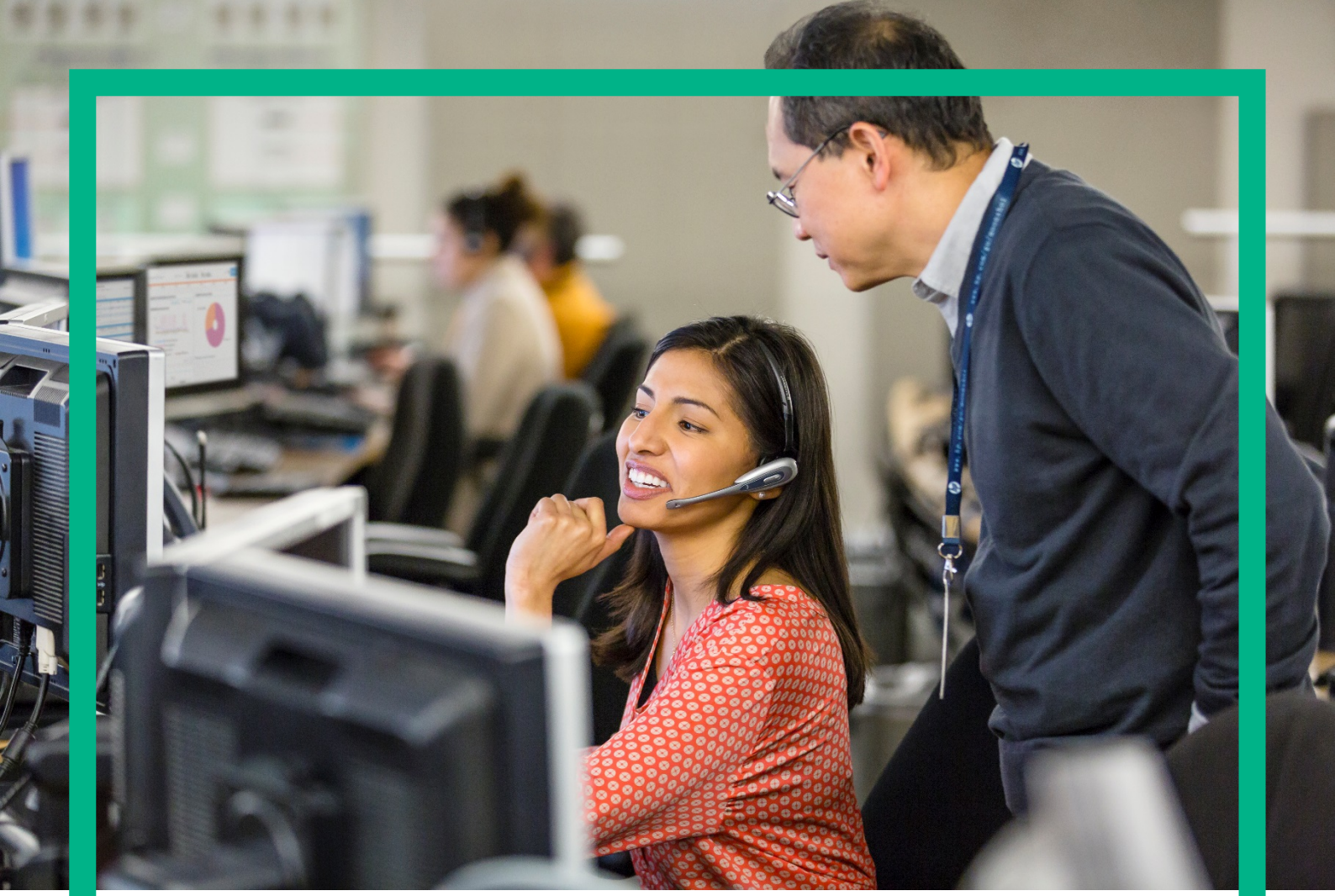


HPE UCA Automation

Administrator and User Interface Guide for Linux (RHEL 6.4)

Version: 2.1
Edition: 1.0
July 2016

Hewlett Packard Enterprise

Notices

Legal notice

Confidential computer software. Valid license from HPE required for possession, use or copying. Consistent with FAR 12.211 and 12.212, Commercial Computer Software, Computer Software Documentation, and Technical Data for Commercial Items are licensed to the U.S. Government under vendor's standard commercial license.

The information contained herein is subject to change without notice. The only warranties for HPE products and services are set forth in the express warranty statements accompanying such products and services. Nothing herein should be construed as constituting an additional warranty. HPE shall not be liable for technical or editorial errors or omissions contained herein.

Printed in the US

Trademarks

Adobe®, Acrobat® and PostScript® are trademarks of Adobe Systems Incorporated.
HP-UX Release 10.20 and later and HP-UX Release 11.00 and later (in both 32 and 64-bit configurations) on all HP 9000 computers are Open Group UNIX 95 branded products.
Oracle® and Java™ are registered trademark of Oracle and/or its affiliates.
Microsoft®, Internet Explorer, Windows®, Windows Server®, and Windows NT® are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.
Firefox® is a registered trademark of the Mozilla Foundation.
Google Chrome® is a trademark of Google Inc.
Oracle® is a registered U.S. trademark of Oracle Corporation, Redwood City, California.
EnterpriseDB® is a registered trademark of EnterpriseDB.
Postgres Plus® Advanced Server is a registered U.S. trademark of EnterpriseDB.
UNIX® is a registered trademark of The Open Group.
X/Open® is a registered trademark, and the X device is a trademark of X/Open Company Ltd. in the UK and other countries.
Red Hat® is a registered trademark of the Red Hat Company.
Linux® is the registered trademark of Linus Torvalds in the U.S. and other countries.
Neo4j is a trademark of Neo Technology.

Contents

List of figures

List of tables

Preface

About this guide

This guide provides an overview of the UCA Automation product and describes how to use the web-based user interface of the UCA Automation.

Product Name: UCA Automation

Product Version: 2.1

Read this document before installing or using this software.

Audience

This guide is intended for solution developers, software development engineers, solution administrator, and solution operators. The administrators, operators, and observers have different privileges provided through the user interfaces.

Software versions

The term UNIX is used as a generic reference to the operating system, unless otherwise specified.

The software versions referred to in this document are as follows:

Product Version	Supported Operating systems
UCA Automation 2.1	Linux Red Hat Enterprise Linux Server release RHEL 6.4

As the mentioned, the user interface is web based; the rendering of some components might be slightly different depending on the browser used.

However, the described features should be identical on any supported browser. For UCA Automation 2.1, the supported browsers are Mozilla Firefox 32 and Microsoft Internet Explorer 9.0.

Typographical conventions

`Fixed width text`	It is used for filenames and their contents, computer inputs or outputs, program codes, and so on.
Italic text	It is used for labels, parameters, emphasized text, and replaceable text, citations and references
Bold text	It is used to indicate navigation options in the interfaces; for example, the text appearing in buttons and menu items. User interface controls, window titles, generic emphasis
<angle brackets>	Indicates generic variable names that must be substituted by real values or strings.

Reference documents

- UCA Automation Installation Guide
- UCA Automation Integrator's Guide
- Deployment Manager Guide (HPE SA)
- NOM Installation and Configuration Guide
- NOM HPE SA Channel Adapter Installation Guide
- NOM UCA Automation Console Channel Adapter Installation Guide
- NOM UCA EBC Channel Adapter Installation Guide
- NOM TEMIP Channel Adapter Installation Guide

Support

Please visit our HPE Software Support Online Web site at softwaresupport.hpe.com for contact information, and details about HPE software products, services, and support.

The software support area of the software web site includes the following:

- Downloadable documentation
- Troubleshooting information
- Patches and updates
- Problem reporting
- Training information
- Support program information

Chapter 1
Overview

In any typical service provider environment, a need for isolating network related issues and automating resolutions for the same is always in demand. UCA Automation software is positioned primarily to address this need. It is implemented as a combination of business rules engine and workflows engine.

The system involves the integration of HPE Unified Correlation Analyzer for Event Based Correlation (UCA EBC) system, which provides business rules capability and HPE Service Activator (HPE SA which provides activation capability] glued via the enterprise service bus called NOM (NGOSS Open Mediation).

Generally, in the resolution solutions available today, there's no separate layering between what resolution steps need to be carried out on the incidence of a specific issue and how these resolution steps are carried out. This mixed up implementation of processes which represent both what and how part of the logic on the top of workflow engines OR in some cases on top of business rules engines, makes the workflows or business rules very complex to develop, comprehend, debug and maintain, read as 'modify' when a business decision changes - say support a new device type, support a new resolution command on the same device or support a new format of the output for an existing resolution command with an upgrade in device firmware. The problem scales to unimaginable magnitudes considering the different technologies such as (DWDM, SDH, DSL, MPLS, LTE and legacies such as ATM, FR and X.25) and different layers / types of networks such as the transport, the access, the core, the radio access and so on.

UCA Automation software which is a combination of both business rule engine and the workflow engine will enable a clear separation of what to automate and how to automate. All the complexities of actual automation such as how to access a network resource [could be a network element, an element component or an EMS or NMS], what it's credentials could be, which specific transport mechanism to use to connect to the resource, what specific OS version of the device are to be supported, what specific commands need to be sent, would be abstracted from the business rules. This would enable the administrators to create-update-read the business rules with utmost clarity and maintain them efficiently. This would empower the administrators to store the knowledge gained regarding the automation in the form of business rules focusing on what part without bothering about the how part. One another advantage of UCA Automation software is, for most of the resolution automations - it would require the operator only to know business rules and he need not have knowledge of the business rules technologies to implement day to day operational changes to the decisions.

Thus UCA Automation System is a platform for building value added resolution automations based on a judicious combination of business rules and workflows.

The following diagram shows the architecture of the UCA Automation system with NOM bus.

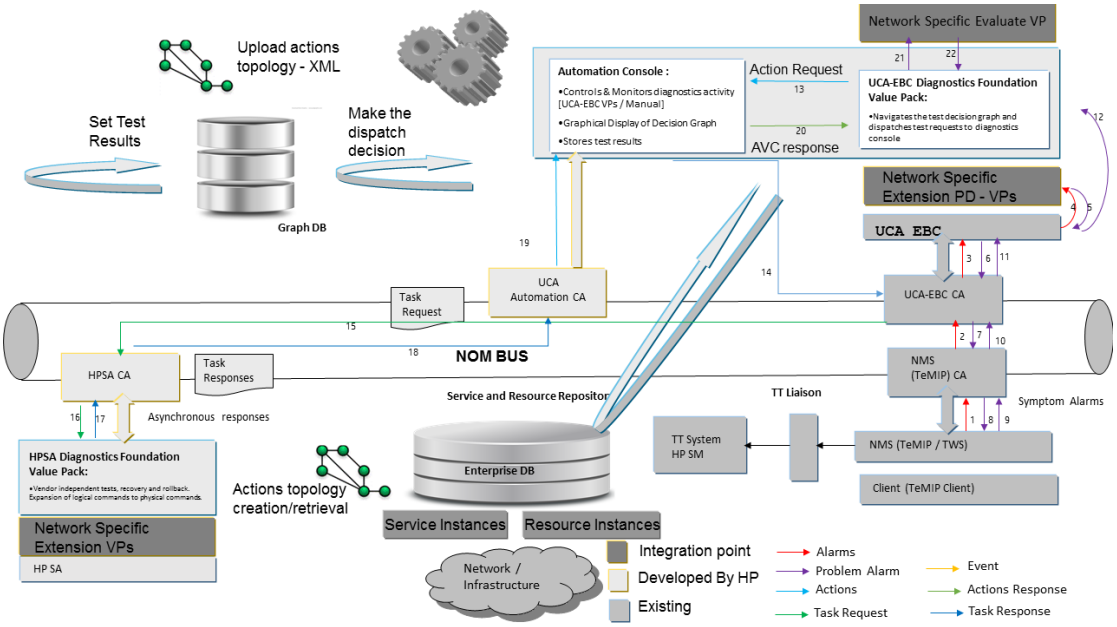


Figure 1: UCA Automation with NOM

The UCA Automation system process is as follows:

1. The network-specific PD value packs process a storm of alarms from an NMS such as HPE TeMIP and create one Problem Alarm.
2. The UCA-EBC Diagnostics Foundation value pack acts on the Problem Alarm, which it receives either from the NOM bus or from the PD value pack.
3. The Decide-and-Act subsystem in the Foundation VP refers to a decision tree and determines the remedial actions for the problem.
4. The value pack sends these actions to the Automation console, enabling the user to view them and interact with the action.
5. The task request is sent to an Activation System like HPE SA via UCA EBC CA.
6. The HPE SA Foundation VP validates the incoming request and then sends them to the workflows in the network specific value pack.
7. After processing the workflow the task response containing the diagnostic results is sent to Automation console.
8. The diagnostic results are sent back to the UCA-EBC Foundation value pack through the Automation console.
9. Depending on whether the administrator wants to make complex decisions based on the results, the diagnostic results are sent to the Evaluate value packs.
10. The Foundation value pack repeats the whole process of retrieving the next action from the decision tree, until it reaches the last action in the branch.

The following diagram shows the architecture of the UCA Automation system with UMB.

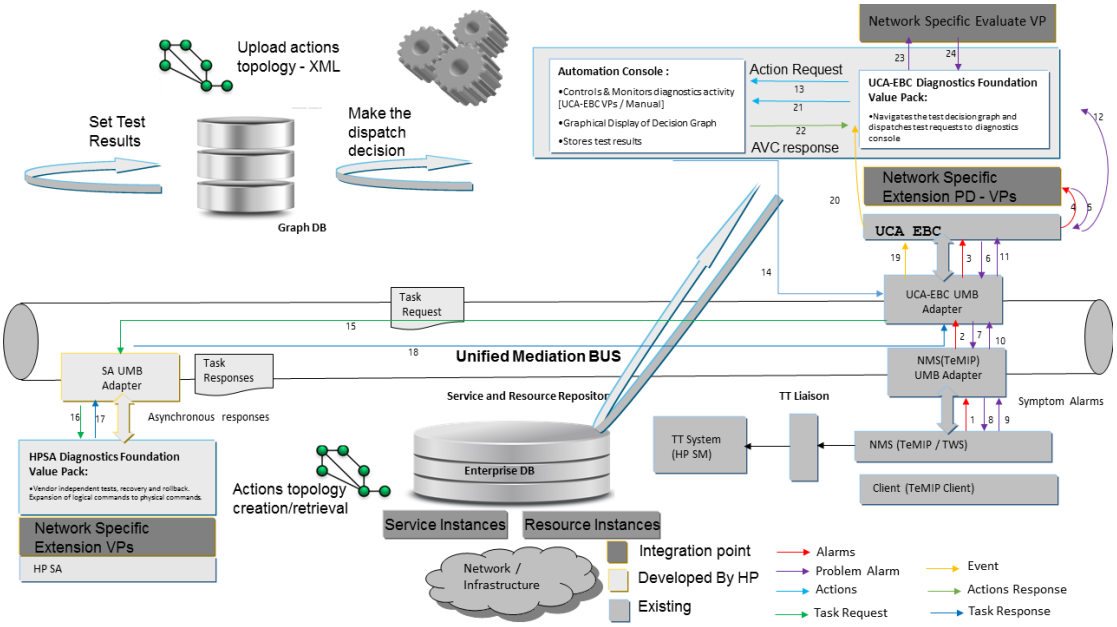


Figure 2: UCA Automation with UMB

Both the task request and task response from HPE SA passes through UCA EBC adapter.

1.1 Design theory

Two key functions are performed by UCA Automation; the problem isolation and problem resolution.

Problem isolation is the responsibility of UCA EBC Problem Diagnosis value pack, which can eliminate event storms, false positives, false negatives, and deduce a single meaningful problem alarm.

This information is then passed to the decide-and-act engine, which identifies the action to be taken for a specific problem. After the action, the evolved knowledge is sent back to the decide-and-act engine for further resolution based on the decision tree or evaluates value-pack optionally, to perform predictive and proactive automation. In addition, diagnostic information is gathered automatically to reduce the MTTR (mean time to resolve).

