/notifications/70efab07-47ea-4a55-baa3-2b14aea12bd8/65-97e0?action=acknowledge
Unacknowledge this alert	Full URL: https://ibmnotifybm.mybluemix.net/notifications/70efab07-47ea-4a55-baa3-2b14aea12bd8/65-97e0?action=unacknowledge
Alerts Overview	
View all my notifications	Full URL: https://ibmnotifybm.mybluemix.net/ui/launch/alertviewer?subscription=70efab07-47ea-4a55-baa3-2b14aea12bd8&all=fals

Figure 1-48 Summary page

Figure 1-49 shows the notification on mobile device.

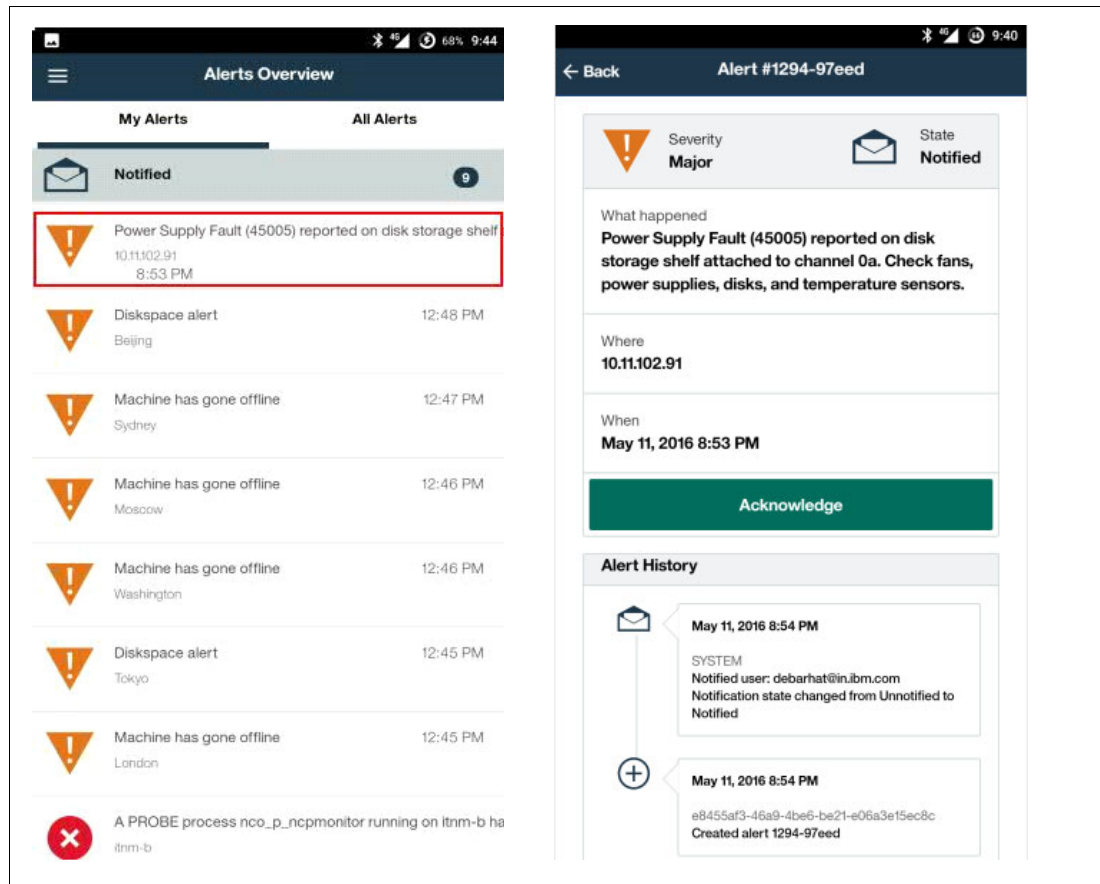


Figure 1-49 Notification through the mobile app

5. If the issue is acknowledged and worked upon, the subsequent notifications are suppressed.
6. If the alert is not acknowledged within the Escalation time limits, an escalation notification is sent to the listed Managers and recipients. See Figure 1-50.

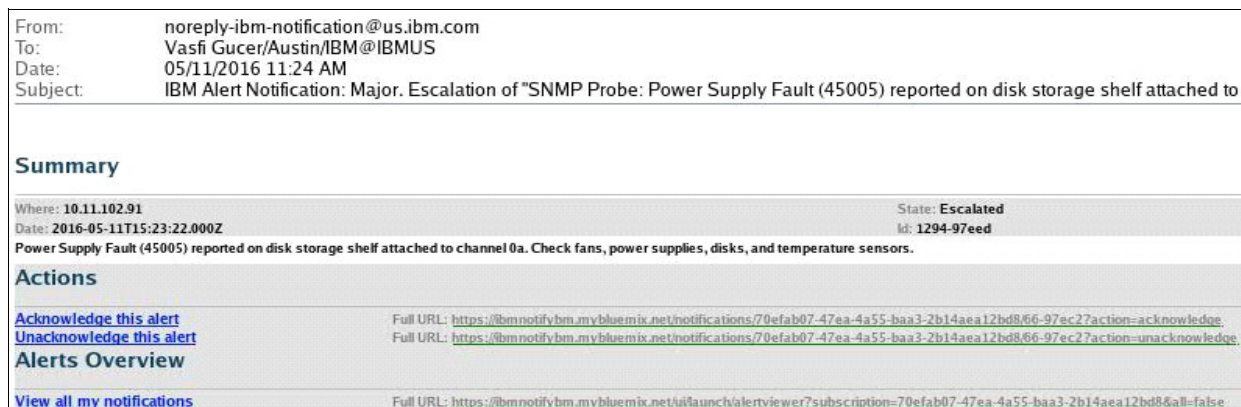


Figure 1-50 Escalation notification

7. From Alert Viewer, users can view the history of the alert as shown in Figure 1-51.

Alert History			
Who	Date ▾ 0	Change	Notified
SYSTEM	5/11/2016, 9:54:45 PM	Notification State changed from Notified to Escalated	vasfi@us.ibm.com
SYSTEM	5/11/2016, 8:54:44 PM	Notification State changed from Unnotified to Notified, Last Notified has been added	debarhat@in.ibm.com
e8455af3-46a9-4be6-be21-e06a3...	5/11/2016, 8:54:43 PM	Created	

Figure 1-51 Alert history

8. The user can acknowledge the event. When a resolution event arrives, or a new occurrence of the event occurs 8 hours after the first, the alert is archived from the Alert Viewer. You can still view Archived alerts by changing the filter condition for Alert Viewer as shown in Figure 1-52.

Alert Viewer						
All Alerts		My Alerts		Refresh: Off <input type="checkbox"/> On		
State	ID	What Happened	Severity	Where	When ▾ 0	Alert Source
	1294-97eed	Power Supply Fault (45005) reported on disk stor...		10.11.102.91	5/11/2016, 8:53:22 PM	SNMP Probe
	1293-886b3	GATEWAY: collection_gate connected from host...		Omni_A	5/11/2016, 8:52:12 PM	OMNibus Self Monitoring @AGG_P

Figure 1-52 Alert viewer: Archived alerts

1.5.2 Scenario 2: Delayed notification, suppression, and work schedules

This scenario demonstrates the available options under IBM Alert Notification to make a suitable notification policy that benefits all.

This scenario is categorized into three parts, based on different features:

- ▶ Delayed notifications
- ▶ Suppression of notifications
- ▶ Scheduling notifications based on working hours.

This scenario explains how a user can best configure Alert Notification service by using the various available options. Therefore, that information flow takes place only for alerts that require attention and only the concerned people are notified once in a given period.

Delayed notification

In a fault management system, an event is reported for any deviation from normal operation of the system. Many of these events are temporary fluctuations that are fixed automatically and only need attention if they keep recurring after a certain period. These temporary alerts might occur due to various reasons such as network congestion and excessive load on the system. These types of issues automatically resolve when the network congestion or system load reduces, which can happen quickly. If the issue is not resolved within a specified amount of time, it needs to be checked by an engineer for the root cause of problem.

Also, there are certain automated solutions deployed in various environments. Such automated solutions are implemented to provide a faster solution to a problem. In such cases, the engineer only needs to look into the issue if the automated solution has failed to resolve it.

Because issues might be resolved automatically or the automation implemented might fix the issue, notifying the user for support becomes a tedious task and involves unnecessary cost of support.

IBM Alert Notification provides an option to control notifications for such alerts. This is done by using X-in-Y minutes alert filtration criteria, where X is the occurrences of alerts in Y minutes.

Scenario

Samantha and her team have developed automated scripts to clean up the disk space whenever a disk space utilization is increased. This automation helps her team to look into only genuine disk space problems that need attention. The automation works such that whenever a disk space alert is reported, there are a few defined locations in script to which a cleanup is performed to make the disk space available. The automation tries to perform cleanup three times before it declares that it is not able to clean up the disk and needs an engineer's attention to check the space other than that defined in script.

This process causes a fluctuation of alerts due to scripts failure to clean the disk space. After deployment of this script, Samantha wants her team to be engaged only if the automation fails and needs the admin team to look into it. As long as the time automation is working, they do not want any notification to be sent.

The Operations team verifies that the event fluctuates four times while the script is trying to fix the issue. If there is a fifth occurrence of alert within 10 minutes, then this is considered a genuine case of disk space and needs an admin to reduce disk space. Sending notifications each time that an alert is reported is not the best approach because it creates excessive alerts for applications. It is a waste of time for admin team to react to every alert when the script might fix it automatically.

To put this in place, use the IBM Alert Notification feature of delayed notification. The Ops team configures a policy in Alert Notification Service that matches the alert and then marks it for delayed notification based on the observation they have made. If the same alert is sent five times in 10 minutes, it means that script has failed. Only then will the notification be sent to Samantha's team as shown in Figure 1-53.

Create a Notification Policy

Disc Space Notifications

This policy shall notify admin team only in case there are multiple occurrences of the same alert based on X-in-Y minutes validation

When an alert matches these rules + Add Rule

Severity of the alert is Major or above ✎ -

Disc Space ✎ -

Match all rules

Delay notifications

until identical alerts occur within seconds

* Notify these recipients + Add recipient

Figure 1-53 Delayed notification option

Suppression of notification

Certain devices continue sending alerts for the same issue until the issue is resolved. For example, an amber light might be glowing on a server due to some hardware issue. In this scenario, until the time hardware issue is fixed, the amber light will keep glowing, and the server keeps on generating alerts towards Netcool/OMNIBus.

If notifications are enabled on such alerts, the users' inbox would be full of notifications from a single device by the time that the issue is fixed. IBM Alert Notification provides a feature wherein if the user is notified one time, subsequent occurrences of alerts do not generate notification for a certain period. This feature helps the user acknowledge and work on the issue without getting flooded with notifications.

Scenario

Aman, an engineer from UNIX team, has complained that his inbox is getting flooded with notifications for an issue that he has already acknowledged and is working on. This flood might make him miss an important notification related to other servers under his jurisdiction. Aman received a notification regarding an alert for a failure in accessing a service reported by IBM Tivoli Composite Application Manager. This alert keeps on repeating itself until the service is available again. Aman accepted and acknowledged the notification on its first occurrence and is troubleshooting, but notifications keep arriving. This process irritates and disturbs him while working on the issue.

Operations team found that Aman is receiving an alert for each time that the alert repeats in Netcool/OMNIBus. To mitigate this issue, operations team implements blocking of subsequent alerts for a particular event in IBM Alert Notification Service for next 8 hours. This setting helps Aman concentrate on troubleshooting and fixing issue, and at the same time avoids excessive notification for same alert as shown in Figure 1-54.

Change Notification Policy

✔ ITCAM Alerts

This policy will notify users once and then wait for 8 hours before the next notification being sent to user, allowing user to work on issue.

✔ Notify these recipients ⊕ Add recipient

Aman Saxena (aman_test@in.ibm.com) ⊖

Each time the rules are matched

First match over an eight hour period

Figure 1-54 Suppression of notification rules

Scheduling notifications based on working hours

In today's world, often your business does not stop at the closure of the business hours. Business keeps on going and growing even when the owners are sleeping. To facilitate such business entities, around-the-clock infrastructure support is required. Many companies provide 24x7 support services for the infrastructure for uninterrupted business continuity.

Companies providing 24x7 support services hire people working on a shift basis to maintain around-the-clock availability for checking any issue. Hired staff either works on a 24x7 support basis or works during normal business hours fixing routine issues and critical issues, and are available on-call to work on critical issues during the non-working hours and weekends.

To stay productive outside of office, shift users must coordinate with other users to take over the task in their absence. Generally what has been observed is notifications are set up for an entire team and the person who is on shift takes up the task to resolve the issue. It becomes an unnecessary disturbance for the ones out of shift to get notifications that are not reported during their working hours. Often there are situations where because of confusion of shift, nobody accepts the issue, causing a delay in fixing that can lead to revenue loss and escalations can take place that impact credibility of service.

IBM Alert Notification service provides a solution to this problem by giving an option to users as to how they want to be notified during the day during, and can have different options for working hours and off-work hours. Also, it gives the user an option to define their normal working hours. Moreover, for a team, the Group notifications allow the user to define the shift of people so that notification is floated only to the person in shift and the rest are spared the alerts for each issue.

This scenario shows how you can configure work timings for a user and how he wants to be notified for issues after his working hours. Also, you will configure a group to send notifications to based on the shifts.

Scenario

Company X has started a project for providing 24x7 infrastructure support to their vendor. Company has hired experienced professionals to perform the task and fix it whenever they are informed of any issue. The challenge is that people are being called for and notified even when they are not on shift, including when they are on leave or out for some other emergency. This system is creating chaos and irritation.

Company X is losing business credibility due to miscommunication between the team that sends notifications about issues and the team that has to work on those issue. The MTTR is increasingly raising questions on the company's quality of service even though the experienced professionals hired can resolve issues within the allotted time frame. Company X wants a proper flow of information to the on-shift person so that issue is looked into and fixed on time. This process can help them achieve approval with its customers.

Tom is chosen for putting such a solution in place. He checks the working of the engineers and makes a note of how, who and when a person is to be scheduled:

- ▶ Three teams support the customer environment: the UNIX team, Hardware team, and DBA team.
- ▶ Each team has four members who work in shifts.
- ▶ Members have different work timings to cover the 24 hours of a day.
- ▶ Every weekend, one person from each team is on-call for any critical issues.

To meet the requirement, Tom, chooses IBM Alert Notification service. This service will help him cover all of the requirements.

Scenario implementation

Perform the following steps for this scenario:

1. A user entry is created for each user in Alert Notification service along with their working hours and notification methods. Figure 1-55 shows sa ample entry for the user Deepak. Part of the information has been hidden.

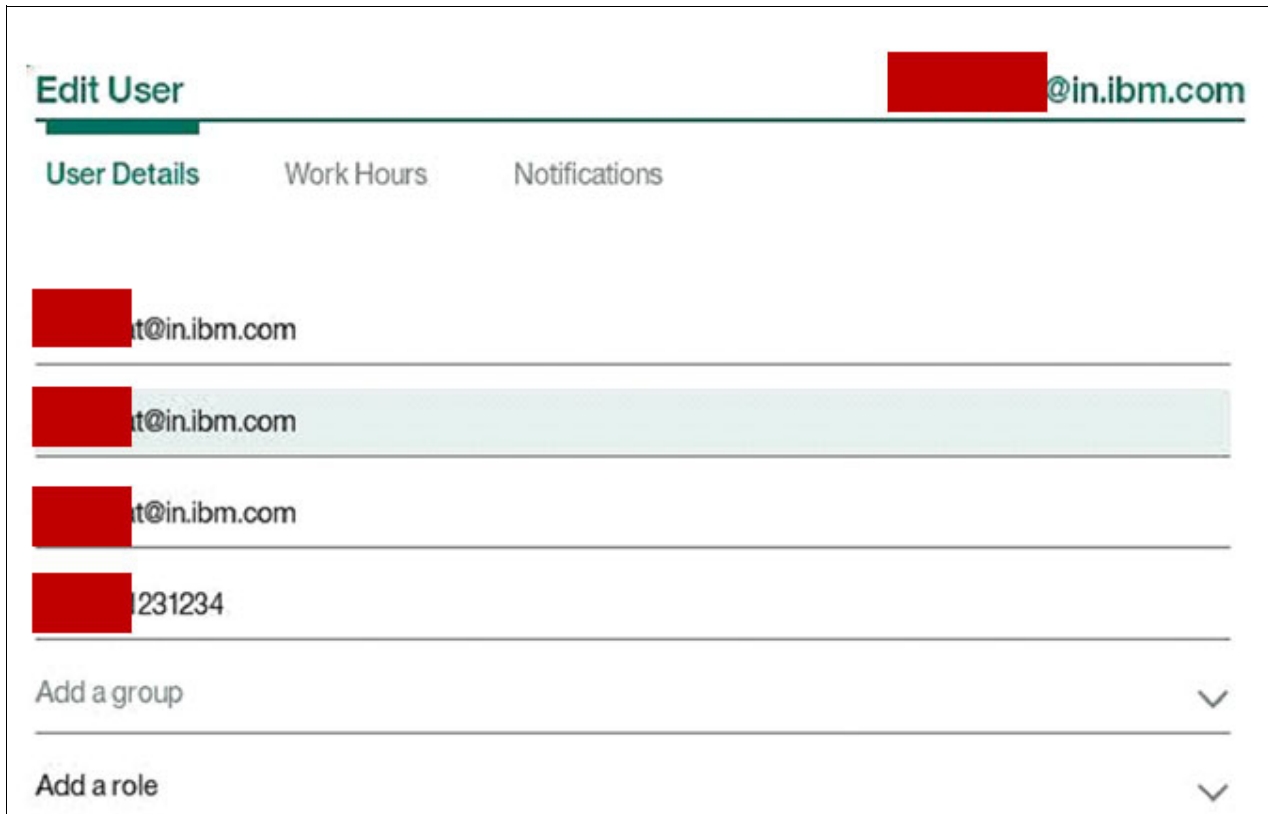


Figure 1-55 Adding User

Notes:

- ▶ The mobile phone number format is +[country code][phonenumber] without spaces or separators.
- ▶ It is necessary to create users and groups because currently there is no integration with LDAP or Netcool/OMNIBus for picking up the users.

Working hours for this user are shown in Figure 1-56.

Day	Start Time	End Time	Copy Icon	Hours
<input checked="" type="checkbox"/> Monday	08:30 am	05:00 pm		8.5
<input checked="" type="checkbox"/> Tuesday	08:30 am	05:00 pm		8.5
<input checked="" type="checkbox"/> Wednesday	08:30 am	05:00 pm		8.5
<input checked="" type="checkbox"/> Thursday	08:30 am	05:00 pm		8.5
<input checked="" type="checkbox"/> Friday	08:30 am	05:00 pm		8.5
<input type="checkbox"/> Saturday				
<input type="checkbox"/> Sunday				

Defaults Working hours: 42.5

Are you on call outside of your normal working hours? Yes

Figure 1-56 Working hours

Tip: Setting of time zone for the users' locales on the work hours page is important, especially if you want to enable Daylight Saving Time (DST).

Clicking any day results in 8-5 as the default work hours. The copy button allows users to duplicate a single day's changes to other days, reducing the number of clicks and keystrokes required.

Notification options are shown in Figure 1-57.

Figure 1-57 Notifications

- Tom checks the work timings of each user and ensures that each user is working at least 40 hours each week and each shift is covered with a minimum of one user. After gathering details from all users, he sets them up for each shift, The UNIX Team Shift pattern is shown in Figure 1-58.

Shift	Timmings	Person
Morning	6:00 AM to 2:00 PM	Aman Saxena
Afternoon	2:00 PM to 10:00 PM	Sagar
Night	10:00 PM to 6:00 AM	Mahadev

Figure 1-58 Work timings of each user

3. Apart from this schedule, each of these people are be available on-call over weekend in rotation. Thus, Tom is able to cover all shift hours and weekends. After all users and the working hours are in place, Tom creates a group for each team and adds users to them. After adding users to the group, Tom schedules the shifts according to the work timings of each user as shown in Figure 1-59.

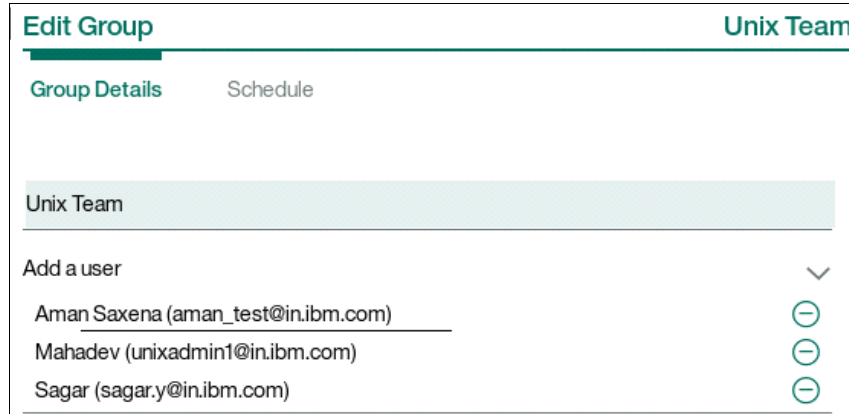


Figure 1-59 Alert Group

4. Tom defines the UNIX team Schedule under the Schedule tab of Group. See Figure 1-60.

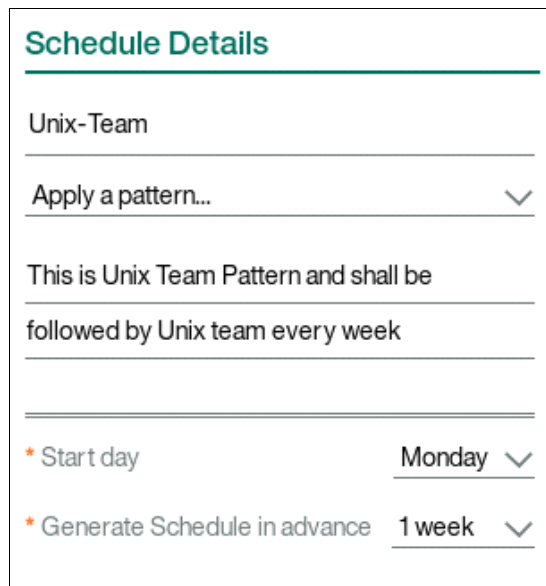


Figure 1-60 Schedule details

5. He then prepares a schedule involving three shifts each day that takes the local time zone into account as shown in Figure 1-61.

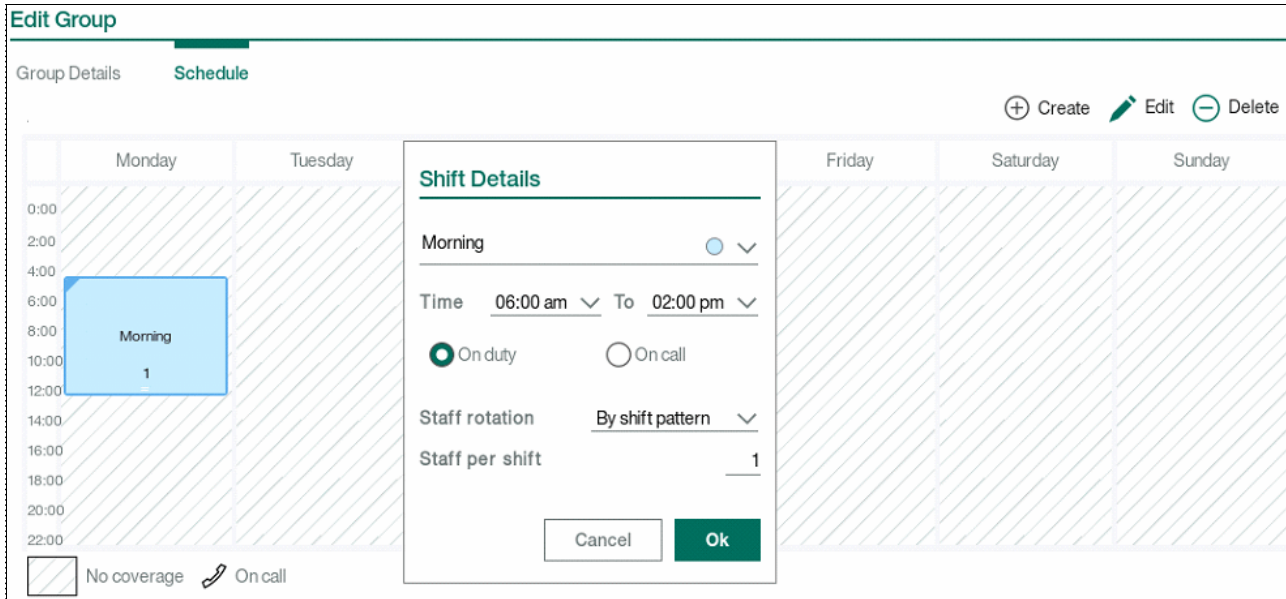


Figure 1-61 Shift inputs

6. Considering one staff per shift, he creates a schedule for the entire day as shown in Figure 1-62.

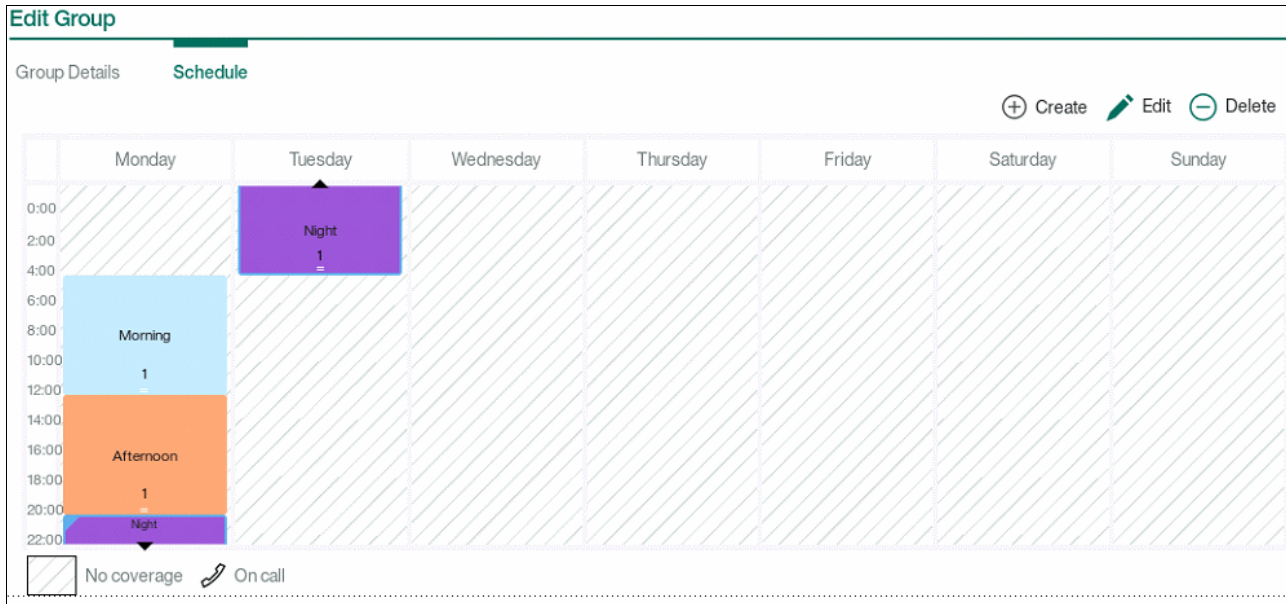


Figure 1-62 Entire day schedule

- Tom then creates a similar schedule for the entire week. According to this schedule, each shift has one person and on the weekend one on-call person is active. The schedules would then be as follows (Figure 1-63).



Figure 1-63 Entire week schedule 1

- After putting all shifts in place, with one person availability for the on duty shifts during the week and one person on-call during the weekend, he generates the Shift pattern as shown in Figure 1-64.

Tip: The Shift pattern can only be saved by using the **Save** button. It is not saved simply by generating the shift.

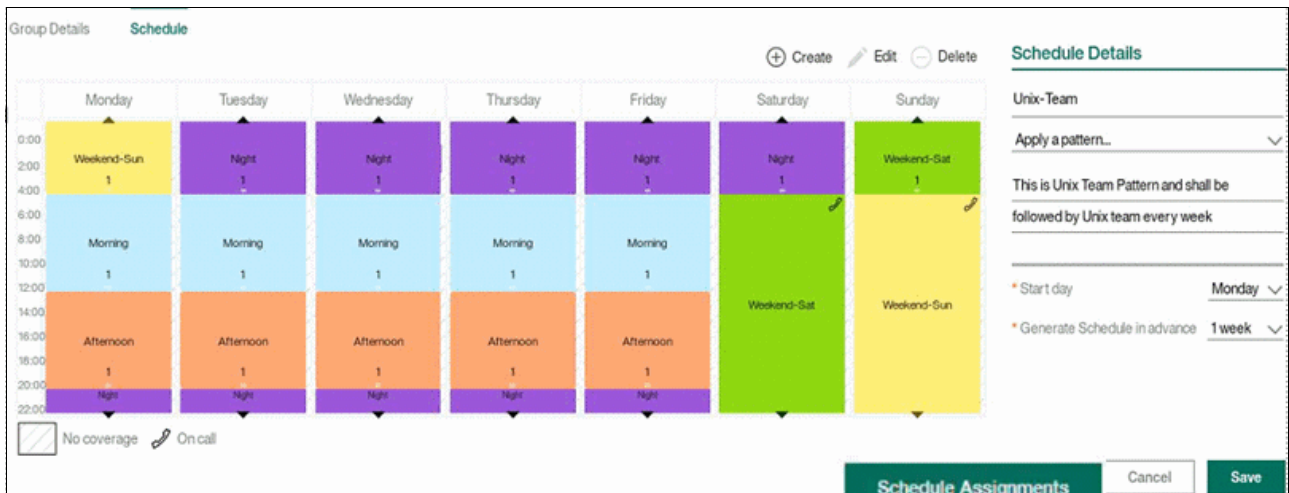


Figure 1-64 Entire week schedule 2

- By clicking **Schedule Assignments**, the schedule tool automatically tries to assign users to the shifts based on the shift duration and the users' working hours. After the shifts have been generated, Tom can modify the schedules by dragging and dropping users from the shifts as he requires.

10. When a person is allocated to a shift, it reflects in the schedule as highlighted in Figure 1-65. Also, with every shift allocation to a member, Tom can track the available hours for each user. After he allocates a user to all shifts and the weekend on-call person is selected, the shift roster is ready to be implemented.

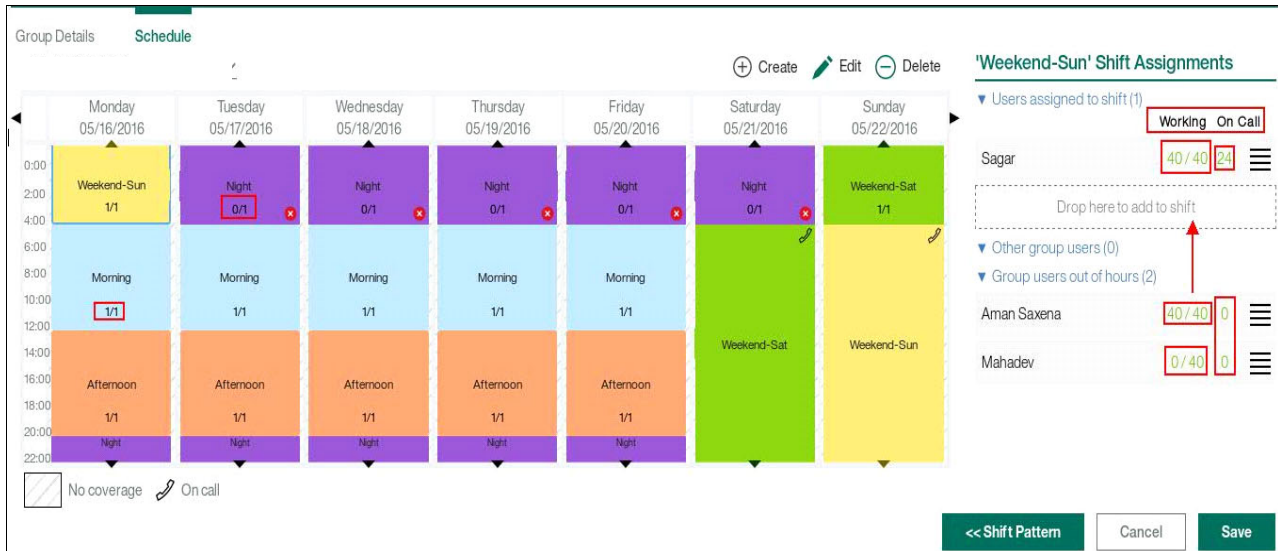


Figure 1-65 Shift Assignments

11. Tom can use the groups created in any policy. Alert Notification service then pushes notifications based on the roster and the method of notification elected by each user when in or out of shift. No user will now be disturbed when he does not want to be disturbed.



IBM Runbook Automation (SaaS)

This chapter introduces IBM Runbook Automation, a new, separately available hybrid service to deliver Runbook Automation to Netcool Operations Insight customers. It is also available for non-Netcool Operations Insight customers. This chapter provides an overview of the product, how it is installed and integrated into IBM Netcool Operations Insight, and samples of usage.

The chapter is divided into these sections:

- ▶ Product overview
- ▶ Architecture
- ▶ Installation and integration into Netcool/OMNIbus/Impact
- ▶ Scenarios

Product overview provides insights into the concepts of IBM Runbook Automation. The Installation and Integration section documents how to put Runbook Automation life into an existing IBM Netcool Operations Insight environment. Scenarios then build on that and show how to use Runbook Automation.

2.1 Product overview

Today's IT and network environments are quickly growing. More and more devices get connected through Internet of Things or Industry 4.0. New technologies are introduced in the market, and those new vendors often use with their own management system that then is used to manage this specific technology. Agile development puts more and quicker software into IT environments, to which operations have to respond.

Operations Management is facing many challenges. Operations is the management of delays, disruption, and risk of error. Operations teams are burdened with too many time-consuming tasks. To cope with these challenges, the teams need to concentrate on these concerns:

- ▶ Getting rid of noise: Reduce mundane or redundant events, incidents, and tickets.
- ▶ Solving problems faster: Reducing the number of manual steps by using recommended actions and pre-filled context.
- ▶ Focusing on what matters most: Get relevant information so that you can act quickly and consistently.

Operations must achieve these goals:

- ▶ Reduce reliance on manual attention and action.
- ▶ Optimize operator skills and allow high-skilled subject matter experts (SMEs) to avoid mundane tasks.
- ▶ Focus on the goal to fix problems, because finding and tracking problems is not enough.

IBM Netcool Operations Insight, together with IBM Runbook Automation, helps to achieve these goals. IBM Netcool Operations Insight acts as a single point of contact by collecting the various pieces of information about IT infrastructure health status into a single system. Correlations and data deduplications are done to reduce the event load initially. Additional information from other systems such as customer data, device information (Change and Configuration Management Database (CCMDB)), and contract and billing information can be used to evaluate if a problem record has an impact on a service or can be dealt with at a lower priority.

Operations is usually divided into support teams by levels from 1 to 3. Level 1 support (L1) has to take all problems and react within a specific time frame according to service level agreements (SLAs). Most of the time L1 applies provided procedures to problems. L2 support takes over all problems that cannot be solved by L1. The L2 team consists of senior technical staff. L3 team includes development and subject matter experts of a specific environment or technology.

To reduce the load that is on L2 / L3 teams the L1 support team needs to achieve more by applying existing proven policies. L2 and L3 teams provide these proven policies, usually by the creation of some kind of knowledge vault (also known as knowledge articles or information management systems).

IBM Runbook Automation provides a repeatable, documented way to solve problems.

Figure 2-1 shows how IBM Runbook Automation and IBM Alert Notification compliment each other in the Netcool Operations Insight portfolio.

