M3UA Management

Table of Contents

Using CLI

You can manage all M3UA Application Server, Application Server Process and Route related configurations through the Command Line Interface by using the `m3ua` command. You can create, destroy, start and stop ASPs by issuing the `m3ua asp` command with appropriate parameters. You can create, destroy, add and remove AS by issuing the `m3ua as` command with appropriate parameters. You can add and remove M3UA Routes by issuing the `m3ua route` command with appropriate parameters.

Using GUI

The GUI will allow you to manage your M3UA configurations efficiently using a user-friendly interface. Open a Web Browser and navigate to http://localhost:8080/jss7-management-console/. Click on the 'M3UA' link in the left panel. The main panel will display the names of all configured M3UA Management units. To configure or view the settings of a particular M3UA Management Unit you must click on the name of that unit. The GUI will look similar to the figure below and is divided into four tabs.

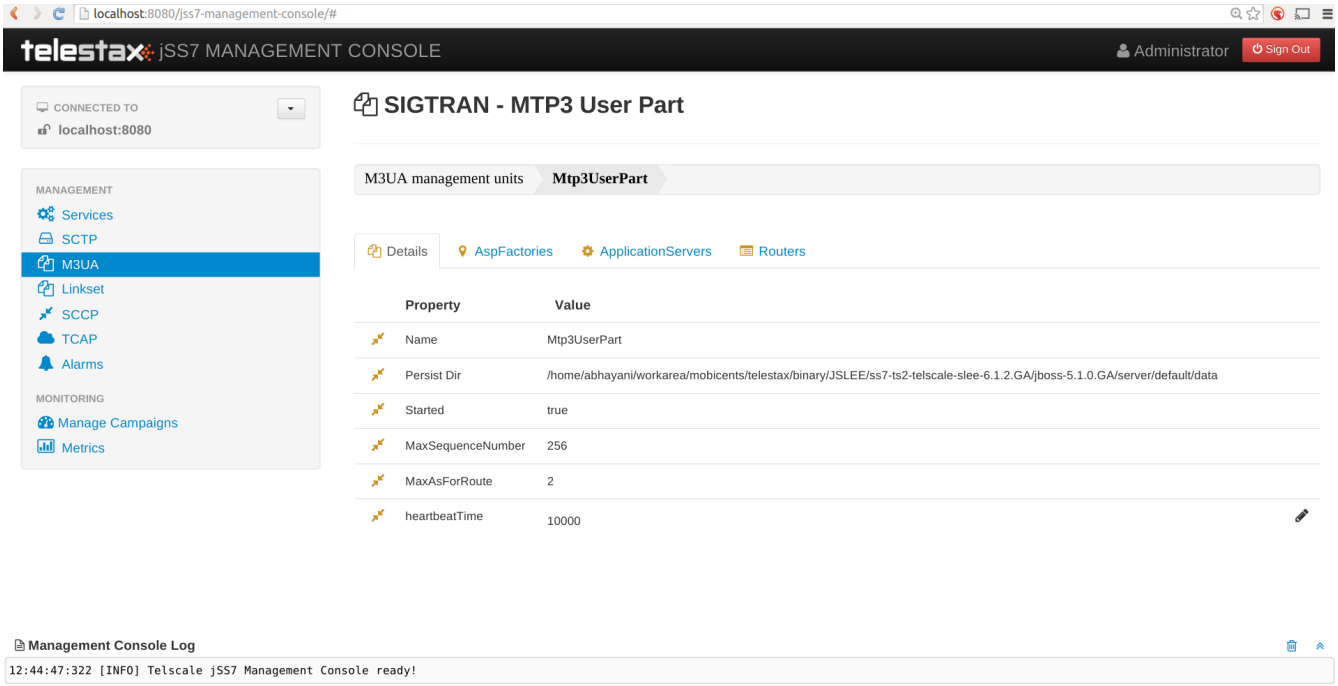

Figure 1. GUI - M3UA Management

The first tab will display the properties of the M3UA Management unit. These details displayed here are fetched from the XML descriptor file *jboss-beans.xml*, which is located at *$JBOSS_HOME/server/profile_name/deploy/restcomm-ss7-service/META-INF*, where `profile_name` is the server profile name. These properties can be modified here in the GUI. To modify them you must click the pencil, change value and save. The GUI will then display the modified values.

The other three tabs will allow you to manage and monitor all Servers, ASPs and Routers within this M3UA Management unit.

M3UA stack properties

Maximum Sequence Number

You can modify the settings for the parameter 'maxsequencenumber' only when the M3UA Stack is not running. In addition, this parameter cannot be modified through the CLI or GUI. You will have to invoke the setter function directly from the source code.

If you are using the JBoss Application Server, then you can set this parameter by adding a property (as shown below) to the XML descriptor file *jboss-beans.xml*, which is located at *$JBOSS_HOME/server/profile_name/deploy/restcomm-ss7-service/META-INF*, where `profile_name` is the server profile name.

```
/*Add property for the parameter 'maxsequencenumber' to jboss-beans.xml file and
specify the value*/
<property name="maxSequenceNumber">128</property>
```

The current settings of the parameter can be viewed in the GUI or by invoking the appropriate CLI command as described below.

Using CLI

You can retrieve the current settings of the parameter 'maxsequencenumber' by issuing the command `m3ua get maxsequencenumber`. However as explained above, you cannot modify the settings through the CLI.

```
Name
    m3ua get maxsequencenumber

SYNOPSIS
    m3ua get maxsequencenumber stackname <stack-name>

DESCRIPTION
    This command is used to retrieve the current settings of the parameter
    'maxsequencenumber'. The 'maxsequencenumber' parameter is used to specify
    the maximum sequence number used for load-balancing algorithm.

    Sequence number or Signalling Link Selection (SLS) is used for load-balancing
    between ASPs in AS and also between various AS for the same point-code.
    The parameter 'maxsequencenumber' controls the maximum SLS that should be
    used for this. It is safe to leave it at 256.

    The settings can be modified only when the M3UA Stack is not running.
    To modify this parameter you must invoke the setter function
    directly from the code or if you are using the JBoss AS, you can add a
    property to the XML descriptor file jboss-beans.xml. You cannot change the
    settings through the CLI.
```

Using GUI

In the M3UA management page, you can view the current settings of the 'Max Sequence Number' property. But as explained above, you cannot change the settings in the GUI. For more details about this parameter, refer to the detailed description about the parameter in the above section for CLI.