The UCA Automation system works in the way depicted by the following diagram. It starts with the original problem, performs tests after tests as per the decision tree design, and then either resolves the problem or enriches the problem alarm with complete diagnosis, or can even create a trouble ticket automatically.

In case of manual resolution, the operator is presented with a set of problems, the associated services, and a list of the types of devices which can support such services. Once the above triplet is chosen, the corresponding resolutions are displayed, which can be invoked manually.

In UCA Automation System, the process of problem resolution happens in the way depicted by the following diagram. The administrator or integrator of the system has the option to easily configure the decision tree without the need for any kind of programming. The decide-and-act subsystems work based on this configuration. In case the administrator needs to make advanced decisions based on the results of the previous tests, the platform allows him to write his own rules in the evaluate block.

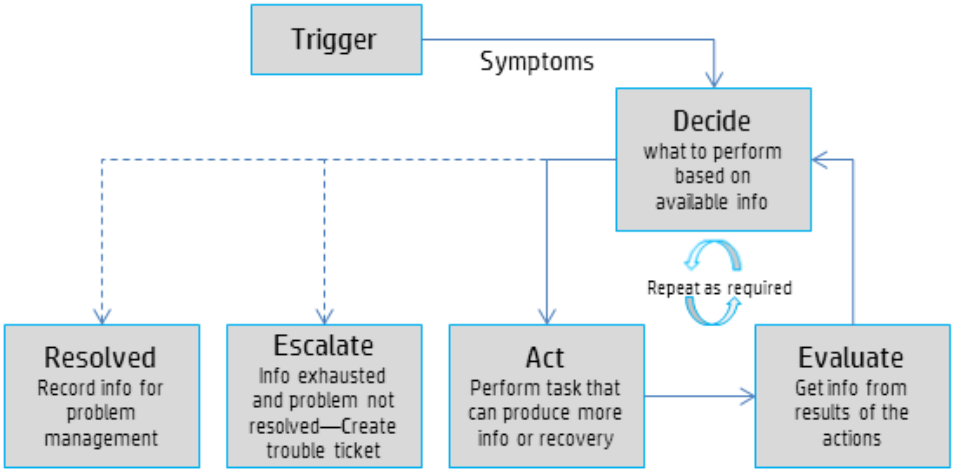


Figure 3: UCA Automation workflow

Chapter 2
Accessing UCA Automation

2.1 Launch UCA Automation UI

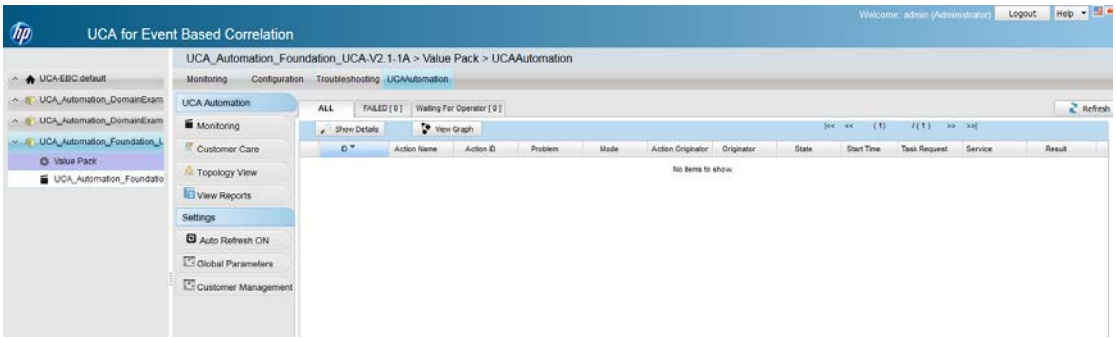
This section explains the procedure to open the UCA Automation UI.

1. After starting the UCA Automation application, you can open the user interface from the UCA-EBC console by accessing the following URL:

   `http://<hostname or IP address>:<port #>/uca`

2. `<hostname or IP address>`—Hostname (full DNS name) or IP address of the UCA Automation server system. If UCA Automation server is running on your local host, you can use the localhost as the name of the host to connect to using your web browser.
3. `<port #>`—Port number of the UCA EBC user interface, which is by default 8888.
4. Click the **UCA Automation Foundation VP** on the left navigation pane
5. Select the **UCAAutomation** tab on the right-hand side.

   The UCA Automation console opens.



2.2 User interface layout

The Monitoring window, which is the main page of the UCA Automation UI, shows various Actions and their statuses. The Actions are grouped by Originator and sorted by the Originator and the ID columns.

By default, the page is displayed for an Observer role.

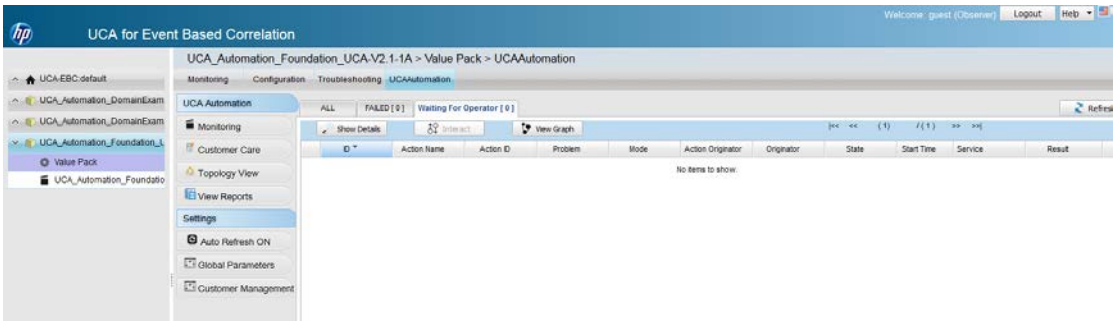


Figure 4: UCA Automation User Interface main view

The various roles available in the UCA Automation User Interface are Observer, Operator, and Administrator.

To access the UCA Automation UI, contact the UCA EBC administrator who can create a user and associate a role.

On the left panel, the various operations available are Monitoring, Manual Tests, Topology View, and View Reports. You can also set the Global Parameters for the UCA Automation console.

2.3 Logging into UI

Use the following procedure to log into the UCA Automation UI.

1. Click the **Login** link on upper right corner of the page.

   The **UCA Automation Console: Login** pop-up window appears.

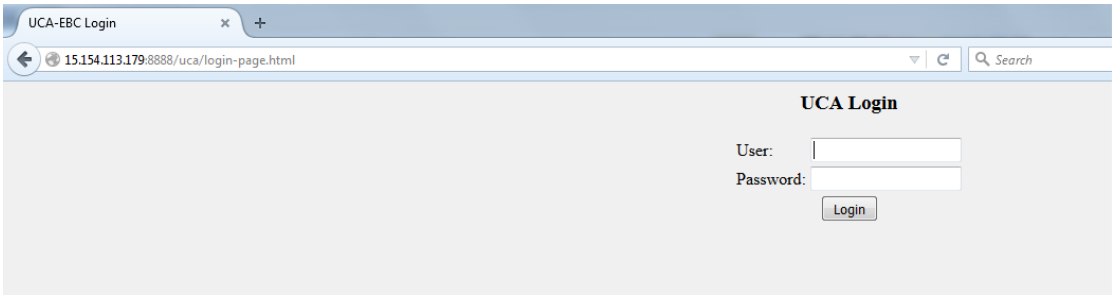


Figure 5: Login panel

   When installing the UCA Automation software, the admin user is created with Administrator privileges. The default login credentials are the following:

   a. Username: `admin`
   b. Password: `admin`

2. Enter the username and password and click the **Login** button.

   After logging in as the administrator, you can create additional users.

Chapter 3
Configuring UCA Automation

3.1 Global parameters

In UCA Automation, before the user applies an action and runs a test on an external system, the administrator can decide whether the user can change any settings of an action during the test. The administrator can restrict the user interactions by activating the Global Parameters feature available in the UI.

The available parameters are the following:

1. **Action mode**: This parameter has two attributes.

    a. Open Loop— User can interact with an action. With this option, an administrator can decide whether to approve or disapprove an action.

    b. Closed Loop—User cannot interact with an action and edit the parameter values for an action.

2. **Action type**:
    a. real — Run the tests in real mode.
    b. demo — Run the tests in demonstration mode

3.2 Activating Global Parameters

Use the following procedure to activate the Global Parameters feature.

1. Select **Settings** -> **Global Parameters** from the menu.

The **Global Parameters** page opens.

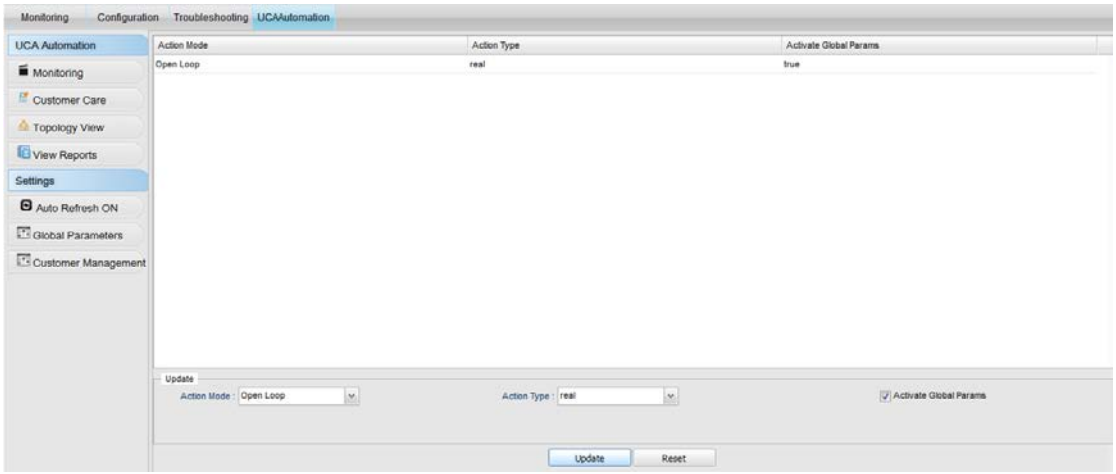


Figure 6: Global Parameters page

2. Select the **Activate Global Params** checkbox.

The Global Parameters feature is activated.

Chapter 4
Monitoring

4.1 View status of tests

Use the following procedure to view the status of each test performed.

1. Select **UCA Automation** -> **Monitoring** from the menu.
   The **Monitoring View** page opens.

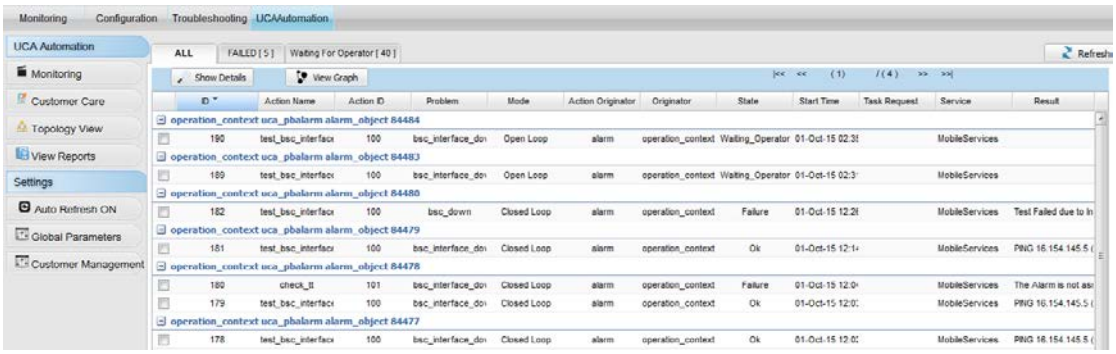


Figure 7: Monitor view

The page contains the following three tabs which show the status of all tests that are currently running as well as the failed ones in.

a. **All**— Status of all tests that are currently running, failed, awaiting operator's response.

b. **Failed**—Lists all tests that have failed.

c. **Waiting For Operator**—Lists all tests that are awaiting an action from the operator.

The value displayed next to these tab names represents the number of actions in these tabs. The default view shows the status of the action taken on a specific problem.

Table 1: Monitoring

Field	Description
ID	Task ID
Action Name	Diagnostic Action taken for a problem.
Action ID	Diagnostic action ID.
Problem	Problem symptom.
Mode	Diagnostic action mode: Whether Open or Closed loop.
Action Originator	The possible values are Alarm and operator.
Originator	The possible values are Alarm ID and Operator ID.
State	The possible values are the following: • Waiting_Operator

	• Request_Sent • In_Progress • Failure • Ok
Start Time	The time at which the task started.
Task Request	The request message sent to the activation system.
Service	Service name.
Result	Diagnostic action results.

NOTE: If the status a test is `Successful`, it is not listed in these lists. The successful reports appear in the Reports menu.

2. Select the checkbox for a record and click the **Show Details** button to view the details of that record.

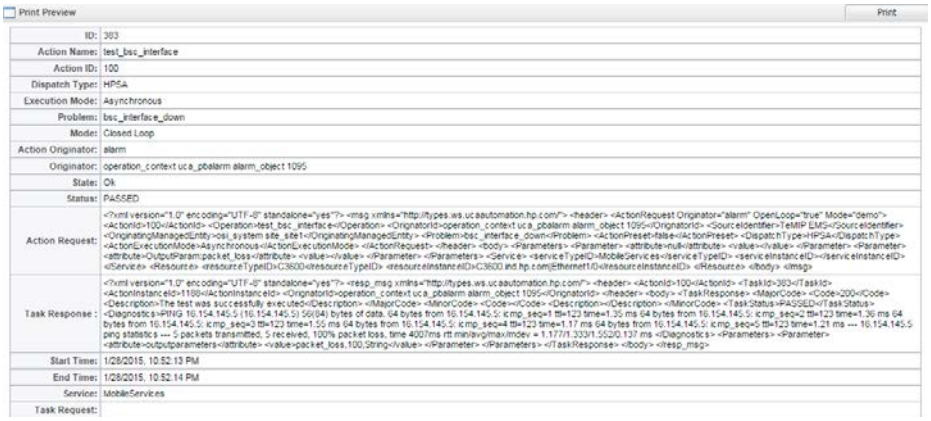


Figure 8: Monitor show details

3. (Optional) Hover mouse over the record's **Result** cell to view the results.

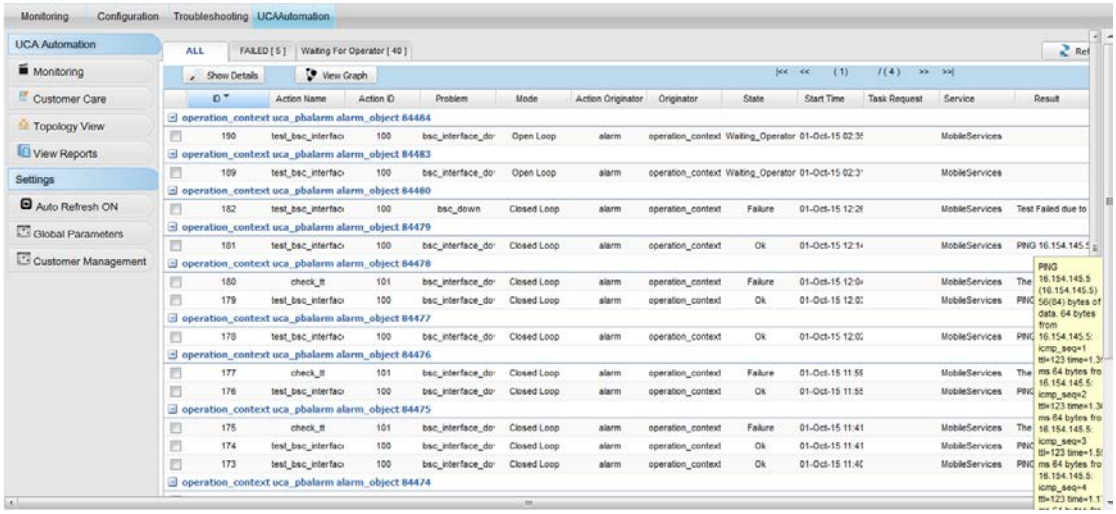


Figure 9: Monitor view result

4. View Graph

   View Graph button allows to locate the selected action and the traversal path with status.