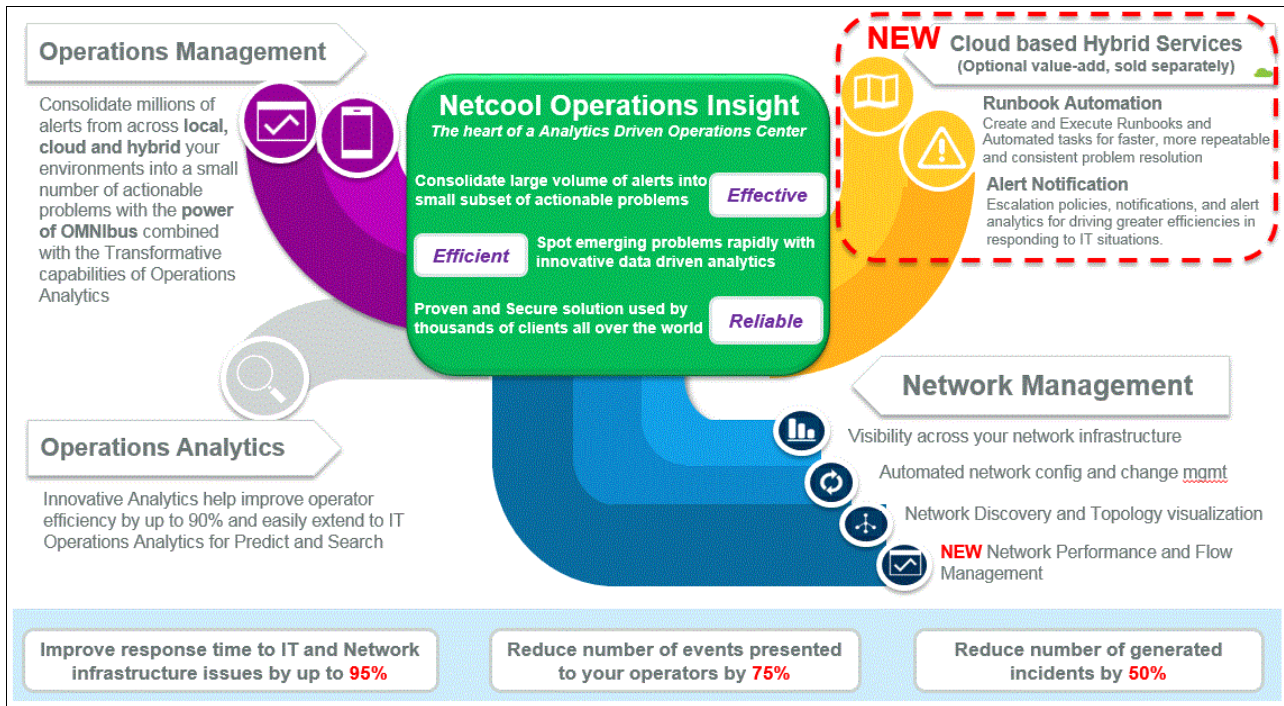


Figure 2-1 Delivering innovations in Analytics, Network Management, and Cloud Based Services

Operations Analytics is all about finding patterns in the event streams. This way events can be grouped and can be resolved in those groups.

More agility and more automated IT Operations Management are achieved by getting more modules of IBM Netcool Operations Insight to work together.

IBM Runbook Automation is about creating and executing runbooks and automated tasks for faster, repeatable, and more consistent problem resolution.

IBM Runbook Automation is different for these reasons:

- ▶ You can create content in minutes without complex programming or coding skills.
- ▶ No reliance on expensive services engagements is required.
- ▶ It is designed to work seamlessly with existing solutions, and work with on-premises tools with the benefits of software as a service (SaaS).
- ▶ Runbook Automation is SaaS-based authoring and management of content that reduces initial configuration and eliminates ongoing maintenance.
- ▶ With Runbook Automation, the time from “Get started” to “Content Creation” is immediate.
- ▶ Runbook Automation improves return on investment (ROI) through immediate added value and improved ROI on existing investments.
- ▶ Runbook Automation continuously drives operational efficiency and knowledge through built-in tracking and analysis of automated IT operational activity.

Many of today's operations teams record knowledge on problem resolution. The ones that do use a collection of notes or a web page or, if they are more sophisticated, an information management system. IBM Runbook Automation helps your company to evolve by providing repeatable and easy to use steps to resolve a problem. Figure 2-2 shows important design points of IBM Runbook Automation.

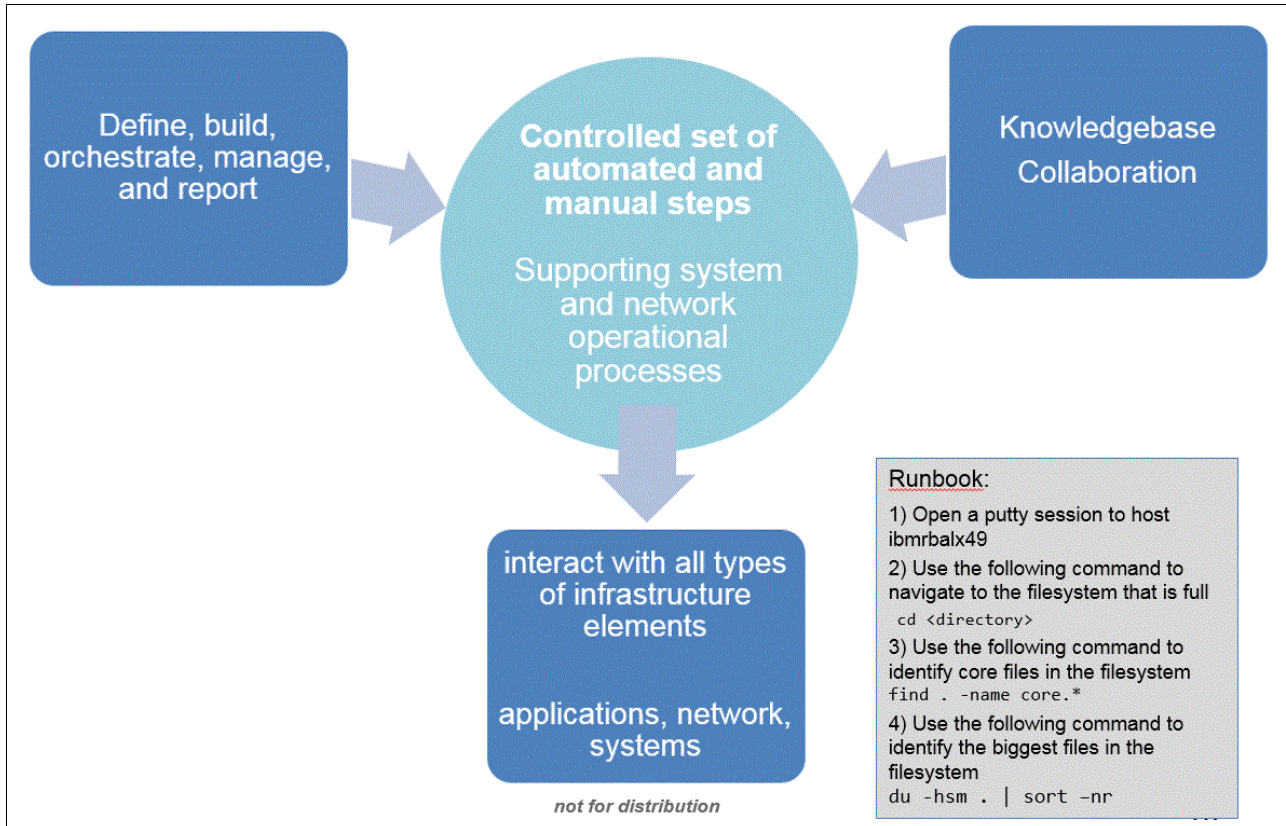


Figure 2-2 What is Runbook Automation?

IBM Runbook Automation is a solution that provides the means to collaborate based on common company knowledge. It defines, builds, orchestrate, manages, and reports on the application of problem-solving procedures. It is a set of automated and manual steps that support system and network operations and processes. It interacts with all types of infrastructure elements, applications, networks, devices, and systems.

Typically a runbook starts with the import of a knowledge article. This article is then divided into individual steps. Commands are separated to interact with the infrastructure. Context is added by relating the runbook to an existing problem record in the event management system.

IBM Runbook Automation is based on Capability Maturity Model Integration (CMMI) models. For more information, see the following website:

https://de.wikipedia.org/wiki/Capability_Maturity_Model_Integration

Today's operations level of maturity can be categorized by the diagram shown in Figure 2-3. These levels of maturity represent the state that most enterprise operations are in today. IBM Runbook Automation helps to master the steps *repeatable*, *defined*, and *managed*.

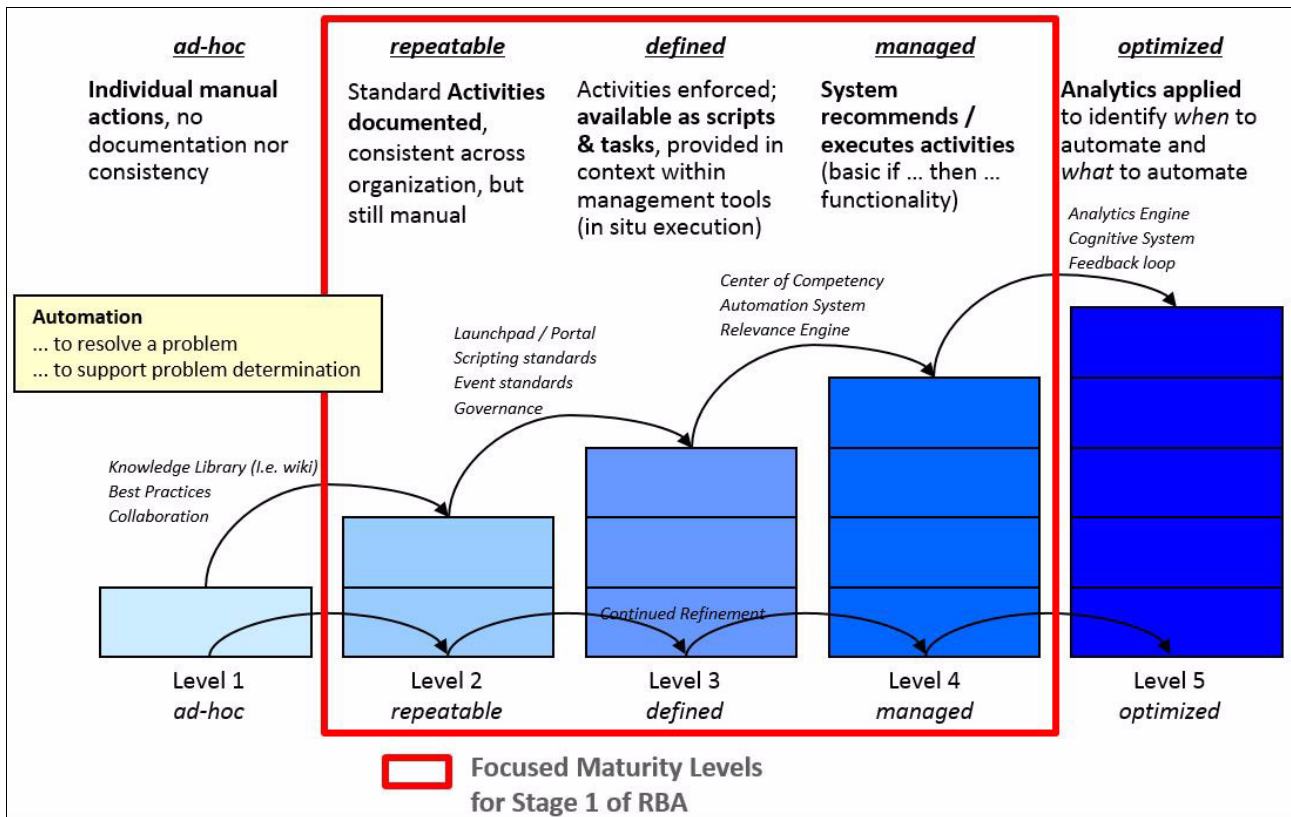


Figure 2-3 Automation in support of problem determination and resolution

Figure 2-4 show the three levels of maturity that runbooks can become: Manual, Semi Automated, and Fully Automated.

- 1. Manual Runbooks**
A step describes the exact procedure an operator has to follow – using standard tools he accesses from his environment.
- 2. Semi Automated Runbooks**
Each step describes exactly what an operator has to do. Additionally, the operator **simply pushes a button** to execute an automated task on a target system.
- 3. Fully Automated Runbooks**
The runbook is selected by the system as response to a trigger and executed without operator attention.

The screenshot shows a runbook titled 'Display runbook details' with a description 'Steps to clean up a Linux filesystem'. It includes parameters for HOSTNAME and FILESYSTEM, and a procedure with two steps: logging in to the host and checking remaining space. A 'Parameters' button is visible.

The screenshot shows the execution of a runbook step: 'Run this command to determine free space in the filesystem'. It displays a terminal output table for filesystem usage and a 'Pushbutton Automation' button next to a 'showFreeSpace' command.

Figure 2-4 Maturity levels for runbooks

2.2 Architecture

IBM Runbook Automation consists of three separately deployed micro services, as you can see in Figure 2-5:

- ▶ Automation service
- ▶ Runbook service
- ▶ Trigger service

Each micro service consists of one or more Node.js applications and at least one IBM Cloudant® database (DB) that holds the data. Each service communicates through REST APIs.

IBM Hybrid Cloud Connector (HCC) allows Runbook Automation, from the cloud, to send a runbook command to an on-premises system in a secure and safe manner. It avoids the need for a VPN between customer and IBM Cloud offerings. The HCC initiates the connection and then talks to the SoftLayer Gateway that then with the Bluemix services.

In Figure 2-5, the on-premises installed components are separated from the SoftLayer/Bluemix components with the dashed line.

The colored arrows indicate component communication.

The three micro services and their databases plus the personalized HCC are the components that are provisioned for each subscription.

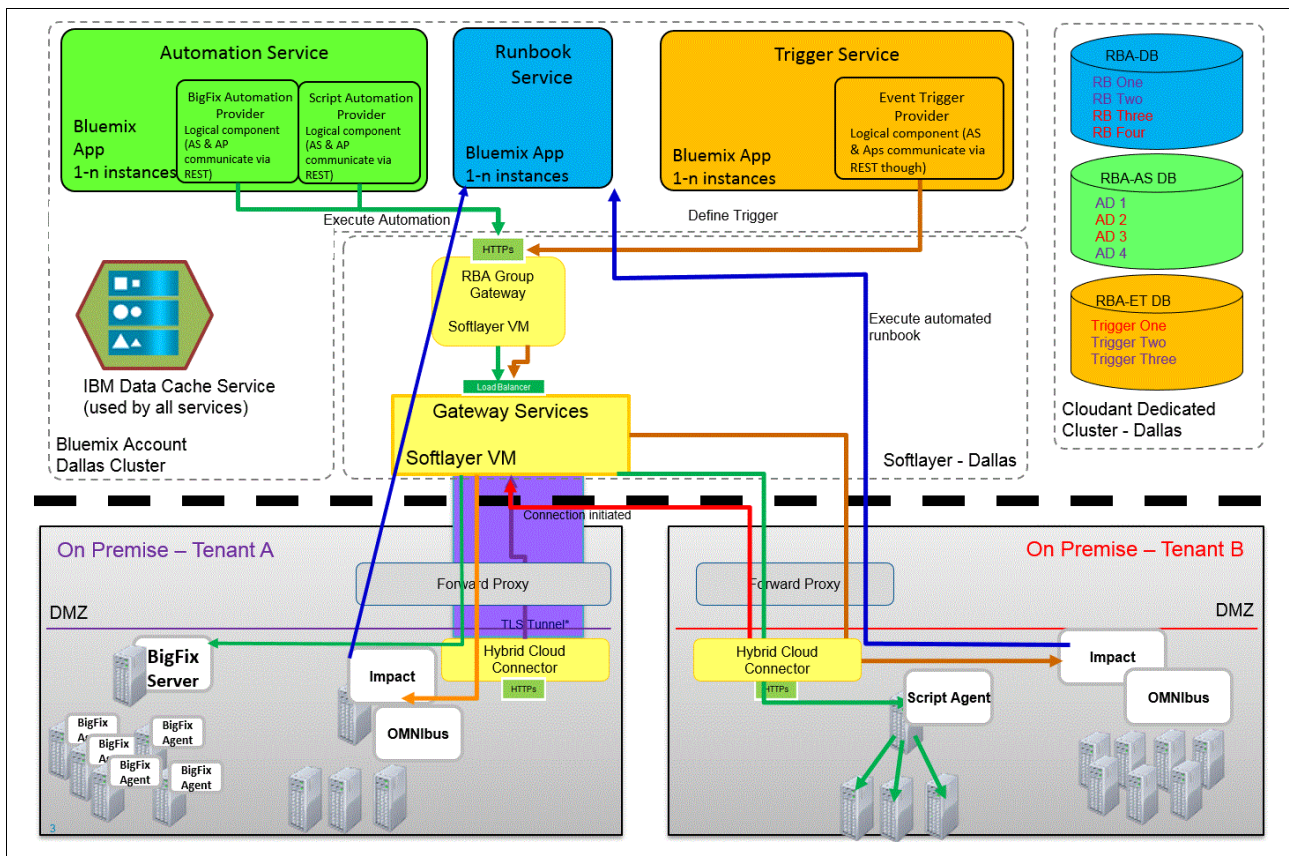


Figure 2-5 IBM Runbook Automation architecture

2.3 Installation and integration into Netcool/OMNIBus/Impact

The installation documentation for IBM Runbook Automation can be found here:

http://www.ibm.com/support/knowledgecenter/SSZQDR/com.ibm.rba.doc/RBA_welcome.html

This chapter compliments the documentation.

Use this procedure to install and run Runbook Automation:

1. Register in IBM Marketplace.
2. Select and register for the IBM Runbook Automation offering.
3. Select a 60 days trial or make a purchase.
4. Download the OMNIBus / Impact integration package.
5. Install the IBM Hybrid Cloud Connector (HCC).
6. Install the IBM Workload Agent (TWA).
7. Install the OMNIBus extensions.
8. Install the Impact integration.
9. Log in to Runbook Automation and start configure runbooks.

The examples in this book use an IBM Netcool Operations Insight POT v1.4 image that is an installation of all Netcool Operations Insight v1.4 on a single server (notebook computer with VM). It runs with 32 GB RAM, 8 x86 CPU cores and 100 GB hard disk. A single ObjectServer is connected to IBM Netcool/Impact, IBM Network Manager, IBM Network Configuration Manager, DASH, and IBM Operations Analytics - Log Analysis. The configuration does not include high availability.

Notes are included to show differences for high availability and multitier setups.

2.3.1 IBM Marketplace registration

Perform the following steps for IBM Marketplace registration:

1. Go to IBM Marketplace and register or sign in. You can do this by using the following URL:
<https://www.ibm.com/marketplace/cloud/us/en-us>

Figure 2-6 shows the page to register or sign in to IBM Marketplace.

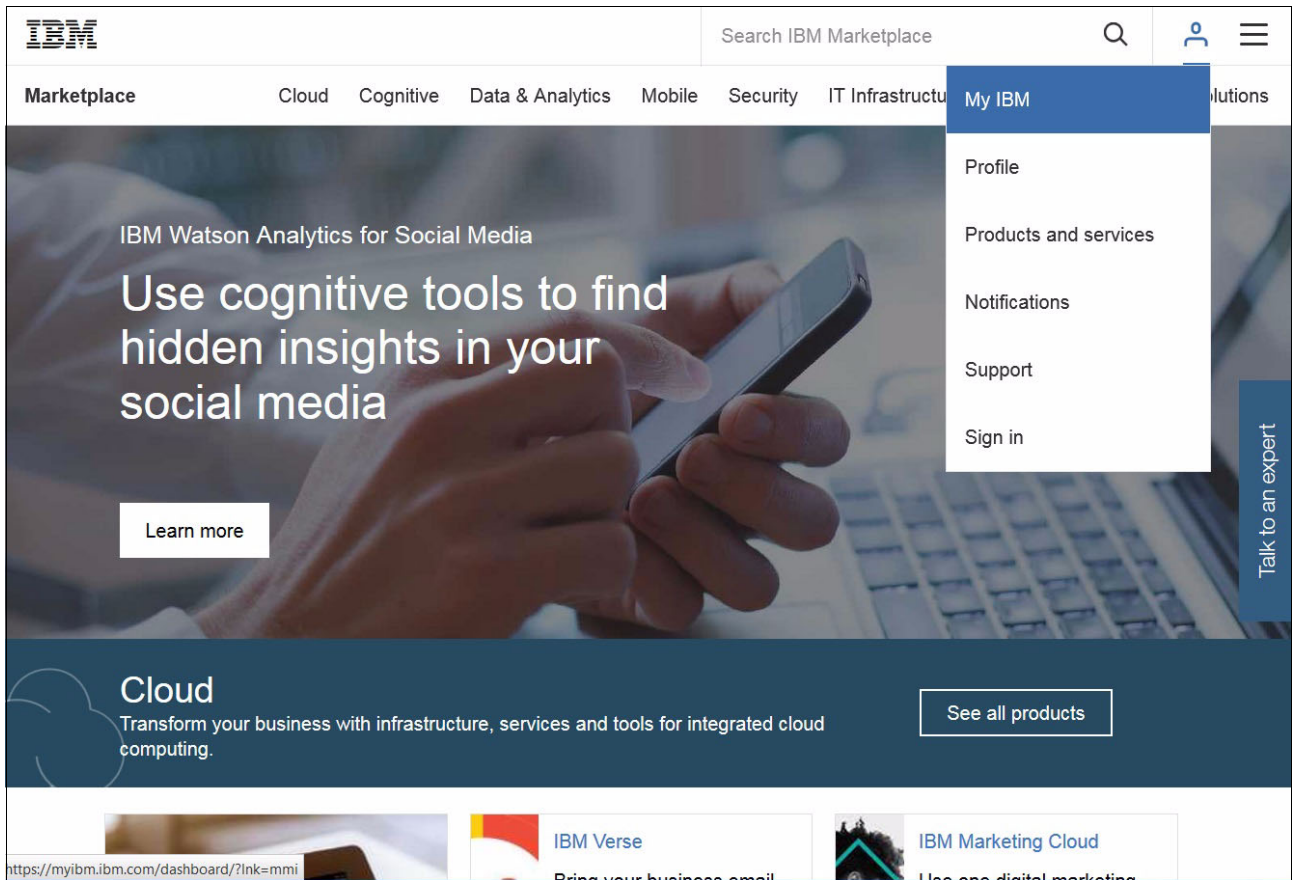
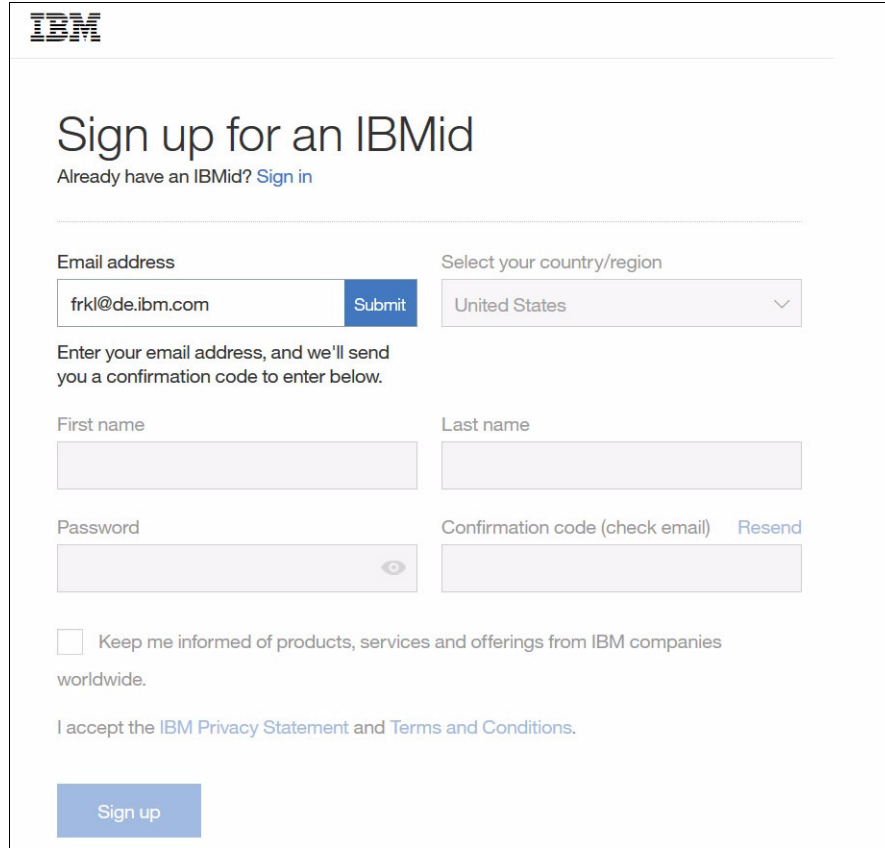


Figure 2-6 IBM Marketplace landing page

Click **Sign in** and log in if you already have an IBM ID. At this point, all that you need for registration is a valid email address to which a validation code will be sent.

2. Figure 2-7 shows the initial registration for a new user page. The first step is to enter an email address and click **Submit**. The validation code is then sent to the email address. Enter this code in the **Confirmation Code** field. Complete the remaining fields. By clicking the **Sign up** button, you accept the IBM Terms & Conditions and the IBM Privacy Statement.



The screenshot shows the IBM Marketplace registration form. At the top left is the IBM logo. The main heading is "Sign up for an IBMid" with a link "Already have an IBMid? Sign in". Below this is a form with several fields: "Email address" (containing "frkl@de.ibm.com") and "Submit" button; "Select your country/region" (dropdown menu showing "United States"); "First name" and "Last name" text boxes; "Password" text box with an eye icon; and "Confirmation code (check email) Resend" text box. Below the form is a checkbox for "Keep me informed of products, services and offerings from IBM companies worldwide." and a statement "I accept the IBM Privacy Statement and Terms and Conditions." followed by a "Sign up" button.

Figure 2-7 IBM Marketplace registration form

3. Your account will be set up for you. Complete your profile. Figure 2-8 shows the profile setup page.

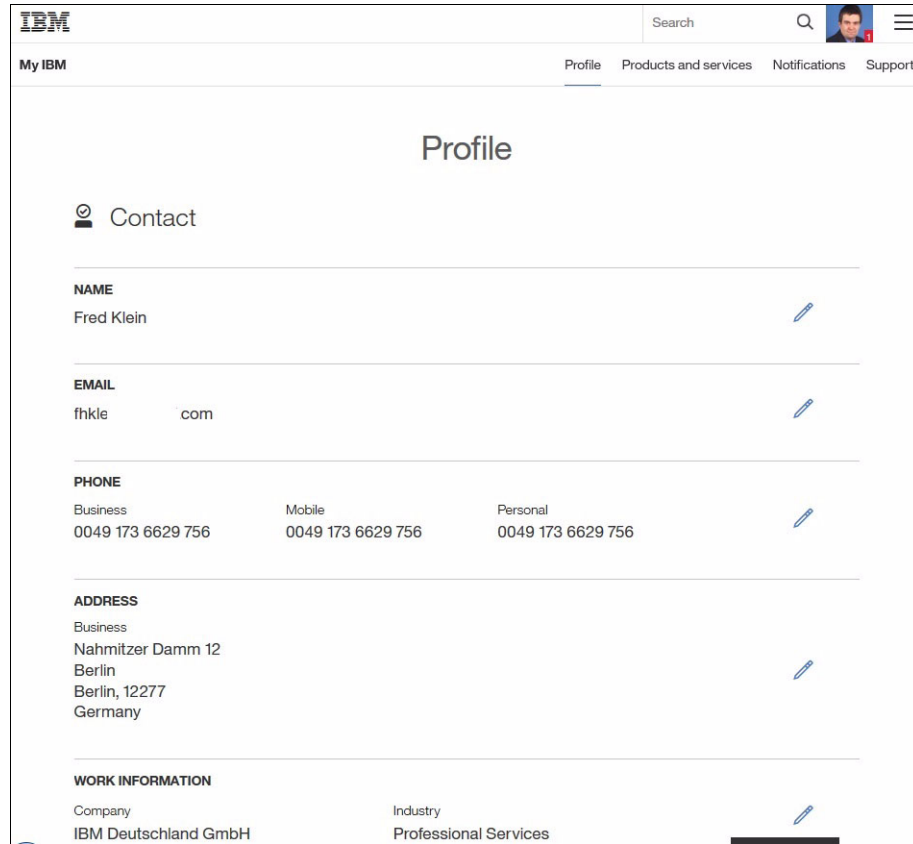


Figure 2-8 IBMid profile setup page

After you complete your profile, the initial IBM Marketplace registration is complete. Now you have access to all the IBM Marketplace offerings. The next step is to request a new IBM Runbook Automation subscription.

2.3.2 Select and register for the IBM Runbook Automation offering

Now you have access to the IBM Marketplace offerings and can request trials at no cost. To get to the Runbook Automation offering, go back to IBM Marketplace and search for it:

1. Go back to the IBM Marketplace landing page and search for the IBM Runbook Automation offering. Figure 2-9 shows the Search field.

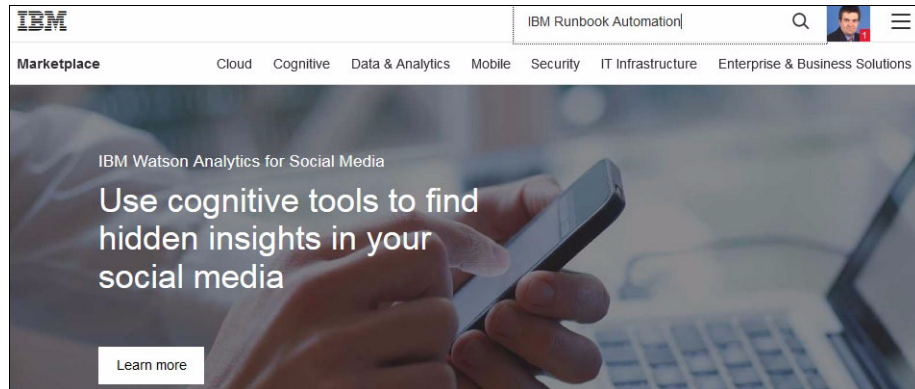


Figure 2-9 Search for IBM Runbook Automation

Figure 2-10 shows a result page from IBM Marketplace.

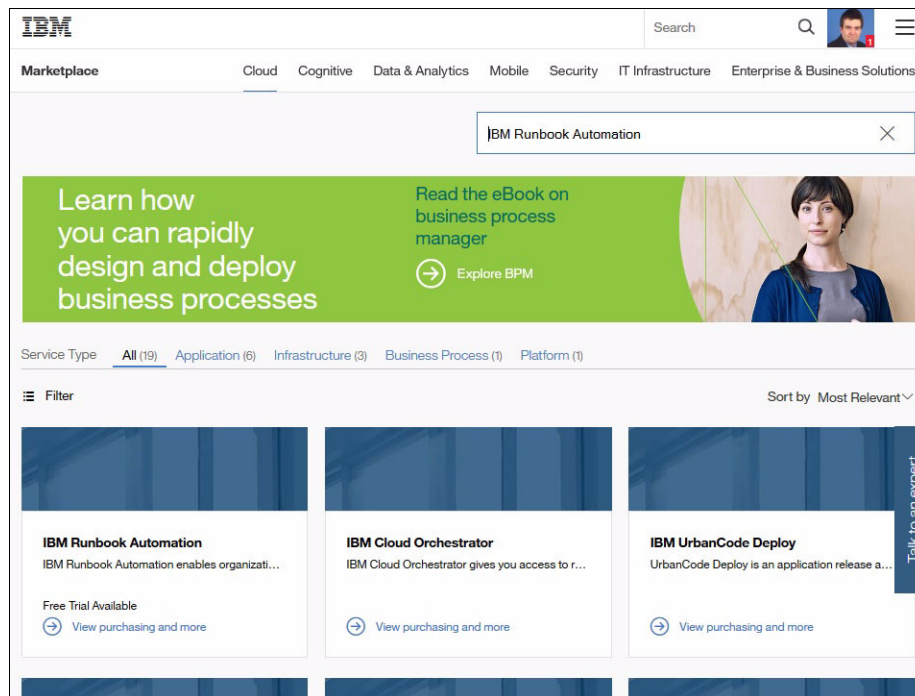


Figure 2-10 IBM Marketplace Service search result

2. In the IBM Runbook Automation box, click **View purchasing and more**.

2.3.3 Select a 60 days trial or make a purchase

You can select the trial to try IBM Runbook Automation for 60 days at no cost, or enter a payment method into your profile and make a purchase. To get IBM Runbook Automation, complete these steps:

1. Figure 2-11 shows the monthly fee and provides a sign-up button for a trial. Click **Free trial** to continue.

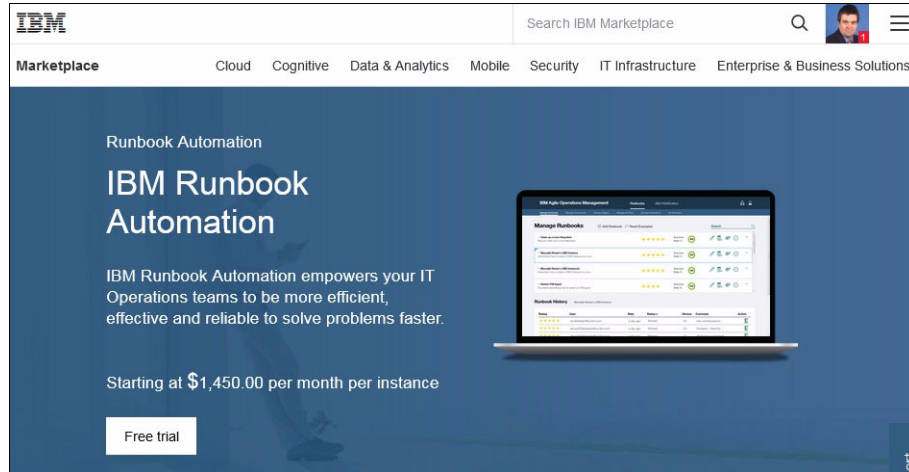


Figure 2-11 IBM Runbook Automation Free Trial sign up window

2. Figure 2-12 shows the page to sign up for a trial of IBM Runbook Automation. Click **Sign Up** to continue.

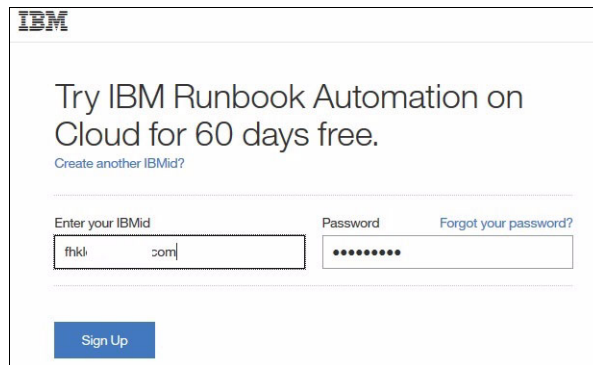


Figure 2-12 Free trial sign up window

Now a new exclusive instance will be provisioned. This is your instance and is only accessible to you. It is not shared with any other instance or subscription. Figure 2-13 shows the status page while the new service is provisioned. Later on you will associate more users to this subscription such as administrators and normal users.

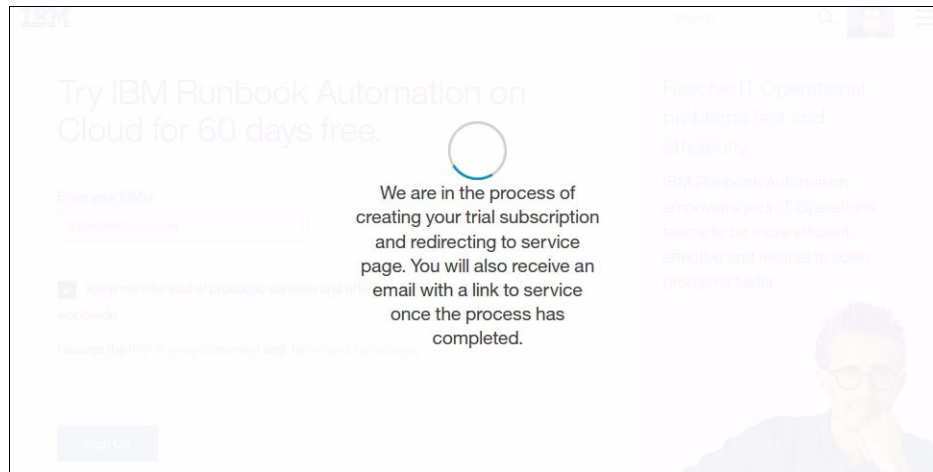


Figure 2-13 Status window on provisioning a new Runbook Automation service.

3. You will receive two emails for signing up with Runbook Automation and for the trial request. It contains additional information, such as links to launch the service and how to find the documentation. Figure 2-14 shows an example of the free trial email.