Maximum AS for route

You can modify the settings for the parameter 'maxasforroute' only when the M3UA Stack is not running. In addition, this parameter cannot be modified through the CLI or GUI. You will have to invoke the setter function directly from the source code.

If you are using the JBoss Application Server, then you can set this parameter by adding a property (as shown below) to the XML descriptor file *jboss-beans.xml*, which is located at *$JBOSS_HOME/server/profile_name/deploy/restcomm-ss7-service/META-INF*, where `profile_name` is the server profile name.

```
/*Add property for the parameter 'maxasforroute' to jboss-beans.xml file and specify
the value*/
<property name="maxAsForRoute">4</property>
```

The current settings of the parameter can be viewed in the GUI or by invoking the appropriate CLI command as described below.

Using CLI

You can retrieve the current settings of the parameter 'maxasforroute' by issuing the command `m3ua get maxasforroute`. However as explained above, you cannot modify the settings through the CLI.

```
Name
    m3ua get maxasforroute

SYNOPSIS
    m3ua get maxasforroute stackname <stack-name>

DESCRIPTION
    This command is used to retrieve the current settings of the parameter
    'maxasforroute'. The 'maxasforroute' parameter is used to specify
    the maximum routes for destination point code.

    Every destination point code should be configured in M3UA with the
    corresponding AS. The parameter 'maxasforroute' controls the
    maximum number of AS that can be used to route the message to the
    same Destination Point Code.

    It is better to always maintain this parameter as an even number for better
    load-sharing and a maximum of 2 is standard and widely accepted. You should
    not change this value if there is at least one route defined, else it will
    throw Exception for that route. You have to delete all the routes,
    change this property and redefine routes.

    The settings can be modified only when the M3UA Stack is not running.
    To modify this parameter you must invoke the setter function
    directly from the code or if you are using the JBoss AS, you can add a
    property to the XML descriptor file jboss-beans.xml. You cannot change the
    settings through the CLI.
```

Using GUI

In the M3UA management page, you can view the current settings of the 'Max As for Route' property. But as explained above, you cannot change the settings in the GUI. For more details about this parameter, refer to the detailed description about the parameter in the above section for CLI.

Heart Beat time

Using CLI

You can set the 'heartbeattime' by issuing the command `m3ua set heartbeattime` with appropriate parameters as described below. You can verify this by issuing the command `m3ua get heartbeattime` which will display the value set for this property.

```
Name
    m3ua set heartbeattime

SYNOPSIS
    m3ua set heartbeattime <heartbeattime> stackname <stack-name>

DESCRIPTION
    Each ASP can send HEART_BEAT to peer to determine the availability of
    link. If there is no traffic M3UA will initiate heart beat every
    'heartbeatTime' milli seconds. If 3 consecutive HEART_BEAT are
    missed, stack will close and re-initiate connection.

PARAMETERS

    Standard Parameters

    <heartbeattime>   -   Heart Beat time in milliseconds.

    Optional Parameters

    <stack-name>  -   Name of the stack on which this command is executed.
                    If not passed, the first stack configured in ShellExecutor
                    will be used.

EXAMPLES
    m3ua set heartbeattime 30000
```

Using GUI

On M3UA management page, click on pencil against the 'heartbeatTime' property and text box becomes editable. Change value and save.

Enable M3UA statistic

Using CLI

You can set the 'statisticsenabled' by issuing the command `m3ua set statisticsenabled` with appropriate parameters as described below. You can verify this by issuing the command `m3ua get statisticsenabled` which will display the value set for this property.

```
Name
    m3ua set statisticsenabled

SYNOPSIS
    m3ua set statisticsenabled <statisticsenabled> stackname <stack-name>

DESCRIPTION
    You can enable/disable statistic via this property.

PARAMETERS

    Standard Parameters

    <statisticsenabled>   -   true/false.

    Optional Parameters

    <stack-name>  -   Name of the stack on which this command is executed.
                    If not passed, the first stack configured in ShellExecutor
                    will be used.

EXAMPLES
    m3ua set statisticsenabled true
```

Using GUI

On M3UA management page, click on pencil against the 'statisticsEnabled' property and text box becomes editable. Change value and save.

Enable routing key management

Using CLI

You can set the 'routingkeymanagementenabled' by issuing the command `m3ua set routingkeymanagementenabled` with appropriate parameters as described below. You can verify this by issuing the command `m3ua get routingkeymanagementenabled` which will display the value set for this property.

```
Name
    m3ua set routingkeymanagementenabled

SYNOPSIS
    m3ua set routingkeymanagementenabled <routingkeymanagementenabled> stackname
<stack-name>

DESCRIPTION
    You can enable/disable routing key management via this property.

PARAMETERS

    Standard Parameters

    <routingkeymanagementenabled> -   true/false.

    Optional Parameters

    <stack-name>  -   Name of the stack on which this command is executed.
                    If not passed, the first stack configured in ShellExecutor
                    will be used.

EXAMPLES
    m3ua set routingkeymanagementenabled true
```

Using GUI

On M3UA management page, click on pencil against the 'routingkeymanagementenabled' property and text box becomes editable. Change value and save.

Threads count for processing of incoming messages

You can modify the settings for the parameter 'deliverymessagethreadcount' only when the M3UA Stack is not running. In addition, this parameter cannot be modified through the CLI or GUI. You will have to invoke the setter function directly from the source code.

If you are using the JBoss Application Server, then you can set this parameter by adding a property (as shown below) to the XML descriptor file *jboss-beans.xml*, which is located at *$JBOSS_HOME/server/profile_name/deploy/restcomm-ss7-service/META-INF*, where `profile_name` is the server profile name.

```
/*Add property for the parameter 'deliverymessagethreadcount' to jboss-beans.xml file
and specify the value*/
<property name="deliveryTransferMessageThreadCount">4</property>
```

The current settings of the parameter can be viewed in the GUI or by invoking the appropriate CLI command as described below.