   Select the task for which the decision tree location to be known and click on View Graph.

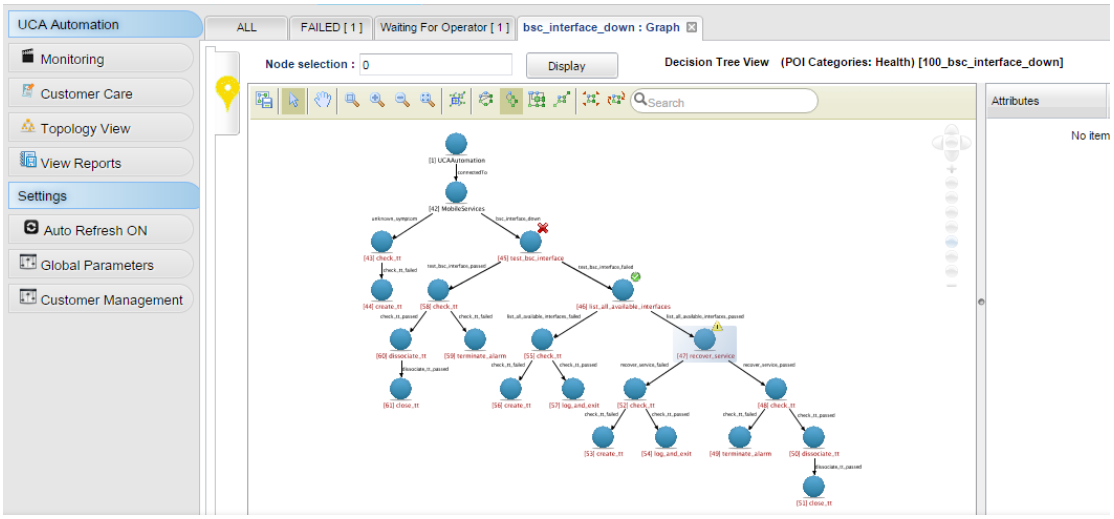


Figure 10: Task View Graph

Details of the icons in the Tom Sawyer Visualization

Table 2: Action Status Icons

Field	Description
Green color tick mark	Passed Action
Red color cross mark	Failed Action
Yellow color caution mark	Actions waiting for operator

User POI (Point of Interest) specifies the task which user might be interested in. In the above decision tree, these specified tasks are displayed on the POI view (left icon on the right of the decision tree).

This POI can either define the Waiting for Operator tasks or failed tasks which are configurable via UCAAutomation.properties.

a. Configure the `UCA_ATM_POI_STATE` attribute in the `${UCA_EBC_DATA}/instances/<your instance>/deploy/UCA_Automation_Foundation_UCA-V2.1-1A/conf/UCAAutomation.properties` with either Waiting_Operator or Failure.
b. By default the value is Waiting_Operator.

4.2 Updating the Waiting for Operator records

If a test shows the status as `Waiting for Operator`, the operator should provide inputs to complete that test successfully.

1. Select the **Waiting For Operator** tab.
2. Select the checkbox for the required record and click the **Interact** button.

   The **Specify parameters for Action: <Name of the test>** window opens.
3. Enter the required inputs if the field is open for editing.
   a. If the values are pre-configured or the parameter has a default value, the field displays those values. You can edit the value before approving it.
   b. If the value is pre-configured and restricted from editing, the field is displayed as non-editable and you cannot edit it before approving.
4. Click **Approve** if the value is correct or click **Disapprove**.

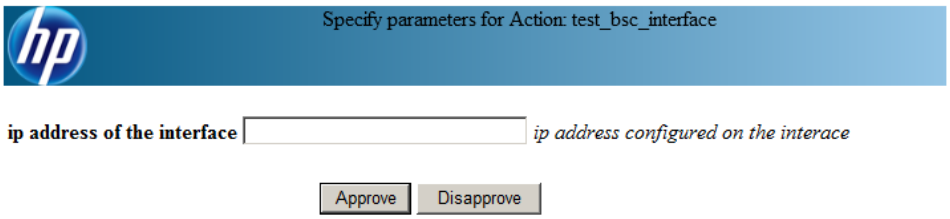


Figure 11: Monitor interact page

4.3 Managing Auto refresh

When a new event occurs, the records are displayed immediately at runtime on the **Monitoring** page.

The page is automatically refreshed to fetch the new records. You can manage refreshing the page in the following two ways:

Configure the `UI_AUTO_REFRESH_INTERVAL` attribute in the `$ {UCA_EBC_DATA}/instances/<your instance>/deploy/UCA_Automation_Foundation_UCA-V2.1-1A/conf/UCAAutomation.properties`.

By default the auto refresh timer is set to 10 seconds (10000ms).

Click the **Refresh** button on the right-hand side of the **Monitoring** page.

You can also toggle the Auto Refresh value by clicking the **Settings** -> **Auto Refresh** option.

Chapter 5
Customer Care

5.1 Customer Management

Customer Management deals with Customer registration and customer – service mapping

5.1.1 Customer Registration

The master screen facilitates the customer to register with the system.

1. Select **Customer Management** -> **Customer**

This page asks the user to enter the customer information including the Customer Name, Address and save the same

Figure 12: Customer registration page

Details of various fields in UCA_CUSTOMER table are as follows:

Table 3: UCA Customer field descriptions

Field	Description
ID	Customer Id
Customer Name	Name of the Customer
Address	Address of the Customer
City	City of the Customer
State	State of the Customer
Country	Country of the Customer

2. **Customer Management** -> **Services**

Customer can avail the service via this page.

The page provides list of customers registered with the system and the list of services. User can map the service to the customer and also provide the validity of the service.

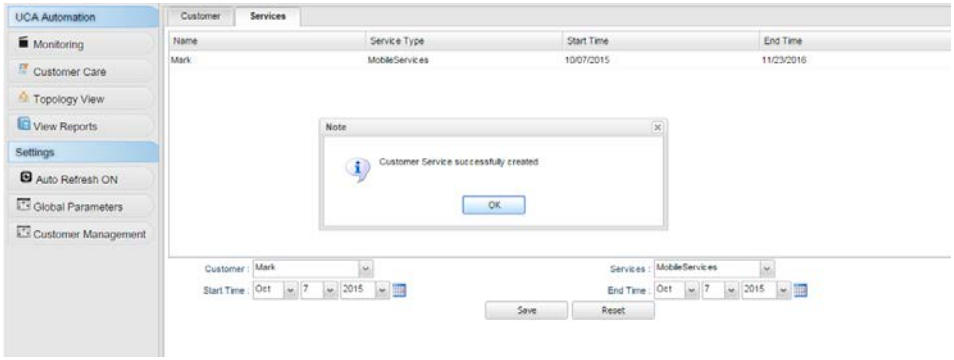


Figure 13: Customer Service mapping page

Details of various fields in UCA_CUSTOMER_SERVICE table are as follows:

Table 4: UCA Customer Service field descriptions

Field	Description
Customer Id	Customer Id defined in UCA_CUSTOMER table
Service type id	Service Id defined in UCA_SERVICETYPE table
Start Date	Service start date
End Date	Service end date

5.2 Customer Care Test

Customer Care Scenario will be initiated once an Operator receives a call from a Customer for any problem. Actions can be performed for a specific service type or a problem.

1. Select **UCA Automation** -> **Customer Care** options from the menu.
   The Customer Relations page asks the operator to enter the Customer Identification number (unique number given to each customer once he registers with the system).

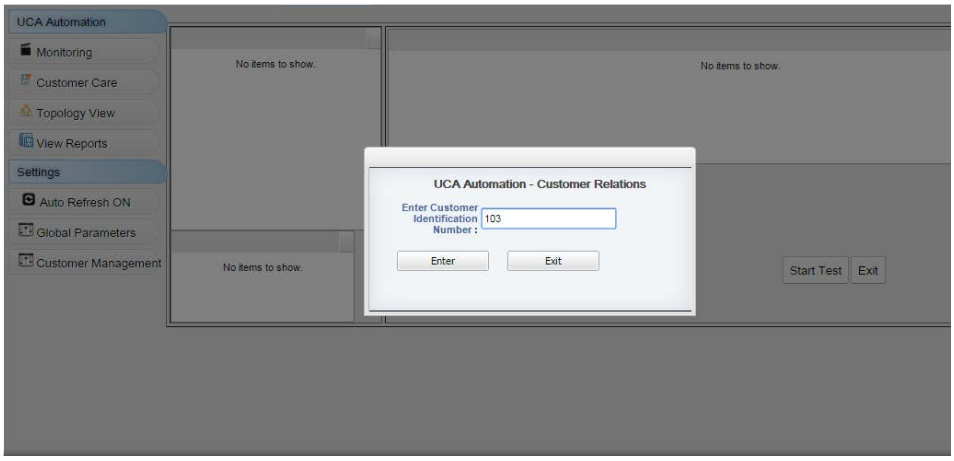


Figure 14: Customer Care Main Page

2. Select the Service for which customer is facing problem.
   All the customer details will be displayed on the left pane and the list of services availed by the customer will be displayed on the right grid. The valid service will be indicated with a green color and the expired services in red color.

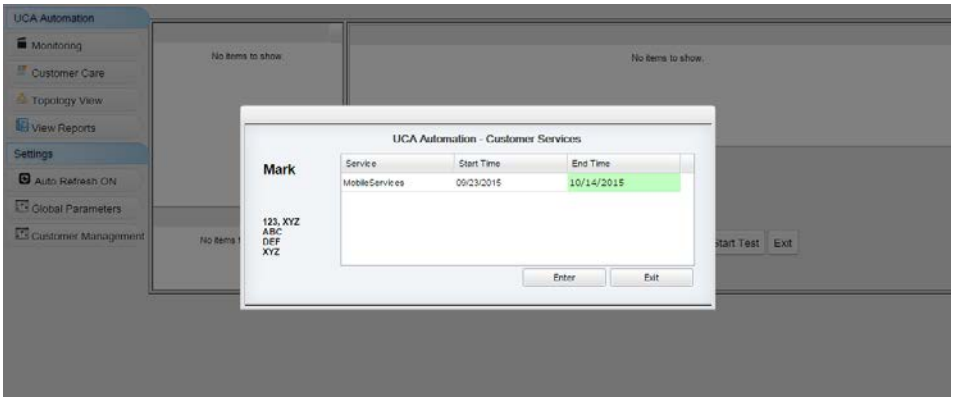


Figure 15: Customer Details Page

3. Chart of customer previous problems
   The column chart here represents a count of the entire passed, failed and disapproved task for all problems faced by the customer.

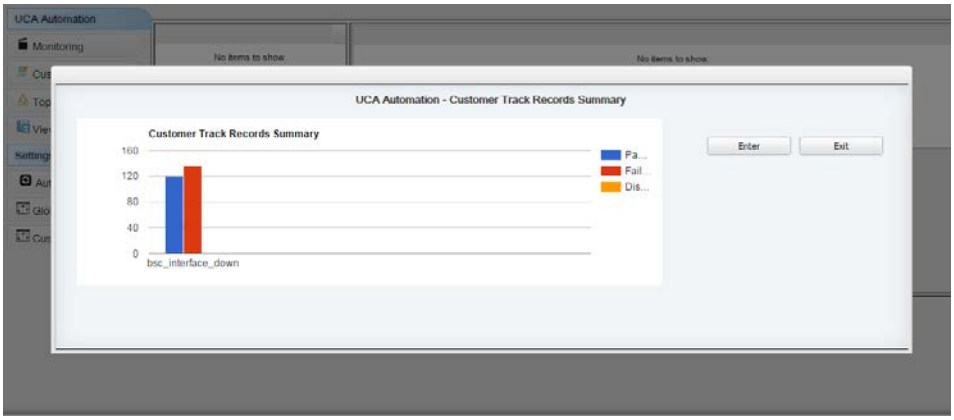


Figure 16: Customer Track record Page

4. Select a problem from the list.
   From the list of problems for the service selected, pick the customer problem.

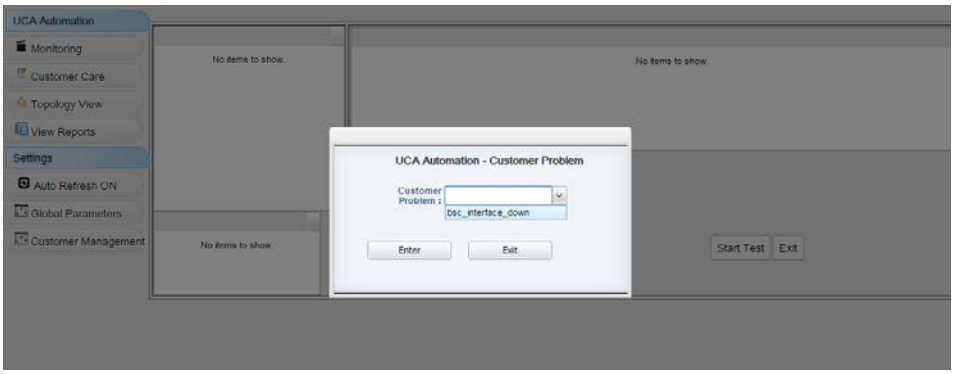


Figure 17: Customer problem Page

For the selected service and problem combination, all the possible actions are listed in the **UCA Actions** table. And the action will be pre-selected.
Details of the various fields in the UCA Actions are as follows:

Table 5: UCA Actions field descriptions

Field	Description
ID	Action ID
Action Name	Name of the diagnostic action to be performed
Action Type	Recover/resolve, test, audit, read-only-test, internal, escalate
Description	Brief description of the action
Action Mode	Open/Closed loop
Output Parser	None/Regular Expression/XPath. The output from the Diagnostic actions can be parsed using either regular expressions or XPath.
Dispatch Type	HPSA. Only actions with Dispatch Type HPSA are listed.

5. Click the **Start Test** button to trigger the diagnostic action.

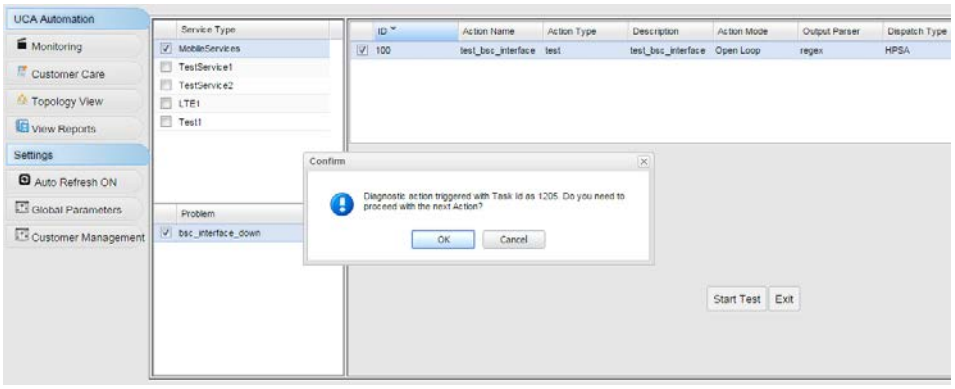


Figure 18: Customer Care – Trigger the diagnostic action

After the test starts, the task waits for the user interaction which is the `Request_Sent` state and then moves to `In_Progress` state, and later to other states.
Based on the result of the test, next diagnostic action defined as per the decision tree will be triggered.