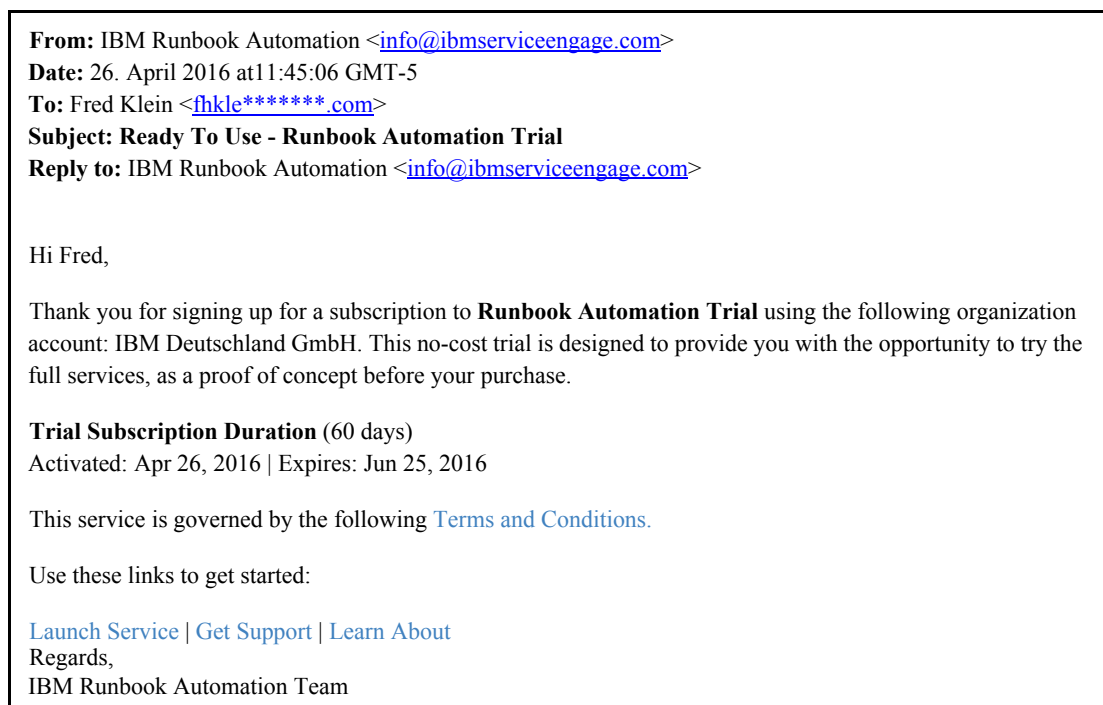


Figure 2-14 Confirmation mail after signing up for a free trial

Figure 2-15 shows an example of the status message about the service being provisioned.

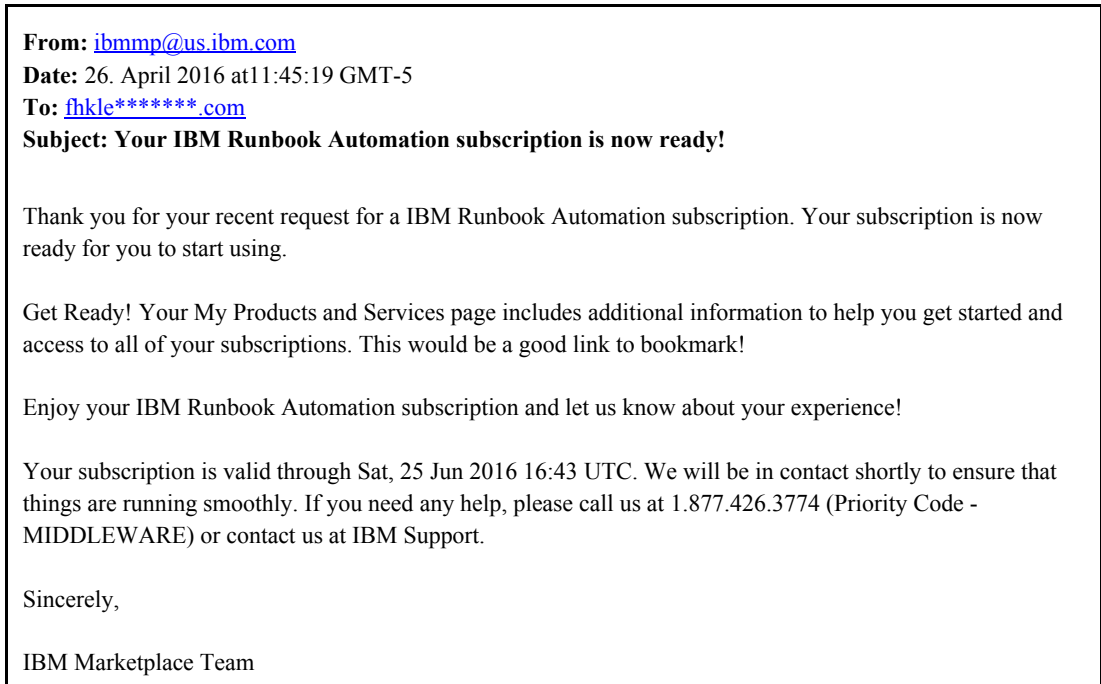


Figure 2-15 Status mail that the service is now provisioned

After you receive these emails, you can use the new subscription.

2.3.4 Download the OMNibus / Impact integration package

Now the new service is provisioned. Pure manual runbooks do not require more than just launching the application. For semi-automated and fully automated runbooks, the service needs to be download and set up.

The integration consists of several parts:

1. IBM Hybrid Cloud Connector (HCC)
2. IBM Workload Agent (TWA)
3. IBM Netcool/OMNibus integration (included in Impact FP 7.1.0.4 and later)
4. IBM Netcool/Impact integration (included in Impact FP 7.1.0.4 and later)

The download is 485 MB. The only currently supported OS version is Red Hat Enterprise Linux (RHEL) Server 6 Update 4 and later on Intel x86-64 (64 bit). To download the integration package, go to your subscription and click **Manage** → **Download Agents**.

Figure 2-16 shows the IBM Marketplace subscription with IBM Runbook Automation and where to make the selection for downloading the integration package.

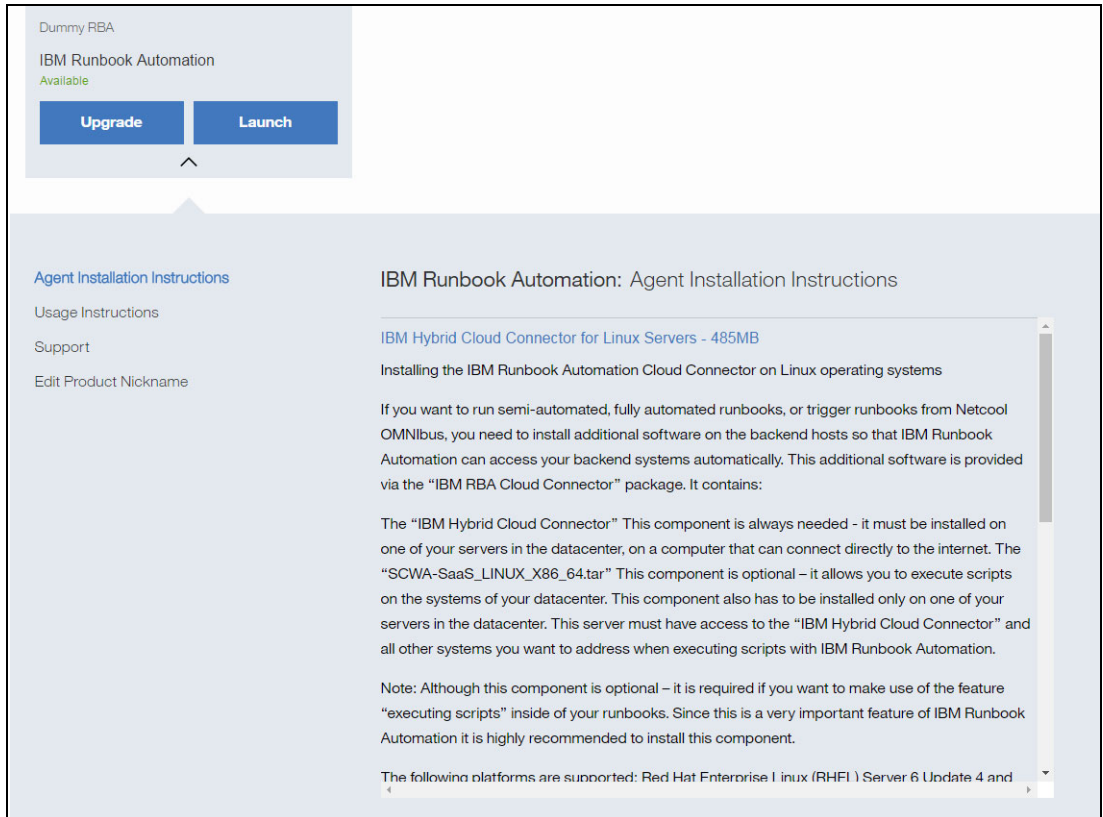


Figure 2-16 Download window for the Integration package

Figure 2-17 shows a page that is shown when you selected to download the integration. To download the integration package, click **Manage** → **Download Agents**.

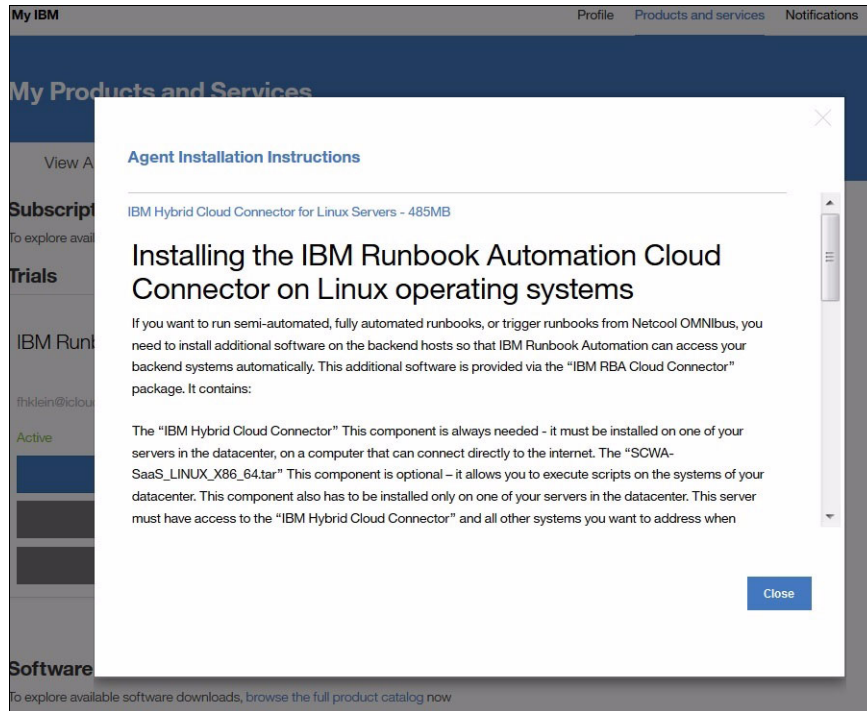


Figure 2-17 Download page of the integration package

Tip: Do not click **Close** too fast because this text contains valuable instructions and information.

The file that contains the package is named `IBM_RBA_Cloud_Connector_1.0.1_Install.tar`.

2.3.5 Install the IBM Hybrid Cloud Connector

Begin by installing IBM HCC installation. The purpose of the HCC component is to avoid a VPN connection between the Runbook Automation Service and the local installation.

Remember that the HCC is personalized to the subscription, so it cannot be shared. It contains built-in configuration items, such as a certificate and a customer key, that are unique to the subscription. The HCC calls by using an HTTPS request to the Gateway Service in SoftLayer, which then waits until the Runbook Automation Service comes back with a response. This process makes sure that no calls come from the outside to the local network.

Figure 2-18 shows the architecture of the IBM Hybrid Cloud Connector. The numbers indicate the sequence of calling back from IBM Runbook Automation (RBA) through Bluemix and SoftLayer to the HCC and then into the TWA agent to start a script.

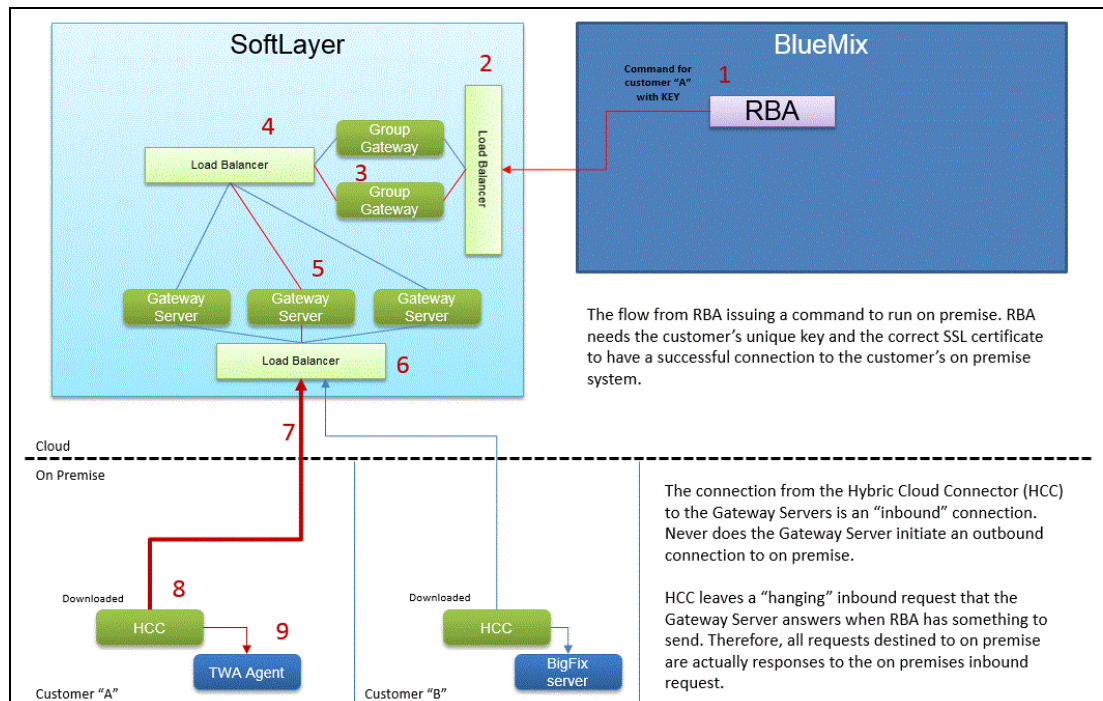


Figure 2-18 Architecture of the IBM Hybrid Cloud Connector

A detailed installation procedure can be found in the documentation here:

http://www.ibm.com/support/knowledgecenter/SSZQDR/com.ibm.rba.doc/CC_cloudconnector.html?lang=en

To install IBM HCC, complete these steps:

1. Unpack the package as shown in Figure 2-19.

```
[root@host1 Downloads]# ls -al
total 504232
drwxr-xr-x  2 netcool ncoadmin    4096 Apr 26 20:22 .
drwx----- 37 netcool ncoadmin    4096 Apr 25 19:06 ..
-rw-r--r--  1 netcool ncoadmin 516321280 Apr 26 18:51 IBM_RBA_Cloud_Connector_1.0.1_Install.tar
[root@host1 Downloads]# tar -xvf IBM_RBA_Cloud_Connector_1.0.1_Install.tar
```

Figure 2-19 Command line for file extraction

2. Change to the connector's top-level directory and run the installation script with root user privileges. Accept or change the default settings (Figure 2-20).

```
[root@host1 Downloads]# cd IBM_Hybrid_Cloud_Connector_1.0.1/
[root@host1 Downloads]# ./hybridcloudconnector.sh install
Checking product prerequisites before installation. You can disable this check by setting environment
variable SKIP_PRECHECK.
Setting Prerequisite Scanner output directory to user defined directory:
/tmp/logs/prereqchecker/20160426_203016

IBM Prerequisite Scanner
  Version: 1.2.0.14
  Build : 20140919
  OS name: Linux
  User name: root

Machine Information
Machine name: host1.csite.edu
Serial number: VMware-56 4d e8 9c 22 26 02 9f-60 94 0b 26 18 fd 41 e1

Scenario: Prerequisite Scan

GSV - IBM Hybrid Cloud Connector [version 01020600]:

Overall result:  PASS

Detailed results are also available in /tmp/logs/prereqchecker/20160426_203016/result.txt

Hybrid Cloud Connector installation started.

Do you accept the license agreement(s) found in the
"/home/netcool/Downloads/IBM_Hybrid_Cloud_Connector_1.0.1/licenses" directory? [ 1=yes or 2=no; "no" is
default ]? yes
User has accepted the license agreement(s).
Specify installation directory or press enter to use the default one (/opt/ibm/hcc):

Configuring Hybrid Cloud Connector.
Successfully established connection to the internet.
Hybrid Cloud Connector successfully configured.
Installing Hybrid Cloud Connector as the 'hcc' system service.
Hybrid Cloud Connector installation completed. Hybrid Cloud Connector was configured and started using
default configuration settings.
[root@host1 IBM_Hybrid_Cloud_Connector_1.0.1]#
```

Figure 2-20 HCC installation output

Note: Note that the default installation directory for the HCC is `/opt/ibm/hcc` as opposed to the default Netcool installation directory, which is usually `/opt/IBM/...`. Therefore, if you want to have all products installed at the same place, change the installation path.

If you want to restart the HCC for any reason, use the procedure shown in Figure 2-21.

```
[root@host1 bin]# pwd
/opt/ibm/hcc/bin
[root@host1 bin]# ./hybridcloudconnector.sh status
Hybrid Cloud Connector started.
[root@host1 bin]# ./hybridcloudconnector.sh stop
Hybrid Cloud Connector stopped.
[root@host1 bin]# ./hybridcloudconnector.sh start
Hybrid Cloud Connector started.
[root@host1 bin]#
```

Figure 2-21 Restart the IBM Hybrid Cloud Connector

There are no postinstallation tasks if no forward proxy is required. If you must use a proxy to connect the HCC to the Internet, complete the steps in the following documentation:

http://www.ibm.com/support/knowledgecenter/SSZQDR/com.ibm.rba.doc/CT_confighybridcloud.html?lang=en

2.3.6 Install the IBM Workload Agent

The following section describes the installation of TWA, which is required when semi-automated and fully automated runbooks are used. TWA provides functionality to execute scripts on servers that are in reach. In reach means the server where the agent is installed and all other servers that are configured in the credential store of the agent.

Alternatively, you can use the IBM Endpoint Manager (BigFix®). See the documentation for further details.

Install the IBM Workload Automation agent to run with IBM Runbook Automation as the script agent. The script agent connects to back-end systems and runs the scripts.

You can install the IBM Workload Automation agent on the same system as the IBM Hybrid Cloud Connector, or on another system within the same network. Only systems that can be reached by the IBM Workload Automation agent can be addressed by scripts from IBM Runbook Automation.

Complete these steps to install TWA:

1. Create a user on the designated machine by using the command shell:

```
useradd -m tws
passwd tws
```

2. Change to this user.

3. Extract the downloaded IBM Workload Automation agent from the HCC package:

```
tar -xvf SCWA-SaaS_LINUX_X86_64.tar
```

4. Change to the subfolder for your operating system:

```
cd SCWA-SaaS/TWS/LINUX_X86_64/
```

5. Start the actual installation:

```
./twsinst -new -acceptlicense yes -uname tws -agent dynamic -jport 33180
```

Note: This installation script includes a prerequisite checker that looks for RAM and a few libraries such as `libstdc++.so.6`.

The installation directory in this example is `/opt/IBM/TWA_tws`.

6. After the installation is successful, you can start configuring the agent's credential store. This configuration is required to connect Runbook Automations scripts with more targets than the server that the agent runs on. You need to add hosts and credentials.

Note: At the time of writing, there was an issue with the default `LD_LIBRARY_PATH`. Double check that it includes these directories when you work with the agent:

```
/opt/IBM/TWA_tws/TWS/CLI/bin/
/opt/IBM/TWA_tws/TWS/bin/
```

- For this scenario with just one server (host1.csite.edu), run the commands shown in Figure 2-22 as the tws user to create the local credential store for a user/password (netcool/object00):

```
[tws@host1 bin]$ . /opt/IBM/TWA_tws/TWS/tws_env.sh
IBM Workload Scheduler Environment Successfully Set !!!
[root@host1 bin]$ export
LD_LIBRARY_PATH=$LD_LIBRARY_PATH:/opt/IBM/TWA_tws/TWS/CLI/bin:/opt/IBM/TWA_tws/TWS/bin:/opt/IBM/TWA_tws/TWS/ITA/cpa/ita/lib/
[tws@host1 bin]$
[tws@host1 bin]$ /opt/IBM/TWA_tws/TWS/CLI/bin/param -c rba.ssh.host1.csite.edu:username netcool
AWSITA149I Operation completed successfully.
[tws@host1 bin]$ /opt/IBM/TWA_tws/TWS/CLI/bin/param -ec rba.ssh.host1.csite.edu:password object00
AWSITA149I Operation completed successfully.
[tws@host1 bin]$
```

Figure 2-22 User and password creation in the TWA credential store

Notes:

- ▶ The option -c creates a new entry, this is to be used for user entries and the option -ce creates a new encrypted entry, this is to be used for passwords.
- ▶ Make sure you start with sourcing the tws_env.sh file as shown in the first line of Figure 2-21 on page 64.

- If you want to test the success of the credential creation, look at the file shown in Figure 2-23.

```
[tws@host1 bin]$ more /opt/IBM/TWA_tws/TWS/ITA/cpa/config/jm_variables_files/rba
[ssh]
host1.csite.edu:username = netcool
host1.csite.edu:password = {aes}eMtieEPHnrVqHA2d+9iwJ70HF/q6m72QUgWJeaTPBKI=
[tws@host1 bin]$
```

Figure 2-23 Credential store

Note: If you need to restart the Workload Agent, use the following commands:

```
[tws@host1 TWS]$ cd /opt/IBM/TWA_tws/TWS
[tws@host1 TWS]$ ./ShutDownLwa
Stopping tebctl-tws_cpa_agent_tws Agent (10425):.....OK
[tws@host1 TWS]$ ./StartUpLwa
Starting tebctl-tws_cpa_agent_tws agent: OK
[tws@host1 TWS]$
```

More information about the **param** command can be found here:

http://www.ibm.com/support/knowledgecenter/SSTG2Y_8.6.0/com.ibm.tivoli.itws.doc_8.6.0.1/awsrparam.htm

For more information about the configuration options of TWS, see “Configure the IBM Workload Agent” at:

http://www.ibm.com/support/knowledgecenter/SSZQDR/com.ibm.rba.doc/CC_configTWA.htm?lang=en-us

For more information about installation and configuration options, see “IBM Workload Automation on Cloud” at:

http://www.ibm.com/support/knowledgecenter/SS4J4Z_1.0.0/com.ibm.tivoli.wasaas.doc_1.0.0/distr/src_pi/awssaaspiinstul.htm

2.3.7 Install the Netcool/OMNIBus extensions

IBM Runbook Automation requires additional fields in the events table `alert.status`. If you have a high availability or multitier ObjectServer setup, run the command on all servers and make changes to corresponding Gateways (for example, bidirectional synchronization and unidirectional forwarding between Collection and Aggregation as well as between Aggregation and Visualization). Runbooks leaves a trace in the event journal.

Note: You do not need to make changes to Gateways for things such as Trouble Ticket integration. The History Gateway does not require the extra Runbook Automation fields as they just contain extra information such as relationship information from event to runbook.

The Runbook Automation extensions are in IBM Netcool/Impact from version 7.1.0.4. Import this schema file to all ObjectServers:

```
$IMPACT_HOME/add-ons/rba/db/rba_objectserver_fields_update.sql
```

To update the ObjectServer, run the following command:

```
$OMNIHOME/bin/nco_sql -user <username> -password <password> -server  
<object_server_name> < rba_objectserver_fields_update.sql
```

<object_server_name> is a placeholder for your ObjectServer name.

<username> is your ObjectServer user name.

<password> is your ObjectServer password.

For more information, see the documentation at:

http://www.ibm.com/support/knowledgecenter/SSZQDR/com.ibm.rba.doc/CT_updateOS.html

The images use a single ObjectServer called `NOI_AGG_P` and has no high availability setup. Figure 2-24 shows the output that is produced in the example scenario.

```
[netcool@host1 Desktop]$ cd /opt/IBM/tivoli/impact/add-ons/rba/db  
[netcool@host1 db]$ ls -al  
total 44  
drwxr--r-- 2 netcool ncoadmin 4096 Feb 23 13:12 .  
drwxr--r-- 4 netcool ncoadmin 4096 Feb 23 13:08 ..  
-rwxr--r-- 1 netcool ncoadmin 733 Feb 23 13:12 objectserver_update.sql  
-rwxr--r-- 1 netcool ncoadmin 762 Feb 23 13:12 rba_objectserver_fields_update.sql  
-rwxr--r-- 1 netcool ncoadmin 8926 Feb 23 13:12 rba_schema_derby.sql  
-rwxr--r-- 1 netcool ncoadmin 5250 Feb 23 13:12 rba_schema_mysql.sql  
-rwxr--r-- 1 netcool ncoadmin 5169 Feb 23 13:12 rba_schema_objectserver.sql  
[netcool@host1 db]$ nco_sql -server NOI_AGG_P -user root -password object00 < rba_schema_objectserver.sql  
(0 rows affected)  
(0 rows affected)  
(0 rows affected)  
(0 rows affected)  
(0 rows affected)  
(0 rows affected)  
[netcool@host1 db]$
```

Figure 2-24 OMNIBus ObjectServer schema update output

Figure 2-25 shows the four new fields, which all start with the runbook, in the nco_config tools.

RowSerial	Incr	4	✗ false	✗ false	✓ true	✓ true	✓ true	1
RunbookID	VarChar	2048	✗ false	✗ false	✗ false	✗ false	✗ false	79
RunbookParameters	VarChar	2048	✗ false	✗ false	✗ false	✗ false	✗ false	80
RunbookStatus	VarChar	2048	✗ false	✗ false	✗ false	✗ false	✗ false	82
RunbookURL	VarChar	2048	✗ false	✗ false	✗ false	✗ false	✗ false	81
SentToSCALA	Integer	4	✗ false	✗ false	✗ false	✗ false	✗ false	78

Figure 2-25 RBA extra ObjectServer fields

2.3.8 Install the Web UI integration

There is one more thing to do to conclude the OMNibus part of the installation. The next step is to create a menu entry and a tool to launch in context the Runbook Automations. To do this, the subscription ID is required and the URL to the Runbook Automation instance that you are registered to.

For more information, see the documentation here:

http://www.ibm.com/support/knowledgecenter/SSZQDR/com.ibm.rba.doc/CT_createmenuentry.html

To install the Web UI integration, complete these steps:

1. To create a **Menu** and **Tool**, you need to go in DASH to the Menu Configuration. In the alerts menu, add a Separator before and after, and then introduce a new tool to launch Runbook Automation.
2. The tool requires a URL to be compiled. The skeleton looks like this:

```
https://<URL>/index?subscriptionId=<YOUR_SUBSCRIPTION_ID>&dashboard=rba.dashboard.executerunbook&context=%7B%22rbid%22%3A%22{$selected_rows.RunbookID}%22%2C%22bulk_params%22%3A%22{$selected_rows.RunbookParameters}%22%7D
```

<URL> is your URL to IBM Runbook Automation.

<YOUR_SUBSCRIPTION_ID> is your subscription ID.

This is the URL for the example subscription:

```
https://ibmopsmanagement.mybluemix.net/index
```

This is the subscription Id:

```
67d364d1eec24efd99cef7c5486d4319
```

This then combines to this URL in the tool as shown in Example 2-1.

Example 2-1 URL to Runbook Automation

```
https://ibmopsmanagement.mybluemix.net/index?subscriptionId=67d364d1eec24efd99cef7c5486d4319&dashboard=rba.dashboard.executerunbook&context=%7B%22rbid%22%3A%22{$selected_rows.RunbookID}%22%2C%22bulk_params%22%3A%22{$selected_rows.RunbookParameters}%22%7D
```

All together then it looks as shown in Figure 2-26.

The screenshot displays the configuration interface for the 'Launch Runbook' tool. At the top, the tool's name is 'LaunchRunbook' and its type is 'CGI/URL'. Below this, there is a 'Data Source' section with a 'Click to show' link. The main configuration area is titled 'Tool Configuration' and contains several settings:

- CGI/URL**: A tabbed section containing:
 - URL**: A text field with the value: `https://ibmopsmanagement.mybluemix.net/index?subscriptionId=67d364d1eec24efd99cef7c5486d4319&dashboard=rba_dashboard_executerunbook&context=%7B%22rbid%22%3A%22{$selected_rows.RunbookID}`
 - Fields**: A 'Show' button.
 - Method**: Radio buttons for GET (selected), POST, and New window.
 - Open In**: Radio buttons for 'Specific window: Runbook Automa' (selected) and 'New window'.
 - Execute for each selected row**: A checked checkbox.
 - Window for each selected row**: An unchecked checkbox.

Below the tool configuration is the 'Access Criteria' section, which has two tabs: 'Group' and 'Fields'. The 'Group' tab is active, showing two lists: 'Available' and 'Selected'. The 'Available' list contains 'Netcool_Admin' and 'Netcool_User'. Between the lists are four buttons: '>>', '>', '<', and '<<'. The 'Selected' list is currently empty. At the bottom of the interface are 'Save' and 'Cancel' buttons.

Figure 2-26 Launch Runbook Automation tool

- Go to the Event Viewer in DASH and then select any event to bring the just introduced tool into the menu structure of the Event Viewer and the Active Event List (AEL). The updated Active Event List is shown in Figure 2-27.

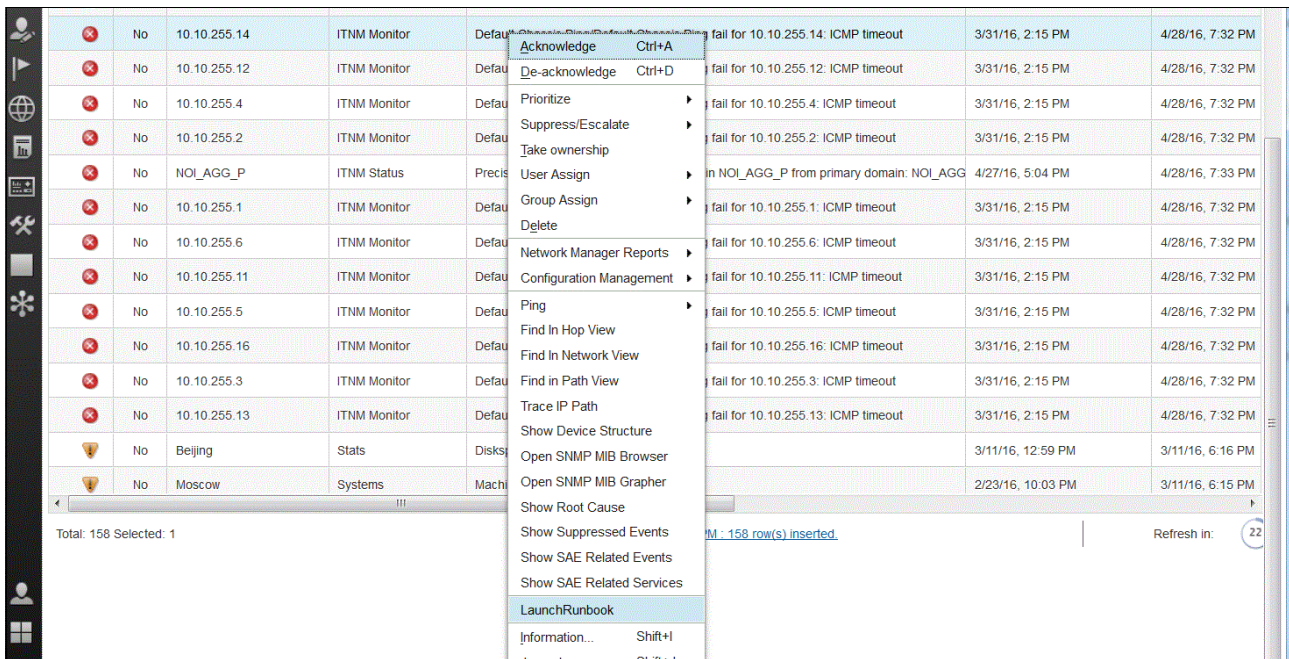


Figure 2-27 Launch Runbook Tool in the Event Viewer

- The tool launches a browser window that then connects to the Runbook Automation subscription. However, the relationship is missing between OMNIBus ObjectServer events and the IBM Runbook Automation. The ObjectServer field that contains this relationship information is **RunbookID**. See Example 2-1 on page 68. So far it will not be filled. This is done by using IBM Netcool/Impact, which will be covered in the following section.

2.3.9 Install the Impact integration

IBM Netcool/Impact from version 7.1.0.4 includes the Runbook Automation extensions.

Important: At the time of writing, IBM Netcool/Impact v7.1.0.4 has a bug concerning Runbook Automation. This bug is fixed by FP5, but that introduces another bug that requires a JAR file to be exchanged. FP6 will fix this issue and is expected to be available in June 2016.

The required file is named `nciClient.jar`. It needs to go into the following directory:

```
/opt/IBM/tivoli/impact/lib/nciClient.jar
```

Now configure IBM Tivoli Netcool/Impact V7.1.0.5 to integrate IBM Runbook Automation and map runbooks to events. To do this, you need extra information like subscriptionID and API details information. Log in to the Runbook Automation application, go the section **Manage API Keys**, and select **Create API Keys**.

For more information about updating the Netcool/Impact configuration, see:

http://www.ibm.com/support/knowledgecenter/SSZQDR/com.ibm.rba.doc/CT_updateconfig.html

Figure 2-28 shows the created API Keys. These are important, so save them to a file.

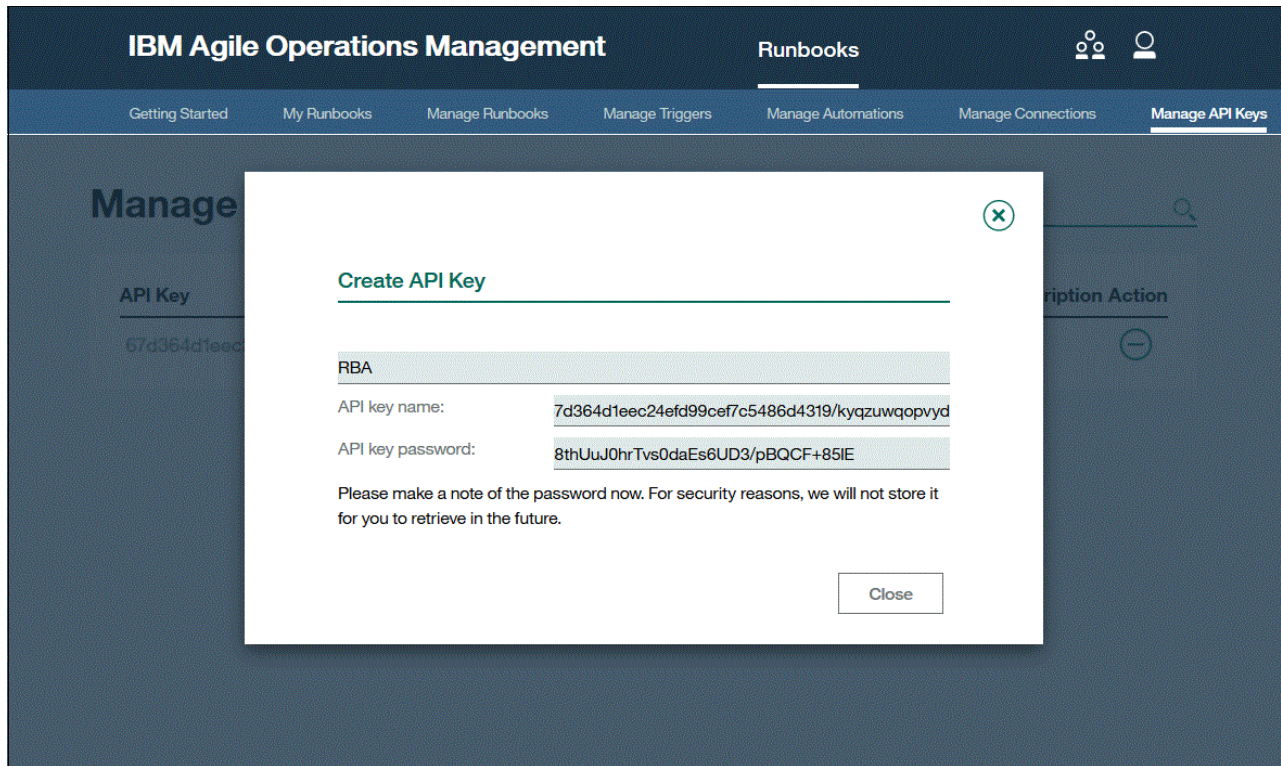


Figure 2-28 Create API Keys (Note: API key password has been made unusable)

The following steps need to be done to get the Impact part of the integration working:

1. Modify the Impact database schema.
2. Import the Runbook Automation certificate.
3. Import the Runbook Automation project.
4. Configure user access rights.
5. Configure and test the RBA_ObjectServer data source connection.
6. Test the integration.