Using CLI

You can retrieve the current settings of the parameter 'deliverymessagethreadcount' by issuing the command `m3ua get deliverymessagethreadcount`. However as explained above, you cannot modify the settings through the CLI.

```
Name
    m3ua get deliverymessagethreadcount

SYNOPSIS
    m3ua get deliverymessagethreadcount

DESCRIPTION
    Returns the count of threads that will be used for message delivering
    to Mtp3UserPartListener's. Messages from SS7 peers (incoming messages)
    are processed by these threads. Messages to SS7 peers (outgoing messages)
    are processed by threads from user applications (not these threads).

    For single thread model this value should be equal 1.
```

Using GUI

In the M3UA management page, you can view the current settings of the 'DeliveryMessageThreadCount' property. But as explained above, you cannot change the settings in the GUI. For more details about this parameter, refer to the detailed description about the parameter in the above section for CLI.

MTP3 RoutingLabel Format

You can modify the settings for the parameter 'routinglabelformat' only when the M3UA Stack is not running. In addition, this parameter cannot be modified through the CLI or GUI. You will have to invoke the setter function directly from the source code.

If you are using the JBoss Application Server, then you can set this parameter by adding a property (as shown below) to the XML descriptor file *jboss-beans.xml*, which is located at *$JBOSS_HOME/server/profile_name/deploy/restcomm-ss7-service/META-INF*, where `profile_name` and also an extra separate bean - RoutingLabelFormat (to which we refer from). is the server profile name.

```
/*Extra bean for RoutingLabelFormat Enum*/
    <bean name="RoutingLabelFormat"
class="org.restcomm.protocols.ss7.mtp.RoutingLabelFormat">
        <constructor factoryClass="org.restcomm.protocols.ss7.mtp.RoutingLabelFormat"
            factoryMethod="getInstance">
            <parameter>ITU</parameter>
        </constructor>
    </bean>

/*Add property for the parameter 'routinglabelformat' to jboss-beans.xml file and
specify the value into M3UAManagementImpl mbean*/
        <property name="routingLabelFormat">
            <inject bean="RoutingLabelFormat" />
        </property>
```

The current settings of the parameter can be viewed in the GUI or by invoking the appropriate CLI command as described below.

Using CLI

You can retrieve the current settings of the parameter 'routinglabelformat' by issuing the command `m3ua get routinglabelformat`. However as explained above, you cannot modify the settings through the CLI.

```
Name
    m3ua get routinglabelformat

SYNOPSIS
    m3ua get routinglabelformat stackname <stack-name>

DESCRIPTION
    Returns RoutingLabelFormat option. Possible values are: ITU, ANSI_Sls8Bit,
    ANSI_Sls5Bit, Japan_TTC_DDI, Japan_NTT, China.
```

Using GUI

In the M3UA management page, you can view the current settings of the 'RoutingLabelFormat' property. But as explained above, you cannot change the settings in the GUI. For more details about this parameter, refer to the detailed description about the parameter in the above section for CLI.

Bit of SLS for loadbalancing between Linksets

Using CLI

You can set the 'uselsbforlinksetselection' by issuing the command `m3ua set uselsbforlinksetselection` with appropriate parameters as described below. You can verify this by issuing the command `m3ua get uselsbforlinksetselection` which will display the value set for this

property.

```
Name
    m3ua set uselsbforlinksetselection

SYNOPSIS
    m3ua set uselsbforlinksetselection <true | false> stackname <stack-name>

DESCRIPTION
    Possible values are false or true. Sets which bit of SLS will be used
    for loadbalancing between Linkset. True value means lowest bit of SLS
    is used for loadbalancing between Linkset, false value means highest bit
    of SLS is used.

PARAMETERS

    Standard Parameters

    <true | false>    -   True value means lowest bit of SLS is used for
                          loadbalancing between Linkset, false value means
                          highest bit of SLS is used. Default value is false.

    Optional Parameters

    <stack-name>  -   Name of the stack on which this command is executed.
                      If not passed, the first stack configured in ShellExecutor
                      will be used.

EXAMPLES
    m3ua set uselsbforlinksetselection false
```

Using GUI

On M3UA management page, click on pencil against the 'Use the lowest bit for link set selection' property and text box becomes editable. Change value and save.

View all M3UA Application Server Processes

Using CLI

You can view the details of all configured M3UA Application Server Processes by issuing the command `m3ua asp show` as described below:

```
Name
    m3ua asp show

SYNOPSIS
    m3ua asp show stackname <stack-name>

DESCRIPTION
    This command is used to view the details of all configured Application Server
    Processes. The information displayed will include the name, the SCTP Association
    name and if it is started or stopped.

PARAMETERS

    Optional Parameters

    <stack-name>  -   Name of the stack on which this command is executed.
                    If not passed, the first stack configured in ShellExecutor
                    will be used.
```

Using GUI

Navigate to the specific M3UA Management unit and switch to the 'AspFactories' tab. Here you can view a list of all the ASPs created. Every correctly configured ASP will be displayed in a row and for each ASP, the first column will display the name of the ASP. The icon adjacent to the name will be lit 'green' if the ASP is currently running or if the ASP is stopped the icon will be lit 'orange'. The second column will indicate the current state of the ASP (true / false), the third column will allow you to Start / Stop the ASP and the fourth column will allow you to delete the ASP.