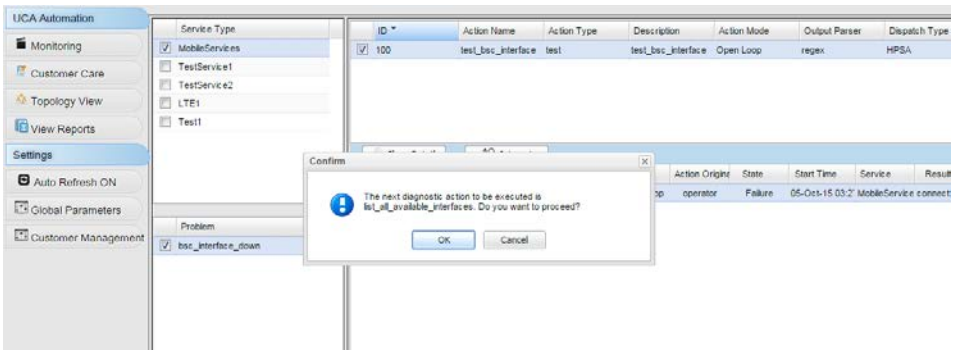


Figure 19: Customer Care – Trigger of next probable action

This process of triggering the next action based on the output of the current action will be continued till the test of the problem is complete.
Only the actions with Dispatch type as 'HPSA' will be considered.
Also, time for fetching the next action or the refresh time is defined in UCAAutomation.properties.

a. Configure the `UI_MANUAL_USR_TESTS_REFRESH_INTERVAL` attribute in the `${UCA_EBC_DATA}/instances/<your instance>/deploy/UCA_Automation_Foundation_UCA-V2.1-1A/conf/UCAAutomation.properties`.
b. By default the auto refresh timer is set to 9 seconds (9000ms).

You can also toggle the Auto Refresh value by clicking the **Settings -> Auto Refresh** option
Once it reaches the end of the test, tasks triggered will be moved to history on confirmation.

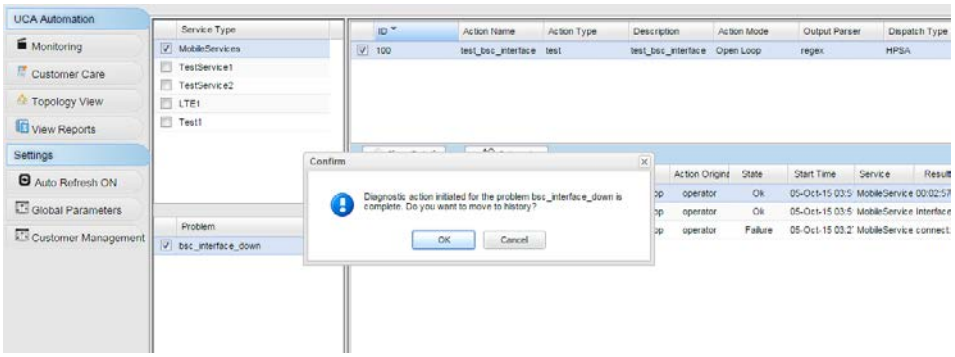


Figure 20: Customer Care – Test completion page

You can monitor the progress of the tests in the **Monitor** page.

Chapter 6
Launching Topology view

The Topology View in UCA Automation provides a graphical presentation of the actions performed during a particular test.

1. To open the Topology view, edit the following attributes in the `${UCA_EBC_DATA}/instances/<your instance>/deploy/UCA_Automation_Foundation_UCA-V2.1-1A/conf/UCAAutomation.properties` file.

```
ucaebc_tomsawyer_port=http://<Neo4J server hostname>:8888/graphdisplay/?username=root&profile=ucaatm
```

2. Click the UCA Automation -> Topology View.
   The Topology viewer of UCA-EBC opens with the ucaatm profile that is defined in the `${UCA_EBC_DATA}/instances/<your instance>/deploy/conf/GraphDisplayProfiles.xml` file.

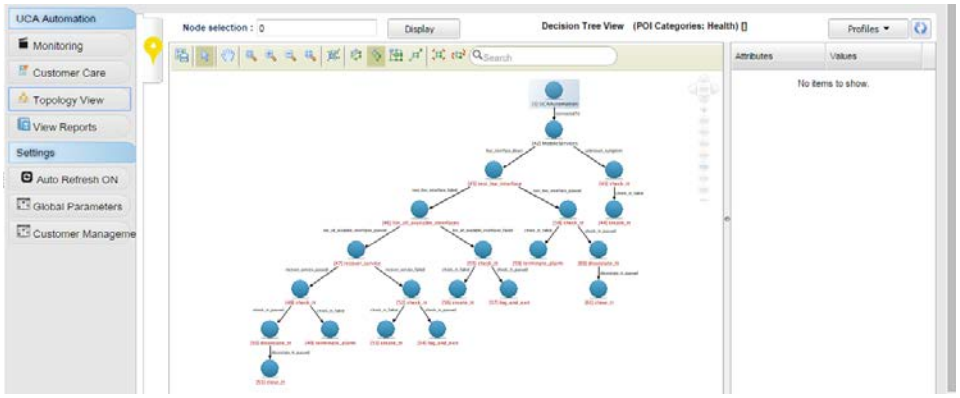


Figure 21: Topology View – launch Neo4j data browser

Chapter 7
Generating reports

You can generate the required reports in the `Reports` window.

After a test is run and it displays the status as `successful` or `Failed`, this test is moved from the **Monitoring** window to the **Reports** window.

1. Select **UCA Automation** -> **View Reports** from the menu.
   The **Reports** page appears with the options to search and generate reports.

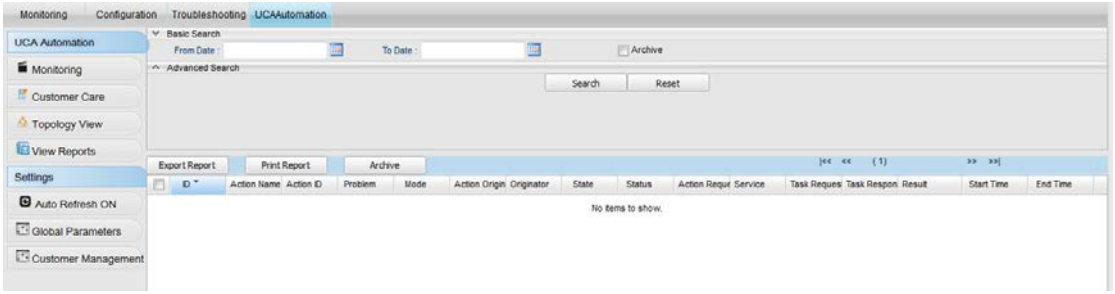


Figure 22: Report search criteria

2. Search the reports based on the following criteria.

Table 6: Report search criteria

Search field	Description
From Date	If set, records are searched from this date onwards
To Date	If set, records are searched up to this date
Status	PASSED, FAILED, DISAPPROVED, INTERNALERROR
Type	Open Loop/Closed Loop
Originator	Alarm/operator/test
Problem	List of all problems defined in the HPE SA inventory
Service Type	List of all service types (domain) defined in the HPE SA inventory
Archive	Searches for archived records, if selected

Table 7: Report actions

Report actions	Description
Search	Search for records with the filter criteria applied. By default, search for all records that are not archived
Export Report	Allows to save the records in CSV format

Print Report	Displays a print preview of the records from which the user can print the records
Archive	Archives the selected records. Only enabled when Archive search option is unchecked and logged in with sufficient privileges.
Delete	Selected archived records can be permanently deleted. Enabled when Archive search option is checked.
Reset	Resets the search criteria to default

Following figure shows the search results when performed with default options.

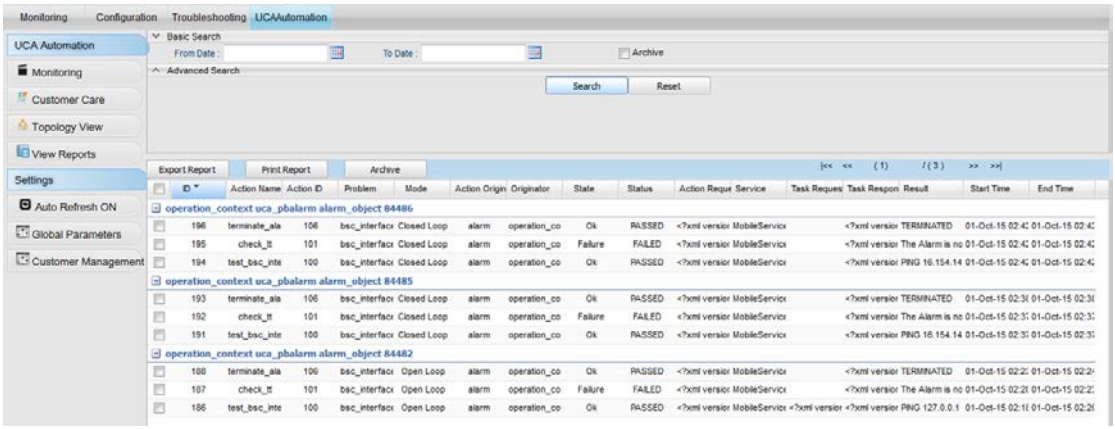


Figure 23: Report default search

3. (Optional) Perform the following based on your requirement.
    a. **Archive**—Select a record from the search result and click the **Archive** button to archive it.
    b. **Print Report**—Click the **Print Report** button to print a report.
    c. **Export Report**—Click the **Export Report** button to export the results into CSV format.

7.1 Deleting a report

Use the following procedure to delete a report.

1. Select **UCA Automation** -> **View Reports** from the menu.
   The Reports page appears with the options to search and generate reports. You can delete only the archived reports.
2. Search the reports with the required criteria and select the checkbox for **Archive**.
   The archived records appear in the bottom panel.

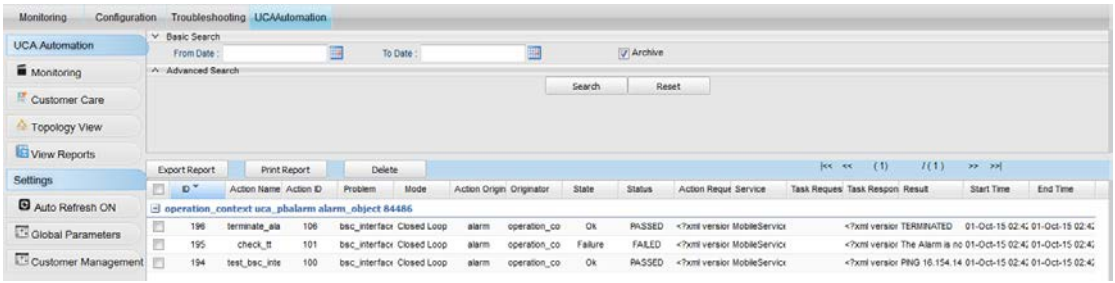


Figure 24: Report search for archived records

3. Select the checkbox for the report you want to delete and click the **Delete** button.
   The report is deleted.

Chapter 8
UCA Automation Orchestrator

The UCA Automation Orchestrator is a tool which you can use for defining and modeling the three entities: Service, Problem, Action, and Action Outcome in the form of a decision tree. You can upload this decision tree to a neo4j graph database and use it to identify the Actions to be executed based on the Problem or Action Outcome. The graph can be designed as an n-ary tree. This tool is made available in the form of a plug-in in Eclipse.

The plug-in provides an interface to define these model entities and retain them in the automation inventory of the DB.

8.1 Prerequisites

The following prerequisites apply to installing and using the Automation Orchestrator:

- The HPE SA Foundation value pack is deployed.
- The tables in the inventory are created.

For more details, refer to the `UCA Automation Installation Guide.`

8.2 Create new decision tree project

After installing the UCA Automation Orchestrator plug-in and restarting eclipse, the plug-in is added to the Eclipse tool bar.

1. Click the  icon in the ribbon.
   The **Create New Automation Orchestrator Project Wizard** appears.

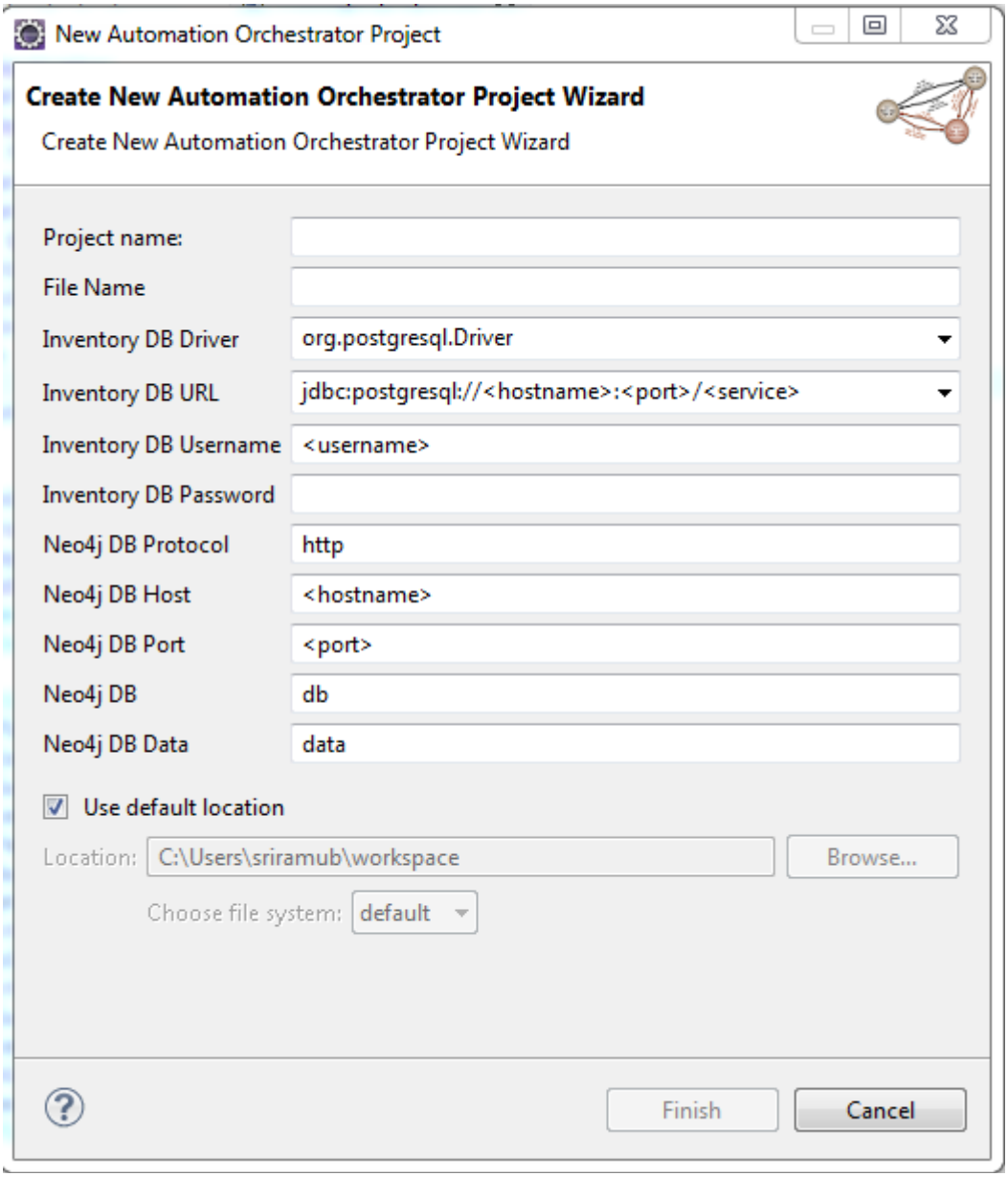


Figure 25: Create New Decision Tree Project Wizard

2. Specify the following details:
    a. Project name
    b. File name
    c. Inventory DB Driver
    d. Inventory DB URL
    e. Username
    f. Password
    g. Neo4j Host
    h. Neo4j Host Port
3. Click the **Finish** button.
   The UCA Automation Orchestrator supports two databases: Enterprise DB and Oracle.
   The project is created with the following folder structure.