Modify the Impact database schema:

To modify the Impact database schema, complete the following steps:

1. Open the following file:

```
$IMPACT_HOME/add-ons/rba/db/rba_schema_derby.sql
```

2. Replace the line:

```
connect  
'jdbc:derby://__PRIMARY_HOST__:__PRIMARY_PORT__/__PRIMARY_DB__;user=__DBUSER__;  
password=__DBPASSWORD__';
```

with:

```
connect 'jdbc:derby://localhost:1527/ImpactDB;user=impact;password=derbypass';
```

The file should look like as shown in Figure 2-29.

```
-- ***** {COPYRIGHT-TOP-RM} ***
-- * Licensed Materials - Property of IBM
-- * "Restricted Materials of IBM"
-- * 5724-S43
-- *
-- * (C) Copyright IBM Corporation 2013, 2015. All Rights Reserved.
-- *
-- * US Government Users Restricted Rights - Use, duplication, or
-- * disclosure restricted by GSA ADP Schedule Contract with IBM Corp.
-- ***** {COPYRIGHT-END-RM} ***

-- connect 'jdbc:derby://__PRIMARY_HOST__:__PRIMARY_PORT__/__PRIMARY_DB__;user=__DBUSER__;password=__DBPASSWORD__';
connect 'jdbc:derby://localhost:1527/ImpactDB;user=impact;password=derbypass;';

-- drop if exist
DROP TABLE rbaconfig.triggers;
DROP TABLE rbaconfig.triggers_settings;
DROP TABLE rbaconfig.rba_info;
DROP TABLE rbaconfig.rba_parameters;
DROP TABLE rbaconfig.event_filters;
DROP TABLE rbaconfig.predefined_event_filters;
DROP TABLE rbaconfig.trigger_to_reader_filter;
DROP TABLE rbaconfig.defaults;
DROP SCHEMA rbaconfig;

...

```

Figure 2-29 Modified sample `rba_schema_derby.sql`

3. Further down in the file, modify the section shown in Figure 2-30 with your subscription details. Note that the API Key Password needs to be encrypted by using the impact tool `nci_crypt`.

```
...
-----
-- insert values into the defaults TABLE
-----
INSERT INTO rbaconfig.defaults VALUES ('RBAHost','Update with RBA Host ');
INSERT INTO rbaconfig.defaults VALUES ('RBAManualExecHost','Update with RBA HOST ');
INSERT INTO rbaconfig.defaults VALUES ('RBAPort','443');
INSERT INTO rbaconfig.defaults VALUES ('RBAProtocol','https');
INSERT INTO rbaconfig.defaults VALUES ('RBARESTPath','/api/rba/');
INSERT INTO rbaconfig.defaults VALUES ('RBARESTPathToView','/api/rba/');
INSERT INTO rbaconfig.defaults VALUES ('RBAAPIKeyName','Update with API Key Name');
INSERT INTO rbaconfig.defaults VALUES ('RBAAPIKeyPassword','Update with value from nci_crypt <API KEY Password>');
INSERT INTO rbaconfig.defaults VALUES ('RBASubscription','Update with Subscription value ');
INSERT INTO rbaconfig.defaults VALUES ('EnumeratedFields','all');
INSERT INTO rbaconfig.defaults VALUES ('ExcludedEnumeratedFields','Expression:NOT LIKE 'X''');
INSERT INTO rbaconfig.defaults VALUES ('GetHTTPUseProxy','false');
INSERT INTO rbaconfig.defaults VALUES ('GetHTTPProxyHost','localhost');
INSERT INTO rbaconfig.defaults VALUES ('GetHTTPProxyPort','8080');
INSERT INTO rbaconfig.defaults VALUES ('MaxNumTrialsToUpdateRBAStatus','60');
INSERT INTO rbaconfig.defaults VALUES ('NumberOfSampleEvents','10');

INSERT INTO rbaconfig.defaults VALUES ('curlCmd',' ');

...

```

Figure 2-30 Standard `rbaconfig.defaults` table

The file should look like the one in Figure 2-31.

```
...
-----
-- insert values into the defaults TABLE
-----
INSERT INTO rbaconfig.defaults VALUES ('RBAHost','rba.mybluemix.net');
INSERT INTO rbaconfig.defaults VALUES ('RBAManualExecHost','ibmopsmanagement.mybluemix.net');
INSERT INTO rbaconfig.defaults VALUES ('RBAPort','443');
INSERT INTO rbaconfig.defaults VALUES ('RBAProtocol','https');
INSERT INTO rbaconfig.defaults VALUES ('RBARESTPath','/api/rba/');
INSERT INTO rbaconfig.defaults VALUES ('RBARESTPathToView','/api/rba/');
INSERT INTO rbaconfig.defaults VALUES ('RBAAPIKeyName','67d364d1eec24e*****486d4319/kyqzuwqopvyd');
INSERT INTO rbaconfig.defaults VALUES ('RBAAPIKeyPassword','{aes}42FDF5E58D*****0BFF609C10688D5D7D07A1403
FE780567635055D885D352B3D57B30C707F4CE06948D7231432');
INSERT INTO rbaconfig.defaults VALUES ('RBASubscription','67d364d1eec24efd99cef7c5486d4319');
INSERT INTO rbaconfig.defaults VALUES ('EnumeratedFields','all');
INSERT INTO rbaconfig.defaults VALUES ('ExcludedEnumeratedFields','Expression:NOT LIKE ''X''');
INSERT INTO rbaconfig.defaults VALUES ('GetHTTPUseProxy','false');
INSERT INTO rbaconfig.defaults VALUES ('GetHTTPProxyHost','localhost');
INSERT INTO rbaconfig.defaults VALUES ('GetHTTPProxyPort','8080');
INSERT INTO rbaconfig.defaults VALUES ('MaxNumTrialsToUpdateRBAStatus','60');
INSERT INTO rbaconfig.defaults VALUES ('NumberOfSampleEvents','10');

INSERT INTO rbaconfig.defaults VALUES ('curlCmd','');
...

```

Figure 2-31 Configured rbaconfig.defaults table (KeyName and KeyPassword have been modified)

Note: Check the file \$IMPACT_HOME/etc/<ServerName>_ImpactDB.ds to figure out the parameter values. For example, to verify on which port Netcool/Impact is installed, search for the PRIMARYPORT property value.

4. To import the database schema, run the following command:

```
$IMPACT_HOME/bin/nci_db connect -sqlfile
$IMPACT_HOME/add-ons/rba/db/rba_schema_derby.sql
```

The output should look like that in Figure 2-32. Note that the API key name and password have been made unrecognizable.

```
[netcool@host1 db]$ /opt/IBM/tivoli/impact/bin/nci_db connect -sqlfile rba_schema_derby.sql
Using rba_schema_derby.sql as SQL source file for the Database.
ij version 10.8
ij> -- ***** {COPYRIGHT-TOP-RM} ***
-- * Licensed Materials - Property of IBM
-- * "Restricted Materials of IBM"
-- * 5724-S43
-- *
-- * (C) Copyright IBM Corporation 2013, 2015. All Rights Reserved.
-- *
-- * US Government Users Restricted Rights - Use, duplication, or
-- * disclosure restricted by GSA ADP Schedule Contract with IBM Corp.
-- ***** {COPYRIGHT-END-RM} ***

connect 'jdbc:derby://localhost:1527/ImpactDB;user=impact;password=derbypass;';
ij> -- drop if exist
DROP TABLE rbaconfig.triggers;
ERROR 42Y07: Schema 'RBACONFIG' does not exist
ij> DROP TABLE rbaconfig.triggers_settings;
ERROR 42Y07: Schema 'RBACONFIG' does not exist
...
Issue the 'help' command for general information on IJ command syntax.
Any unrecognized commands are treated as potential SQL commands and executed directly.
Consult your DBMS server reference documentation for details of the SQL syntax supported by your server.
ij> -----
-- CREATE database for runbook automation
-----
CREATE SCHEMA rbaconfig;
0 rows inserted/updated/deleted
ij> SET SCHEMA rbaconfig;
0 rows inserted/updated/deleted
ij> -----
-- rba triggers
-----
...
ij> -----
-- insert values into the defaults TABLE
-----
INSERT INTO rbaconfig.defaults VALUES ('RBAHost','rba.mybluemix.net');
1 row inserted/updated/deleted
ij> INSERT INTO rbaconfig.defaults VALUES ('RBAManualExecHost','ibmopsmanagement.mybluemix.net');
1 row inserted/updated/deleted
...
1 row inserted/updated/deleted
ij> INSERT INTO rbaconfig.defaults VALUES ('RBAAPIKeyName','67d364d1eec24e*****486d4319/kyzquwqopvyd');
1 row inserted/updated/deleted
ij> INSERT INTO rbaconfig.defaults VALUES ('RBAAPIKeyPassword','{aes}42FDF5E58D*****0BFF609C106B8D507D07A1403
FE7B0567635055D8B5D352B3D57B30C707F4CE06948D7231432');
1 row inserted/updated/deleted
ij> INSERT INTO rbaconfig.defaults VALUES ('RBASubscription','67d364d1eec24efd99cef7c5486d4319');
...
ij> -----
-- insert into predefined filter
-----
INSERT INTO rbaconfig.predefined_event_filters VALUES (1,'Severity','=','5','Critical Alarms','PREDEFINED');
1 row inserted/updated/deleted
ij> INSERT INTO rbaconfig.predefined_event_filters VALUES (2,'Severity','>','=','4','Critical and Major
Alarms','PREDEFINED');
1 row inserted/updated/deleted
ij> INSERT INTO rbaconfig.predefined_event_filters VALUES (3,'Severity','>','=','3','Alarms equal to or higher then
minor','PREDEFINED');
...
ij> -----
-- insert into operators table
-----
INSERT INTO rbaconfig.query_operators VALUES ('NOT LIKE','not like','TRG.LB.OPERATOR_NOT_LIKE');
1 row inserted/updated/deleted
ij> INSERT INTO rbaconfig.query_operators VALUES ('=','equal to','TRG.LB.OPERATOR_EQUAL');
1 row inserted/updated/deleted
...
1 row inserted/updated/deleted
ij> INSERT INTO rbaconfig.query_operators VALUES ('NOT IN','not in','TRG.LB.OPERATOR_NOT_IN');
1 row inserted/updated/deleted
[netcool@host1 db]$
```

Figure 2-32 Sample output of import database schema command

It is best practice in a production type environment to remove the text password and other sensitive data in the configuration file on your Impact server, after you have run this command.

If you want to change something in the Derby settings, you can use the SQL shown in Example 2-2.

Example 2-2 SQL to change the Derby settings

```
[netcool@host1 bin]$ ./nci_db connect
ij version 10.8
ij> connect
'jdbc:derby://localhost:1527/ImpactDB;user=impact;password=derbypass;';
ij> update rbaconfig.defaults set FieldValue = 'rba.mybluemix.net' WHERE
FieldName='RBAHost';
1 row inserted/updated/deleted
ij>
```

If you want to list what you have configured in the Derby DB, use the SQL in Example 2-3.

Example 2-3 SQL to list Derby DB settings

```
[netcool@host1 bin]$ ./nci_db connect
ij version 10.8
ij> connect
'jdbc:derby://localhost:1527/ImpactDB;user=impact;password=derbypass;';
ij> select * from rbaconfig.defaults;
FIELDNAME
|FIELDVALUE
-----
-----
-----
-----
RBAHost
|rba.mybluemix.net
RBAManualExecHost
|ibmopsmanagement.mybluemix.net
RBAPort
|443
RBAProtocol
|https
RBARESTPath
|/api/rba/
...
GetHTTPProxyPort
|8080
MaxNumTrialsToUpdateRBAStatus
|60
NumberOfSampleEvents
|10
curlCmd
|
```

17 rows selected
ij>

Import the Runbook Automation certificate

In this step, you import the certificate to your Impact server so the policy can connect to the Bluemix subscription. It enables SSL connections between IBM Netcool/Impact and external servers, such as the IBM Runbook Automation application, which is hosted on IBM Bluemix. Obtain a signed certificate for the external server and copy it to the Impact server host. Import the signed certificate into the truststore of the Impact server:

1. One way to get the certificate is the one described in the documentation. There is another, maybe easier, way. Open a browser to your subscription and export the certificate with the browser features. Figure 2-33 shows this for Mozilla Firefox ESR 38.8.0 IBMCCK 2.2.4.

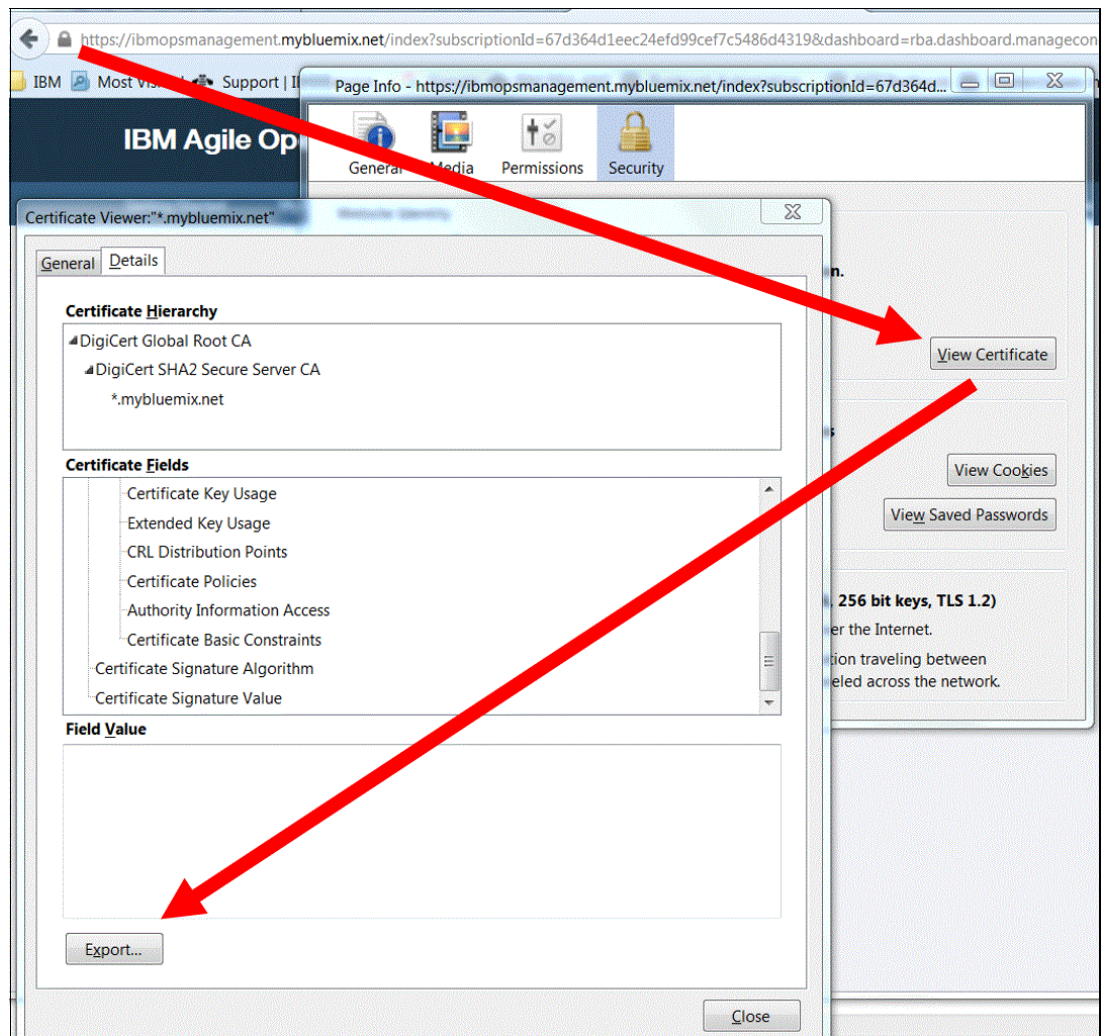


Figure 2-33 Browser certificate export of an existing SSL connection

In the example environment, the certificate looks as shown in Figure 2-34.

```
-----BEGIN CERTIFICATE-----
MIIFNjCCBB6gAwIBAgIQDjrrHdwZDMNMLp17gadRaTANBgkqhkiG9w0BAQsFADBN
MQswCQYDVQQGEwJVUzEVMBMGA1UEChMMRG1naUNlcnQgSW5jMScwJQYDVQQDEw5E
aWdpQ2VydCBTSEEyIFN1Y3VyZSBTZjJ2ZXIgdG9wHhcNMjQwNjA5MDAwMDAwWhcN
MTcwNjA2MTIwMDAwWjCBGTELMAKGA1UEBhMCMVVMxETAPBgNVBAGTE51dyBZb3Jr
MQ8wDQYDVQQHEwZBcm1vbmsxNDAYBgNVBAoTK01udGVybmFOaW9uYWwgQnVzaW5l
c3MgTWJfJaG1uZXMGQ29ycG9yYXRpb24xGDAWBgNVBAMMDyoubX1ibHV1bW14Lm5l
dDCCASIdDQYJKoZIhvcNAQEBBQADggEPADCCAQoCggEBAMMqWfczgcNeG1NeF++p
9Lh0DnAawubHb9Z3H7fBklbImq5s0K1WMQy2ZemETP83aii3dEDAUFHQ8uP2If
zh2SFg7AEvkXQjg9XERONbC9muLcJ3XIF6vIWLpgI+0jq+cIRA0gaLR5xyc8V1DR
gFFJ9n/zMTqUkKna7R0IeQkJ0th1f5nJom2+m0FVXeKd2nwAVC9c9D1Q4BZMveyM
Je/dnQqrJNx4xHgU9k7z/fZOK0j1aJ0nzYWpTDtncyAdr3Q/PiWitTsiy9IgLyt7
/wCWUUMSVnuPMYahr42iAHjMOQLQXqnNcnp+GOUcH4KiR8YHo5FSJtv+LxCxMEme
uokCAwEAaOCAdswggHXMB8GA1UdIwQYMBaAFA+AYRyCMWHVlyjnjUY4tCzhxtni
MB0GA1UdDgQWBbTtVEX9mc1YBJT0gsByB7AiD2HYyTjApBgNVHREEIjAggg8qLm15
Ymx1ZW1peC5uZXSCDW15Ymx1ZW1peC5uZXQwDgYDVROPAQH/BAQDAgWgMB0GA1Ud
JQQWMBQGCcsGAQUFBwMBBggrBgEFBQcDAjBrBgNVHR8EZDBiMC+gLaArhilodHRw
Oi8vY3Js*****C2gK4YpaHR0
cDovL2Ny*****gYDVR0gBDsw
OTA3Bg1ghkgBhv1sAQEwKjAoBggrBgEFBQcCARYcaHR0cHM6Ly93d3cuZG1naWNl
cnQuY29tLONQUzB8BggrBgEFBQcBAQRwMG4wJAYIKwYBBQUHMAAGGGGh0dHA6Ly9v
Y3NwLmRpZ21jZjJ0LmNvbTBGGBggrBgEFBQcwoY6aHR0cDovL2NhY2VydHMUZG1n
aWNlcnQuY29tLORpZ21DZXJOU0hBM1N1Y3VyZVN1cnZ1ckNBLmNydDAMBgNVHRMB
Af8EAjAAMAOGCSqGS1b3DQEBcWUAA4IBAQAwpDD+DRxMweuj9nTBEIDRfaMpxVb0
MOODggaJayiULYTWkoBYu/wkeB9Aw1Z/ZwhjikiWgyXONSxd2QTPiKYgrxe4ayKR
AU46NReUSEKEMU1FTvygPjhl5M4+SrwHt+kcJ6rt93YmIoSHXurXcIzyv5jiYQx
3rLIUMd0og2y5DYrVBQcCkQBMDw3jjZjKdkVFsA14hJ/Zz28bxVowJjAjVKQR13
oAhDha8vjqs71TtAmKH7b9tjSN9hwGI4d/QAnFk2UcumnjVmbraQp/5GaDe9mRuw
x8fqgz00mBtIPYZJYoj2VPbObjRFcK1GHR2iM1ykyQiXxq30oMBwym
-----END CERTIFICATE-----
```

Figure 2-34 Sample certificate file (the ***** mask some parts of the certificate to make it unusable)

If errors occur, make sure that your exported certificate contains a full and valid certificate. Errors like `verify error:num=20:unable to get local issuer certificate` occur due to a missing CA root certificate for the DigiCert CA. The following import procedure assumes that you have saved / exported the certificate as `file.cert`.

2. Import the certificate by using this command:

```
$IMPACT_HOME/sdk/bin/keytool -importcert -alias RBA_Bluemix_Certificate -file
file.cert -keystore
$IMPACT_HOME/wlp/usr/servers/<instance>/resources/security/trust.jks -storepass
<password>
```

<instance> is a placeholder for your Netcool/Impact server instance and <password> for your Netcool/Impact admin password. For example:

```
$IMPACT_HOME/sdk/bin/keytool -list -keystore
$IMPACT_HOME/wlp/usr/servers/NCI/resources/security/trust.jks -storepass
object00
```

3. Enter `yes` if you are prompted `Trust this certificate? [no]:` **yes**

Wait until you see that the Certificate was added to keystore. The command output will look as shown in Figure 2-35.

```
[netcool@host1 Projects]$ /opt/IBM/tivoli/impact/sdk/bin/keytool -importcert -alias RBA_Bluemix_Certificate -file
file.cert -keystore /opt/IBM/tivoli/impact/wlp/usr/servers/NCI/resources/security/trust.jks -storepass object00
Owner: CN=*.mybluemix.net, O=International Business Machines Corporation, L=Armonk, ST=New York, C=US
Issuer: CN=DigiCert SHA2 Secure Server CA, O=DigiCert Inc, C=US
Serial number: e3aeb1ddc190cc34c2e997b81a75169
Valid from: 6/2/14 12:00 AM until: 6/6/17 12:00 PM
Certificate fingerprints:
    MD5:  5A:37:1E:3D:56:50:77:33:69:7F:07:DB:06:BF:A7:51
    SHA1: 4C:E5:40:36:86:4C:E5:19:3A:5A:3B:2B:BD:BF:86:20:3F:8B:8C:F7
    SHA256: 76:6C:1A:F4:92:21:39:77:EC:B9:95:73:5E:CB:D5:D3:13:81:5F:6A:22:36:CA:F9:27:FD:DF:FE:7B:68:94:FD
    Signature algorithm name: SHA256withRSA
    Version: 3

Extensions:

#1: ObjectID: 1.3.6.1.5.5.7.1.1 Criticality=false
AuthorityInfoAccess [
  [accessMethod: ocsp
accessLocation: URIName: http://ocsp.digicert.com
, accessMethod: caIssuers
accessLocation: URIName: http://cacerts.digicert.com/DigiCertSHA2SecureServerCA.crt
]]
...

#9: ObjectID: 2.5.29.14 Criticality=false
SubjectKeyIdentifier [
KeyIdentifier [
0000: ef 11 7f 66 73 56 01 25 33 a0 b0 1c 81 ec 08 83 ...fsV..3.....
0010: d8 76 32 4e                                     .v2N
]
]

Trust this certificate? [no]: yes
Certificate was added to keystore
[netcool@host1 Projects]$
```

Figure 2-35 Sample output of certificate import

The important piece is in the last three lines: Certificate was added to keystore

For listing the certificates in your store, use these commands:

```
$IMPACT_HOME/sdk/bin/keytool -list -keystore
$IMPACT_HOME/wlp/usr/servers/<instance>/resources/security/trust.jks -storepass
<password>
```

<instance> is your Netcool/Impact server instance, and <password> is your Netcool/Impact admin password.

- Restart the Impact and the Impact GUI server after you import the certificate. You can run the following commands if the Impact server and the Impact GUI server are installed on the same system:

```
$IMPACT_HOME/bin/stopGUIServer.sh
$IMPACT_HOME/bin/stopImpactServer.sh
$IMPACT_HOME/bin/startImpactServer.sh
$IMPACT_HOME/bin/startGUIServer.sh
```

The sample in Figure 2-36 shows what the output of these commands should look like.

```
[netcool@host1 Projects]$ /opt/IBM/tivoli/impact/bin/stopGUIServer.sh
Stopping server ImpactUI.
Server ImpactUI stopped.
[netcool@host1 Projects]$ /opt/IBM/tivoli/impact/bin/stopImpactServer.sh
Stopping server NCI.
Server NCI stopped.
[netcool@host1 Projects]$ /opt/IBM/tivoli/impact/bin/startImpactServer.sh
Starting server NCI.
Server NCI started with process ID 4705.
[netcool@host1 Projects]$ /opt/IBM/tivoli/impact/bin/startGUIServer.sh
Starting server ImpactUI.
Server ImpactUI started with process ID 4919.
```

Figure 2-36 Sample output for GUI and Impact server restart

Import the Runbook Automation project

Tip: As a precaution, run the command: `$IMPACT_HOME/bin/nci_version_control <ServerName> uncoall ""` to clear all locks before you import the data.

Run this command under the same user account that you used to install Netcool/Impact:
`$IMPACT_HOME/bin/nci_import <ServerName> $IMPACT_HOME/add-ons/rba/importData`

Figure 2-37 shows what these command line responses should look like.

```
[netcool@host1 db]$ /opt/IBM/tivoli/impact/bin/nci_version_control NCI uncoall ""
[netcool@host1 db]$
[netcool@host1 db]$ cd ../importData/Projects
[netcool@host1 Projects]$ /opt/IBM/tivoli/impact/bin/nci_import NCI /opt/IBM/tivoli/impact/add-ons/rba/importData/
nci_import of NCI from /opt/IBM/tivoli/impact/add-ons/rba/importData/ completed.
[netcool@host1 Projects]$
```

Figure 2-37 Sample output from lock removal and project import

Configure user access rights

IBM Runbook Automation needs to connect to Netcool/Impact for trigger management. This connection is secured with a user name and a password. The corresponding user name needs to have appropriate roles.

You can add the correct role to an existing user or create a user. This example associates the existing `impactadmin` user with the role `impactRBAUser`. Use the following command:

```
cd $IMPACT_HOME/install/security ./mapRoles.sh -add -user <username> -roles
impactRBAUser
```

Figure 2-38 shows what the command line responses should look like.

```
[netcool@host1 impact]$ cd /opt/IBM/tivoli/impact/install/security/
[netcool@host1 security]$ ./mapRoles.sh -add -user impactadmin -roles impactRBAUser
Adding user impactadmin to role impactRBAUser
[netcool@host1 security]$
```

Figure 2-38 Associate impact user with RBA user role

Configure and test RBA_ObjectServer data source connection

Now configure the project that you imported by completing these steps:

1. Log in to Netcool/Impact.
2. Switch to the Runbook Automation project from the drop-down menu in the upper right.
3. Click the Data Model tab.
4. Select **RBA_ObjectServer** data source, open the menu and click **Edit**.
5. Enter the access information for your Netcool/OMNIBus ObjectServer. By default there is a root user entry and it has no password (even if some ***** characters are shown). Change these settings to fit your environment.
6. Test the settings by using the **Test Connection** button as shown in Figure 2-39.

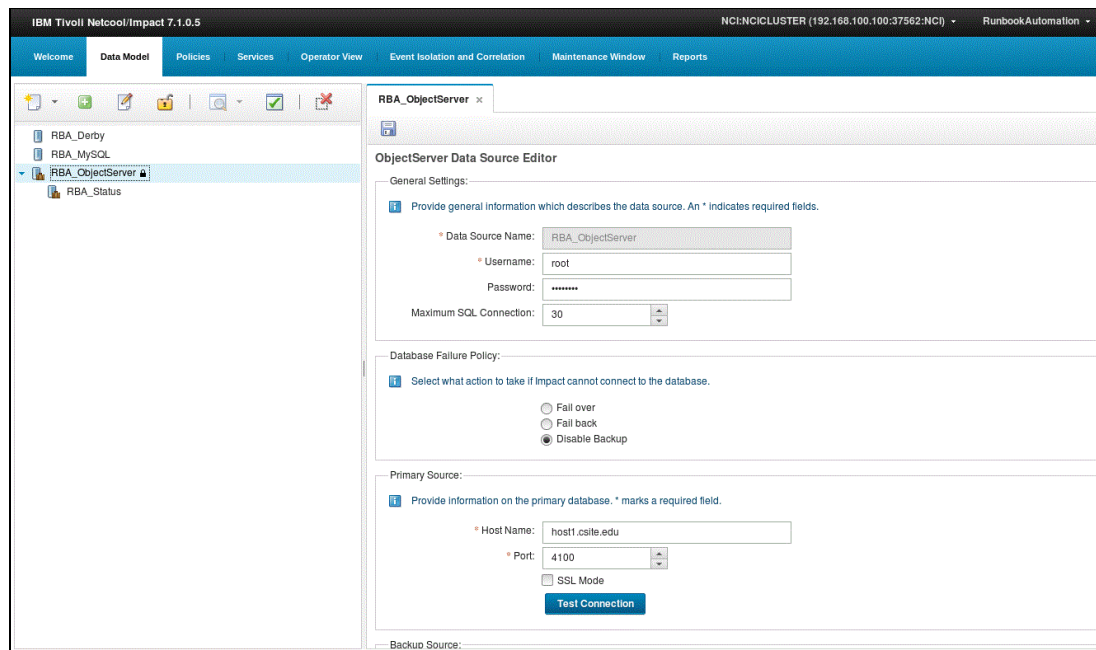


Figure 2-39 IBM Netcool/Impact Runbook Automation data source adapter

Figure 2-40 shows an successful test result.

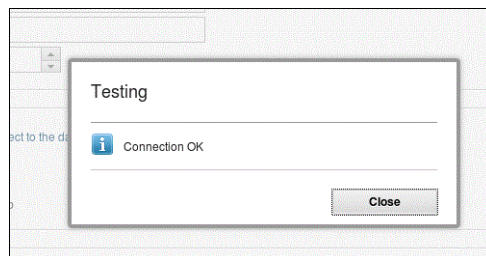


Figure 2-40 RBA_ObjectServer connection test ok

- Next step is to check the event field mapping. Go to the **RBA_Status** table and refresh the fields. Make sure that the rba fields are displayed as shown in Figure 2-41.

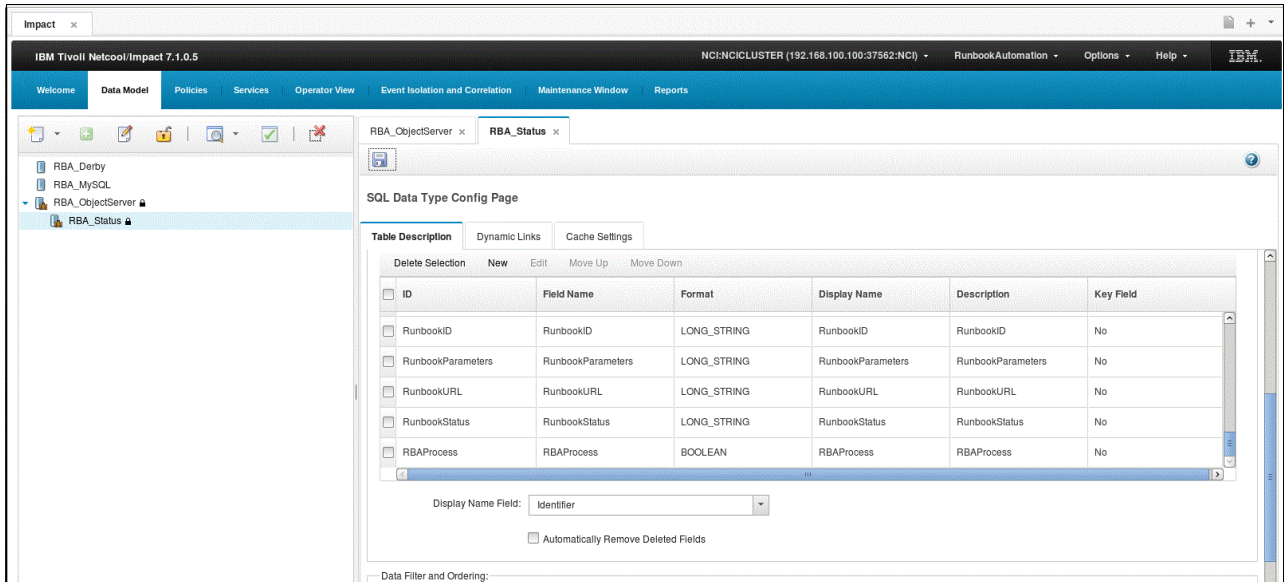


Figure 2-41 RBA_Status window with the Runbook Automation extra fields

- Make sure that you save each tab before you close them.

Test the installation

The best validation whether the IBM Netcool/Impact installation / RBA updates worked is to enter this URL in your browser:

`https://<ImpactServer>:<ImpactPort>/ibm/custom/RBARestUIServlet?UserAction=ALLINFO`

In the example installation, this translates to the URL shown in Example 2-4.

Example 2-4 IBM Netcool/Impact RBA test URL

`https://host1.csite.edu:17311/ibm/custom/RBARestUIServlet?UserAction=ALLINFO`

It will prompt you for the username and password that you have configured as part of the installation. For more information, see the following website:

http://www.ibm.com/support/knowledgecenter/SSZQDR/com.ibm.rba.doc/CT_configaccessrights.html?lang=en

Figure 2-42 shows a sample output of this URL. If you are asked for a user password combination (in the example scenario, the following works: `impactadmin/object00`), that is a good indication. If it comes back with **SUCCESS** in it, that is even better. Putting the result through a Rest client normally provides more readable feed back, but this time it made little difference.

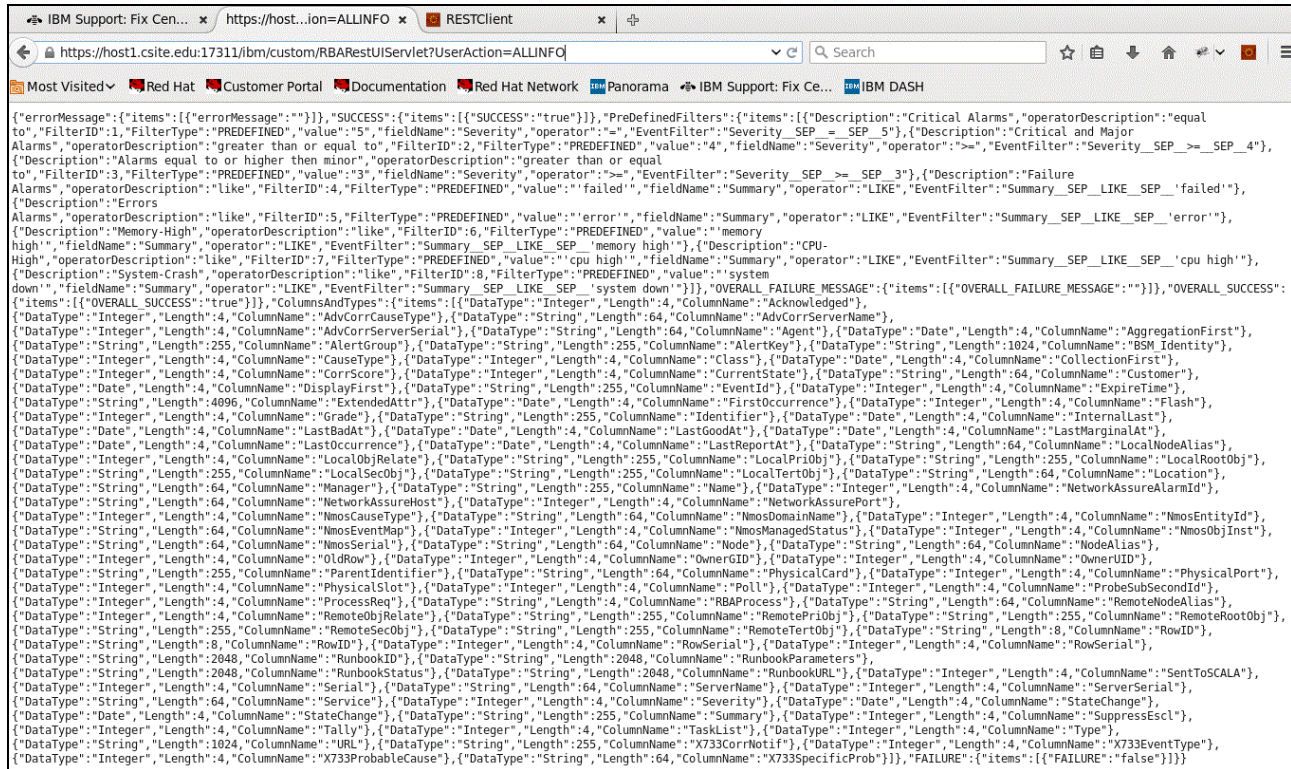


Figure 2-42 Impact Runbook Automation Rest API ALLINFO

The next steps will be done in the Runbook Automation application.