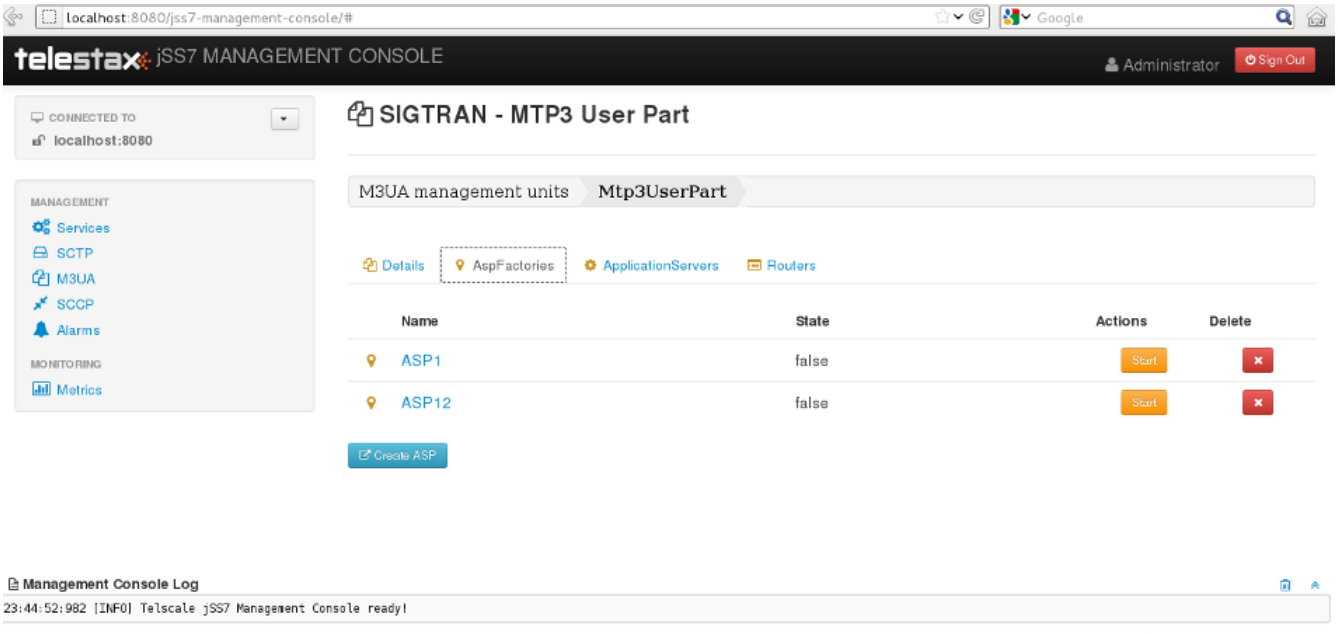

Figure 2. GUI - M3UA Management - AspFactories

In the screen above, click on the name of the ASP whose details you wish to view. This will launch the ASP Details and display all the configured properties of the selected ASP. The second tab in this

view will allow you to view all connected Application Servers. You can click on the bread crumbs at the top to return to any of the previous pages you navigated through.

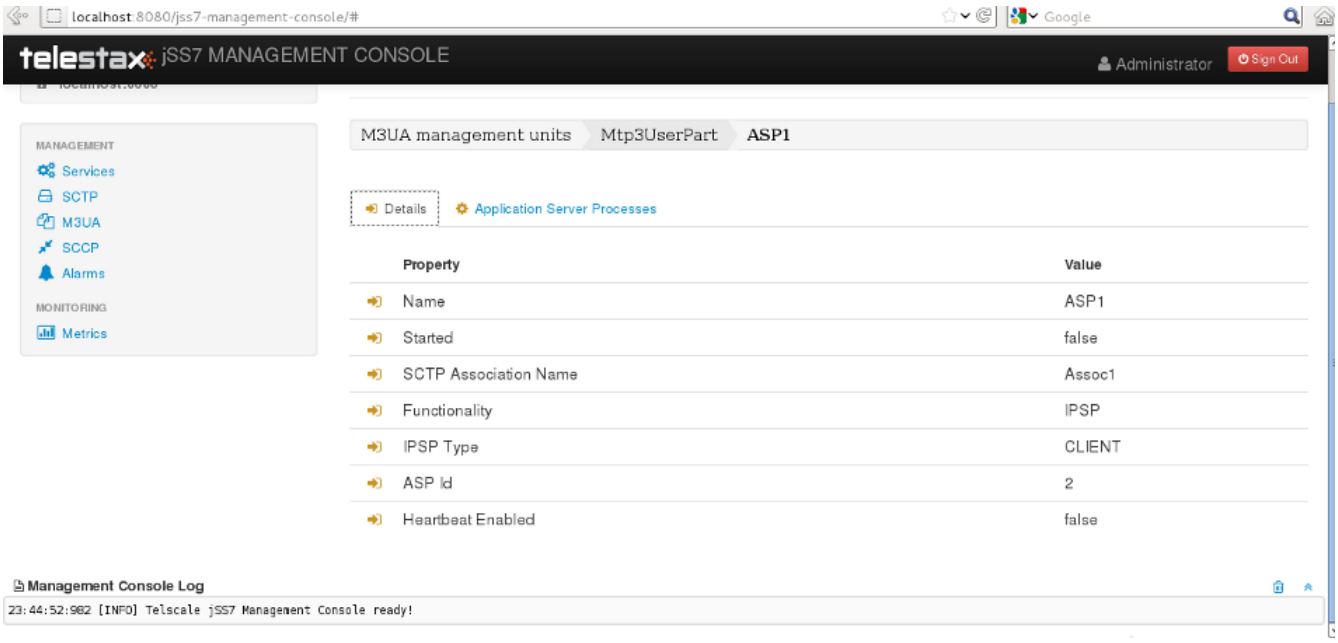

Figure 3. GUI - M3UA Management - ASP Details

Create a new M3UA Application Server Process

Using CLI

You can create a new M3UA ASP by issuing the command `m3ua asp create` with appropriate parameters as described below:

```
Name
    m3ua asp create

SYNOPSIS
    m3ua asp create <asp-name> <sctp-association> aspid <aspid> heartbeat <true|false>
    stackname <stack-name>

DESCRIPTION
    This command is used to create a new Application Server Process.

PARAMETERS

    Standard Parameters

    <asp-name>            -   Name of the new Application Server Process
                        created. This must be unique and takes any
                        String value.
```

```
    <sctp-association>        -   Name of the SCTP Association

    Optional Parameters

    <aspid>               -   Identifier for this newly created
                          Application Server Process. If this is
                          not passed, next available aspid will be
                          used.

    heartbeat <true|false>        -   If this parameter is enabled (value set to
                          true), then heartbeat mechanism is enabled
                          between M3UA peers. When this is enabled,
                          it sends a Heartbeat message every 10
                          seconds. If there is no response for the
                          third heartbeat then it assumes that the
                          underlying network is dead. So it closes
                          the connection and attempts to connect
                          again. The M3UA peers are brought back to
                          the same state as they were prior to
                          dying.

                          This is an optional parameter and if
                          unspecified, heartbeat mechanism is
                          disabled.

    <stack-name>  -   Name of the stack on which this command is executed.
                          If not passed, the first stack configured in ShellExecutor
                          will be used.

EXAMPLES
    m3ua asp create ASP1 Assoc1 aspid 12 heartbeat true

    The above command will create a new M3UA Application Server Process with name ASP1
    and id 12. Heartbeat mechanism is enabled.
```

Using GUI

Procedure: Create a new Application Server Process using GUI

1. Navigate to the tab 'AspFactories' in the M3UA Management Unit window and click on the 'Create ASP' button. This will launch a pop-up 'Create AspFactory'.
2. In the 'Create ASP' page, add details of the new ASP. You must ensure that you fill in all the mandatory parameters (Name, SCTP Association Name). For definition of these parameters, please refer to the description of the CLI command for the same in the preceding section. You must ensure that a correctly configured SCTP Association is created and available prior to creating a new ASP. When the ASP is started or stopped, this corresponding SCTP Association will start / stop automatically.
3. Verify the details entered and then click on the 'Create' button. A new ASP will be created with parameters as specified. If there is an error in creating the ASP then you will find the details of

the error in the Management Console Log section below.