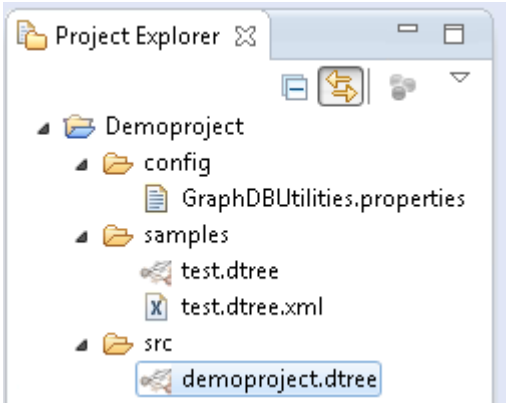


Figure 26: UCA Automation Orchestrator project folder structure

a. `GraphDBUtilities.properties` file—Contains the inventory properties and Neo4j properties.

```
inventory.db.driver=org.postgresql.Driver
inventory.db.url=jdbc:postgresql://<hostname>:<port>/<service>
inventory.db.user=<username>
inventory.db.password=<password>
neo4j.db.protocol=http
neo4j.db.host=<hostname>
neo4j.db.port=<port>
neo4j.db.db=db
neo4j.db.data=data
org.neo4j.rest.batch_transaction=true
```

o

Parameter	Description
inventory.db.driver	Inventory database driver name.
inventory.db.url	Inventory database URL.
inventory.db.user	Inventory database username.
inventory.db.password	Inventory database password.
neo4j.db.protocol	The neo4j graph database protocol. By default, the value is http.
neo4j.db.host	The neo4j graph database hostname.
neo4j.db.port	The neo4j graph database port.
neo4j.db.db	Default value is db.
neo4j.db.data	Default value is data.
org.neo4j.rest.batch_transaction	Default value is true.

b. `.dtree` file—Created under the `src` directory. This file contains the Automation Orchestrator.

When defining the model objects in the inventory, the system uses the Inventory database configuration. When you want to upload the decision tree to neo4j graph database, the system uses the neo4j graph database configuration.

8.3 UCA Automation Orchestrator UI layout

The following picture shows the UCA Automation Orchestrator main screen.

The following functions are available on the UI:

- Definition—Automation definition view where you can define the model objects.
- Orchestration—Editor view using which you can define the decision tree.
- Deployment—Uploads the decision tree to Neo4j graph database. This button is enabled only after the decision tree is orchestrated and saved. By default the button is disabled.

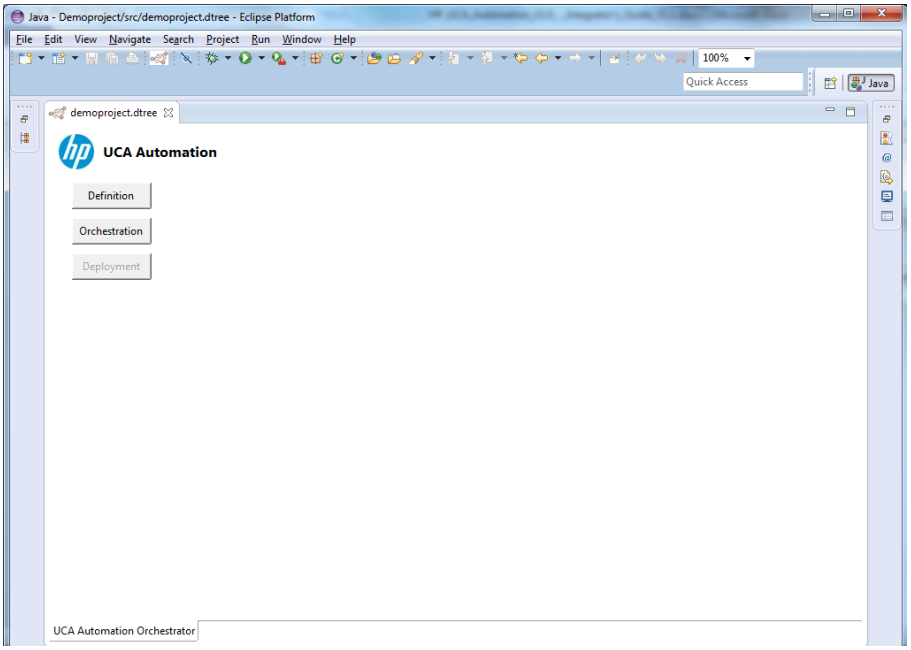


Figure 27: UCA Automation Orchestrator main page in Eclipse

NOTE: Use the Eclipse Console View to see the errors and log messages.

8.4 Define Model Objects

1. Click the **Definition** button.
2. The **Automation Definition** View with the following three tabs appears.
    a. **Service Definition** tab—To define Service types.
    b. **Action Definition** tab—To define the Actions.
    c. **Problem Definition** tab—To define the Problems.

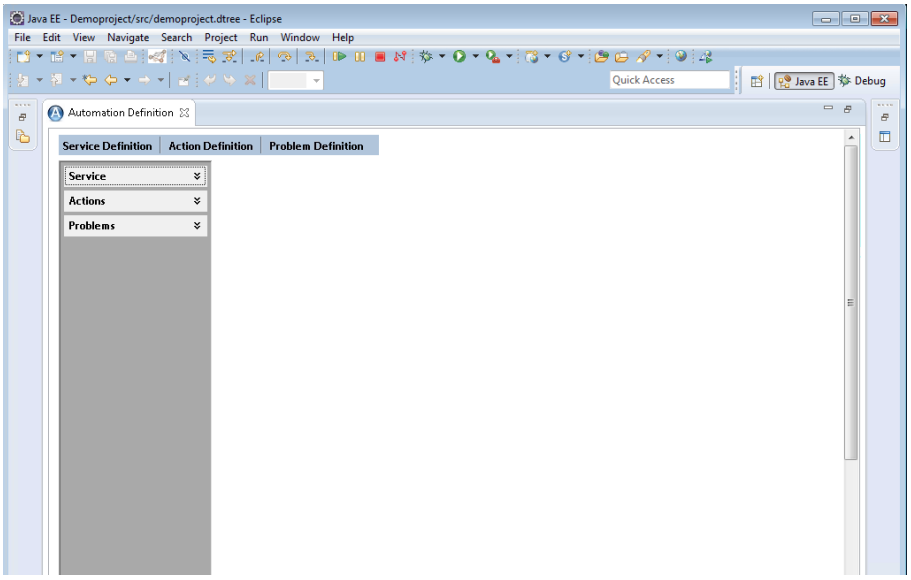


Figure 28: Automation Definition View

8.4.1 Create a new service type

Follow this procedure to create a new Service type.

1. Click the **Definition** button.
   The **Automation Definition** View appears.
2. Click the **Service Definition** tab.
   The **CREATE A SERVICE** pane opens.

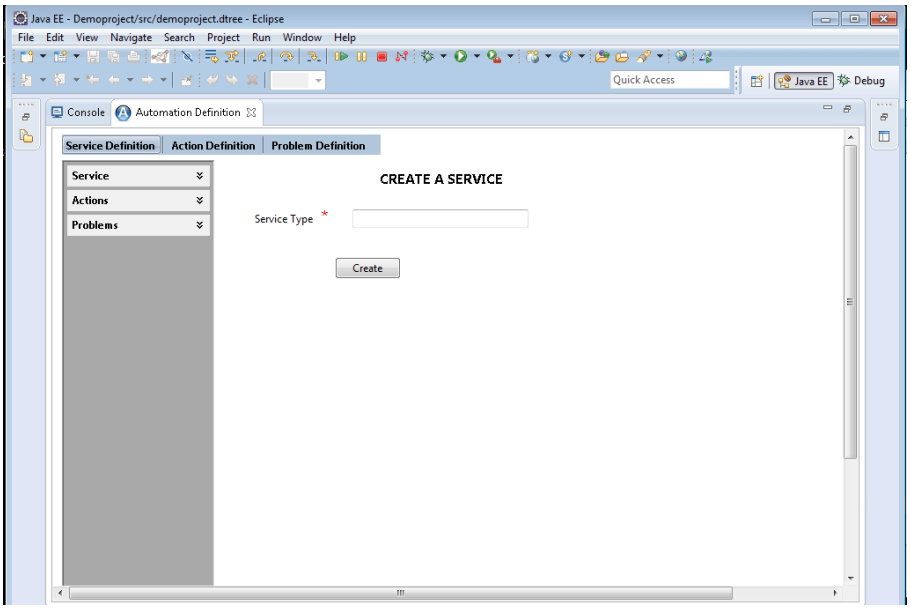


Figure 29: Create a new service

3. Enter a name for the Service type in the text box.
4. Click the **Create** button.

8.4.2 Create a new problem

The following procedure shows how to create a new Problem.

1. Click the **Definition** button.
   The **Automation Definition** View appears.
2. Click the **Problem Definition** tab.
   The **CREATE A PROBLEM** pane opens.

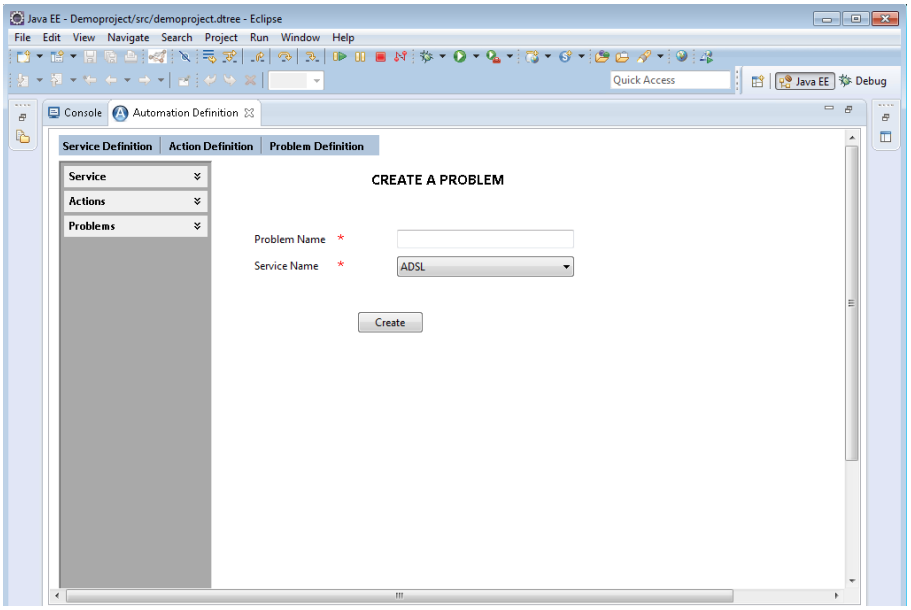


Figure 30: Create a new Problem

3. Specify the name of the problem in the **Problem Name** text box.
4. Select the service type for which the problem is being created, from the **Service Name** drop-down list and click the **Create** button.

8.4.3 Create a new action

The following procedure shows how to create a new Action.

1. Click the **Definition** button.
   The **Automation Definition** View appears.
2. Click the **Action Definition** tab.
   The **CREATE AN ACTION** pane opens.

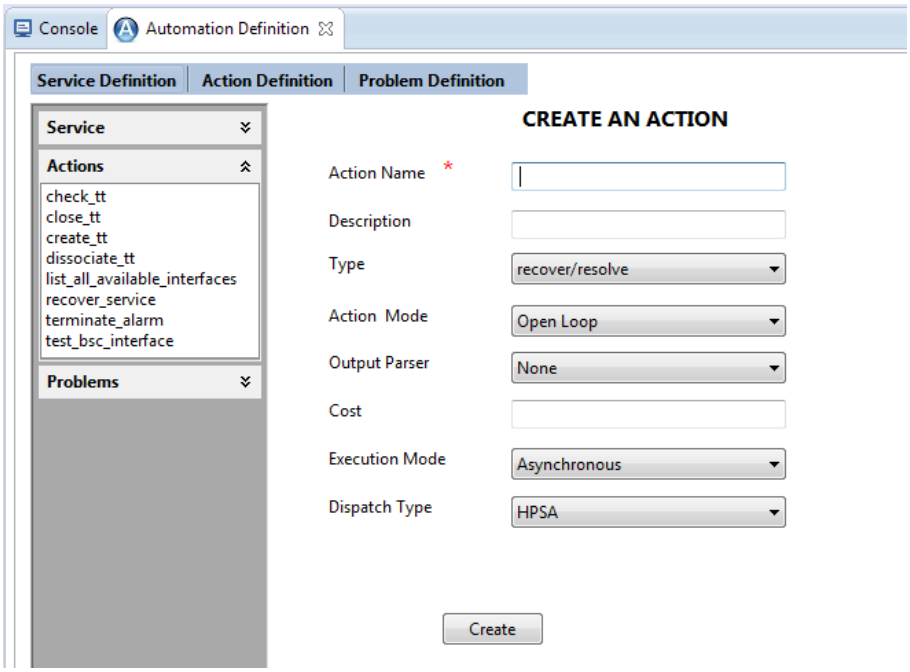


Figure 31: Create a new Action

3. Enter the required details in the **CREATE AN ACTION** pane.
    a. Action Name—Name of the action.
    b. Description—Enter a description for the action.
    c. Type—Select an action type from the drop-down list, which contains recover/resolve, test, audit, read-only-test, internal, and escalate options.
    d. Action Mode—Select an option from the drop-down list, which contains Open Loop, Closed Loop, or None options.
    e. OutputParser—Select an option from the drop-down list, which contains None, regex, and xpath options.
    f. Cost
    g. Execution Mode —Select an option from the drop-down list, which contains Asynchronous and Synchronous options.
    h. Dispatch Type—Select an option from the drop-down list, which contains HPSA, OO, Shell Script, Alarm, and Trouble Ticket options.
        i. Trouble Ticket Action—Select the Trouble Ticket Action from the drop-down list.
        ii. Alarm—Select the alarm action from the drop-down list.
4. Click the **Create** button to create a new action.
   When you create an Action, the system creates two Action Outcomes by default. The default Action outcomes contain the Action name with the following suffixes `_passed` and `_failed`. An example of the formats is `<ActionName>_passed` and `<ActionName>_failed`.

Table 8: Action Types

Action Type	Description
Recover/Resolve	Action that can recover or resolve a problem symptom.
Test	Actions performed to test the network.
Audit	Action to audit a pre-defined configuration.
Read-only-test	Read-only actions performed on the network.
Internal	Trouble ticket and alarm handling actions.
Escalate	Actions to escalate when a problem resolution is not performed.

Table 9: Action Modes

Action Mode	Description
Open Loop	Actions that require operator intervention. The operator can optionally disapprove a test.
Closed Loop	Actions that do not require operator intervention.
None	If the value is set to None, the value set in the **Parameters** -> **Global Parameter** -> **ActionMode** is used.

Table 10: Output Parsers

Output Parser	Description
Regex	The action output is parsed using regular expressions.
XPath	The action output is parsed using XPaths.
None	Action outputs are not parsed.

Table 11: Execution Mode

Execution Mode	Description
Asynchronous	The execution mode of the Action is Asynchronous.
Synchronous	The execution mode of the Action is Synchronous.

Table 12: Dispatch Types

Dispatch Type	Description
HPSA	Action is dispatched to HPE Service Activator for execution.
OO	HPE Object Orchestration. For future possible integration.

Shell Script	Action that can be executed using a shell script. For future possible integration.
Alarm	An internal Alarm handling action. Possible operations are creating alarms and updating alarms.
Trouble Ticket	An internal trouble ticket action. Possible operations are creating Trouble Ticket, associating a trouble ticket, dissociating a trouble ticket, and closing a trouble ticket.

Table 13: Alarm Actions

Execution Mode	Description
clear_alarm	Alarm action to clear alarm.
update_alarm	Alarm action to update an existing alarm.
terminate_alarm	Alarm action to terminate an existing alarm.
log_and_exit	Alarm action to just log a message and exit the tree.