2.3.10 Configuring runbooks

Use a bookmark like the one shown in Example 2-5 to log in to the Runbook Automation subscription.

Example 2-5 Sample Runbook Automation URL

<https://ibmopsmanagement.mybluemix.net/index?subscriptionId=67d364d1eec24ef99cef7c5486d4319>

Add users and groups to your subscription. All users need to have an IBM ID. Therefore, register these IDs first and then add these user IDs here.



Log in to your subscription and go to the User and Group Management section. Click this icon to go to the User Add window, which is shown in Figure 2-43.

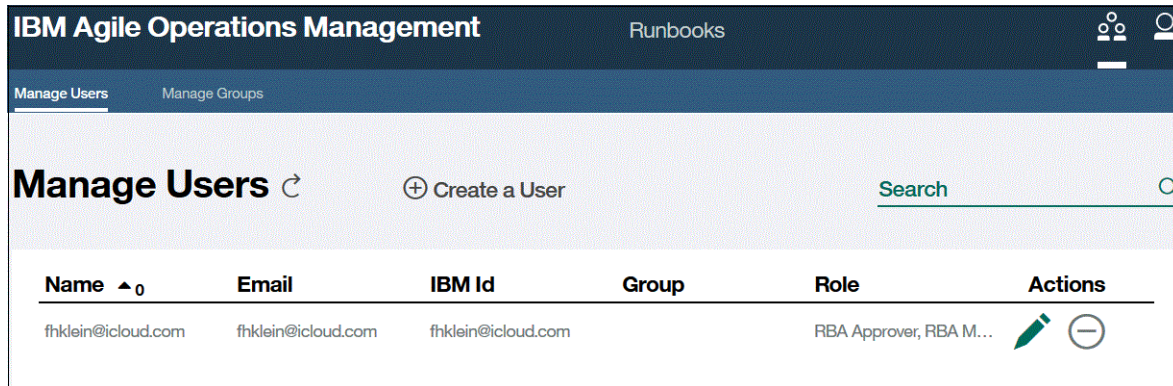


Figure 2-43 Create Users window

All users that you want to add require an IBM ID. Register these users first and then add them here. The following roles are available:

1. User: Normal user with no edit rights.
 - Preview and run a runbook
 - Monitor all runbooks that are run by the user that is logged on
 - Add comments about the quality of runbooks after the runbook is completed
 - Export runbooks
2. Approver: User with the following capabilities.
 - Preview and run a runbook
 - Add and edit the runbook
 - Monitor all runbooks that are run by the current user
 - Monitor all runbooks that are run by all users
 - Preview, edit, and create a trigger
 - Add comments about the quality of runbooks after the runbook is completed
 - Run a draft version of a runbook
 - Create and edit a connection
 - Publish a runbook
3. Manager: User with the following capabilities.
 - Import runbooks
 - Delete a runbook
 - Delete a trigger
 - Delete a connection
 - Preview, create, and delete API Keys.
4. Author: This role is used to create and manage runbooks.
 - Preview and run a runbook
 - Add and edit the runbook
 - Monitor all runbooks that are run by the user that is logged on
 - Monitor all runbooks that are run by all users
 - Preview, edit, and create a trigger
 - Add comments about the quality of runbooks after the runbook is completed
 - Run a draft version of a runbook
 - Create and edit a connection
 - Load runbook examples

So for example, if you want to create the API keys, then you need the *Manager* role.

You will need to have at least one super user to administer all parts of the IBM Runbook Automation and some regular users to execute the runbooks. Associate the roles to the users as required. Grouping is there, but does not provide a benefit to Runbook Automation so far. Grouping is useful for the IBM Alert Notification Service.

2.3.11 Connections

Before going into the scenarios, use the IBM Runbook Automation UI to tell IBM Runbook Automation how to reach the local Impact and the TWA. This step is done through connections. A connection is nothing more than a reference to the local installation. The Impact connection is required so IBM Runbook Automation can read the Triggers. The TWA connection is required to execute scripts, which are the part that makes IBM Runbook Automation capable executing of semi and fully automated runbooks. Connections also provide a link to a local IBM Endpoint Manager installation, but this connection is not used in the scenarios. To make a connection, complete these steps:

1. Click the Connections tab.
2. Create two new connections: One to Impact called TRIGGER and one to TWA called SCRIPT:
 - a. Provide a name.
 - b. Put in the connection details. The example installation used a local server named `host1.csite.edu` and the default ports.
 - c. Click **Save**.

Figure 2-44 shows what the connections should look like.

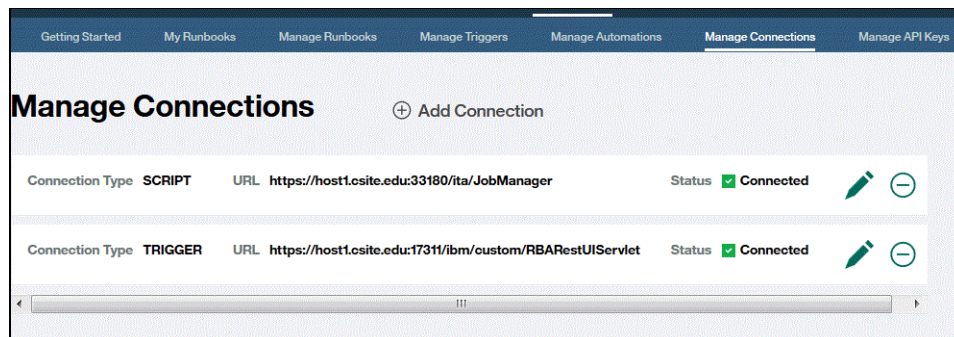


Figure 2-44 Connections

As soon as you have configured and saved the connections, they are tested and a status indication is given. In Figure 2-44 on page 84 you can see the two connections are both status **OK**. This is important because the triggers are put into the local Impact server. Without connection, IBM Runbook Automation cannot show and edit these triggers.

2.4 Scenarios

The scenarios in this book are built on each other. The first (2.4.1, “Scenario 1: Manual runbook” on page 86) is a fully manual runbook that will then be evolved into a semi-automated runbook (2.4.3, “Scenario 2: Semi-Automated runbook” on page 106) and finally becomes a fully automated runbook (2.4.4, “Scenario 3: Fully-Automated runbook” on

page 112). This progression is to illustrate how runbooks typically evolve. Chapter 3, “Scenario with IBM Runbook Automation and Alert Notification: Unsecure user endpoint detection” on page 121 then takes this progression a step further and shows how IBM Netcool Operations Insight, IBM Runbook Automation, and IBM Alert Notification can work together in a more complex scenario.

A usual starting point is that there is already a kind of knowledge article that describes a procedure that can be applied to solve a particular problem. This knowledge article can then be loaded by using the Runbook Automation editor as a draft runbook. After loading the raw content, the text is divided into steps. Then commands will be extracted and made executable. Screen captures can be added to make it easier to explain what is meant.

What you want to achieve with manual runbooks is to provide a repeatable, documented, and an easy-to-use method of troubleshooting a problem event.

For more information about getting started, see:

http://www.ibm.com/support/knowledgecenter/SSZQDR/com.ibm.rba.doc/GS_getStarted.html

2.4.1 Scenario 1: Manual runbook

The Knowledge Article shown in Figure 2-45 forms the base of this scenario.

Knowledge Article: Simnet Probe disconnected

Related to event: <probe name> probe on <host> Going Down ...

If the following event occurs in your event list:

Severity: Critical

Node: host1.csite.edu

Summary: A PROBE process simnet running on host1.csite.edu as username probe has disconnected

Class: Default Class

AlertKey: PROBE:simnet

AlertGroup: Probe

Agent:

Manager:

Then you have to execute the following procedure to solve the problem:

- login to the server where the probe is running on
use SSH and the netcool / object00 credentials
- look if there is a process remaining which name is simnet
use the following command to do so:
`ps -ef | grep simnet`
- check if you can reach the ObjectServer
use the command `nco_ping NOI_AGG_P`
- check if the simnet probe property file is configured correctly
go to `$OMNIHOME/probes/linux86`
and check the file `simnet.props`
- check if the process control agent file is configured correctly
go to `$OMNIHOME/etc`
and check the file `nco_pa.conf`
- check if the systems startup procedures are configured correctly
go to `/etc/init.d`
and check the file `nco`
- start the simnet probe by using the system startup files
execute `/etc/init.d/nco start`

Figure 2-45 Sample knowledge article for simnet probe disconnected

To create a manual runbook, complete these steps:

1. Log in to the Runbook Automation subscription. You can do this by reusing the bookmark in Example 2-6.

Example 2-6 Runbook Automation subscription login

<https://ibmopsmanagement.mybluemix.net/index?subscriptionId=67d364d1eec24efd99cef7c5486d4319>

2. After you are logged in, you will see the Runbook Automation Getting Started part of the application as shown in Figure 2-46.

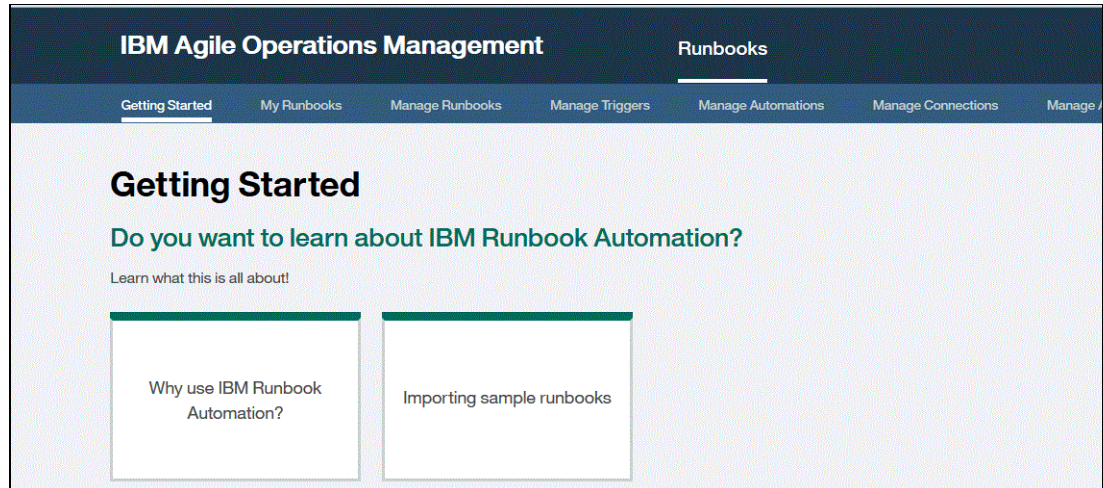


Figure 2-46 IBM Runbook Automation Getting Started

This window contains the following tabs:

- Getting Started: Links to documentation that helps you to get on your way with the application.
 - My Runbooks: The place where runbooks can be viewed and executed.
 - Manage Runbooks: Where you can add, preview, execute, and delete your runbooks.
 - Manage Triggers: The location to connect runbooks with events in OMNIbus.
 - Manage Automations: Where scripts are created and stored which then can deliver automated actions.
 - Manage Connections: Connects the Runbook Automation application with local execution like Impact, IBM Tivoli Workload Agent (TWA), and IBM Endpoint Manager (IEM or Big Fix).
 - Manage API Keys: The place to create and view the API keys.
3. Click the Manage Runbooks tab.

Tip: If you are new to runbooks, begin with the Getting Started window, and then load the samples and read through them.

4. Click the **Load Examples** button shown in Figure 2-47.

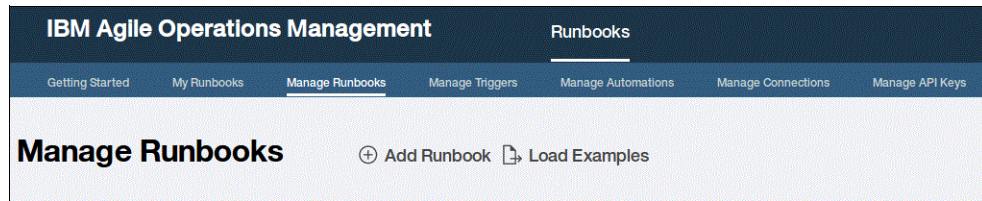


Figure 2-47 Manage Runbooks

5. You will be asked if you are sure to insert the samples. Click **Confirm** as shown in Figure 2-48.

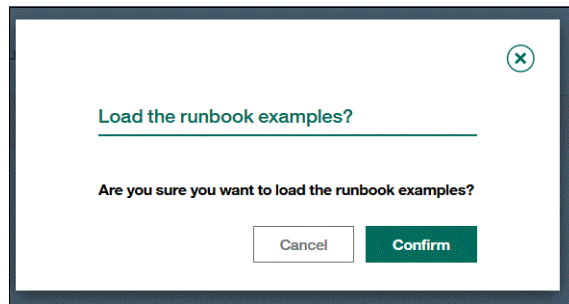


Figure 2-48 Confirm to load the sample runbooks library

After the samples are loaded, this list shows the sample runbooks. There are no semi- or fully automated samples in the library. Figure 2-49 shows the top of the list of samples.

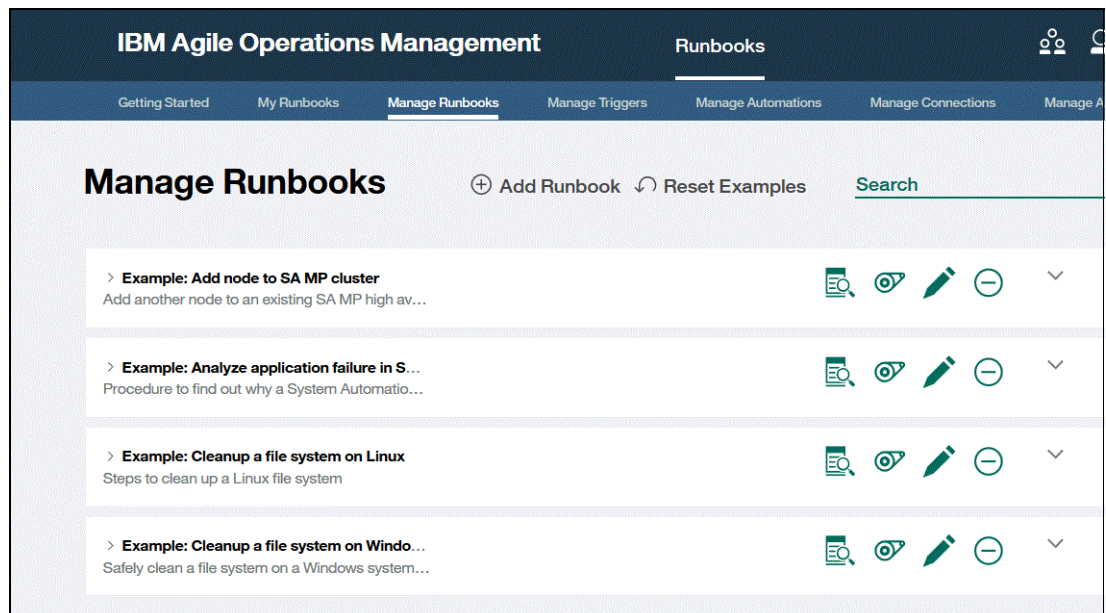


Figure 2-49 Sample runbooks loaded

6. To create a runbook, click **Add Runbook**. To reset (remove any changes) of the sample runbooks, click **Reset Examples**.

Figure 2-50 shows the new blank runbook.

The screenshot shows the 'Create Runbook' interface in IBM Agile Operations Management. The top navigation bar includes 'Runbooks' and several sub-menus: 'Getting Started', 'My Runbooks', 'Manage Runbooks', 'Manage Triggers', 'Manage Automations', 'Manage Connections', and 'Manage API Keys'. The main heading is 'Create Runbook'. The form contains several input fields: 'Name' (with a red asterisk), 'Description', 'Add tags to describe the runbook', 'Last updated by', and 'Runbook ID'. Below these fields is a rich text editor with a toolbar containing icons for undo, redo, search, font, size, bold, italic, text color, background color, link, unlink, list, and indent. To the right of the editor are three panels: 'Automation' with a search bar, 'Parameter' with a plus icon, and 'Legend' with a list of actions like 'Add step' (Ctrl+3) and 'Add comment' (Ctrl+4). At the bottom right, there are three buttons: 'Cancel', 'Save as Draft', and 'Publish'. A small note 'Press ALT 0 for help' is visible near the bottom of the editor.

Figure 2-50 New blank runbook

7. Enter a name, which in this example is Start Simnet probe on disconnect event. Provide a meaningful full description and add the appropriate tags. The **Last update by** and **RunbookID** fields will be automatically completed after it has been saved. The **RunbookID** is the value that you will need later to associate it with the disconnect event in the IBM Netcool/OMNibus ObjectServer.

Figure 2-51 shows **Name**, **Description**, and **Tags** fields completed for the new runbook.

The screenshot displays the 'Create Runbook' interface in IBM Agile Operations Management. The top navigation bar includes 'Runbooks' and several sub-tabs: 'Getting Started', 'My Runbooks', 'Manage Runbooks', 'Manage Triggers', 'Manage Automations', 'Manage Connections', and 'Manage API Keys'. The main heading is 'Create Runbook'. The form contains the following fields and sections:

- Name:** 'Start Simnet probe on disconnect event'
- Description:** 'Start Simnet probe on disconnect event'
- Tags:** 'omnibus' and 'linux' (with 'Add tags to describe the runbook' text)
- Last updated by:** (empty field)
- Runbook ID:** (empty field)
- Automation:** A section with a search bar.
- Parameter:** A section with a plus icon to add parameters.
- Legend:** A list of actions including 'Add step' (Ctrl + 3) and 'Add comment' (Ctrl + 4).

At the bottom of the form, there are three buttons: 'Cancel', 'Save as Draft', and 'Publish'.

Figure 2-51 Fields completed for a new runbook

- Paste the text from the knowledge article into the Runbook Automation Editor. The result is shown in Figure 2-52.

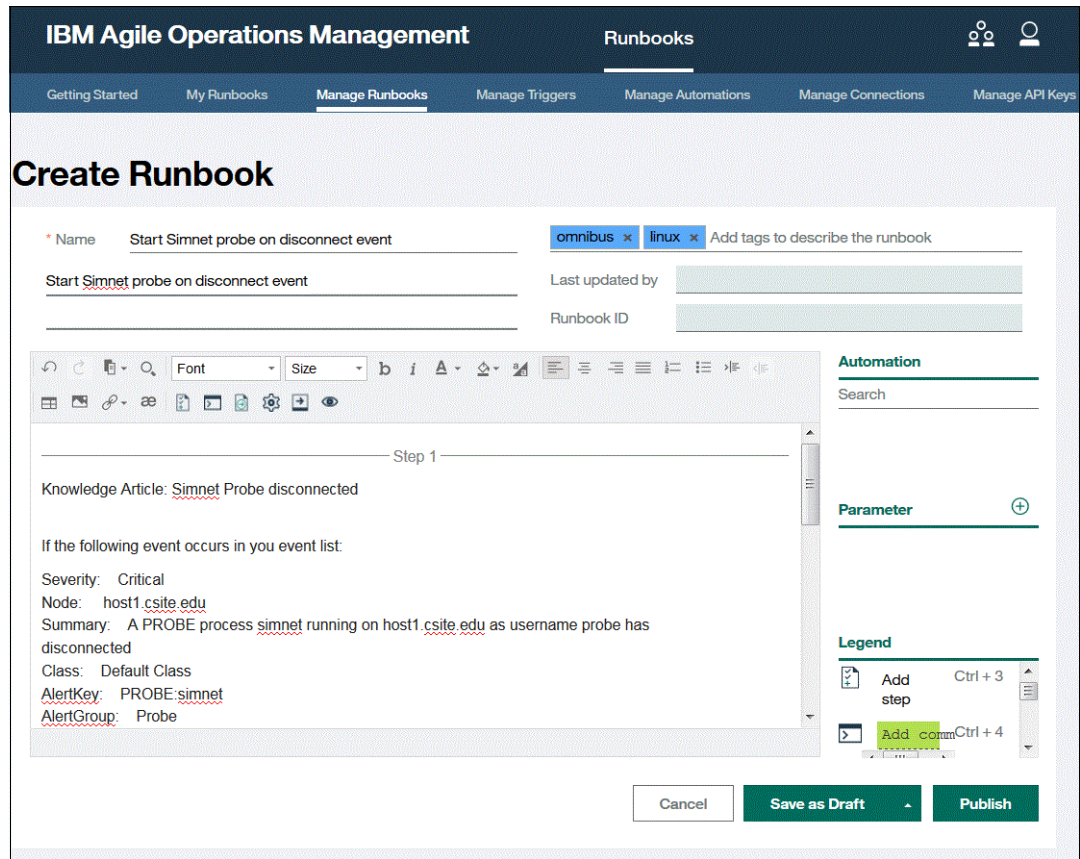


Figure 2-52 Knowledge Article pasted into the editor

- The editor has added a **Step 1** mark to the text. These step marks are used to divide individual action items. A typical first step is “log in to the target system.”
The IBM Runbook Automation uses the runbooks with a context: Events in OMNibus. As a result, you can cut out information like the heading and the top section that just describe the conditions in which this Knowledge Article is used. All this can be deleted, and the entry can simply start with the first step of the procedure.

Figure 2-53 shows what the remaining instructive text from the knowledge article looks like.

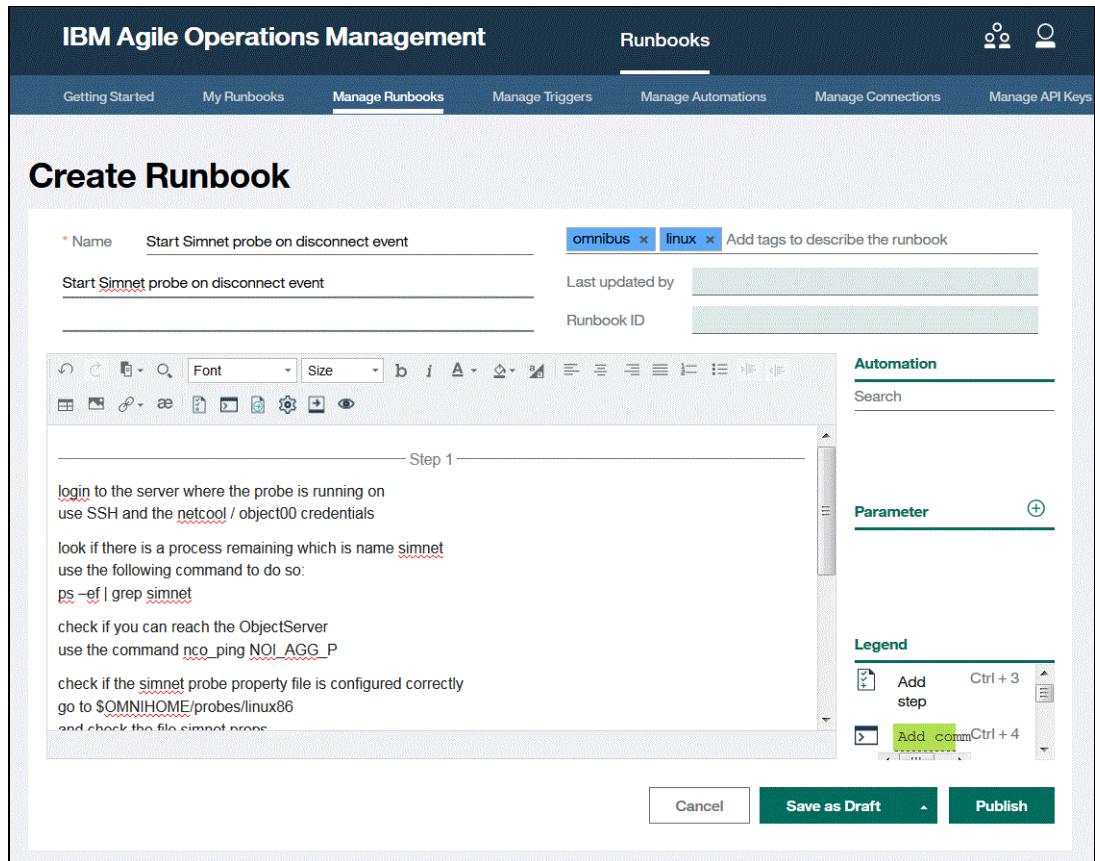


Figure 2-53 The extra text is deleted so that just the instructions remains

Complete these steps on the runbook content:

1. Segment the text into steps.
2. Isolate commands.
3. Put context into the runbook (Parameters).
4. Save.
5. Publish.
6. Test.
7. Enhance.

Segment the text into steps

To segment the text into steps, complete the following steps:

1. Go to each of the lines that conclude a step and then use the short cut **Ctrl + 3**.

The test will now look as shown in Figure 2-54.

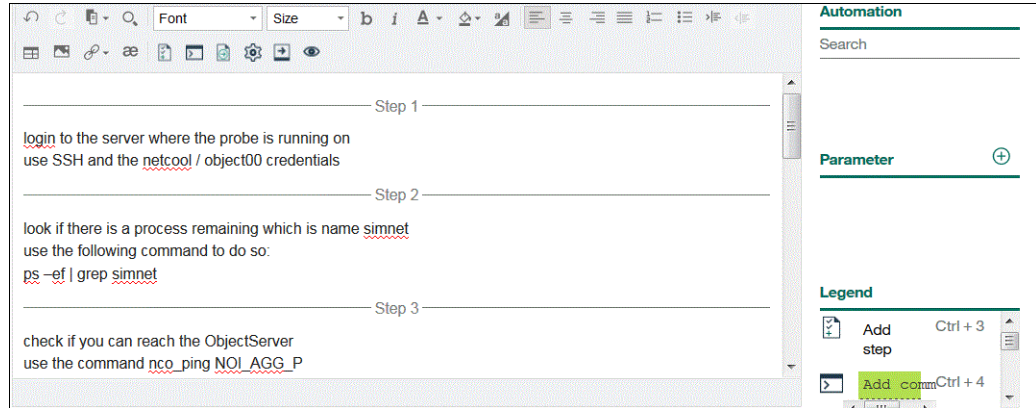


Figure 2-54 Steps added to the runbook

2. If you would execute the runbook now, it would look like shown in Figure 2-55.

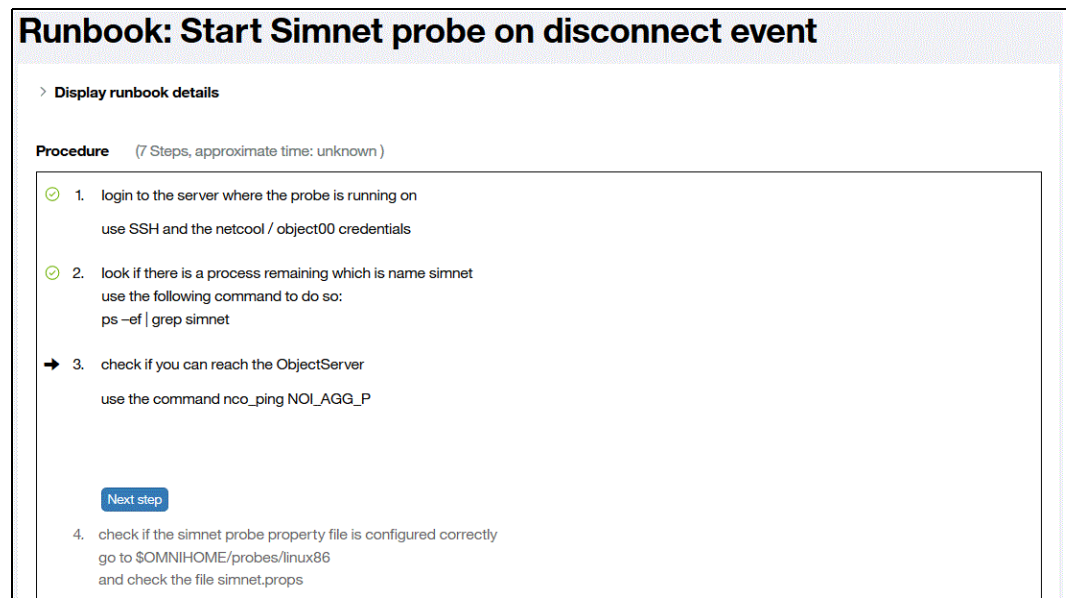


Figure 2-55 Sample execution with just steps added to the new runbook

You can see that the runbook now goes through the steps one by one. Click **Next Step** to conclude one step and continue to the next in line. The application calculates the total number of steps and execution time, and puts that into the summary on top of the window.

Isolate commands

In **Step 2**, you can use `ps -ef | grep simnet` as a command. The purpose of commands is to reduce typing errors and also provide a copy paste experience to the users command line, which also saves time.

Mark this piece of text and then use the short cut **CTRL + 4** to make it a command. This action will change background color. Figure 2-56 shows how it looks with the command feature added.

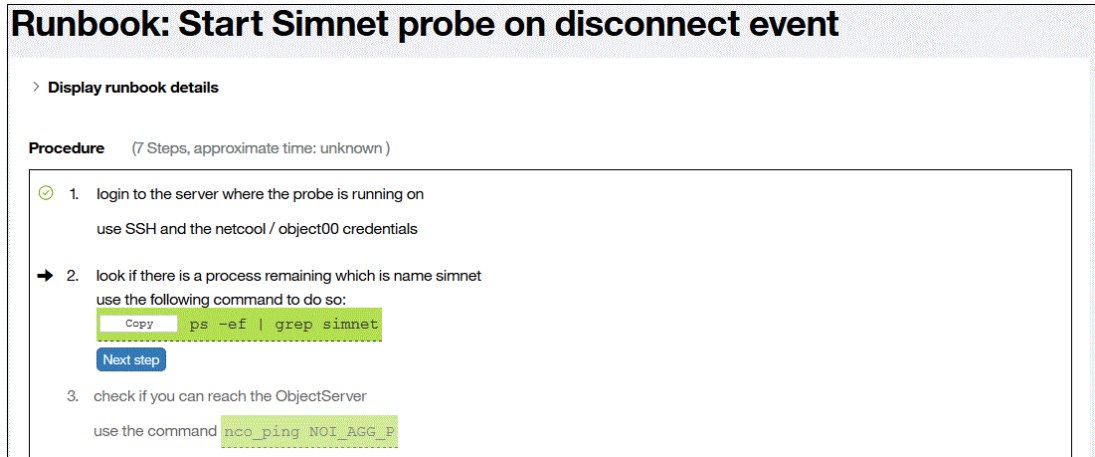


Figure 2-56 Runbook with commands

The text background of the command changed and a new button is available, **Copy**, that copies the command to the clipboard. The clipboard can then be used on the target machine to insert the command into the command line.

Put context into the runbook (parameters)

Parameters are used to provide variable input to runbooks during run time.

In the example in Step 1, the user logs in to the server where the event is coming from with specific credentials. This manual process can be replaced by a command with parameters and defaults. Instead of having to SSH to a host, you can provide the following command:

```
ssh USERNAME@HOSTNAME
```

The example involves creating these parameters:

- ▶ HOSTNAME
- ▶ USERNAME, which has the default of netcool.

To create a parameter, complete these steps:

1. Go to the side of the editor where it says **Parameter**. Figure 2-57 shows what this can look like.

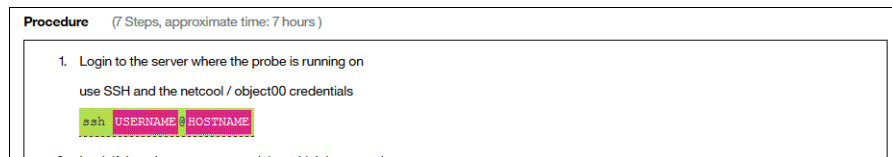


Figure 2-57 Runbook with parameters

2. Create the parameter by using the + symbol button.
3. Drag the parameter into the Step 1 section.

Save

When saving, you can click **Save as Draft** or **Publish**. Use **Save as Draft** to save the changes to file. Use **Publish** to make your changes executable. Only users with the role RBA Approver can publish runbooks. Users with RBA User role do not see drafts in their “My runbooks” list, and therefore cannot execute them. When a runbook is published, it is available to all users for execution.

An already published runbook can still be edited and saved as a draft. This has no effect on the published version, which can still be used by the users. After the new version is ready, an RBA Approver can publish it, and the new version becomes available to the users. This process allows you to improve an active runbook, but only make the changes visible to users after they are good to go.

The **Save as Draft** button can also be opened to reveal more options like **Save as Draft and Close**. Click the **Triangle** button. The **Save as** allows you to easily copy the runbook to use as a template for a new one.

Publish

After a runbook has been published, or saved, it will show up in the runbook list. To see the sample that you created, scroll to the bottom of the list.

Figure 2-58 shows the newly created runbook.

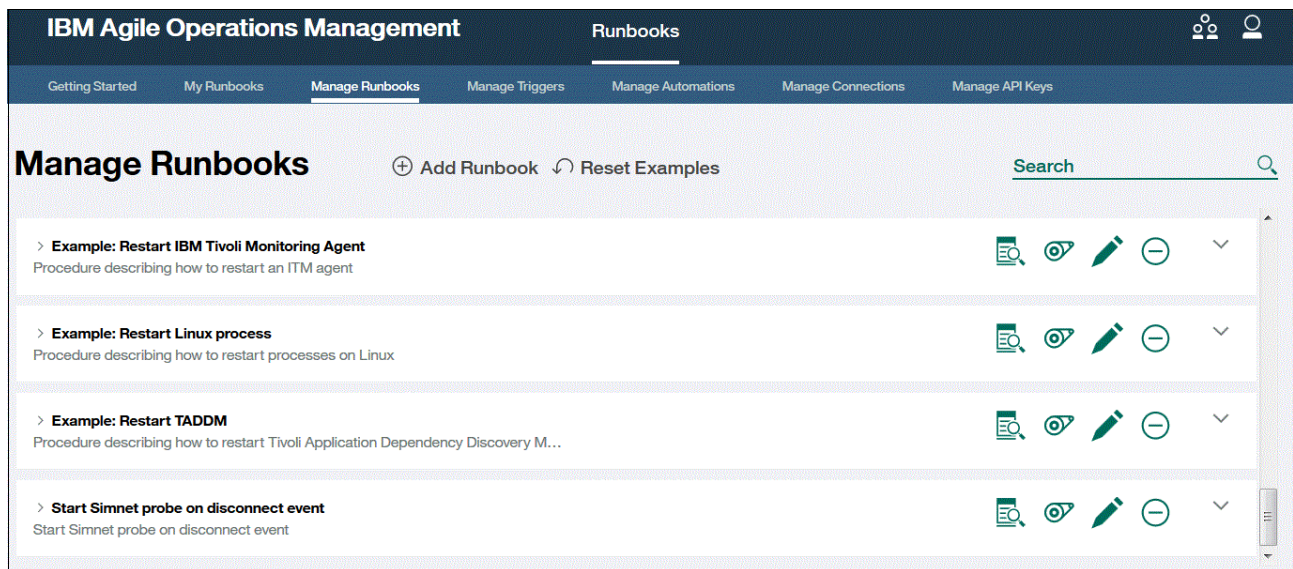







Figure 2-58 Start Simnet probe on disconnect event

Each of the runbooks has five icons associated with it, which allow you to perform have these actions on them:

-  - View this runbook
 -  - Run this runbook
 -  - Edit this runbook
 -  - Delete this runbook
 -  - Statistics for this runbook
- | | |
|-----------|---|
| Successes | 0 |
| Failures | 1 |
| Cancel | 4 |
| Comments | 1 |

Test

To test the runbook, complete the following steps:

1. Click the **Run** button. You must provide the host name to connect to (already completed for this example). Notice that the default value for the username (netcool) has been completed as well.
2. Press **Apply and Run** to finish the parameter input and continue with the execution.

Figure 2-59 shows what the execution of this runbook will look like.