4. Click on the 'Close' button to close the 'Create Server' pop-up.

Delete an Application Server Process

Using CLI

You can delete an existing M3UA ASP by issuing the command `m3ua asp destroy` with appropriate parameters as described below:

```
Name
    m3ua asp destroy

SYNOPSIS
    m3ua asp destroy <asp-name> stackname <stack-name>

DESCRIPTION
    This command is used to delete an existing M3UA Application Server Process
    identified by the name 'asp-name'. You must ensure that the ASP is stopped prior
    to issuing the command.

PARAMETERS

    Standard Parameters

    <asp-name>        -   Name of the ASP to be deleted.

    Optional Parameters

    <stack-name>  -   Name of the stack on which this command is executed.
                    If not passed, the first stack configured in ShellExecutor
                    will be used.

EXAMPLES
    m3ua asp destroy ASP1

    The above command will destroy the ASP identified by the name ASP1.
```

Using GUI

Procedure: Delete an Application Server Process using GUI

1. Navigate to the 'ASPs' section in the M3UA Management Unit window and locate the row corresponding to the ASP you wish to delete.
2. You must ensure that the ASP is stopped and unassigned from AS prior to deletion. If the ASP is stopped, the last column for 'Delete' will display a 'x' button in red and will be enabled. If the Server is currently running, the 'x' button will be disabled.

3. Click on the red 'x' button to delete the corresponding ASP.

Start an Application Server Process

Using CLI

You can start an existing ASP by issuing the command `m3ua asp start` with appropriate parameters as described below:

```
Name
    m3ua asp start

SYNOPSIS
    m3ua asp start <asp-name> stackname <stack-name>

DESCRIPTION
    This command is used to start an existing ASP. You must ensure that the ASP is
    assigned to at least one AS prior to starting it.

PARAMETERS

    Standard Parameters

    <asp-name>        -   Name of the ASP to be started.

    Optional Parameters

    <stack-name>  -   Name of the stack on which this command is executed.
                    If not passed, the first stack configured in ShellExecutor
                    will be used.

EXAMPLES
    m3ua asp start ASP1

    The above command will start the ASP identified by the name ASP1.
```

Using GUI

Procedure: Start an Application Server Process

1. Navigate to the 'AspFactories' tab in the M3UA Management Unit window and locate the row corresponding to the ASP you wish to start.
2. Click on the 'Start' button in the actions column to start the corresponding ASP. You must ensure that the ASP is assigned to at least one AS prior to starting it.
3. If the ASP has started successfully you will find the status indicating the ASP running as 'true' and the icon will be lit green. If there is an error and the ASP failed to start, you will find details of the error in the Management Console log below.

Stop an Application Server Process

Using CLI

You can stop a currently running ASP by issuing the command `m3ua asp stop` with appropriate parameters as described below:

```
Name
    m3ua asp stop

SYNOPSIS
    m3ua asp stop <asp-name> stackname <stack-name>

DESCRIPTION
    This command is used to stop a currently running ASP.

PARAMETERS

    Standard Parameters

    <asp-name>        -   Name of the ASP to be stopped.

    Optional Parameters

    <stack-name>  -   Name of the stack on which this command is executed.
                    If not passed, the first stack configured in ShellExecutor
                    will be used.

EXAMPLES
    m3ua asp stop ASP1

    The above command will stop the ASP identified by the name ASP1.
```

Using GUI

Procedure: Stop an Application Server Process

1. Navigate to the 'AspFactories' section in the M3UA Management Unit window and locate the row corresponding to the ASP you wish to stop.
2. Click on the 'Stop' button in the actions column to stop the corresponding ASP.
3. If the ASP has stopped successfully you will find the status indicating the ASP running as 'false' and the icon will be lit orange. If there is an error and the ASP failed to stop, you will find details of the error in the Management Console log below.

View all M3UA Application Servers

Using CLI

You can view the details of all configured M3UA Application Servers by issuing the command `m3ua as show` as described below:

```
Name
    m3ua as show

SYNOPSIS
    m3ua as show stackname <stack-name>

DESCRIPTION
    This command is used to view the details of all configured Application Servers.
    The information displayed will include the configured
    functionality (AS or IPSP or SGW), mode (SE or DE), IPSP type (if applicable),
    routing context, traffic mode and network appearance values.

PARAMETERS

    Optional Parameters

    <stack-name>  -   Name of the stack on which this command is executed.
                    If not passed, the first stack configured in ShellExecutor
                    will be used.
```

Using GUI

Navigate to the specific M3UA Management unit and switch to the 'ApplicationServers' tab. Here you can view a list of all the ASs created. Every correctly configured AS will be displayed in a row and for each AS, the first column will display the name of the AS. The icon adjacent to the name will be lit 'green' if the AS is currently running or if the AS is stopped the icon will be lit 'orange'. The second column will indicate the current state of the AS (defined / undefined), the third column will allow you to delete the AS.