Table 14: Trouble ticket Actions

Execution Mode	Description
create_tt	Trouble ticket action to create a new trouble ticket.
check_tt	Trouble ticket action to check a trouble ticket.
associate_tt	Trouble ticket action to associate trouble ticket.
dissociate_tt	Trouble ticket action to dissociate trouble ticket.
close_tt	Trouble ticket action to close trouble ticket.

8.5 Update or delete model objects

8.5.1 Modify or delete a Service type

The following procedure shows how to update the name of a service type or delete the Service type.

1. Click the **Definition** button.
   The **Automation Definition** View appears.
2. Click the **Service** tab or the  icon on the left-hand side.
   The **Service** tab expands and shows the configured service types.
3. Select a service type.
   The **UPDATE A SERVICE** pane appears. All the configured problems associated with the service type are displayed under the **Problems** tab. You can see them by clicking the **Problem** tab.

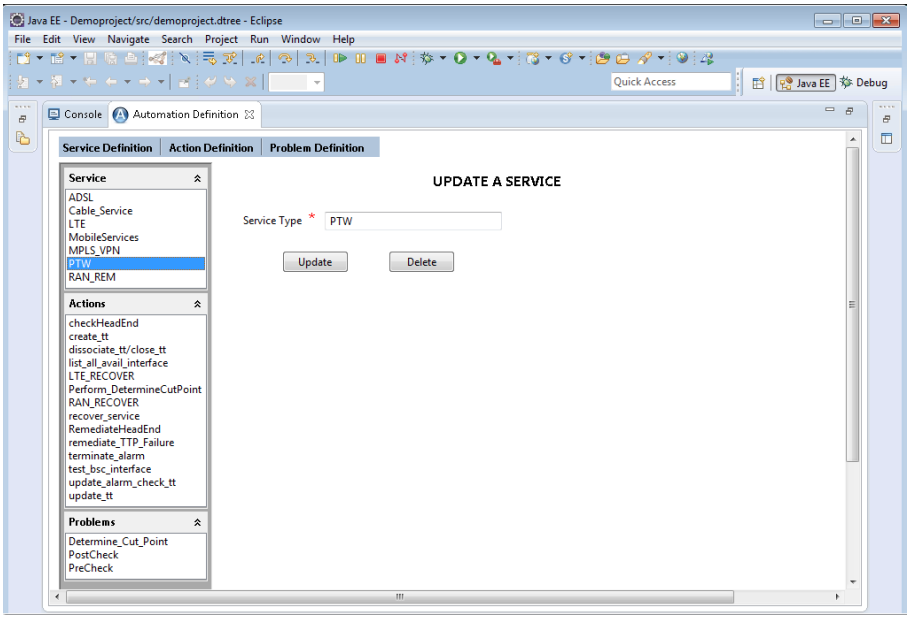


Figure 32: Update a Service

4. Modify the name in the **Service Type** text box.
5. Click the **Update** button to update the service type or click the **Delete** button to delete the service type.

8.5.2 Modify or delete an Action

The following procedure shows how to update or delete an Action.

1. Click the **Definition** button.
   The **Automation Definition** View appears.
2. Click the **Actions** tab or  icon on the left-hand side.
   The **Actions** tab expands and shows the configured Actions.
3. Select the action you want to modify from the actions listed under the **Action** tab.
   The **UPDATE AN ACTION** pane appears.

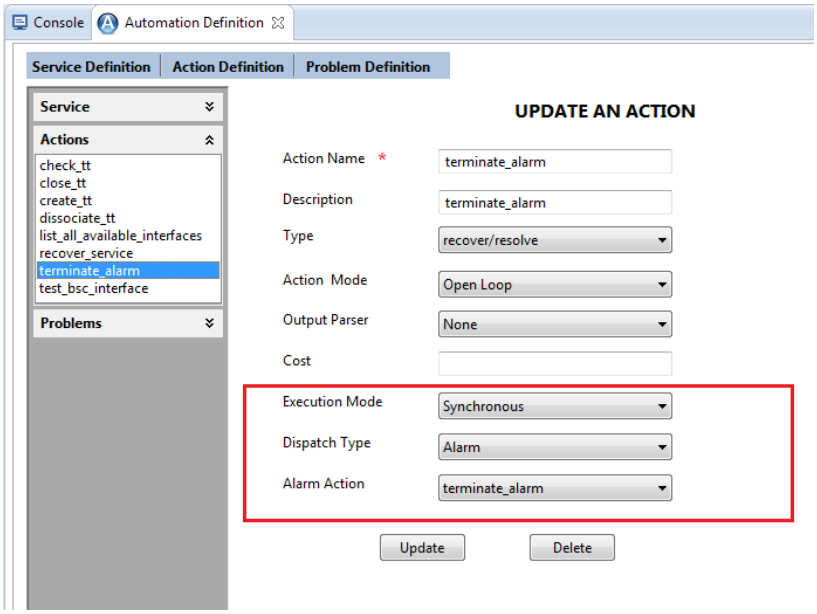


Figure 33: Update an Action

4. Modify the required fields on this pane.
5. Click the **Update** button to update the action or click the **Delete** button to delete the action.
   When you delete an action, all action outcomes and all parameters associated with the action are deleted.

8.5.3 Modify or delete a configured Problem

The following procedure shows how to update or delete a Problem.

1. Click the **Definition** button.
   The **Automation Definition** View appears.
2. Click the **Problems** tab or the  icon on the left-hand side.
   The Problems tab expands and shows the configured Problems.
3. Select the problem you want to modify from the problems listed under the **Problems** tab.
   The UPDATE A PROBLEM pane appears.
   If you did not select a service type before trying to expand the Problems tab, the `Please select a Service first!` message appears.

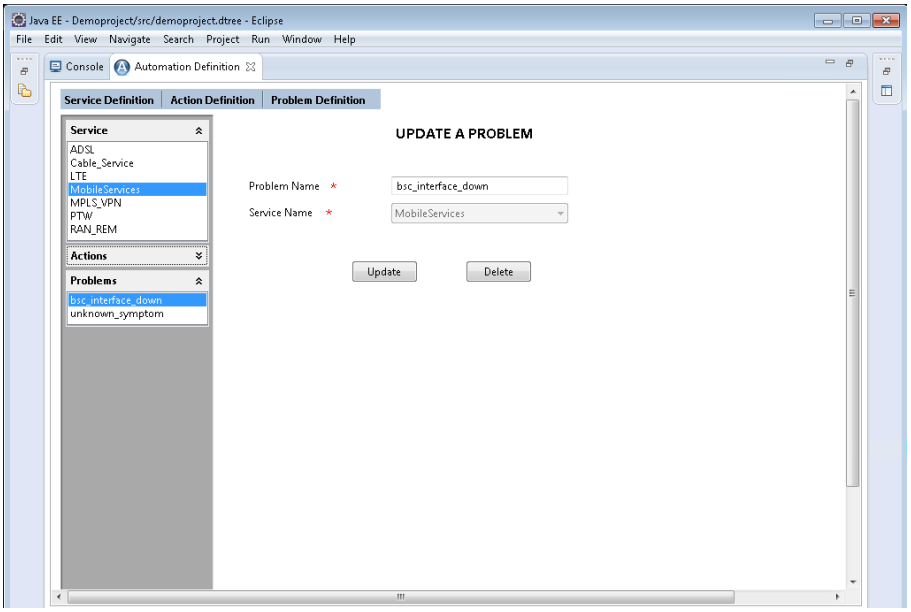


Figure 34: Update a Problem

4. Modify the name of the problem and click the **Update** button to update the problem.
5. (Optional) Click the **Delete** button to delete the problem.

8.6 Define parameters

8.6.1 Create a parameter

The following procedure shows how to create a parameter.

1. Click the **Definition** button.
   The **Automation Definition** View appears.
2. Click the **Actions** tab or  icon on the left-hand side.
   The **Actions** tab expands and shows the configured Actions.
3. Select an Action for which you want to create a parameter, right-click and select the **Create a Parameter** option from the pop-up list.
   The **CREATE A PARAMETER** pane opens.

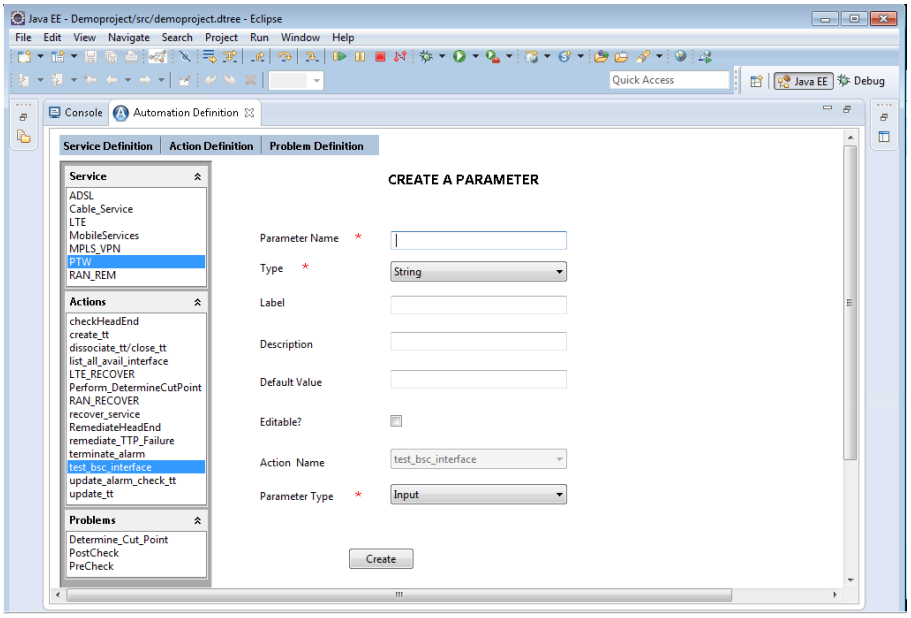


Figure 35: Create a Parameter

4. Enter the required information in the fields.
    a. Parameter Name
    b. Type—The available values are String, Integer, Float, and Boolean
    c. Parameter Type—Select a value from the drop-down list. The available values are Input and Output.
5. Click the **Create** button to create the parameter.

8.6.2 View and update existing parameters

The following procedure shows how to view and update an existing parameter for an action.

1. Click the **Definition** button.
   The **Automation Definition** View appears.
2. Click the **Actions** tab or the  icon on the left-hand side.
   The **Actions** tab expands and shows the configured Actions.
3. Select an Action for which you want to modify the parameter, right-click and select the **View Parameters** option from the pop-up list.
   The **LIST OF PARAMETERS** pane opens with the existing input and output parameters listed separately.

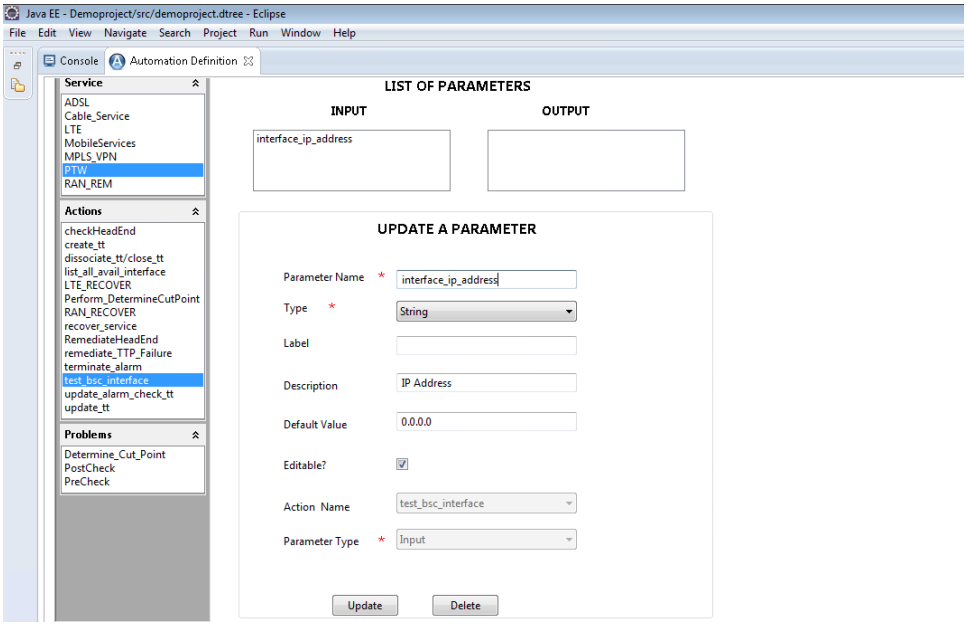


Figure 36: List of parameters

4. Select the parameter you want to modify.
   The **UPDATE A PARAMETER** pane appears.
5. Update the required fields for the parameter and click the **Update** button.
6. The parameter is updated.

8.6.3 Delete a parameter

The following procedure shows how to delete an already created parameter for an action.

1. Click the **Definition** button.
   The Automation Definition View appears.
2. Click the **Actions** tab or the  icon on the left-hand side.
   The **Actions** tab expands and shows the configured Actions.
3. Select an Action for which you want to delete the parameter, right-click and select the **View Parameters** option from the pop-up list.
   The **LIST OF PARAMETERS** pane opens with the existing input and output parameters listed separately.

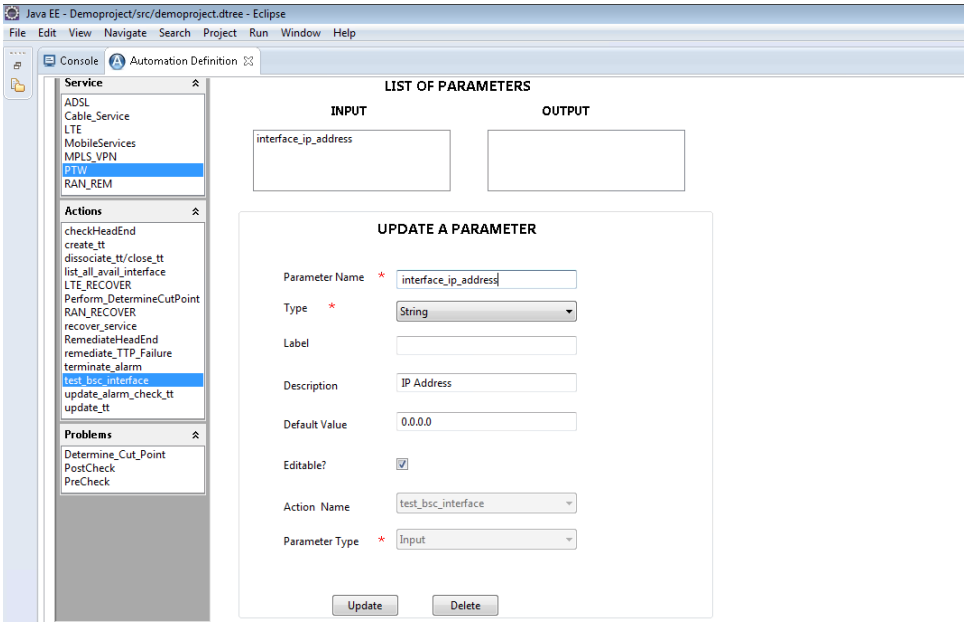


Figure 37: List of parameters

4. Select the parameter you want to delete.
   The **UPDATE A PARAMETER** pane appears.
5. Click the **Delete** button.
   The parameter is deleted.

8.7 Create an Action Outcome

The following procedure shows how to view the already created Action outcomes for an Action.

1. Click the **Definition** button.
   The **Automation Definition** View appears.
2. Click the **Actions** tab or the  icon on the left-hand side.
   The **Actions** tab expands and shows the configured Actions.
3. Select an Action for which you want to create an action outcome, right-click and select the Create an Action Outcome option from the pop-up list.
   The **CREATE AN ACTION OUTCOME** pane opens.