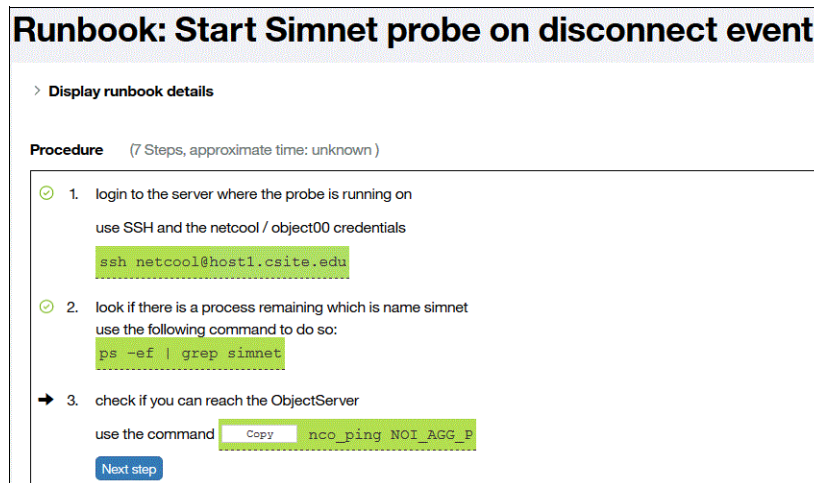


Figure 2-59 Runbook executed with parameters

- Click through the procedure until the end. Figure 2-60 shows how the procedure ends. Click **Complete** to finalize the runbook.

2. look if there is a process remaining which is name simnet
use the following command to do so:
`ps -ef | grep simnet`

3. check if you can reach the ObjectServer
use the command `nco_ping NOI_AGG_P`

4. check if the simnet probe property file is configured correctly
go to \$OMNIHOME/probes/linux86 `cd $OMNIHOME/probes/linux86`
and check the file simnet.props `vi simnet.props`

5. check if the process control agent file is configured correctly
go to \$OMNIHOME/etc `cd $OMNIHOME/etc`
and check the file nco_pa.conf `vi nco_pa.conf`

6. check if the systems startup procedures are configured correctly
go to /etc/init.d `cd /etc/init.d`
and check the file nco `more nco`

7. start the simnet probe by using the system startup files
execute /etc/init.d/nco -start `Copy /etc/init.d/nco -start`

Complete

Runbook command Runbook parameter Automation GOTO element

Cancel Pause

Figure 2-60 Complete runbook

- After you have completed the runbook, you can provide a rating and feedback. Figure 2-61 shows the feedback section. We have given it 2 out of 5 stars and provided a comment that something can be improved and that the last step is wrong. Click **Did Not Work** or **It Worked** to save your feedback.

Runbook: Start Simnet probe on disconnect event

> Display runbook details

Rate It ★★☆☆☆

In Step 4 the commands can be put together, Step 7 is wrong

Did Not Work It Worked

Procedure (7 Steps, approximate time: unknown)

- login to the server where the probe is running on
use SSH and the netcool / object00 credentials
`ssh netcool@ host1.csite.edu`
- look if there is a process remaining which is name simnet
use the following command to do so:
`ps -ef | grep simnet`

Figure 2-61 Runbook feedback

- The feedback is available in the stats section of the Runbook GUI. To get there, click **Manage Runbooks** and then select the runbook that you want to see statistics about. Figure 2-62 provides information on versions, who edited them, and any feedback received.

Rating	User	Date	Status	Version	Comment	Automated	Action
★★	fhklr	.com 6 minutes ago	Failed	3.0	In Step 4 the comma...	No	
	fhkl	.com 3 hours ago	Canceled (OTHER)	2.0		No	
	fhi	.com 3 hours ago	Canceled (OTHER)	1.0		No	
	fhki	.com 3 hours ago	Canceled (WRONG_RUNBOOK)	1.0		No	
	fhi	.com 3 hours ago	Canceled (WRONG_RUNBOOK)	1.0		No	

Figure 2-62 Runbook feedback

This way runbooks can evolve as they are used, tested, and amended over time.

Enhance

This section describes how to enhance and simplify a runbook.

Feedback from the users should be used to correct problems and raise acceptance. If nobody uses the runbook, it might be that the problem addressed has never occurred or the runbook is not applicable.

Error correction is important, but adding screen captures and diagrams of what the steps look like enhances usability and user acceptance.

Runbook has a variety of features available to enhance the outlook of the runbook:

- ▶ Change fonts
- ▶ Insert pictures
- ▶ Link URLs
- ▶ Insert tables
- ▶ Insert lists
- ▶ Insert bullets points

Figure 2-63 shows the editor features.

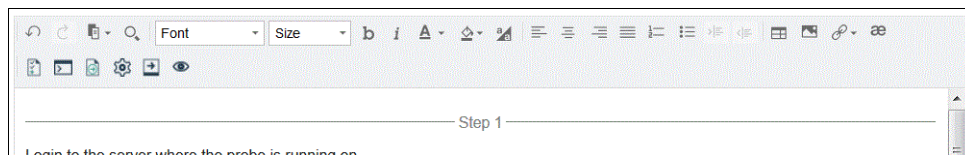


Figure 2-63 Runbook editor

You can add graphics to the copying, for example, a screen capture of the command output of Step 2 to the clipboard and pasting it after Step 2. If you want to alter the graphic, right-click it and make any changes that you want. The example in Figure 2-64 shows adding a border.

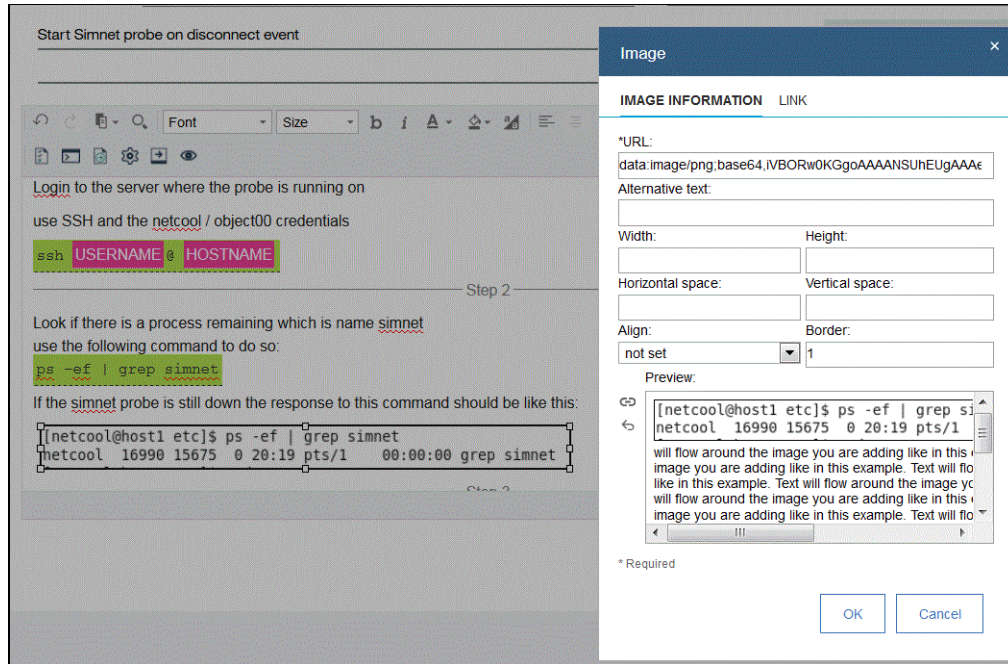


Figure 2-64 Picture with property setting window

Next, you can reduce the two commands in Step 4, 5, and 6 as shown in Figure 2-65.

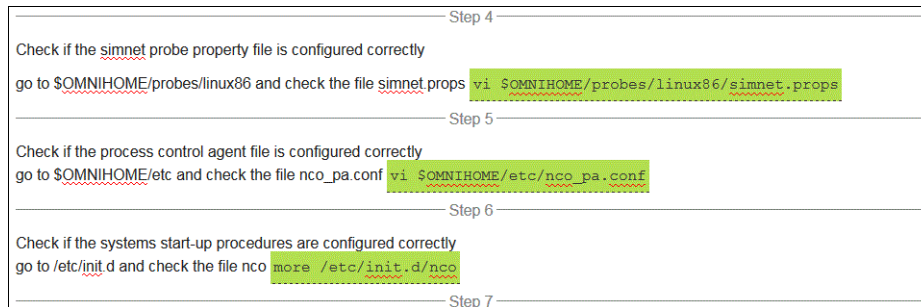


Figure 2-65 Enhanced runbook

Tip: Make yourself familiar with the editor features. There are a lot of possibilities to make the runbook look nice and be of significant help.

This concludes scenario 1, which is a pure manual runbook.

2.4.2 Trigger

This section introduces triggers, which are used to link events in OMNIBus with runbooks. A runbook has a unique ID that needs to be related to a corresponding event. This link is done by using an IBM Netcool/Impact policy.

This example involves associating the existing runbook “Start Simnet probe on disconnect event” with corresponding events. Figure 2-66 shows these events:



Node	Count	Summary	RunbookID	RunbookParameters	RunbookStatus	RunbookURL
host1.csite.edu	7	simnet probe on host1.csite.edu. Going Down ...				

Figure 2-66 RunbookID empty for Simnet probe connection events

To do this, add filter statements into a trigger. The Runbook Automation then pushes this trigger back to the Impact event reader. The event reader will then enhance these events with the RunbookID. Complete these steps:

1. Open the Runbook Automation subscription.
2. Click the Trigger tab.
3. Click **Add Trigger** as shown in Figure 2-67.

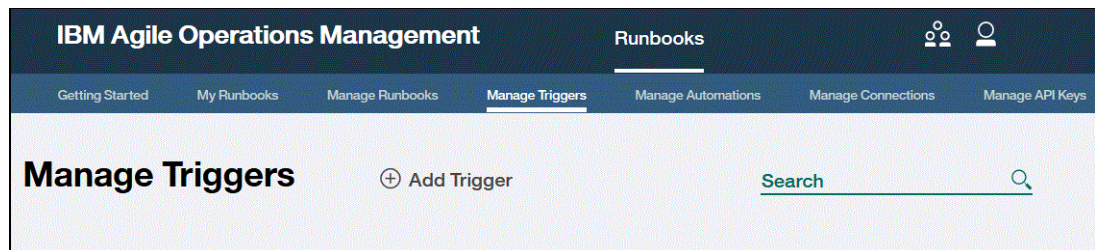


Figure 2-67 Add a trigger

An Add Trigger window opens as shown in Figure 2-68.

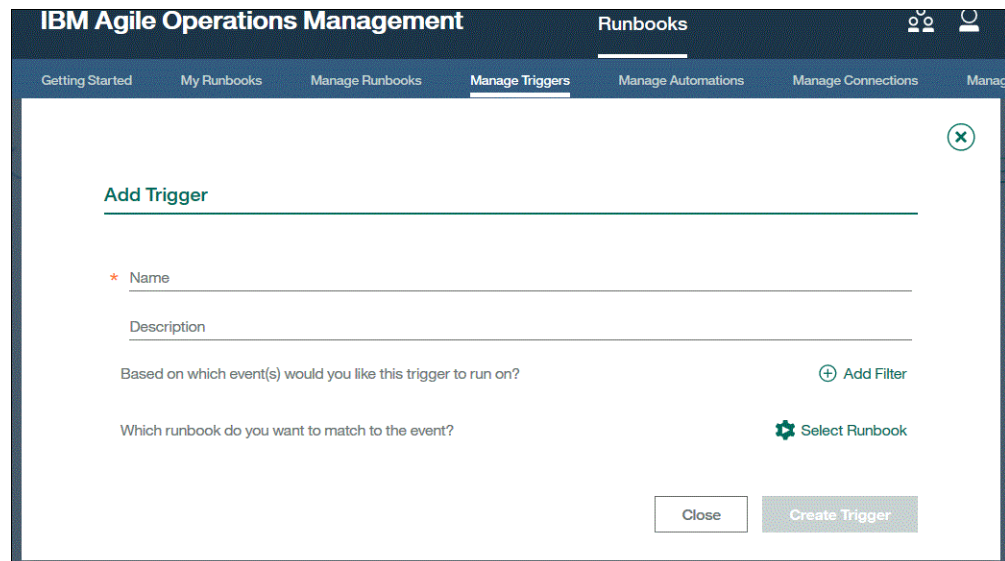


Figure 2-68 Add trigger window

4. Enter a name and description, then click **Add Filter** and select the events that you want associated with the runbook. There are multiple ways to create filters for the event mapping:
 - a. Event Summary: A simple filter on the Summary field with the following operator options:
 - contains
 - does not contain
 - equals
 - does not equal

Figure 2-69 shows how a simple Summary Filter can work.

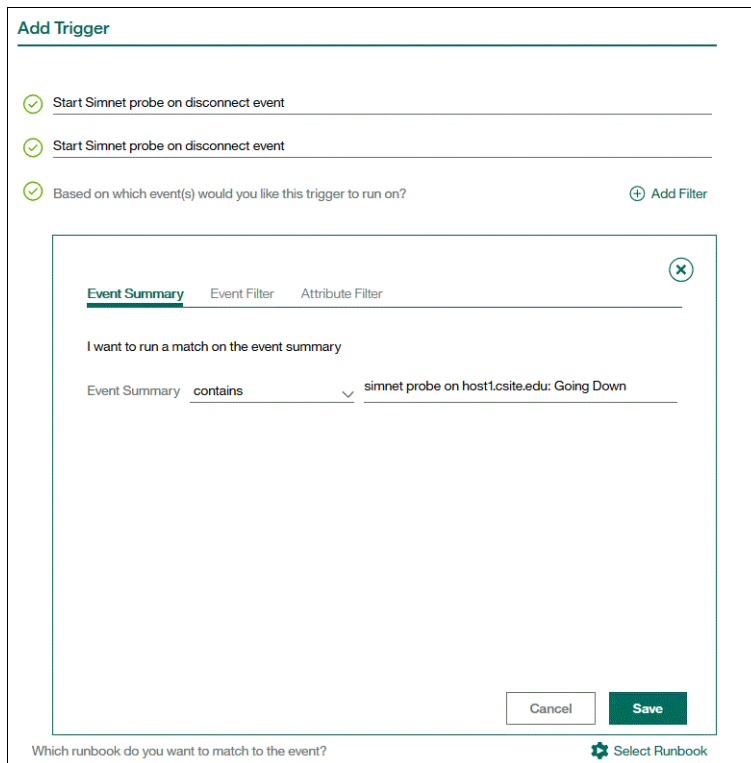


Figure 2-69 Summary Filter in trigger

- b. Event Filter: You can select from built-in filters here:
 - Alarms equal to or higher then minor
 - CPU-High
 - Critical Alarms
 - Critical and Major Alarms
 - Error Alarms
 - Failure Alarms
 - Memory-High
- c. Attribute Filter: This is the most flexible option to create filters. You can chain filters here by using all ObjectServer fields and many operators. IBM Runbook Automation queries the connected ObjectServer and provides an up-to-date alerts.status field list. You can choose if all or any filter needs to equal to true to fire the trigger.

Figure 2-70 shows what this can look like.

Note: When the Attributes do not populate or represent your current ObjectServer settings from the alerts.status table, then this can be a connectivity problem between the Runbook Automation service and your local installation.

Based on which event(s) would you like this trigger to run on? + Add Filter

Event Summary Event Filter **Attribute Filter**

I want to do a comparison on an attribute.

Description * Summary Going Down

Attribute Summary

Operator contains

Value Going Down
Example: Summary contains error

+ Add filter

Problem events ✎ ⊖

Watch events ✎ ⊖

Which runbook do you want to match to the event? ⚙️ Select Runbook

Cancel Save

Figure 2-70 Attribute trigger

5. Quite useful is to test if the filter matches currently some events in the ObjectServer. You can do this by using the test button **View Sample Events** as shown in Figure 2-71.

Based on which event(s) would you like this trigger to run on? + Add Filter

Event Summary ✎ ⊖

How do you want to match filter criterias to events? Match all (AND)

View Sample Events

Figure 2-71 View Sample Events for a filter

6. After filters are set and tested then you need to associate a runbook with the trigger. You do this by using the **Select Runbook** button and then choose from the list and click **Save**.

Figure 2-72 shows how to select and save this. In between you can choose if you want to associate an Automation or a Manual runbook.

The screenshot displays a two-step configuration process in the IBM Netcool/Impact UI. The top window, titled "Going Down", shows a "Value" field with the text "Example: Summary contains error". Below this are sections for "Problem events" and "Watch events", each with a pencil icon and a minus sign. At the bottom of this window are "Cancel" and "Save" buttons. The second window, titled "Which runbook do you want to match to the event?", features a "Runbook type" dropdown set to "Manually" and a "Search" field. A list of runbooks is shown with radio buttons: "Example: Restart DB2 instance", "Example: Restart IBM Tivoli Monitoring Agent", "Example: Restart Linux process", "Example: Restart TADDM", and "Start Simnet probe on disconnect event" (which is selected). A "0" is visible next to the selected runbook. At the bottom of this window are "Cancel", "Save", "Close", and "Create Trigger" buttons.

Figure 2-72 Select a runbook and save the trigger

Now let's have a look on what just happened. This association of a RunbookID in an event through a Filter to a runbook, is in essence a simple event enrichment, which is carried out by IBM Netcool/Impact. So if you open the Impact UI and have a look in the runbook project then you will find an event reader service which has a number of filters associated to this. All these filters trigger the same policy which then does the enrichment piece.

The important piece here is that the events are executed against all filters.

Figure 2-73 shows what this window looks like.

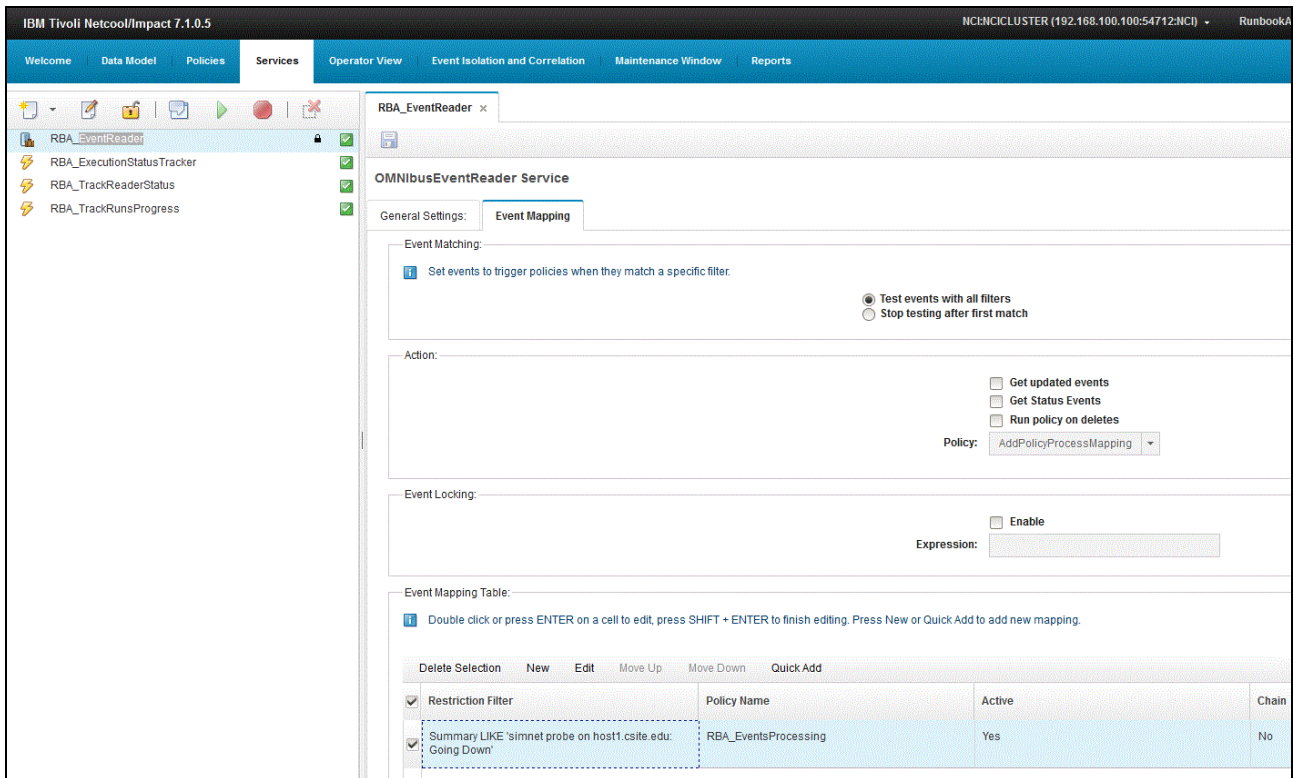


Figure 2-73 IBM Netcool/Impact event reader for Runbook Automation

Using a like operator on the Summary field might not be the most efficient way to create a filter, but it shows the concept used here. Figure 2-74 shows the result of this enrichment with the four Runbook ObjectServer fields complete.

Node	Summary	RunbookID	RunbookParameter:	RunbookStatus	RunbookURL
host1.csite.edu	simnet probe on host1.csite.edu: Going Down ...				
host1.csite.edu	A PROBE process simnet running on host1.csite.edu has disconnected as username pro	19e4644c0c0db44688	HOSTNAME=host1.csi	Runbook set for manu	https://host1.csite.edu/index?subscriptionId=67d364d1e

Figure 2-74 First RunbookID enrichment

As you can see in Figure 2-74, there is another event indicating that the simnet probe has disconnected. To extend the trigger that you just created to this event, complete these steps:

1. Go back to the **Trigger editor** and select the trigger you just created.
2. Go to the filter section and change the filters to Summary like ‘A PROBE process simnet running on host1.csite.edu has disconnected’ or Summary like ‘simnet probe on host1.csite.edu has Going Down’ as shown in Figure 2-75.

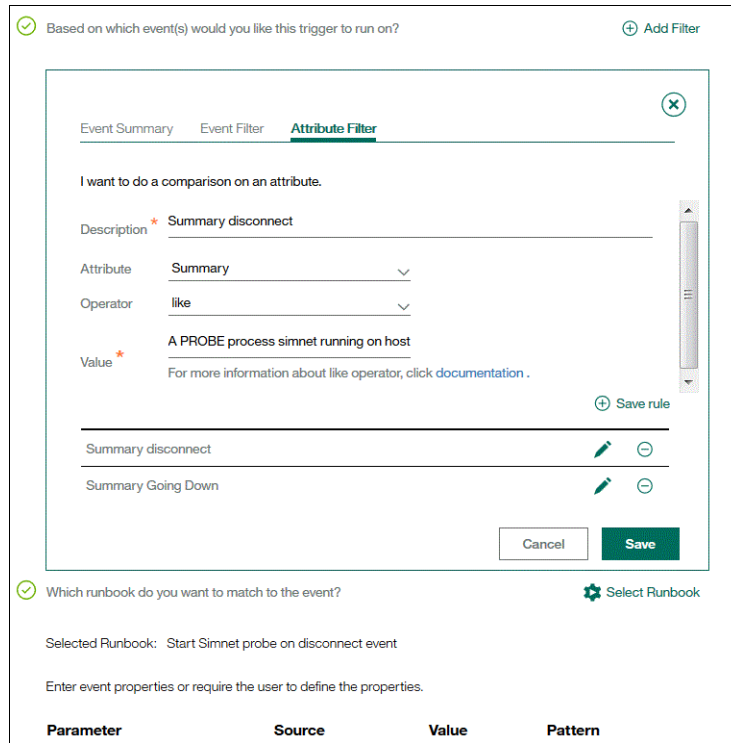


Figure 2-75 Two Attribute Filters in a Runbook Automation Trigger

3. Select the **match any** operator.
4. After you have saved this change, the Bluemix Service will store the trigger in your local Impact. As soon as a new event arrives that matches the filter, Impact enriches the event with the Runbook ID and the matching parameters. The result will then look like Figure 2-76.

Summary	RunbookID	RunbookParameter:	RunbookStatus	RunbookURL
A PROBE process simnet running on host1.csite.edu has disconnected as username pro	19e4644c0c0db44688	HOSTNAME=host1.csit	Runbook set for manus	https://host1.csite.edu/index?subscriptionId=67d364d1e
simnet probe on host1.csite.edu: Going Down ...	19e4644c0c0db44688	HOSTNAME=0&USERN	Runbook set for manus	https://host1.csite.edu/index?subscriptionId=67d364d1e

Figure 2-76 Both probe down events have been matched

5. Now use the launch-in-context tool to start the runbook Start Simnet Probe on disconnect event.

One way to test whether the runbook has been linked to the event is to see whether the ObjectServer field **RunbookID** has been populated.

Another way to confirm it is to look at the Journal entry of the event. Figure 2-77 shows how Runbook Automation adds a Journal entry.

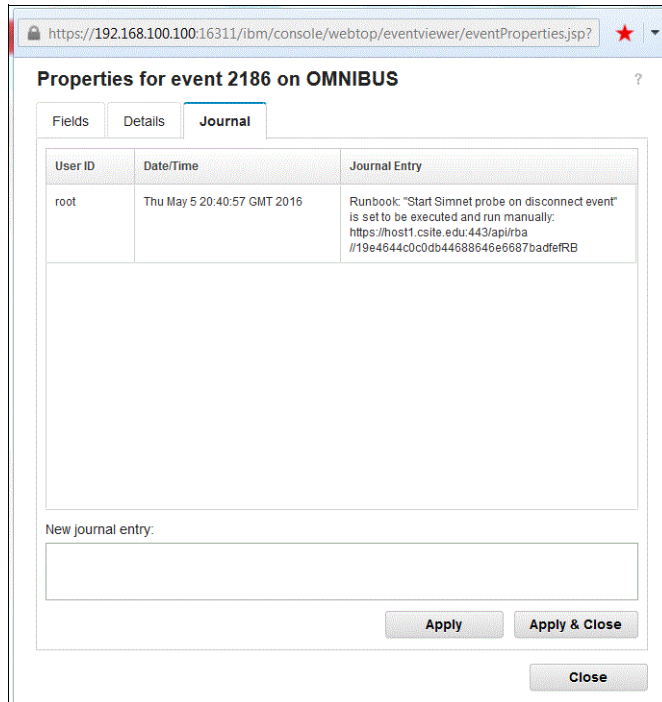


Figure 2-77 New Journal entry from Runbook Automation

2.4.3 Scenario 2: Semi-Automated runbook

This scenario reuses the specifics from the first scenario and an automated step to it to reduce execution time. To become semi-automated, the runbook needs at least one automated step. In this procedure, you automate the check whether the ObjectServer is available. This check will be conducted by using the Netcool/OMNIBus command line tool `nco_ping`.

1. To insert an automated step, create an Automation. Click the Manage Automations tab and click **Add automation** as shown in Figure 2-78.

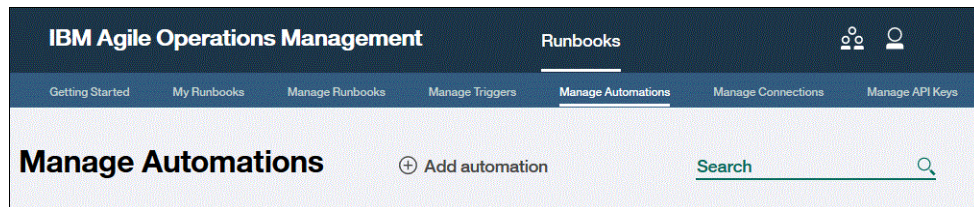


Figure 2-78 Add automation

2. The Automation editor now opens as shown in Figure 2-79.

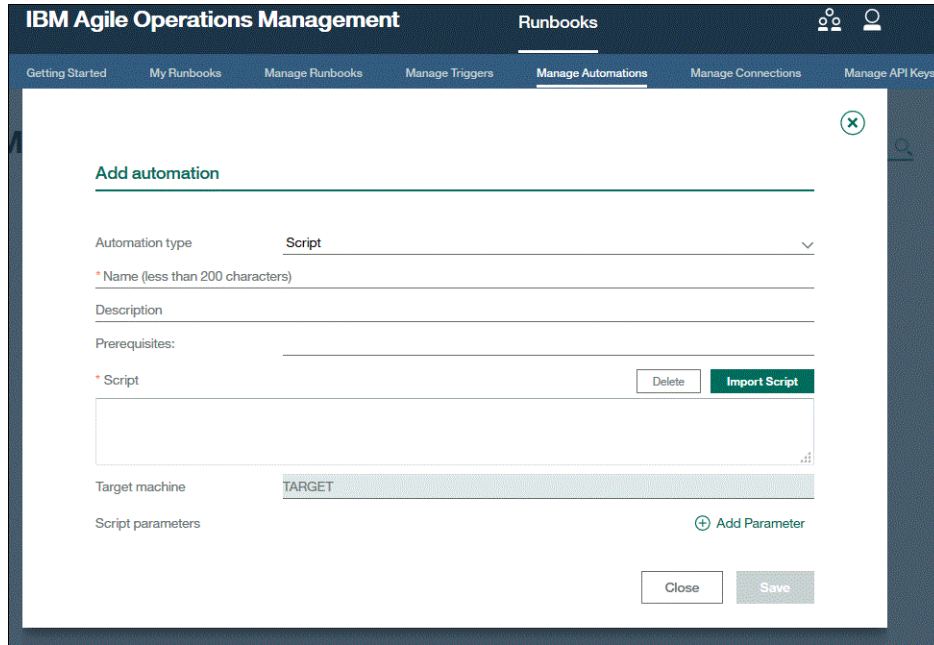


Figure 2-79 Automation Editor

3. Enter a name and a description for the Automation.
4. Add your script into the **Script** field. The script will be started using the standard shell unless you put something else into it. This example uses bash. In this example, you want to check whether the ObjectServer is up and running. To make it simple, use the existing `nco_ping` binary file. This connects to the ObjectServer like a real component (for example, a probe or gateway) would. This test is better than just a simple test for the existence of an ObjectServer process (for example `ps -ef | grep nco_objserv`). The test is expected to generate results like those in Figure 2-80.

```
[netcool@host1 TWS]$ /opt/IBM/tivoli/netcool/omnibus/bin/nco_ping NOI_AGG_P
NCO_PING: Server available.
[netcool@host1 TWS]$
[netcool@host1 TWS]$
```

Figure 2-80 The `nco_ping` output result

The complete editor input will then look like Figure 2-81.

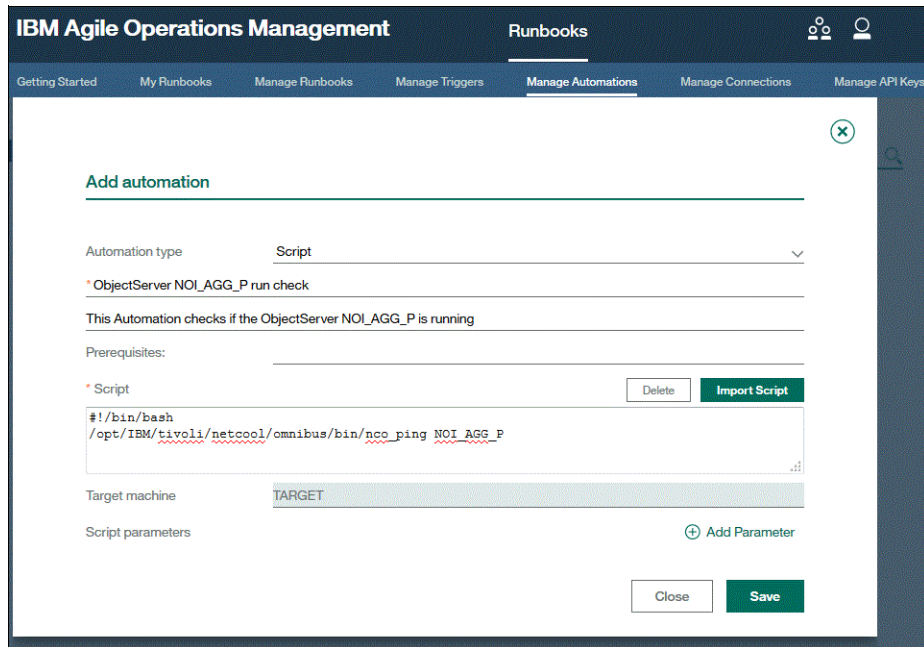


Figure 2-81 Automation editor with inputs

5. You can provide parameters, but for this example nothing more is required. Parameters provide capabilities to make an Automation more generic and reusable. A good candidate for a parameter here would be the ObjectServer name (NOI_AGG_P) that you are pinging or a user / password combination. Click **Save**.

A new Automation appears in the list as shown in Figure 2-82.

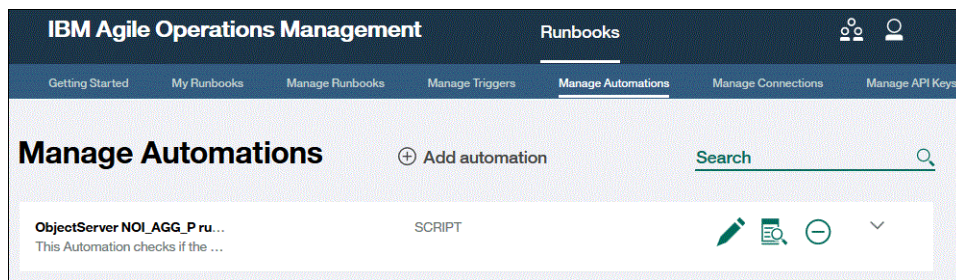


Figure 2-82 ObjectServer NOI_AGG_P check

- Now change the existing manual runbook Start Simnet Probe on disconnect event. Replace step 3 with the Automation you have created. Step 3 is shown in Figure 2-83. Open the Runbook Automation Editor by selecting **Manage Runbooks**.

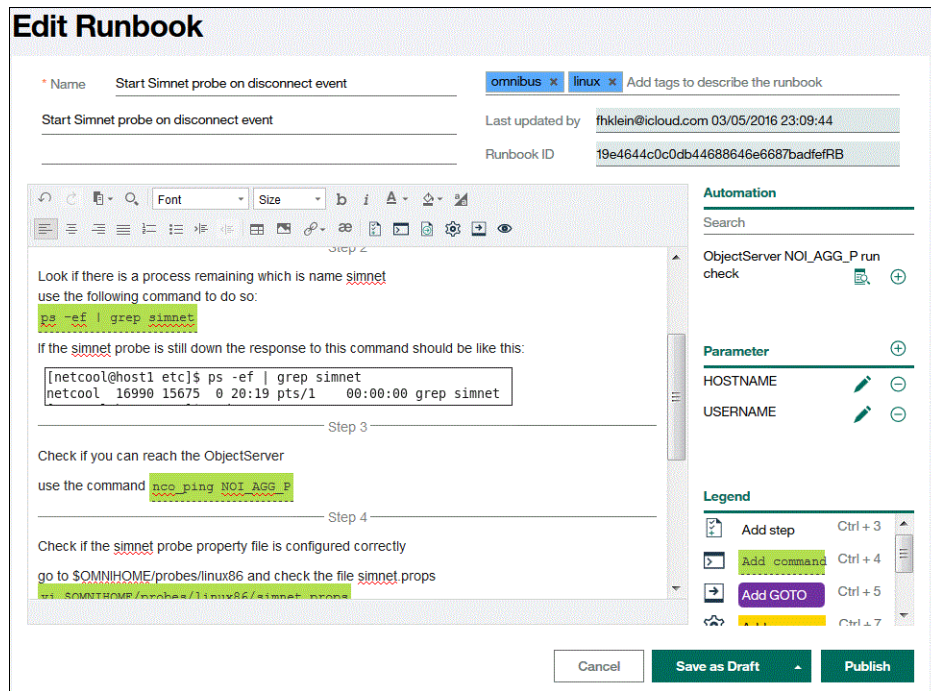


Figure 2-83 Step 3 will be replaced with the automation

- Select the **Start Simnet Probe on disconnect event** and click the **Edit** button.
- Go to **Step 3**.
- Select the existing text and delete it.
- Press **Ctrl+7** to insert an Automation.
- Select **ObjectServer NOI_AGG_P run check** and click **Add** as shown in Figure 2-84.