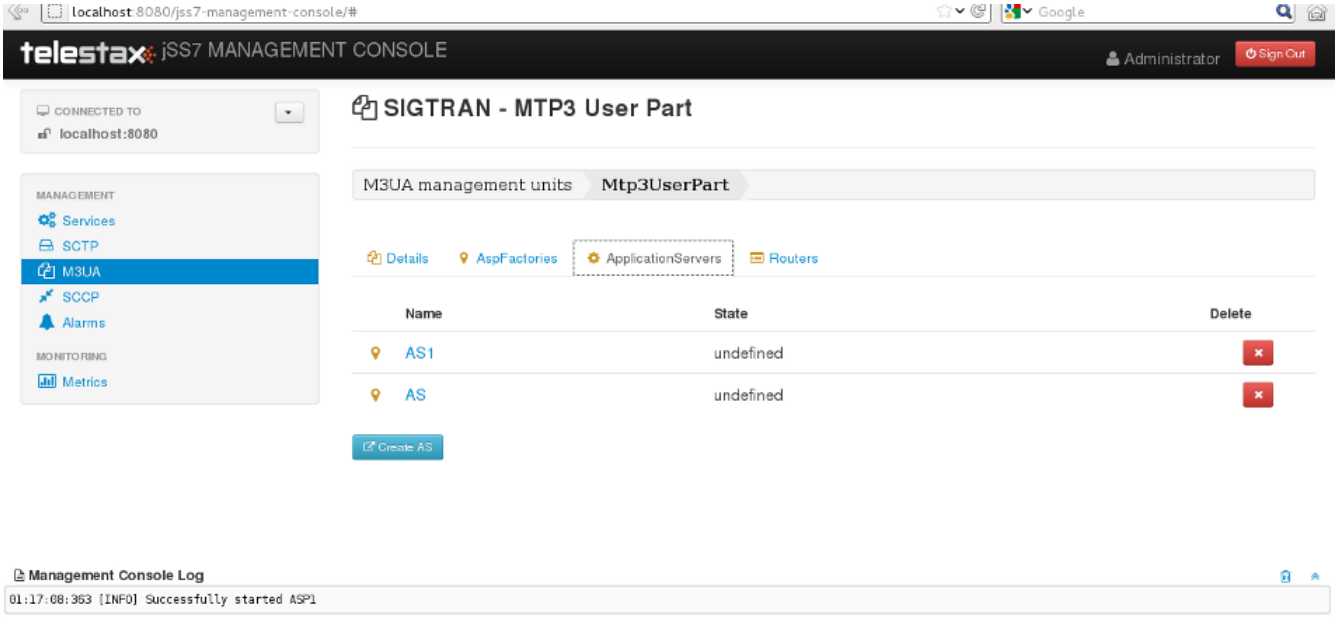

Figure 4. GUI - M3UA Management - ApplicationServers

In the screen above, click on the name of the AS whose details you wish to view. This will launch the AS Details and display all the configured properties of the selected AS. The second tab in this view will allow you to view the details of the connected ASP. You can click on the bread crumbs at the top to return to any of the previous pages you navigated through.