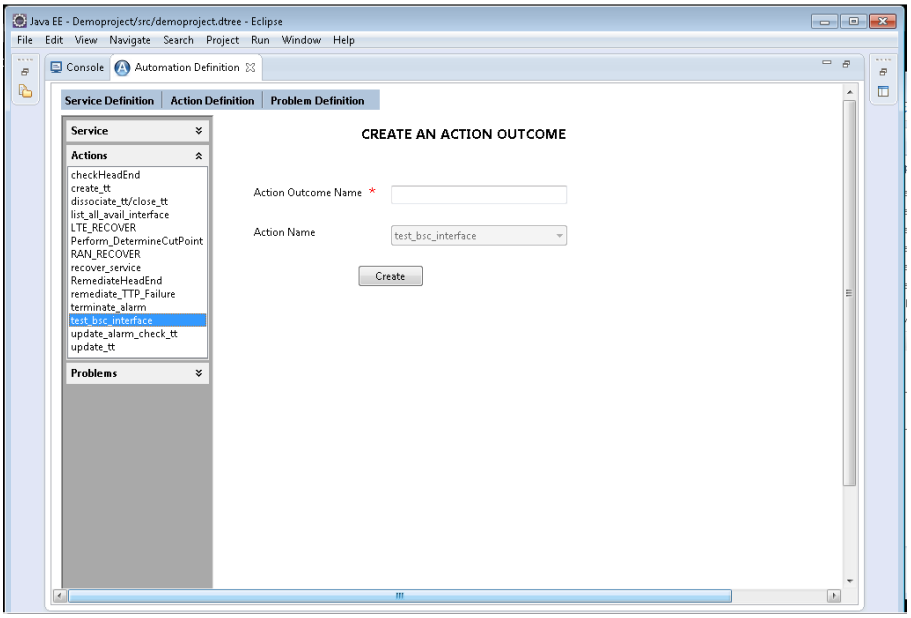


Figure 38: Create an Action Outcome

4. Enter a name for the action outcome in the **Action Outcome Name** and click the **Create** button.
   A new Action outcome is created with the given name.

8.7.1 View and update Action Outcomes

The following procedure shows how to view the already created Action outcomes for an Action.

1. Click the Definition button.
   The **Automation Definition** View appears.
2. Click the **Actions** tab or the  icon on the left-hand side.
   The **Actions** tab expands and shows the configured Actions.
3. Select the Action for which you want to modify an action outcome, right-click and select the View Action Outcomes option from the pop-up list.
   The LIST OF ACTION OUTCOMES pane opens with a list of outcomes for the selected Action in the **ACTION OUTCOMES** box.

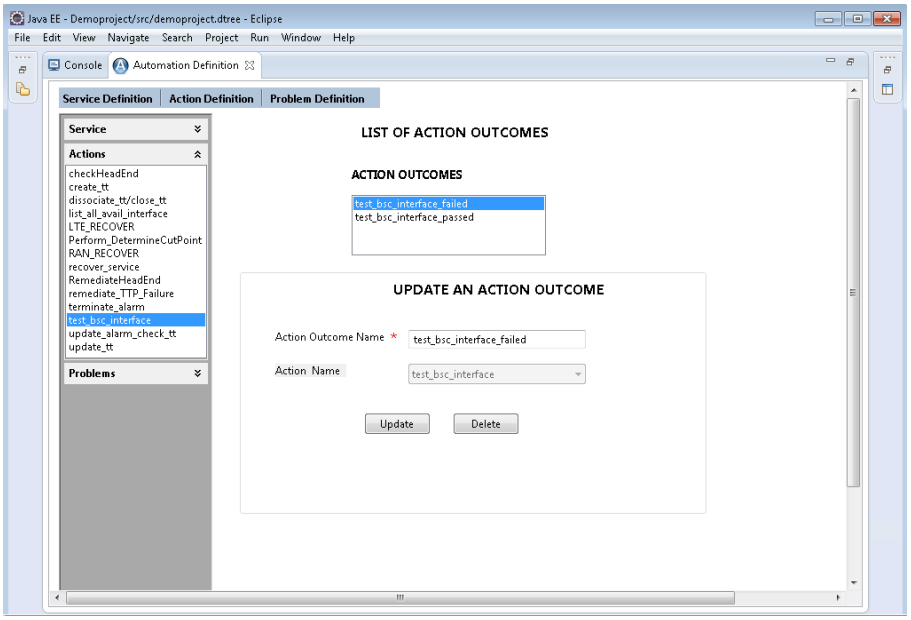


Figure 39: Update an Action Outcome

4. Select an Action outcome you want to update from the list.
   The **Update an Action Outcome** pane appears. You can modify only the name.
5. Modify the Action outcome name and click the **Update** button.
   The Action outcome is modified.

8.7.2 Delete an action outcome

The following procedure shows how to view the already created Action outcomes for an Action.

1. Click the Definition button.
   The **Automation Definition** View appears.
2. Click the **Actions** tab or the  icon on the left-hand side.
   The **Actions** tab button expands and shows the configured Actions.
3. Select the Action for which you want to delete the action outcome, right-click the action and select the View Action Outcomes option from the pop-up list.
   The LIST OF ACTION OUTCOMES pane opens with a list of outcomes for the selected Action in the **ACTION OUTCOMES** box.

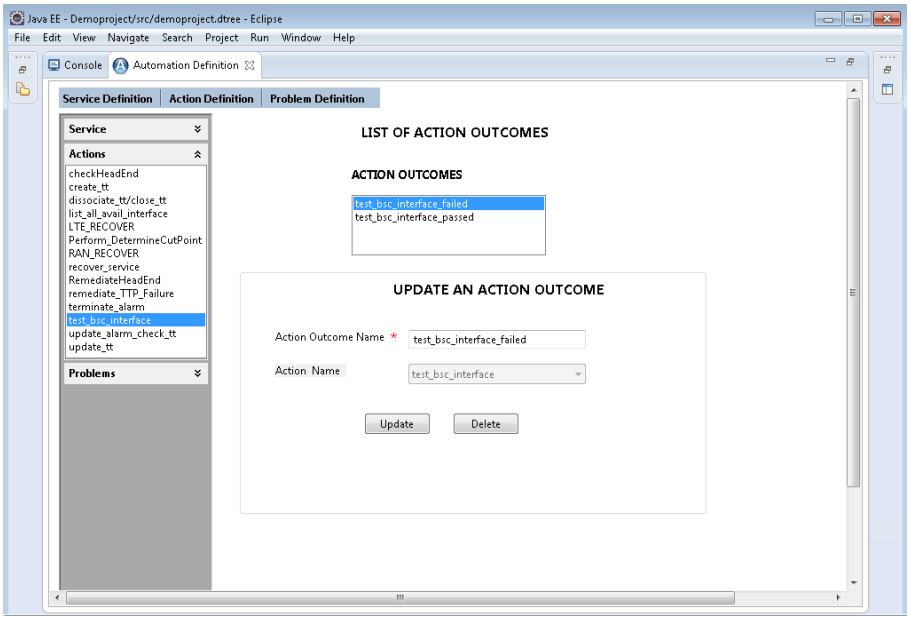


Figure: 40 Update an Action Outcome

4. Select the action outcome you want to delete from the list.
   The **Update an Action Outcome** pane appears.
5. Click the **Delete** button.
6. Click **Yes** to confirm deleting the action outcome.
   The action outcome is deleted.

8.8 Orchestrating Model Objects

In the UCA Automation Orchestrator UI main window, the **Orchestration** button opens an editor, where you design a decision tree by using the entities from the database (Enterprise DB or Oracle).

8.8.1 Launch Orchestration

1. In the UCA Automation Orchestrator project folder structure, click the `.dtree` file under the `src` directory.
   The **Automation Orchestrator** home page opens.
2. In the Automation Orchestrator home page, click the **Orchestration** button.
   A palette with the following options appears:
   a. Select—To select a Problem link or Action Outcome link.
   b. Root—To draw a root node. In a decision tree, you can have only one root node.
   c. Service—To draw a Service node. All the Service nodes are linked to the root node at top.
   d. Action—To draw an Action node.
   e. Problem—To define links or relationships. The Service nodes are always linked to the Action nodes using Problem link.

f. Action Outcome— To define links or relationships. The Action nodes are linked to another Action node by action outcome link.

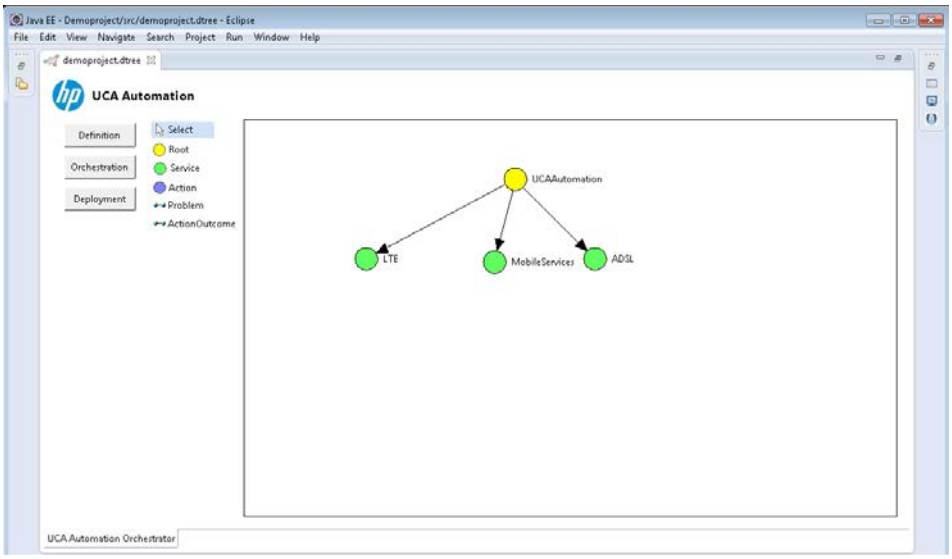


Figure 41: UCA Automation Orchestration

Each option is associated with an icon. To the right of the palette is the editor.
The editor contains a decision tree with root node as **UCAAutomation** and all Service nodes appear as linked to the root node.
A new file with extension .dree.xml is generated under the src folder. This file contains all Problems, Actions, and the XML format of the skeleton decision tree.

8.8.2 Add a Service to decision tree

The following procedure describes how to add a Service node to a decision tree.

1. In the **Automation Orchestrator** home page, click the **Orchestration** button.
   The palette with options and the editor appears.
2. Select the **Service** option from the palette and click in the editor.
   The service icon is placed in the editor. The link with the root node is established automatically and the **Properties** pane opens with the following two columns:
   a. Property
   b. Value
   The **serviceName** property appears in the **Property** column.

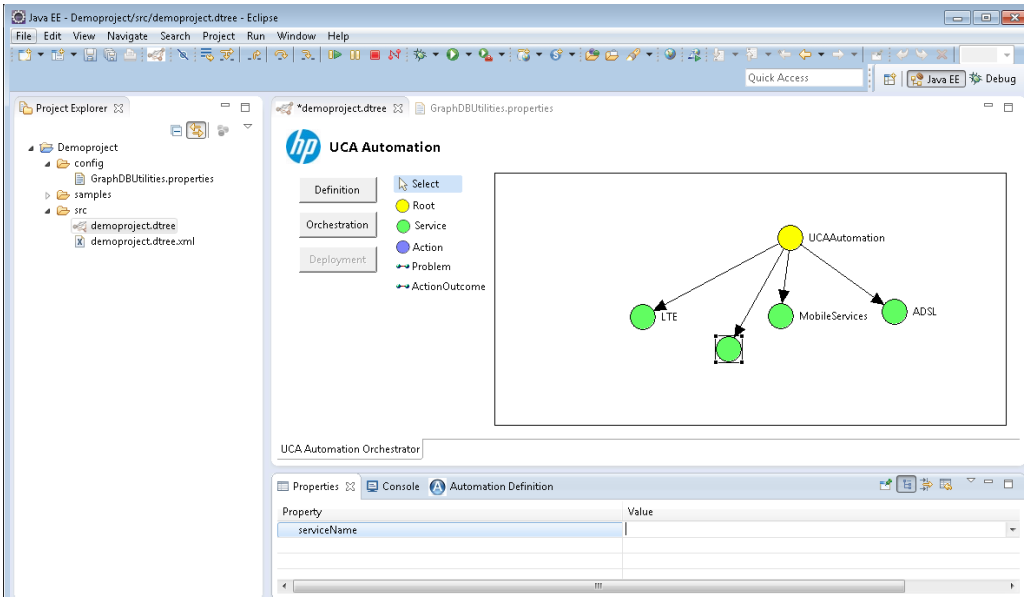


Figure 42: Add Service node to orchestrator editor

3. Click the row in the **Value** column corresponding to the **serviceName**.
   A drop-down list appears with all the service names.
4. Select a service name and click inside the orchestrator editor.
   The service name is added to the editor against the Service node. If you do not give a name to the node, the `Please specify the Service name!` message appears when you save the decision tree.
5. (Optional) Select **Edit** from the menu or right-click the node to perform the following operations:
   a. Undo— To undo a previous operation, select **Undo <operation name>**. Multiple undo operations are possible.
   b. Redo— The **Redo <operation name>** is enabled after an operation is undone.
   c. Zoom In—Click **View** -> **Zoom In** from the menu to magnify the decision tree in the editor.
   d. Zoom Out—Click **View** -> **Zoom Out** from the menu to diminish the decision tree. This option is available only for the decision tree editor.
   e. Delete—To delete a node. When you delete a Service node, the Service node and the incoming link and outgoing link are deleted.

NOTE: You cannot delete the Root node and the link between the Root node and the Service node.
When you delete a Service node, UCA Orchestrator automatically deletes the link to the Root node.

8.8.3 Delete a Service from the decision tree using CLI

You can use the command line utility to delete a specific branch in the decision tree for a Service.

1. Run the following command:

```
./decisionTree.sh -d MobileServices
```

2. To Delete all the Services run the following run

```
./decisionTree.sh -d ALL
```

8.8.4 Add an Action to decision tree

The following procedure describes how to add an action to a decision tree.

1. In the **Automation Orchestrator** home page, click the **Orchestration** button.
   The palette with options and the decision tree editor appear.
2. Select the **Action** option from the palette and click in the editor.
   The icon for the Action option is placed in the editor. The **Properties** pane opens with the following two columns:
   a. Property
   b. Value
   The **actionName** property appears in the **Property** column.

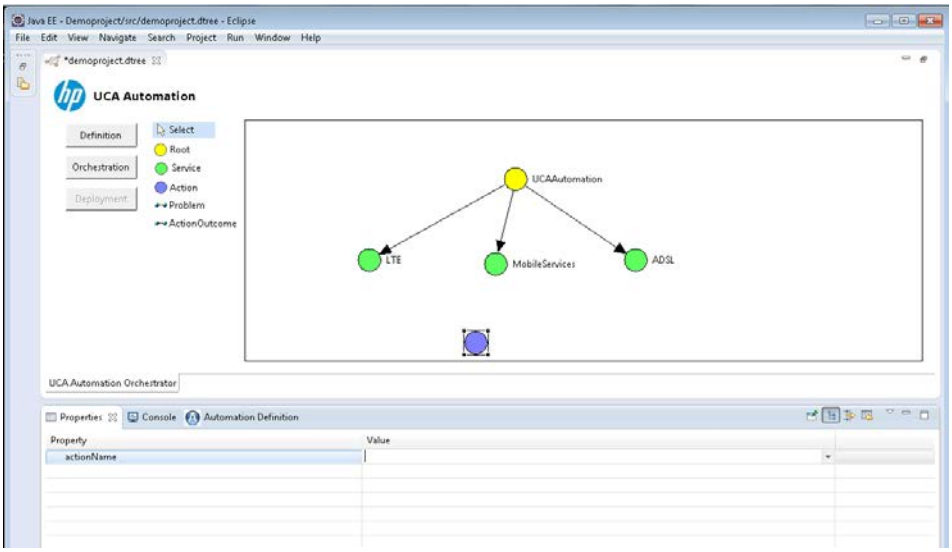


Figure 43: Add an Action node to orchestrator editor

3. Click the row in the **Value** column corresponding to the **actionName**.
   A drop-down list appears with all the action names.
4. Select an action name and click inside the orchestrator editor.
   The action name is added to the editor against the Action node. If you do not give a name to the node, the `Please specify the Action name!` message appears when you save the decision tree.
5. (Optional) Select **Edit** from the menu or right-click the node to perform the following operations:
   a. Undo— To undo a previous operation, select **Undo <operation name>**. Multiple undo operations are possible.
   b. Redo— The **Redo <operation name>** is enabled after an operation is undone.
   c. Zoom In—Click **View** -> **Zoom In** from the menu to magnify the decision tree in the editor.
   d. Zoom Out—Click **View** -> **Zoom Out** from the menu to diminish the decision tree. This option is available only for the decision tree editor.
   e. Delete—To delete a node. When you delete an Action node, the Action node and the incoming link and outgoing link of the Action node are deleted.