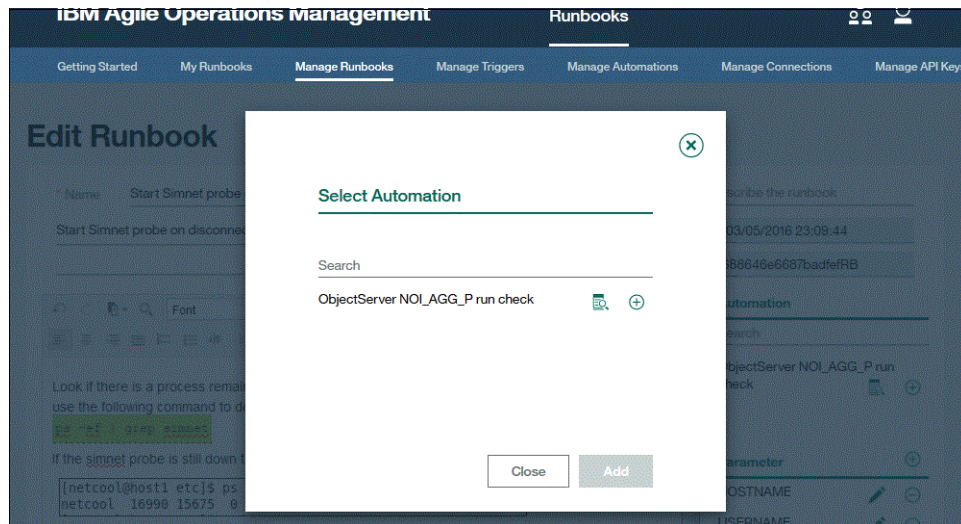


Figure 2-84 Select ObjectServer NOI_AGG_P run check

The runbook will look as shown in Figure 2-85.

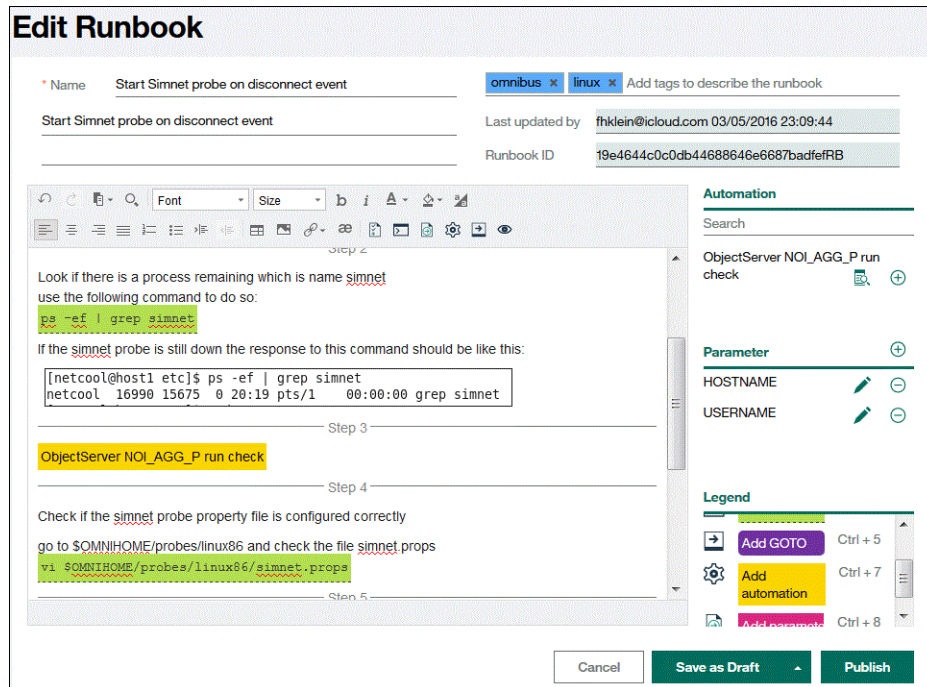


Figure 2-85 Step 3 changed to an automation

12. You can add some meaningful text to Step 3 to explain what it does, such as Run the following automation to check whether the corresponding ObjectServer is running.
13. Click **Publish** and to save the changes into the Bluemix service.
14. Executing this runbook will look like Figure 2-86.

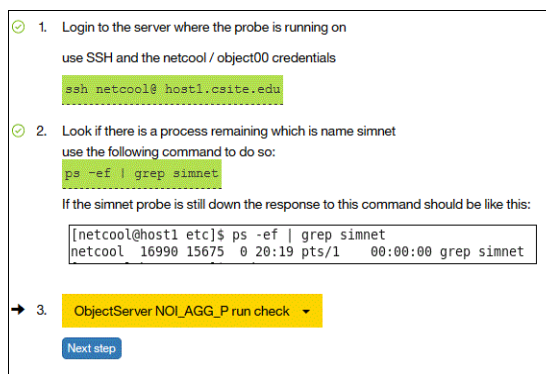


Figure 2-86 Semi-automated runbook

15. The new automated step provides two options. Select the small triangular button in the yellow box. **Run** executes the automation and **Show information** provides extra information. The **Run** command is followed by an inline response that shows the result of that command execution (black box: NCO_PING: Server available). See Figure 2-87.

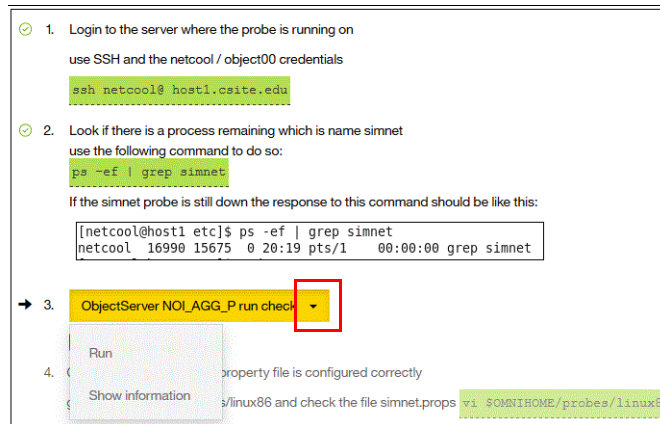


Figure 2-87 Run and Show information options

The extra information added by executing this Automation is shown in Figure 2-88. You can see in the black box the result and feedback of the automation that has been run. The result comes from the execution of the script that has been handed over to the TWA agent. The feedback is then captured and brought back to the IBM Runbook Automation UI.

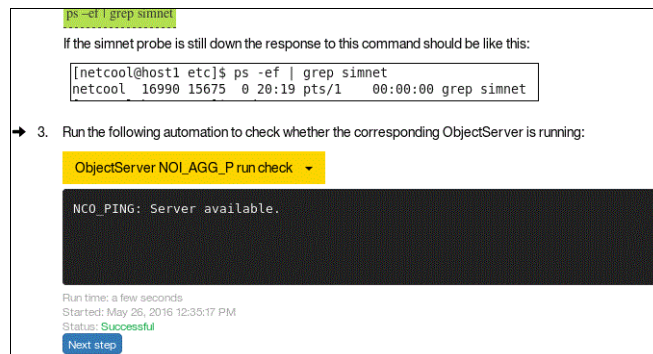


Figure 2-88 Automation execution feedback

Note: If the response does not show and an error is displayed, then the connection from the runbook to the TWA agent might have been lost. Check the Connection tab.

Figure 2-89 shows the Show information window.

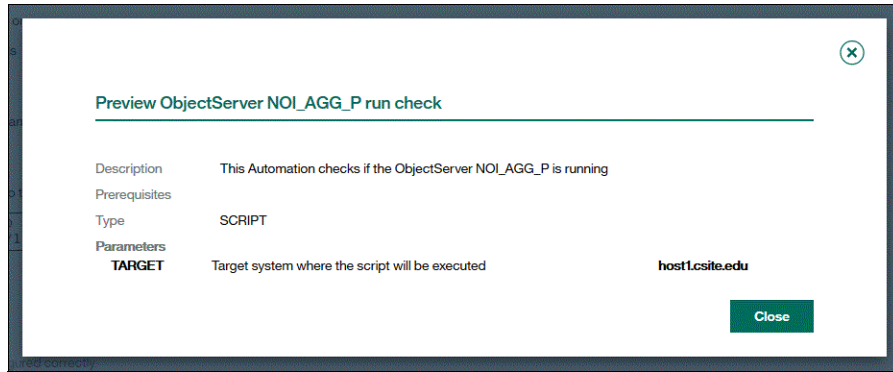


Figure 2-89 Show information

You can add as many automated steps in a runbook as you want.

If you pause the execution of a runbook, the action is recorded and you can continue from the point where you paused it. Figure 2-90 shows the **Runbooks I have run** window. The yellow highlight shows the resume button (select the In progress tab).

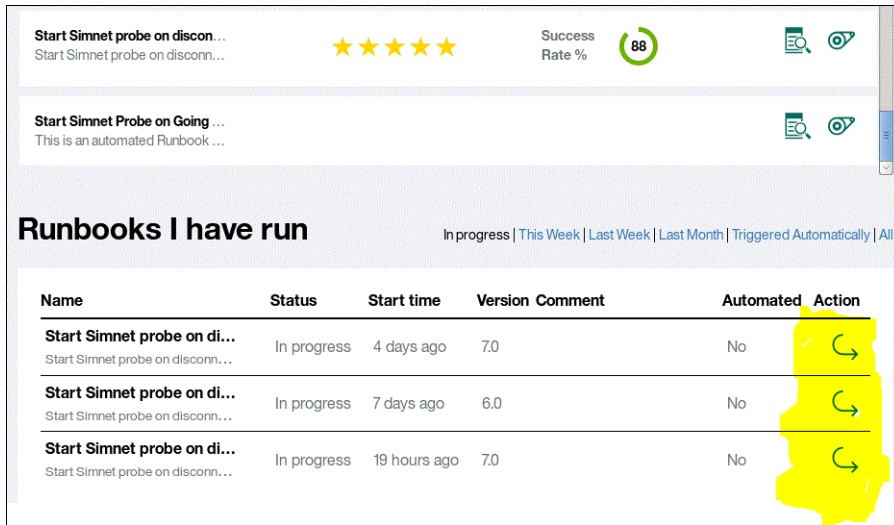


Figure 2-90 Resume runbooks

This concludes scenario 2 on how to evolve from a manual Runbook Automation to a semi-automated runbook.

2.4.4 Scenario 3: Fully-Automated runbook

Scenario 3 moves from a semi-automated runbook to a fully automated runbook. The fully automated runbook is the highest possible evolution for a Runbook Automation.

Note: One of the main purposes of Runbook Automations to reduce time to execute a procedure that resolves a problem. Therefore, higher levels of automation provide more benefits from using runbooks.

Integration of runbooks with Alert Notification into NOI makes runbooks work even better. This integration is described in detail in Chapter 3, “Scenario with IBM Runbook Automation and Alert Notification: Unsecure user endpoint detection” on page 121.

This scenario starts the Simnet probe when an event is received that indicates that the probe has gone down.

The Netcool probe down event contains in the Summary field in the ObjectServer the following string:

```
simnet probe on host1.csite.edu: Going Down
```

This example shows how to connect this event with the fully automated Runbook Automation Start Simnet probe nco_pa.

In this scenario, process control is up and running and has a process that is configured for the Simnet Probe.

To accomplish this scenario, create these objects in Runbook Automation:

1. **Automation:** This is the action (script) that starts the Simnet process in the Process Control Daemon.
2. **Runbook:** The runbook that is called by the Trigger. It contains only a single Automation and contains no manual tasks.
3. **Trigger:** This is function scans the ObjectServer for a suitable event and then starts the runbook.

The following sections will walk you through the process of creating a fully-automated runbook.

Automation

To create an Automation, complete these steps:

1. Go to **Manage Automations**.
2. Create an **Automation**. Enter a meaningful name and description.

3. Add the script that starts the Simnet probe. You can either type the script into the **Script** field, or upload it from a file on your computer. After the script is added, it looks like Figure 2-91.

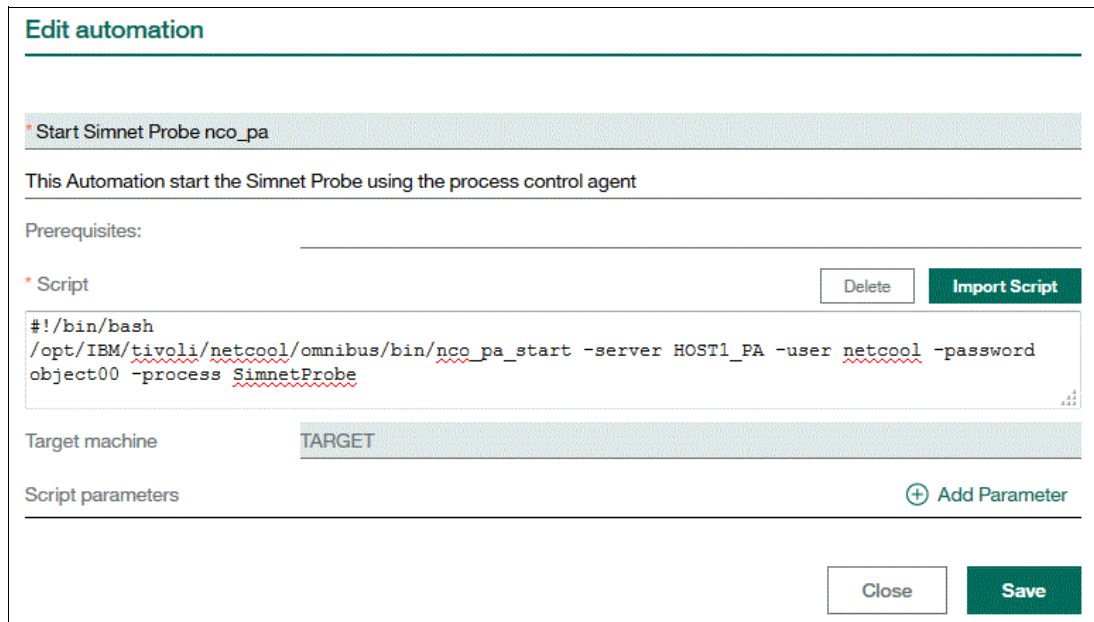


Figure 2-91 Automation: Start Simnet Probe by using Process Control

4. This Automation also needs the server name where it will run the script. This name is defined in the parameter **Target machine**, which in this sample is named TARGET. This name will be populated later with the content of the event in the ObjectServer @Node field when you trigger the Automation.

This Automation so far is static. Additional parameters can be used to make it more generic and applicable to more scenarios, for example, server, user, password, and process. The flexibility of Netcool Operations Insight is useful here. Anything that is available in the event data in the ObjectServer can be used to make the Automation more flexible. Event enrichment with external data by using IBM Netcool/Impact can include location, customer, SLA, or any other data.

Chaining an event enrichment with a runbook and ensuring that the enrichment has taken place before the runbook is triggered can be done by using an additional flag field in the event.

Runbook

To create a runbook, complete these steps:

1. Open up **Manage Runbooks**.
2. Create a runbook.
3. Enter a name and a meaningful description.
4. Add some tags so that you can find it again easily after you have configured lots of runbooks.

The new runbook will be similar to the one in Figure 2-92.

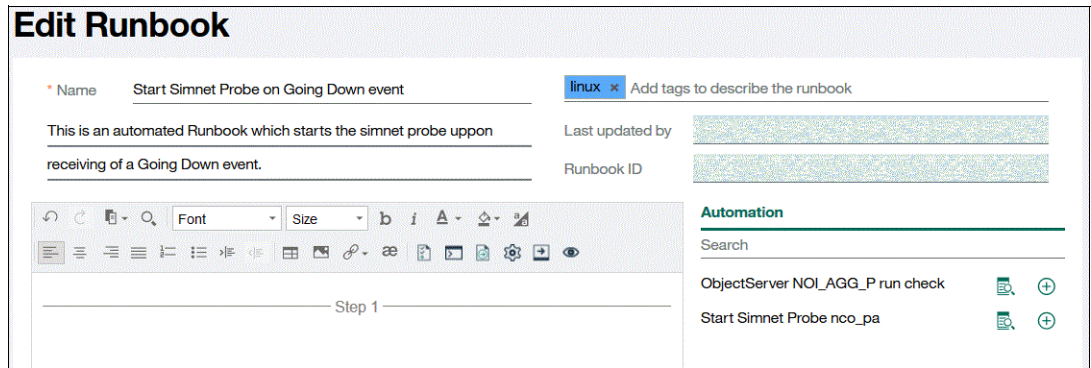


Figure 2-92 Runbook Start Simnet Probe on Going Down event

5. Go into Step 1 and insert an Automation by pressing **Ctrl + 7**.
6. Select the Automation that you just created as shown in Figure 2-93.

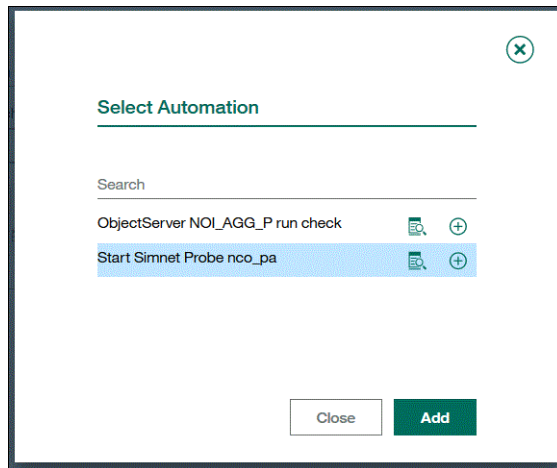


Figure 2-93 Select Automation

- Now you are immediately asked to provide a parameter. Select **Runbook parameter** and then **TARGET** as shown in Figure 2-94.

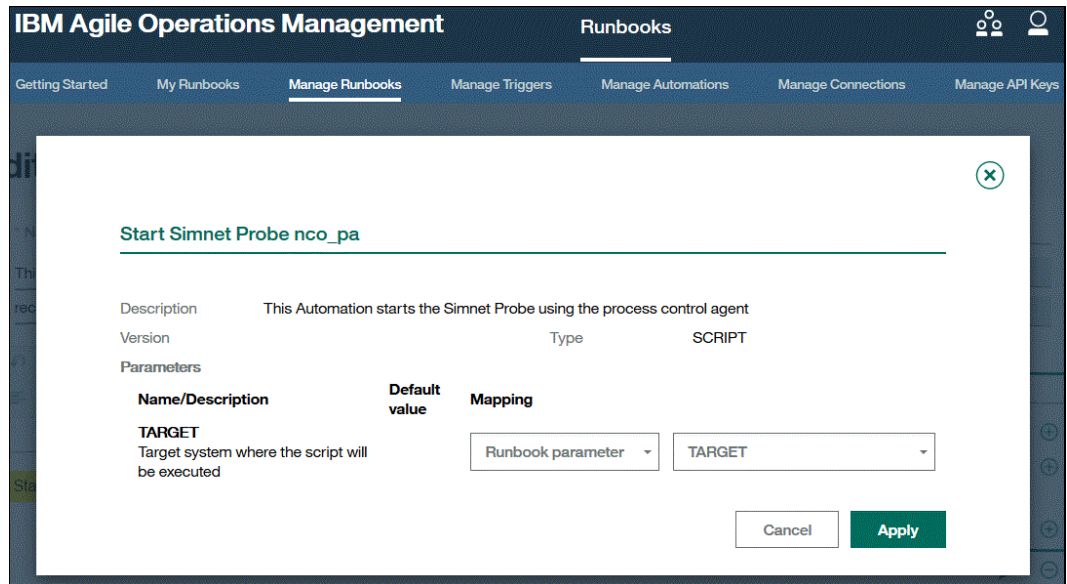


Figure 2-94 Parameter mapping for Automation

- Click **Apply**. The runbook should now look like Figure 2-95.

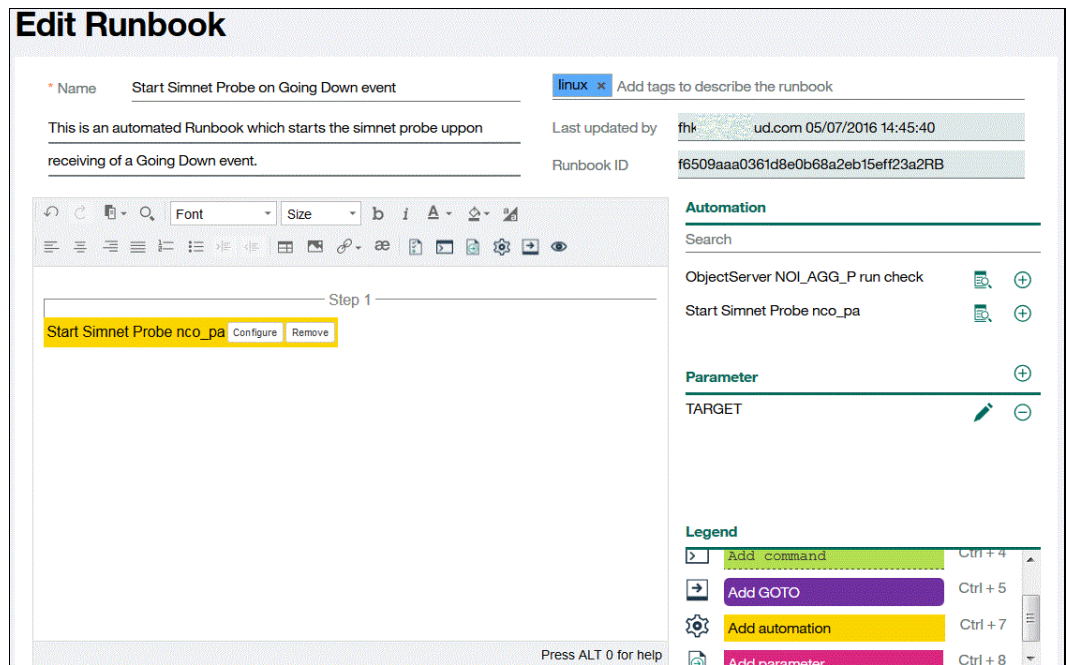


Figure 2-95 Fully automated runbook

Trigger

Now you need to create a Trigger to execute the Automation. To create it, complete the following steps:

1. Click the Manage Triggers tab. Creation, naming, and filtering are all the same. The difference comes when the association to the action item is done.
2. Click **Add Trigger**.
3. Enter a meaningful name.
4. Enter a description.
5. Create a filter by clicking **Add Filter**. The Filter will select the event that will trigger the Automation.
6. Select **Attribute Filter**.
7. Enter a name for the Filter in the **Description** field.
8. In the **Summary** field, select **Attribute**.
9. Select the operator **contains**.
10. Enter in the **Value** field the text that selects the event you want to trigger on:
simnet probe on host1.csite.edu: Going Down ...

These settings are shown in Figure 2-96.

The screenshot shows the 'Add Trigger' configuration interface. At the top, there are two green checkmarks indicating successful steps: 'Start Simnet probe on Going Down event'. Below this, a question asks 'Based on which event(s) would you like this trigger to run on?' with an 'Add Filter' button. A modal window titled 'Attribute Filter' is open, showing the configuration for a filter. The modal has tabs for 'Event Summary', 'Event Filter', and 'Attribute Filter'. The text inside the modal says 'I want to do a comparison on an attribute.' The fields are: 'Description' with the value 'Going_Down', 'Attribute' with a dropdown menu set to 'Summary', 'Operator' with a dropdown menu set to 'contains', and 'Value' with the text ':probe on host1.csite.edu: Going Down ...'. An example below the value field reads 'Example: Summary contains error'. There is an 'Add filter' button at the bottom right of the modal.

Figure 2-96 Trigger for scenario 3

11. Click **Add filter** to add the filter to the trigger.
12. Click **Save** to close the filter creation window.

If you create multiple filters, select whether you require all conditions to true or any before the Trigger is activated. The default selection is **Match all (AND)** as you can see in Figure 2-97.

Figure 2-97 Trigger creation for scenario 3

13. Check whether the correct events are mapped by clicking **View Sample Events**. In this sample, only one event should be visible. Compare Figure 2-97 and Figure 2-98. Figure 2-98 shows what this sample event looks like.

Runbooks I have run				
Name	Status	Start time	VersionComment	AutomatedAction
Start Simnet Probe on Going Down event <small>This is an automated Runbook which starts the simnet probe upon receiving of a ...</small>	Completed	13 minutes ago	4.0	Yes

Figure 2-98 Sample event for Going Down filter

Use the x button to close the Sample Event window.

14. Click **Select Runbook** to progress to the runbook selection.
15. Select the runbook you just created as shown in Figure 2-99. Note that you can preselect between automated and manual runbook types with the **Runbook type** drop-down box. In addition, there is a **Search** feature.

Figure 2-99 Select the runbook

16. Click **Save**.

17. Figure 2-100 shows the mapping that needs to be defined now. This mapping at execution time places the value of the **ObjectServer** field **Node** into the Automation **TARGET** field. **TARGET** then communicates to the script execution part (TWA) and allows the script to run on the selected server.

Select **From event, Node** in the **Value** field, and leave the **Pattern** field blank. **Pattern** allows you to insert a regular expression. The two check boxes are used to enable the trigger in general and to enable automated execution.

Figure 2-100 Enable and Save

18. Click **Save Trigger** and you are done.

Within RBA, you can use these methods to verify that your automated runbook has worked and run:

1. In the triggering event in the ObjectServer, look in the **RBASStatus (Runbook Status)** field as shown in Figure 2-101.

Node	Summary	RunbookID	RunbookParameter	RunbookStatus	RunbookURL
host1.csife.edu	simnet probe on host1.csife.edu: Going Down ...			complete	

Figure 2-101 Automated runbook execution feedback in ObjectServer field RBASStatus

You can also look in the Journal tab (Status: complete) as shown in Figure 2-102.

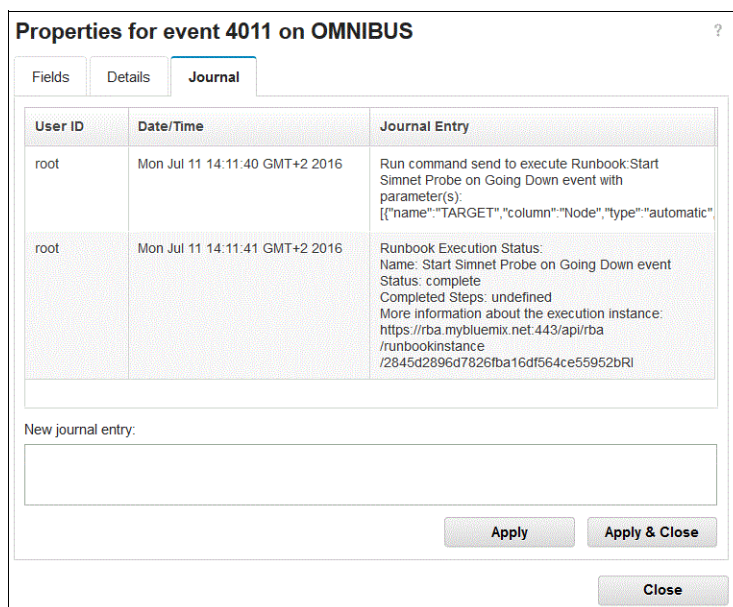


Figure 2-102 Automated runbook execution feedback in ObjectServer event Journal

2. Look in the My Runbook tab in the **Runbooks I have run** field. In the time window selector, click **Triggered Automatically**. This displays the status as shown in Figure 2-103.

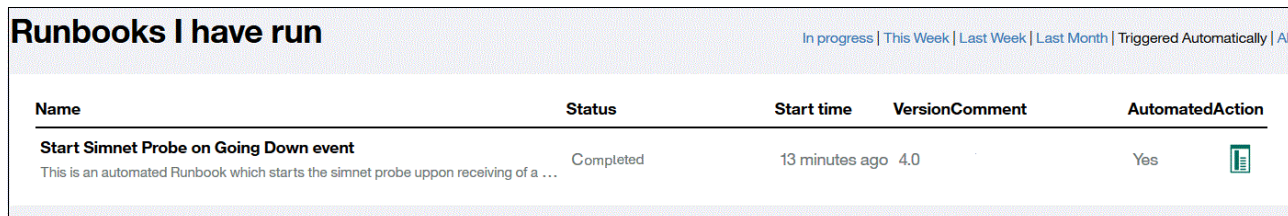



Figure 2-103 Runbook Feedback in My Runbooks

This concludes creating a fully automated runbook.

A more complex interaction using Netcool Operations Insight, IBM Alert Notification Service, and IBM Runbook Automation is documented in Chapter 3, "Scenario with IBM Runbook Automation and Alert Notification: Unsecure user endpoint detection" on page 121.



Scenario with IBM Runbook Automation and Alert Notification: Unsecure user endpoint detection

This chapter describes an end-to-end scenario that uses both IBM Runbook Automation and Alert Notification.

This chapter includes the following sections:

- ▶ Introduction to scenario
- ▶ Scenario steps
- ▶ Summary

3.1 Introduction to scenario

This chapter describes an end-to-end scenario for how you can detect a non-white listed MAC address that has intruded into your network. Using an application like nmap, you can scan network to detect whether an unknown MAC address is an intruder or not. If intrusion is detected, an alert will be sent through Alert Notification to notify all interested persons.

3.1.1 Business value

This scenario is intended to target security concerns for any organization that has high security restrictions. The scenario implementation takes advantage of applications that are available for Linux and Windows platforms for no extra fee. Other operating systems might have similar applications.

The scenario will help security teams to act promptly if intrusion is detected. The scenario implementation sets up how an alarm will be raised and sent through mail, SMS, and voice by using the IBM Alert Notification SaaS service.

3.1.2 Scenario topology

System components and default settings in the test environment are described in the deployment papers. The solution that is used in this particular scenario includes system components installed on the following host names:

- ▶ OMNI_A
 - Netcool/OMNibus
 - Hybrid Cloud Connector
 - Tivoli Workload Agent
- ▶ NCI_A
 - Netcool/Impact

3.2 Scenario steps

The high-level concept of this scenario involves the following activities, which are shown in Figure 3-1 on page 123:

1. A crontab task inserts an event (rba-trigger-event) into OMNibus ObjectServer that acts as a triggering alarm for scanning the network.
2. An Impact policy that detects the existence of the triggering alarm is mapped to a runbook through the trigger service (scan_network).
3. An Impact policy to call the runbook service (end_point_scanning).
4. The Runbook Automation service that executes the runbook.
5. The automation script (run_nmap) inserts an event (MAC-alert-event) when a suspicious MAC found.
6. OMNibus ObjectServer forwards the inserted alert to the Alert Notification service by using send_alert_to_an automation.

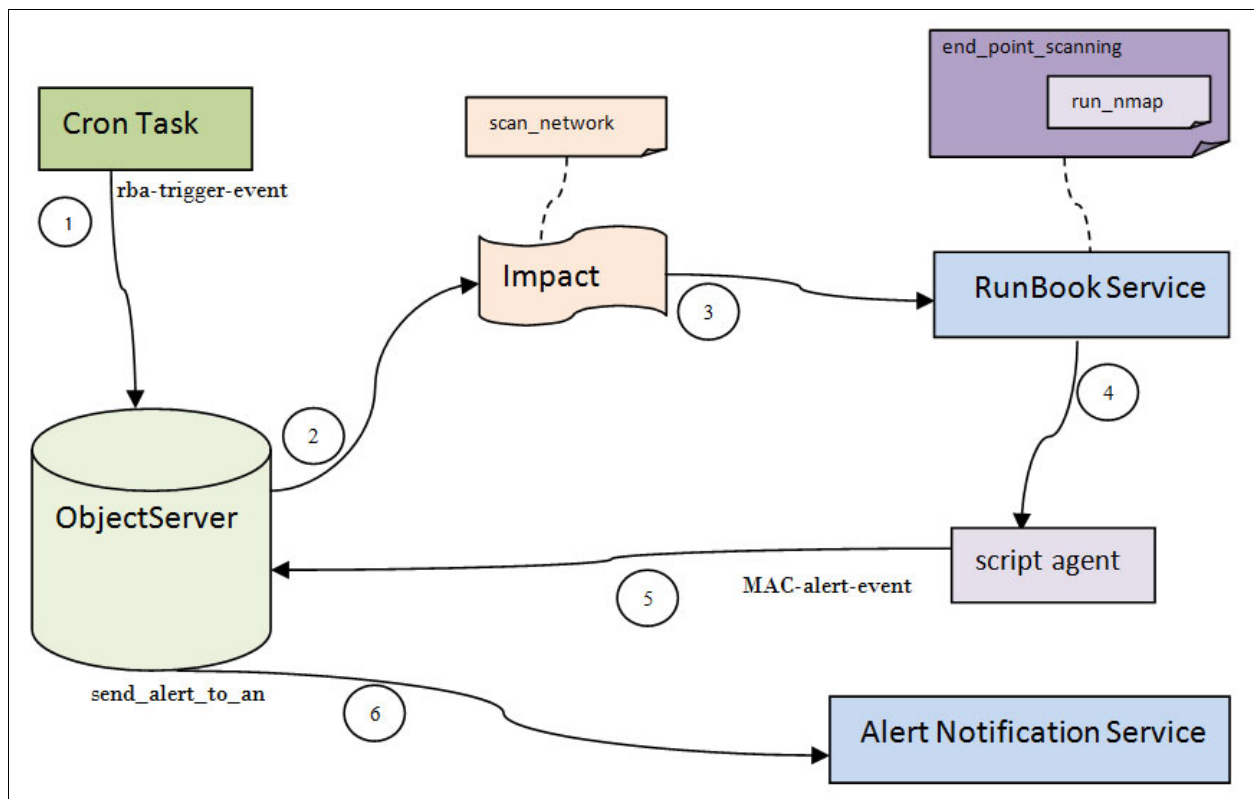


Figure 3-1 Scenario interaction diagram

Perform the following steps to implement this scenario:

- ▶ Create trigger event
- ▶ Create alert notification policy
- ▶ Check your connections
- ▶ Create Runbook Automation script
- ▶ Create runbook
- ▶ Create trigger

Important: For a fully automated scenario, a runbook cannot contain more than one automation. However, you can make your automation script call other scripts as a work-around.

3.2.1 Create Trigger Event

Log in to the server where OMNIBus ObjectServer is running. Use the `OMNIBus nco_sq1` command to send an alarm to the ObjectServer that serves as a trigger for Runbook Automation.

On your command prompt and as a **root** user, enter this command:

```
crontab -e
```

Set the system to send a trigger alarm in every five minutes:

```
*/5 * * * * /home/netcool/trigger.sh
```

The following is a sample for the script trigger.sh:

```
#!/bin/sh

/opt/IBM/tivoli/netcool/omnibus/bin/nco_sql -u root -s NCOMS -p "smartway" <
event.sql
```

The following is a sample for event.sql:

```
insert into alerts.status (Identifier, Severity, Node, Summary, Manager, Type)
values ('rba-trigger-event', 0, 'TestNode','Trigger event for network scanning',
'OMNibus', 13 );
go
```

After successful installation of the cron job, you should see an alert in Alert Viewer as shown in Figure 3-2.

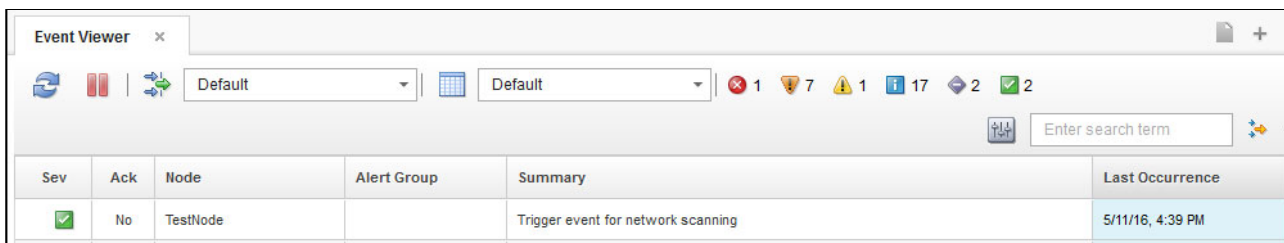


Figure 3-2 Triggering Alarm to start Runbook Automation

3.2.2 Create Alert Notification Policy

This section assumes that you are familiar with Alert Notification setup. See Chapter 1, “IBM Alert Notification (SaaS)” on page 1 for more information.

To create an Alert Notification Policy, complete the following steps:

1. Go to IBM Marketplace at this URL:
<https://www.ibm.com/marketplace/cloud/us/en-us>

See Figure 3-3.