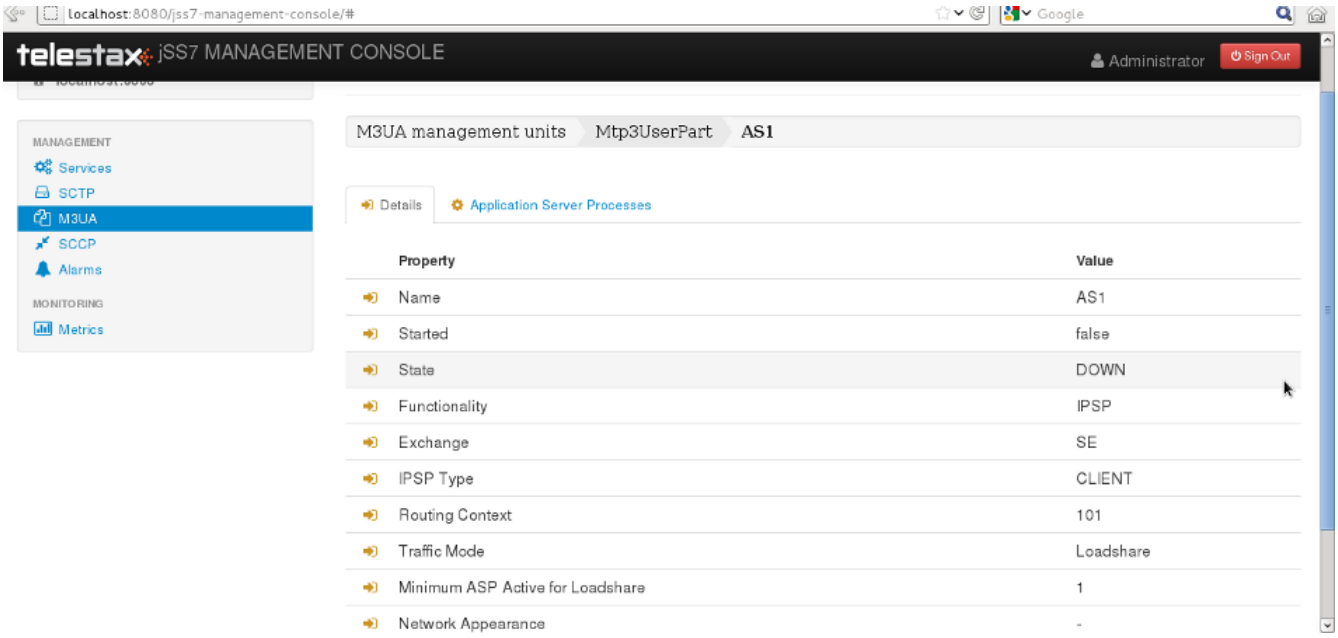

Figure 5. GUI - M3UA Management - AS Details

Create a new M3UA AS

Using CLI

You can create a new M3UA AS by issuing the command `m3ua as create` with appropriate parameters as described below:

```
Name
    m3ua as create

SYNOPSIS
    m3ua as create <as-name> <AS | SGW | IPSP> mode <SE | DE>
    ipspType <client | server> rc <routing- context> traffic-mode <traffic mode>
    min-asp <minimum asp active for TrafficModeType.Loadshare>
    network-appearance <network appearance value> stackname <stack-name>

DESCRIPTION
    This command is used to create a new Application Server.

PARAMETERS

    Standard Parameters

    <as-name>     -   Name of the new Server created. This must be
                    unique and takes any String value.

    <AS | SGW | IPSP> -   The type of the new Server is specified using this
                    parameter. The three possible values are
                    AS (Application Server), SGW (Signaling Gateway)
                    and IPSP.

    <SE | DE>     -   You must specify if Single Exchange or
                    Double Exchange of ASPSM (ASP State Maintenance)
                    and ASPTM (ASP Traffic Maintenance) messages
                    should be performed.

    <client | server> -   This is required if the newly created AS is of
                    type IPSP. You must specify is if it is of type
                    Client or Server.

    Optional Parameters

    <routing-context> -   This refers to the Routing Context configured for
                    M3UA Stack on SGW. This parameter is optional.

                    However for an ASP (Application Server Process)
                    assigned to this AS to be configured to process
                    signaling traffic related to more than one AS over
                    a single SCTP Association, it is mandatory to
                    specify a routing-context for the AS. If an ASP is
                    configured to always process signaling traffic
                    from one AS, irrespective of whether the received
                    messages have routing context set or not, it will
                    always be delivered to AS for further processing.

                    However if an ASP is configured to process
                    signaling traffic related to more than one AS over
                    a single SCTP Association and if a signaling
```

```
                    message is received without RC, then the ASP will
                    drop the message and send back an Error message.
                    A respective log4j error will also be logged.

    <traffic-mode>        -   You may choose to specify the traffic mode for
                    ASPs. At the moment jSS7 M3UA supports only
                    2 modes: loadshare and override. Broadcast mode is
                    not supported.

                    This is an optional parameter and if not specified
                    the default mode is 'loadshare'.

    <min-asp>          -   You may choose to specify the minumum asp
                    active for traffic mode 'loadshare' before the
                    payload starts flowing.

                    This is an optional parameter and if not specified
                    the default value is 1. Also if traffic-mode is not
                    'loadshare' setting this value has no effect.

    <network-appearance>  -   This is a M3UA local reference (typically an
                    integer) shared by SG and AS. This value together
                    with a Signaling Point Code, uniquely identifies a
                    SS7 node by indicating the specific SS7 network to
                    which it belongs. It can be used to distinguish
                    between signalling traffic, associated with
                    different networks, being sent between the SG and
                    the ASP over a common SCTP association.

    <stack-name>  -   Name of the stack on which this command is executed.
                    If not passed, the first stack configured in ShellExecutor
                    will be used.

EXAMPLES
    m3ua as create AS1 IPSP mode DE ipspType server rc 1 traffic-mode loadshare

    The above command will create a new M3UA Application Server identified as AS1,
    of type IPSP (Server), Double Exchange mode. The Routing Context is 1 and
    traffic-mode is 'loadshare'.

    m3ua as create AS2 AS mode SE rc 100 traffic-mode loadshare 2 network-appearance
12

    The above command will create a new M3UA Application Server identified as AS2,
    of type AS, Single Exchange mode. The Routing Context is 100,
    traffic-mode is 'loadshare' and minimun asp to be active for payload transfer is
2.
    The network-appearance value is 12.
```

Using GUI

Procedure: Create a new M3UA Application Server using GUI

1. Navigate to the tab 'ApplicationServers' in the M3UA Management Unit window and click on the 'Create AS' button. This will launch a pop-up 'Create AS'.
2. In the 'Create Application Server' pop-up, add details of the new AS. For definition of these parameters, please refer to the description of the CLI command for the same in the preceding section.
3. Verify the details entered and then click on the 'Create' button. A new AS will be created with parameters as specified. If there is an error in creating the AS then you will find the details of the error in the Management Console Log section below.
4. Click on the 'Close' button to close the 'Create Application Server' pop-up.

Delete a M3UA AS

Using CLI

You can create a new M3UA AS by issuing the command `m3ua as create` with appropriate parameters as described below:

```
Name
    m3ua as destroy

SYNOPSIS
    m3ua as destroy <as-name> stackname <stack-name>

DESCRIPTION
    This command is used to delete an existing M3UA Application Server instance
    identified by the name 'as-name'. You must ensure that all ASPs are unassigned and
    the AS state is 'INACTIVE' prior to destroying the AS.

PARAMETERS

    Standard Parameters

    <as-name>     -   Name of the AS instance to be deleted.

    Optional Parameters

    <stack-name>  -   Name of the stack on which this command is executed.
                      If not passed, the first stack configured in ShellExecutor
                      will be used.

EXAMPLES
    m3ua as destroy AS1

    The above command will destroy the AS identified by the name AS1.
```

Using GUI

Procedure: Delete a M3UA Application Server using GUI

1. Navigate to the 'ApplicationServers' tab in the M3UA Management Unit window and locate the row corresponding to the AS you wish to delete.
2. You must ensure that all ASPs are unassigned from this AS and the current state of the AS is 'INACTIVE' (displayed as 'undefined') prior to destroying the AS. If the AS is inactive, the last column for 'Delete' will display a 'x' button in red and will be enabled. You can only delete the AS if it is inactive.
3. Click on the red 'x' button to delete the corresponding AS.

Assign an ASP to an AS

Using CLI

You can assign an ASP to an AS by issuing the command `m3ua as add` with appropriate parameters as described below:

```
Name
    m3ua as add

SYNOPSIS
    m3ua as add <as-name> <asp-name> stackname <stack-name>

DESCRIPTION
    This command is used to assign an Application Server Process to an Application
    Server. The AS and ASP must both be created prior to executing this command.

    You can configure an ASP to process signaling traffic related to more than one AS,
    over a single SCTP Association. However you must ensure that all the Application
    Servers that share the ASP are configured with a valid Routing Context value.

PARAMETERS

    Standard Parameters

    <as-name>     -   Name of the AS to which this ASP is being assigned.

    <asp-name>        -   Name of the ASP that is being assigned to the AS.

    Optional Parameters

    <stack-name>  -   Name of the stack on which this command is executed.
                    If not passed, the first stack configured in ShellExecutor
                    will be used.

EXAMPLES
    m3ua as add AS1 ASP1
    - The above command will assign ASP1 to AS1.
```

Using GUI

Procedure: Assign an ASP to an AS using GUI

1. Navigate to the 'ApplicationServers' tab in the M3UA Management Unit window, locate the row corresponding to the AS you wish to assign an ASP and click on the name of the AS. This will launch the AS details page where all the properties of the AS will be displayed. Switch to the second tab in this view called "Application Server Processes". As shown in the figure below, you will find a list of all currently assigned ASPs to this selected AS.