8.8.5 Link Service node to Action node

After you add an Action node, the Service node and Action node are linked using the Problem link. Problems are associated with Services. A service can have more than one Problem associated to it. If you want to associate a problem to two different service types, you should create the problem for each service type.

Follow the procedure to link the Action and Service nodes.

1. In the **Automation Orchestrator** home page, click the **Orchestration** button.
   The palette with options and the decision tree editor appear.
2. Select the **Problem** option from the palette and in the editor, click the Service node and then the Action node.
3. Select the **Select** option in the palette and click the problem link to associate the problem name to the link.
   The **Properties** pane opens with the following two columns:
   a. Property
   b. Value
   The **problemName** property appears in the **Property** column.
4. Click the row in the **Value** column corresponding to the **problemName**.
   A drop-down list appears with all problems associated with the Service type.

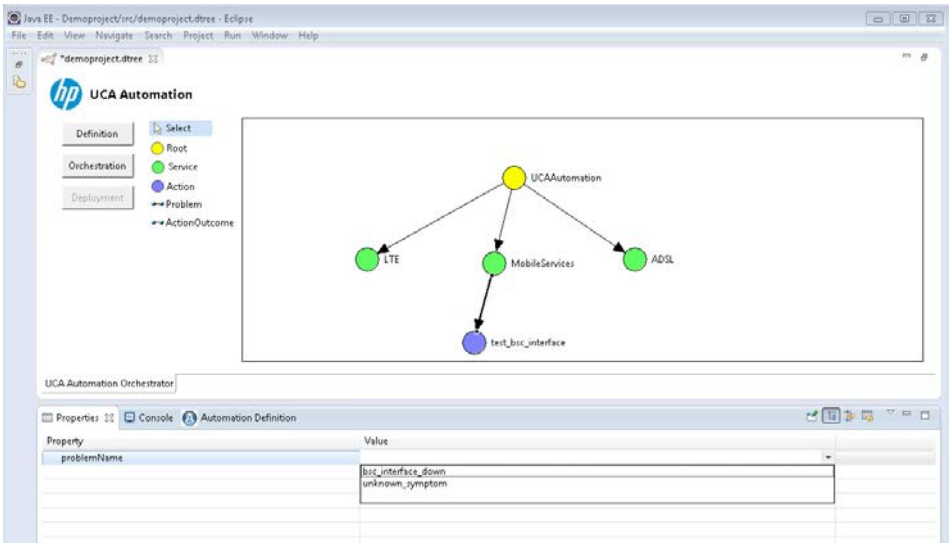


Figure 44: Link a Service and Action node

5. Select a value and click inside the orchestrator editor for the value to get updated in the editor. The Service node is linked to the Action node via the Problem link. If you do not give a name to the node, the `Please specify the Problem name!` message appears when saving the decision tree.
6. (Optional) Select **Edit** from the menu or right-click the node or link, you can perform the following operations:
   a. Undo— To undo a previous operation, select **Undo <operation name>**. Multiple undo operations are possible.
   b. Redo— The **Redo <operation name>** is enabled after an operation is undone.
   c. Zoom In—Click **View** -> **Zoom In** from the menu to magnify the decision tree in the editor.

d. Zoom Out—Click **View** -> **Zoom Out** from the menu to diminish the decision tree. This option is available only for the decision tree editor.
e. Delete—To delete a node or a link. When you delete a link, the system deletes only the link.

8.8.6 Link Action nodes

You can link two Action nodes using the Action outcome link. Follow the procedure to link the Action nodes.

1. In the **Automation Orchestrator** home page, click the **Orchestration** button.
   The palette with options and the decision tree editor appear.
2. Add and Action node in the editor.
3. Select the **Action Outcome** option from the palette and in the editor, click the Action node from which the link should be defined and then the other Action node.
4. Select the **Select** option in the palette and click the Action outcome link to associate the action outcome name to the link.
   The **Properties** pane opens with the following two columns:
   a. Property
   b. Value
   The **actionOutcomeName** property appears in the **Property** column.
5. Click the row in the **Value** column corresponding to the **actionOutcomeName**.
   A drop-down list appears with all action outcomes of the Action from which the link is drawn.

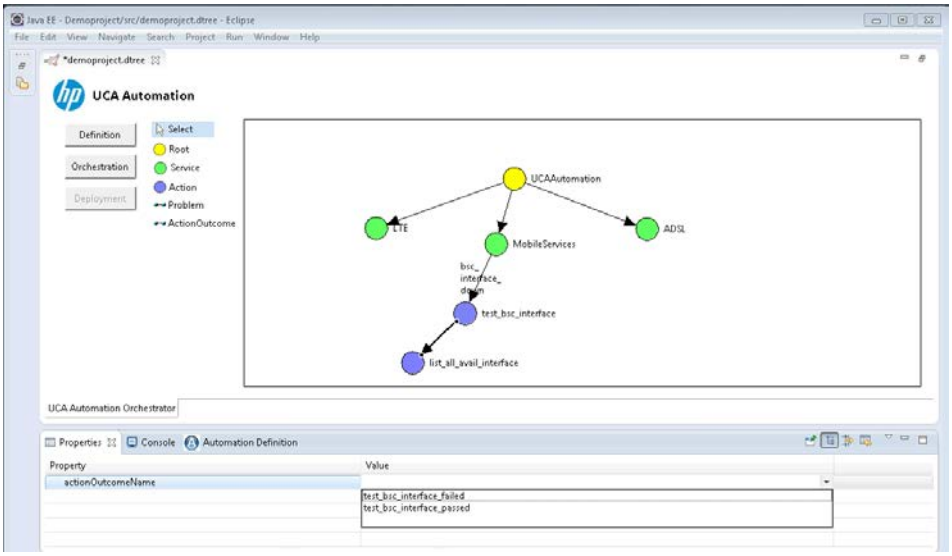


Figure 45: Action Outcome link

6. Select the action outcome and click inside the orchestrator editor for the value to get updated in the editor.
   The Action nodes are linked via the action outcome link. If you do not give a name to the node, the `Please specify the Action outcome name!` message appears when you save the decision tree.
7. (Optional) Select **Edit** from the menu or right-click the node or link, you can perform the following operations:
   a. Undo— To undo a previous operation, select Undo <operation name>. Multiple undo operations are possible.

b. Redo— The Redo <operation name> is enabled after an operation is undone.
c. Zoom In—Click **View** -> **Zoom In** from the menu to magnify the decision tree in the editor.
d. Zoom Out—Click **View** -> **Zoom Out** from the menu to diminish the decision tree. This option is available only for the decision tree editor.
e. Delete—To delete a node or link. When you delete a link, only the link is deleted.

8.8.7 Save decision tree

1. After drawing the decision tree, click the **Save** button in the UI to save the decision tree. The **.dree.xml** file is updated. After you successfully save the decision tree, the option for deployment is enabled.

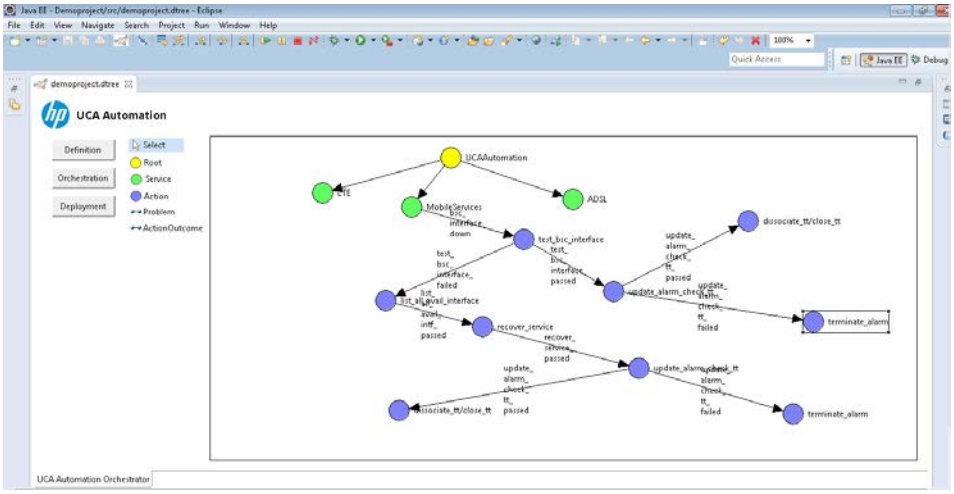


Figure 46: Final Decision Tree

After orchestrating the decision tree, if you click the **Orchestration** button again, a confirmation message appears: `Do you want to re-draw the decision tree?`

2. Click **Cancel** to save the current graph.
   If you click **Ok**, the decision tree skeleton with the Root node and Service nodes is re-generated and the all updates to the decision tree are lost.

8.9 Deploy decision tree

After you deploy the final decision tree, you can view it in the UCA EBC console's **Topology View**.

Follow the procedure to deploy the decision tree into neo4j graph database.

1. Specify the Neo4j graph database credentials in the `GraphDBUtilities.properties` file.
2. Click the **Deployment** button to deploy the decision tree.
   A confirmation message appears.
   If the decision tree contains services without any further links to problems or actions, the orchestrator uploads those services as well.
   Hence, if the decision tree contains services without any links to Actions, the confirmation message displays the list of services which do not have any problem linked and the message checks whether you still want to upload the decision tree.

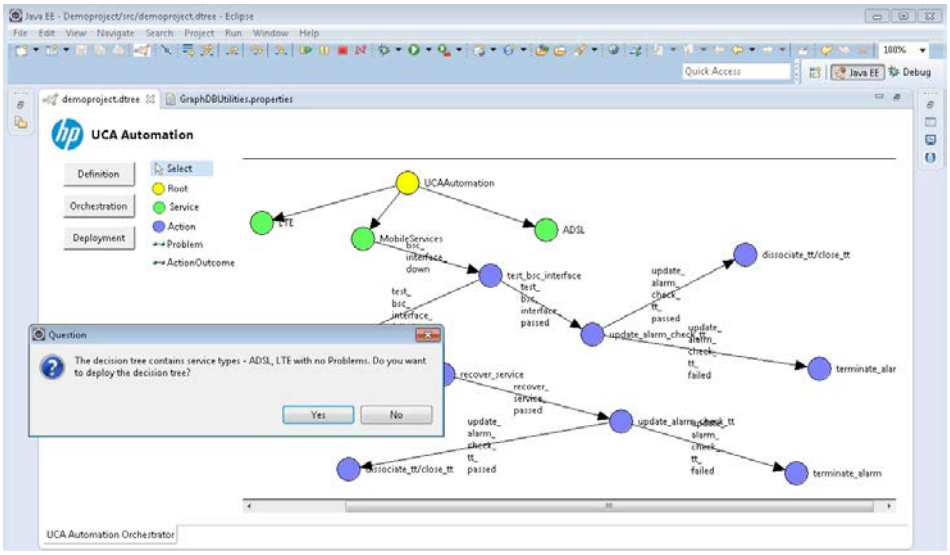


Figure 47: Confirmation message

3. Select **Yes** to upload the decision tree into the neo4j database.
4. Log into UCA EBC, after the new graph is uploaded into the neo4j graph database.
5. Select **UCA-EBC:default** -> **Topology Management** -> **Display** to view the uploaded graph.

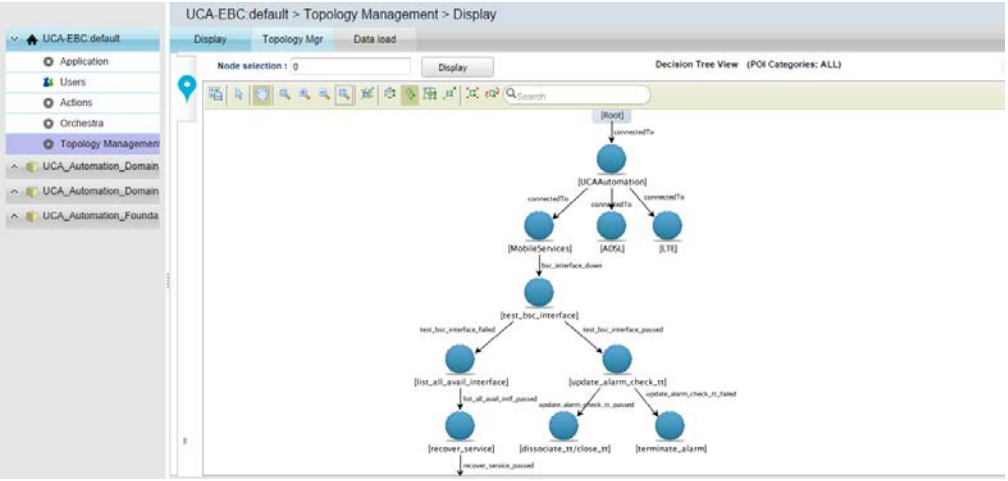


Figure 48: Decision tree after uploading into Neo4j graph database

NOTE: Only the nodes that have links in the decision tree are saved in the `.dtree.xml`. Hence, you cannot deploy the nodes which do not have links in the decision tree. However, when you save, the orchestrator editor saves all nodes and you can continue editing the graph.

8.10 Generate skeleton decision tree using CLI

You can Use the command line utility to generate a skeleton decision tree from the database.

1. Modify the `GraphDBUtilities.properties` file to specify the database URL, username, and password.
2. Run the following command to generate the skeleton decision tree XML.

```
./decisionTree.sh -e text.xml
```

3. Modify and upload the XML to the Neo4j database.
   Modify the XML only if you are familiar with the syntax of the decision tree.

8.10.1 Deploy using command Line utility

You can use the command line utility to deploy the decision tree developed using the automation orchestrator to Neo4j database.

1. Modify the `GraphDBUtilities.properties` file available under the `/opt/UCA_Automation/Utilities/DecisionTree/conf` to specify the location of the Neo4j host and port database.

```
#UCA Automation Inventory database connection details
#Oracle jdbc driver : oracle.jdbc.driver.OracleDriver
#Oracle url : jdbc:oracle:thin:@<hostname>:<port>:<service>
#Postgres jdbc driver : org.postgresql.Driver
#Postgres url : jdbc:edb:@<hostname>:<port>:<service>
inventory.db.driver=org.postgresql.Driver
inventory.db.url=jdbc:postgresql://<hostname>:<port>/<service>
inventory.db.user=<username>
inventory.db.password=<password>
```

```
#Neo4j database connection details
neo4j.db.protocol=http
neo4j.db.host=<hostname>
neo4j.db.port=<port>
neo4j.db.db=db
neo4j.db.data=data
#enables batch transaction of inserts into neo4j db
org.neo4j.rest.batch_transaction=true
#enables http streaming
org.neo4j.rest.stream=true
```

The default value for the `<host>` is `localhost` and `<port>` is `7474`.

2. Copy the Decision Tree XML developed using the orchestrator from projects `src` folder to any location in the server.
   For example, copy the XML file to `/opt/UCA_Automation/Utilities/DecisionTree/etc.`
3. Run the following command available at `/opt/UCA_Automation/Utilities/DecisionTree/bin.`

```
./decisionTree.sh -u etc/<Name of the decision tree xml>
```