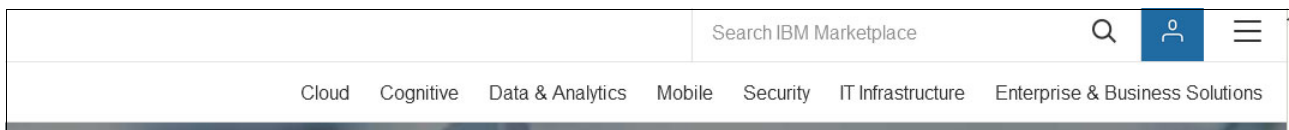


Figure 3-3 Go to IBM Marketplace

2. Click **My IBM** and use your subscription ID as shown in Figure 3-4.

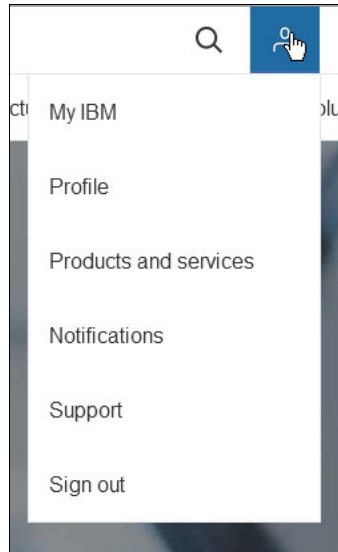


Figure 3-4 Use your subscription ID to log in

3. Go to **Products and services**, select **IBM Alert Notification**, then click **Launch** as shown in Figure 3-5.

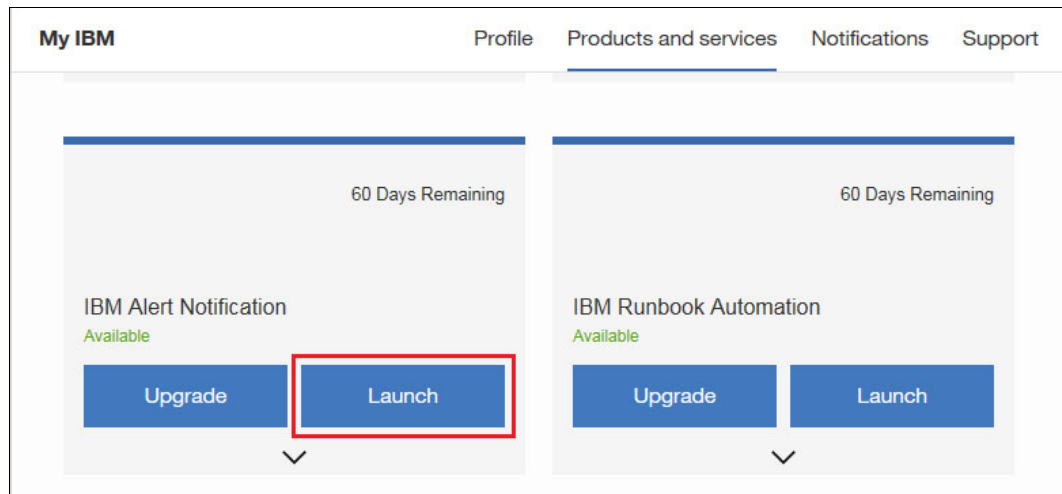


Figure 3-5 Launch your Alert Notification service

The IBM Agile Operations Management - Alert Notification window is displayed as shown in Figure 3-6.

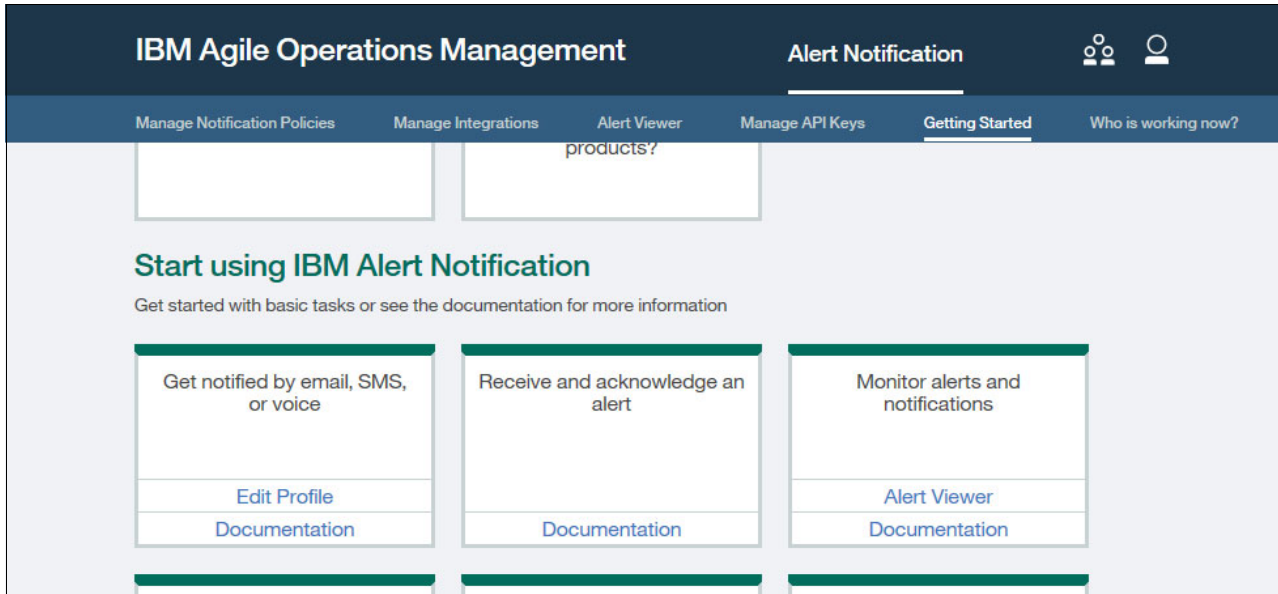


Figure 3-6 IBM Agile Operations Management - Alert Notification

4. Create your intended group and users for the notification alert. Click the **Group** icon as shown in Figure 3-7.

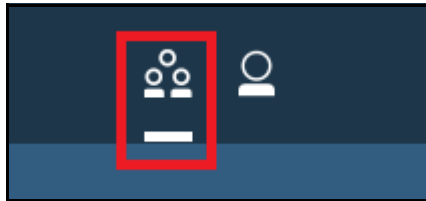


Figure 3-7 Click the Group icon

5. Go to the Manage Users tab and click **Create a User** to create users who will be notified whenever the alert occurs. See Figure 3-8.

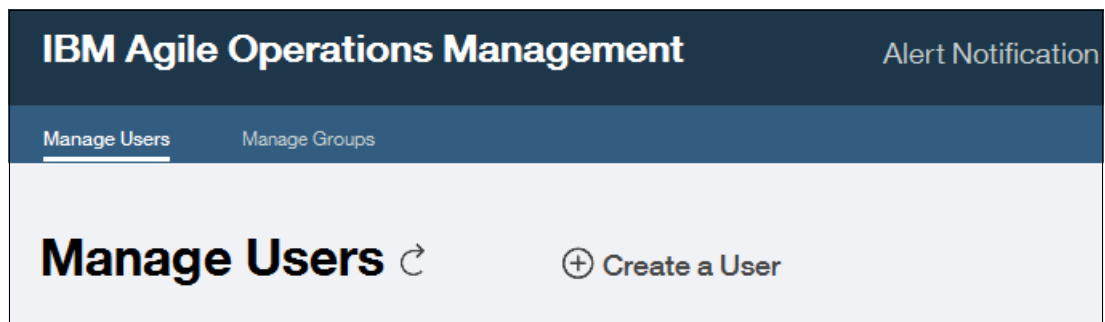


Figure 3-8 Add users to the alert notification

6. Create your users. You will need their IBM IDs (they should get it during the subscription on IBM Marketplace), emails addresses, and names as seen in Figure 3-9.

Create User

User Notifications

* Full Name

* IBM Id

* Email

Mobile Phone

Add a group

Add a role

Cancel Save

Figure 3-9 Create users to be notified

7. Go to the Manage Groups tab and click **Create a Group** as shown in Figure 3-10.

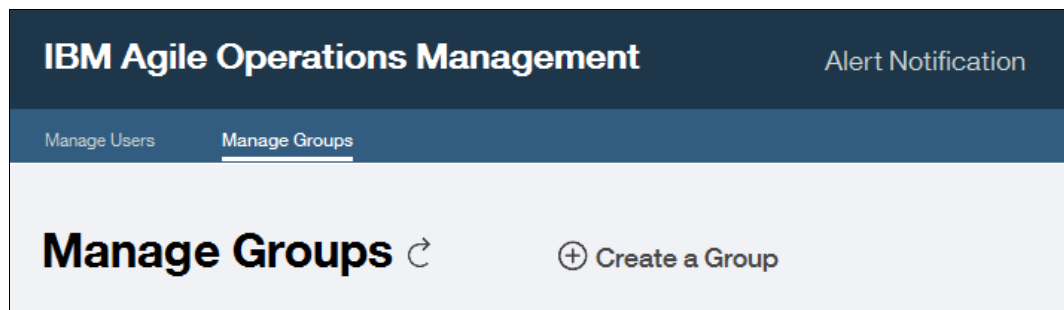
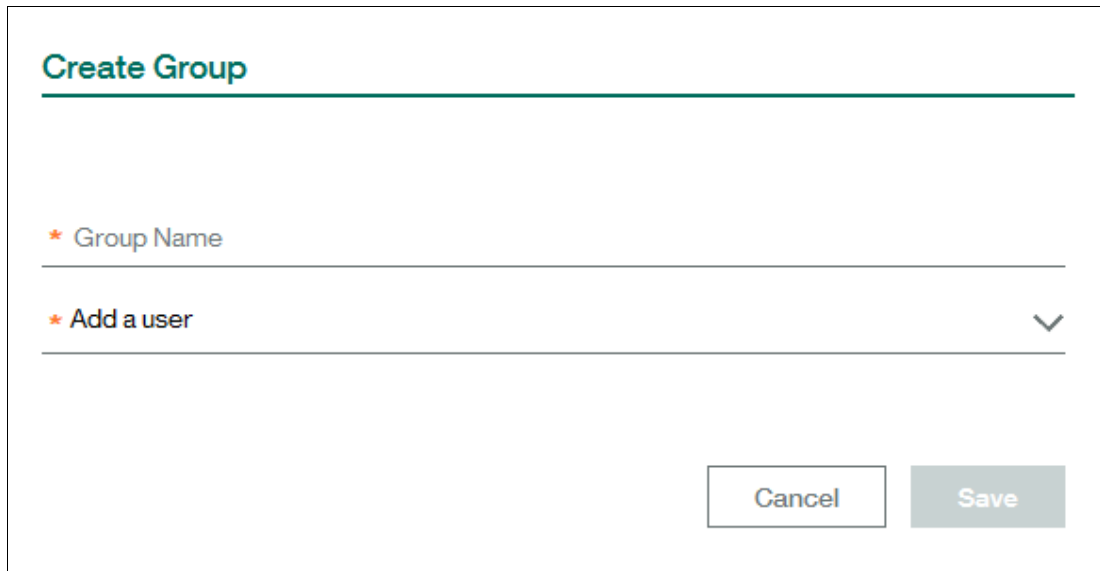


Figure 3-10 Create dedicated group for the alarm

8. Edit group name and assign users to it as shown in Figure 3-11.



The screenshot shows a 'Create Group' form. At the top, the title 'Create Group' is displayed. Below the title, there are two input fields: the first is labeled '* Group Name' and the second is labeled '* Add a user'. At the bottom right of the form, there are two buttons: 'Cancel' and 'Save'.

Figure 3-11 Assign users to the notification group

9. Switch to the Alert Notification window by clicking **Alert Notification** as shown in Figure 3-12.

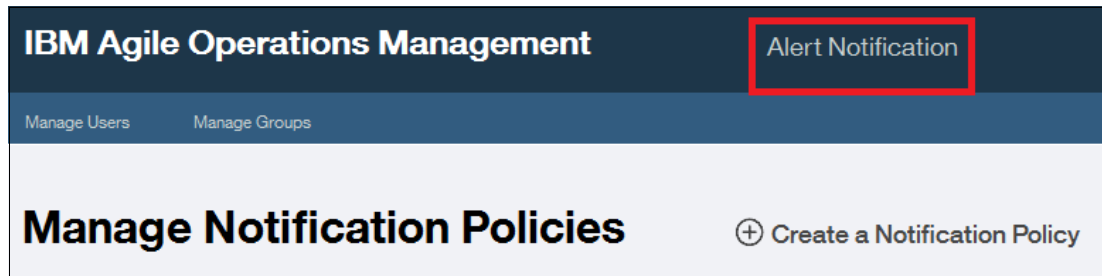


Figure 3-12 Switch to Alert Notification page

10. Go to **Manage Notification Policies** tab, and click **Create a Notification Policy** as shown in Figure 3-13.

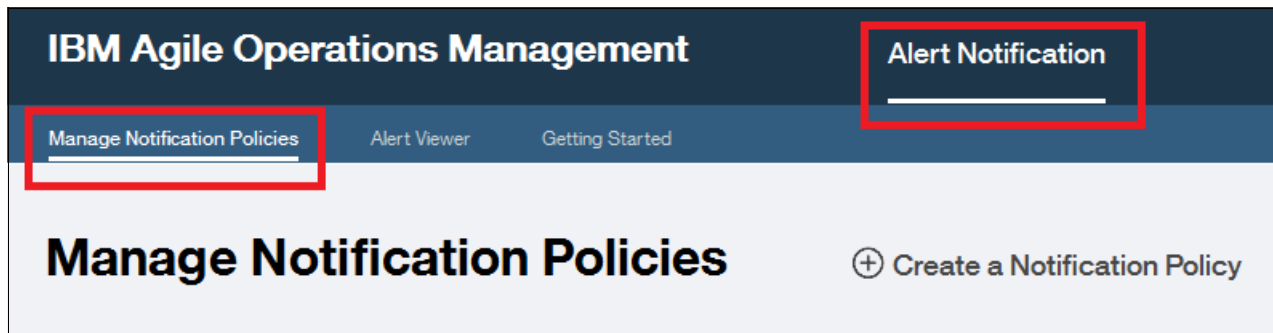


Figure 3-13 Create notification policy

11. Enter **Network Threat Event Notification** in the **Name** field and a suitable description in the **Description** field. See Figure 3-14.

Create a Notification Policy

✓ * **Network Threat Event Notification**

This policy used for sending notifications related to network threat alerts

* **When an alert matches these rules** + Add Rule

* **Notify these recipients**

Escalate if the alert is not acknowledged

Cancel Save

Figure 3-14 Put name and description for the policy

12. Click **Add Rule** to edit a filter for the events as shown in Figure 3-15. Edit the **Rule Description**, select **What happened** in the **Attribute** field, select **Contains** in the **Operator** field, and edit the **Value** field to include your event summary, which is non white listed MAC found. Finally click **Save**. The corresponding event will later be generated by the runbook, which in turn is executed when a trigger event for network scanning is received.

Pre-defined **Add Rule** ✕

* Rule Description filter alerts to retrieve alert related to non whitelisted MAC event

The "What happened" attribute stands for summary information about the alert. The "Where" attribute stands for the endpoint on which the alert occurred. [Examples](#).

* Attribute What happened ▼

* Operator Contains ▼

* Value non white listed MAC found

0 pre-defined rules and 1 new rule will be saved

Cancel Save

Figure 3-15 Add Rule to filter non white listed MAC events

13. Click **Add recipients** to add groups and users to the notification policy as shown in Figure 3-16.

Create a Notification Policy

✓ * **Network Threat Event Notification**
This policy used for sending notifications related to network threat alerts

✓ * **When an alert matches these rules** + Add Rule
filter alerts to retrieve alert related to non whitelisted MAC event ✎ -

Delay notifications
until [] identical alerts occur within [] seconds

* **Notify these recipients** + Add recipient

Escalate if the alert is not acknowledged

Cancel Save

Figure 3-16 Add recipients to the notification policy

14. Go to the Groups tab and from the drop-down menu select the intended group as shown in Figure 3-17.

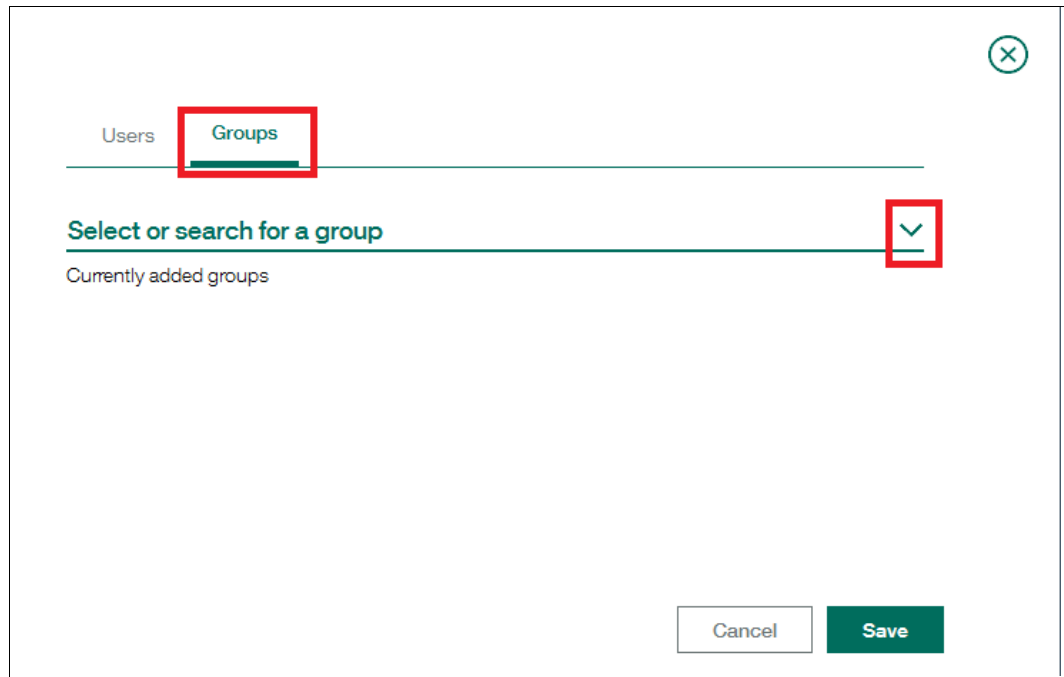


Figure 3-17 Add required group to the notification list

15. Specify the criteria for how often the notifications should be processed. Select **Each time the rules are matched** and click **Save** as shown in Figure 3-18.

Create a Notification Policy

✓ * **Network Threat Event Notification**

This policy used for sending notifications related to network threat alerts

✓ * **When an alert matches these rules** + Add Rule

filter alerts to retrieve alert related to non whitelisted MAC event ✎ -

Delay notifications

until identical alerts occur within seconds

✓ * **Notify these recipients** + Add recipient

Critical Network Security SMEs -

Each time the rules are matched

First match over an eight hour period

Escalate if the alert is not acknowledged + Add Escalation

Cancel Save

Figure 3-18 Specify notification frequency

16. You can optionally add an escalation if the alert is not acknowledged within specified period of time. Click **Add Escalation** and specify the escalation period as shown in Figure 3-19.

Create a Notification Policy

✓ * **Network Threat Event Notification**
This policy used for sending notifications related to network threat alerts

✓ * **When an alert matches these rules** + Add Rule
filter alerts to retrieve alert related to non whitelisted MAC event ✎ -
 Delay notifications
until [] identical alerts occur within [] seconds

✓ * **Notify these recipients** + Add recipient
Critical Network Security SMEs -
 Each time the rules are matched
 First match over an eight hour period

Escalate if the alert is not acknowledged + Add Escalation

1 Escalate after 20 minutes -

Notify: + Add Contact

Cancel Save

Figure 3-19 Escalate the alert if not acknowledged with specific period

17. You can as well add other persons to get notified with the escalation alert, click **Add Contact** and select users or groups you want to add, then click **Save** as shown in Figure 3-20.

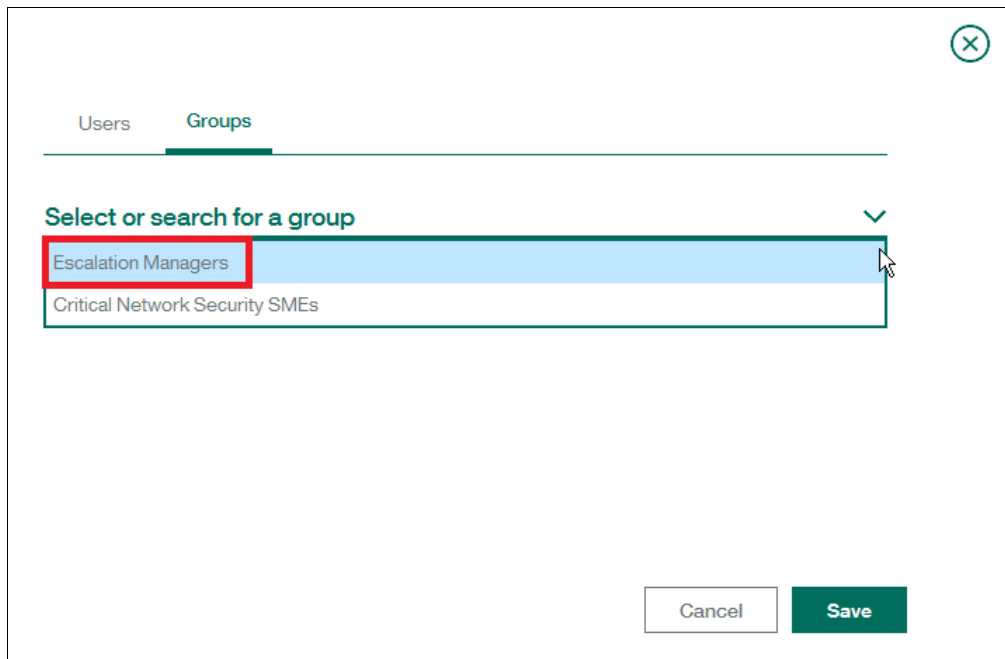


Figure 3-20 Add escalation group

18. Click **Save** to create your notification policy and return to the Manage Notification Policies tab. Click the **Disabled** icon to enable the newly created policy as shown in Figure 3-21.

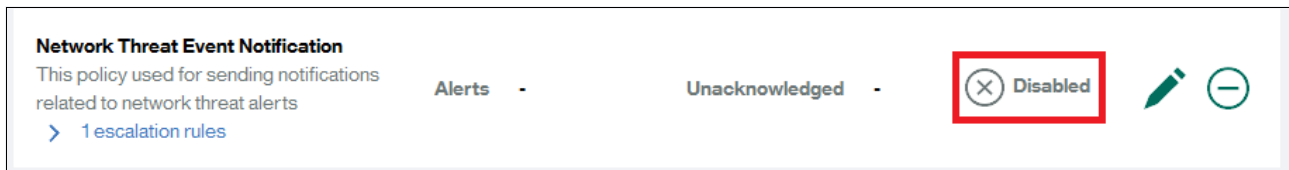


Figure 3-21 Enable the policy

3.2.3 Check your connections

Perform the following steps to validate your connections:

1. Log in to your IBM Marketplace account and start your Runbook Automation SaaS (if it is not already started).
2. Check that your connections (Trigger and Script) have a green check mark. See Chapter 2, "IBM Runbook Automation (SaaS)" on page 47 on how to configure the system for connectivity.

Figure 3-22 shows the Manage Connections window.



Manage Connections				+ Add Connection
Connection Type	SCRIPT	URL	https://172.16.61.80:33180/ita/JobManager	Status <input checked="" type="checkbox"/> Connected 
Connection Type	TRIGGER	URL	https://172.16.61.80:17311/ibm/custom/RBAREstUIServlet	Status <input checked="" type="checkbox"/> Connected 

Figure 3-22 Connections are active

3.2.4 Create the Runbook Automation script

This section describes how to run automation script that will run the nmap utility to retrieve MAC addresses in the network, then compare the result with whitelist file. If a non-whitelisted MAC found, the automation script will create an alert into OMNibus ObjectServer. To create the script, complete these steps:

1. Go to **Manage Automations** and click **Add automation**. Enter **Name**, **description**, and **Script** to run, as shown in Figure 3-23.

Edit automation

run_nmap

this is to collect MAC addresses

Prerequisites: nmap installed on machine

Script Delete Import Script

```
#!/bin/sh
nmap -n -sP 172.16.61.0/24 --exclude 172.16.61.80 | awk '/MAC Address:/{printf
$3;printf "\n"}' > scanlist.txt
sed 's://g' scanlist.txt > temp.txt
sort temp.txt > scanlist_sorted.txt
sed 's://g' whitelist.txt > temp.txt
sort temp.txt > whitelist_sorted.txt
rm -f temp.txt

#compare found MAC list with our white-list
result=$(comm -2 scanlist_sorted.txt whitelist_sorted.txt)
```

Target machine: TARGET

Script parameters + Add Parameter

Close Save

Figure 3-23 Edit automation

2. Feel free to use your own tools and your own script to scan the network and compare the results, as shown in Figure 3-24. If a non-whitelisted MAC address is not found, send an alert by using `nco_sql` inside the script `send_alert.sh`. See Example 3-1 as a sample.

Example 3-1 The send_alert.sh script

```
#!/bin/sh
/opt/IBM/tivoli/netcool/omnibus/bin/nco_sql -u root -s NCOMS -p "smartway" <
MAC_alert.sql
```

3. The `MAC_alert.sql` script is highlighted with the red box. Example 3-2 shows the contents of this script. Notice that the summary field is the same as the one already used, and a rule was added to the Alert Notification Policy.

Example 3-2 MAC_alert.sql

```
insert into alerts.status (Identifier, Severity, Node, Summary, Manager, Type) values
('MAC-alert-event', 5, 'TestNode','non white listed MAC found', 'OMNIBUS', 1 );
go
```

Figure 3-24 shows the script to collect the MAC addresses in the run nmap window.

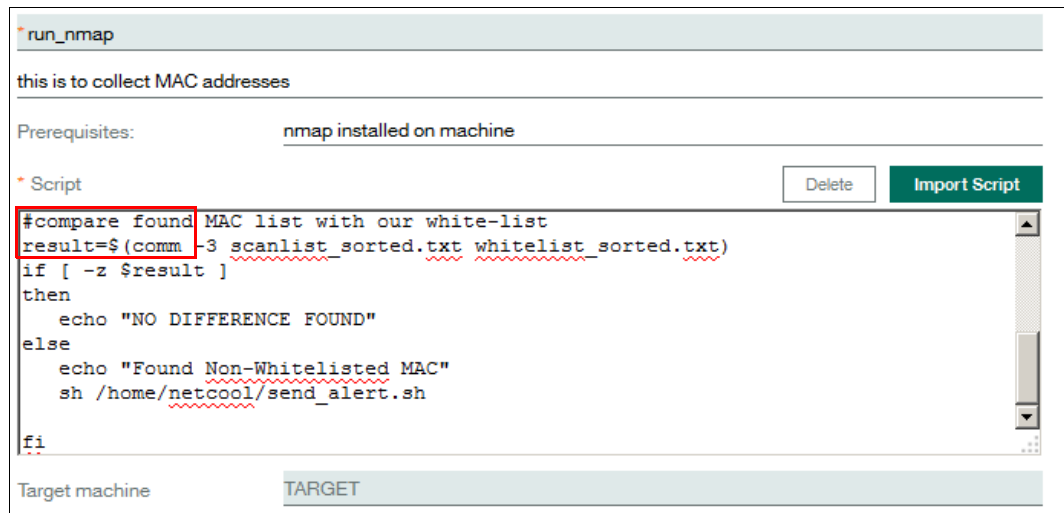


Figure 3-24 Script to collect MAC addresses

3.2.5 Create runbook

Complete the following steps to create a runbook that uses the automation script that you previously created:

1. Go to **Manage Runbooks** and click **Add Runbook**.
2. Enter the name and description, then insert the automation script `run_nmap` as shown in Figure 3-25. Click **Publish** to save the runbook.

Important: Because of a temporary limitation, runbooks must have parameters to be triggered. The development team is working on removing this limitation.

Due to this limitation, the non-mandatory `HOSTNAME` parameter was added for the target where the script must be executed. Make sure to select this option while you are creating the parameter.

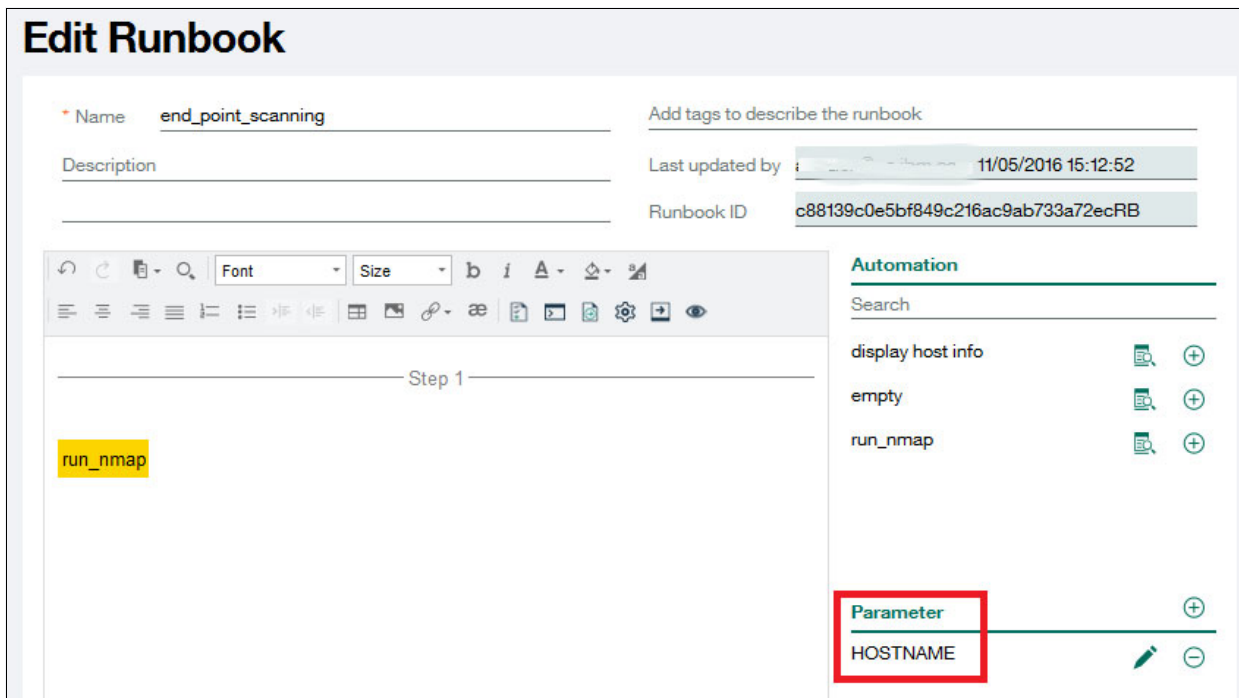


Figure 3-25 Create runbook

3.2.6 Create Trigger

In this part, link the triggering event with the required runbook so that whenever a trigger is fired, the runbook runs automatically. To do so, use these steps:

1. Go to Manage Triggers tab and click **Add Trigger** as shown in Figure 3-26:
 - a. Enter the name: scan_network.
 - b. Provide a relevant description.
 - c. Click **Add Filter** and complete **Event Summary** as shown. That is the summary in the event that will be sent by the cron task. See “Create Trigger Event” on page 123.
 - d. Click **Save**.

The screenshot displays the 'Add Trigger' configuration page. At the top, the title 'Add Trigger' is shown. Below the title, there are two input fields: the first contains 'scan_network' and the second contains 'This will trigger network scan'. Below these fields, there is a section titled 'Based on which event(s) would you like this trigger to run on?' with an 'Add Filter' button. A modal window is open, showing the filter configuration. The modal has three tabs: 'Event Summary' (selected), 'Event Filter', and 'Attribute Filter'. The text 'I want to run a match on the event summary' is displayed. Below this, there is a filter rule: 'Event Summary contains Trigger event for network scanning'.

Figure 3-26 Filter creation for new trigger

2. Click **Select Runbook** to pick your runbook, then click **Save** as shown in Figure 3-27.

Figure 3-27 Select runbook for a trigger

3. Select how the runbook parameter will be evaluated. Select **Manual** in the **Source** field and your host name for **Value** as shown in Figure 3-28. The value that is shown is an alias name for the OMNibus server.

Source	Value	Pattern
Manual	itsm.service.netcool	

Figure 3-28 Select runbook parameter calculation

4. Finally, click **Create Trigger** and notice that **Automated Runbook** equals **Yes**, as shown in Figure 3-29.

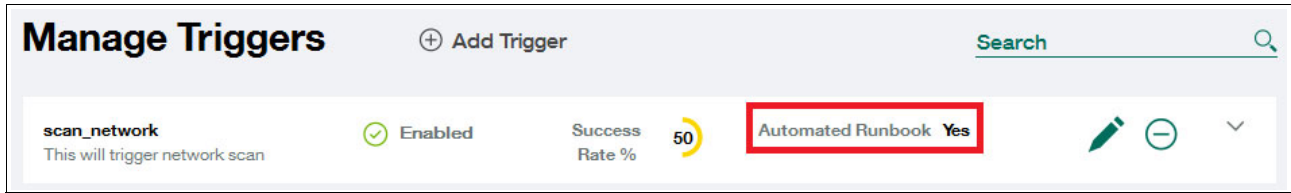


Figure 3-29 Trigger created for automated runbook

Result

After the triggering event is sent to OMNibus, the end_point_scanning runbook will be executed automatically, the run_nmap script will scan the network, and if a non-whitelisted MAC is found, you are alerted by email, SMS, and voice. Therefore, getting an alert proves that you correctly configured your system. Figure 3-30 shows the content of the Alert Viewer tab.

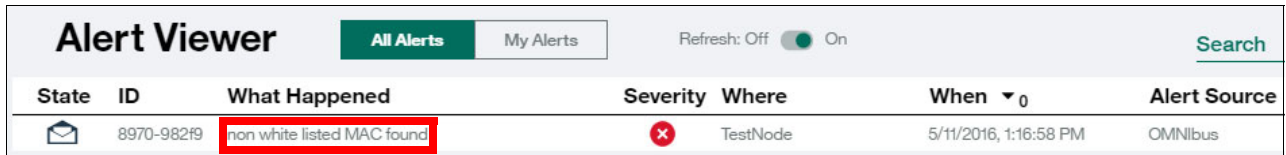


Figure 3-30 Alert notification received

You can also go to your RunBook Automation link, click the My Runbooks tab, click **Triggered Automatically**, and check the status of the runbook as shown in Figure 3-31.

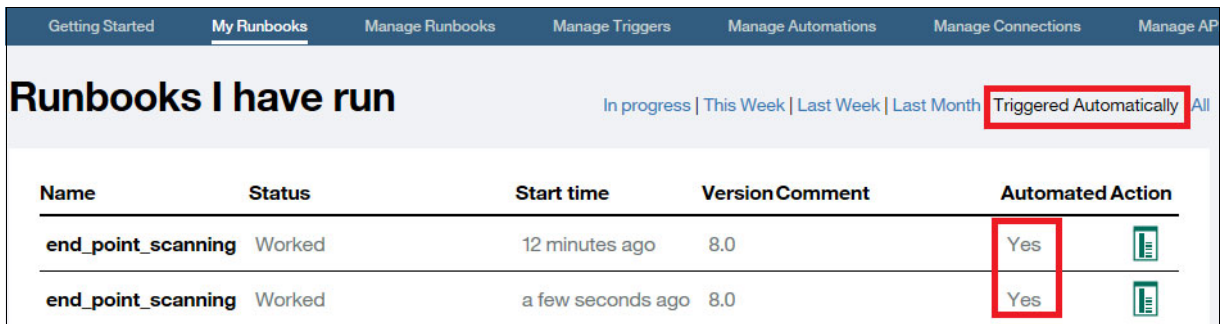


Figure 3-31 Check runbook activity

3.3 Summary

The scenario in this chapter walked you through complex and effective integration between IBM Runbook Automation and IBM Alert Notification. The integration brings a solution that increases enterprise awareness of its IT infrastructure troubles and security threats.

Related publications

The publications listed in this section are considered particularly suitable for a more detailed discussion of the topics covered in this paper.

IBM Redbooks

The following IBM Redbooks publications provide additional information about the topic in this document. Note that some publications referenced in this list might be available in softcopy only.

- ▶ *IBM Netcool Operations Insight Version 1.4: Deployment Guide*, SG24-8365
- ▶ *IBM Netcool Operations Insight: A Scenarios Guide*, SG24-8352

You can search for, view, download or order these documents and other Redbooks, Redpapers, Web Docs, draft and additional materials, at the following website:

ibm.com/redbooks

Online resources

These websites are also relevant as further information sources:

- ▶ Alert Notification documentation:
http://www.ibm.com/support/knowledgecenter/SSY487/com.ibm.netcool_OMNIBusaas.doc_1.2.0/concept/emaas_ins_overview.html
- ▶ Runbook Automation documentation welcome page
http://www.ibm.com/support/knowledgecenter/SSZQDR/com.ibm.rba.doc/RBA_welcome.html
- ▶ IBM Netcool Operations Insight Version 1.4.0.1 Knowledge Center documentation:
https://www.ibm.com/support/knowledgecenter/en/SSTPTP_1.4.0.1/soc/collaterals/soc_netops_kc_welcome.html

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