GUI - M3UA Management - Assign ASP to an AS

1. image::images/GUI_M3UA_Management_ASP_Assign.png[]
2. Click on the 'Add ASP' button at the bottom. This will launch a pop-up named 'Add ASP' where all available ASPs will be listed in a drop down box.
3. Click on the 'Create' button to add the selected ASP to this AS. The ASP will be assigned to this AS and will be displayed in the ASP list for this AS.

4. You can configure an ASP to process signaling traffic related to more than one AS, over a single SCTP Association. However you must ensure that all the Application Servers that share the ASP are configured with a valid Routing Context value.

Unassign an ASP from an AS

Using CLI

You can unassign an ASP from an AS by issuing the command `m3ua as remove` with appropriate parameters as described below:

```
Name
    m3ua as remove

SYNOPSIS
    m3ua as remove <as-name> <asp-name> stackname <stack-name>

DESCRIPTION
    This command is used to un-assign an Application Server Process from an
    Application Server that it was previously assigned to.

PARAMETERS

    Standard Parameters

    <as-name>     -   Name of the AS from which this ASP is being
                    un-assigned.

    <asp-name>        -   Name of the ASP to be un-assigned.

    Optional Parameters

    <stack-name>  -   Name of the stack on which this command is executed.
                    If not passed, the first stack configured in ShellExecutor
                    will be used.

EXAMPLES
    m3ua as remove AS1 ASP1

    The above command will remove ASP1 from AS1.
```

Using GUI

Procedure: Unassign an ASP from an AS using GUI

1. Navigate to the 'ApplicationServers' tab in the M3UA Management Unit window, locate the row corresponding to the AS you wish to unassign an ASP from and click on the name of the AS.

2. This will launch the AS details page where all the properties of the AS will be displayed. Switch to the second tab in this view called "Application Server Processes". As shown in the figure above, you will find a list of all currently assigned ASPs to this selected AS.
3. Locate the row corresponding to the ASP you wish to unassign from this AS.
4. Click on the red coloured 'x' remove button in the row corresponding to the ASP you wish to remove. This action will unassign the ASP from this AS.

View all M3UA Routes

Using CLI

You can view the details of all configured M3UA Routes by issuing the command `m3ua route show` as described below:

```
Name
    m3ua route show

SYNOPSIS
    m3ua route show stackname <stack-name>

DESCRIPTION
    This command is used to display all configured routes.

PARAMETERS

    Optional Parameters

    <stack-name>  -   Name of the stack on which this command is executed.
                    If not passed, the first stack configured in ShellExecutor
                    will be used.
```

Using GUI

Navigate to the specific M3UA Management unit and switch to the 'Routers' tab. Here you can view a list of all the Routes created as shown in the figure below. Every correctly configured Route will be displayed in a row and for each Route, the first column will display DPC:OPC:SI values. The icon adjacent to the name will be lit 'green' if the Route is currently active or if the Route is inactive the icon will be 'orange'. The second column will indicate the current state of the Route (Active / Inactive) and the third column will display the name of the AS assigned to route messages for this DPC.

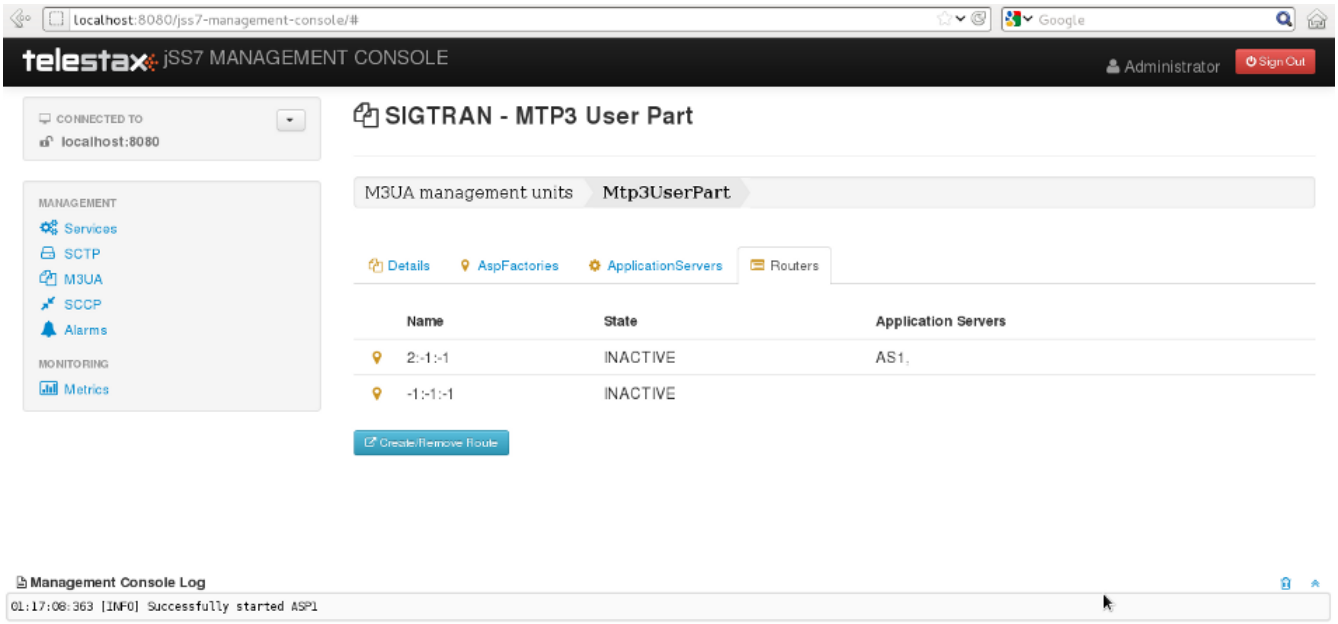

Figure 6. GUI - M3UA Management - Route

Create a new M3UA Route

Using CLI

You can create a new M3UA Route by issuing the command `m3ua route add` with appropriate parameters as described below:

```
Name
    m3ua route add

SYNOPSIS
    m3ua route add <as-name> <dpc> <opc> <si> trafficmode <traffic-mode> stackname
<stack-name>

DESCRIPTION
    This command is used to configure an AS to route message, i.e. configure the
    destination point code that the message will be routed to. You must ensure that
    the AS is created prior to executing this command.

PARAMETERS

    Standard Parameters

    <as-name>     -   Name of the AS assigned to route message for
                      this dpc.

    <dpc>         -   Destination Point Code.

    <opc>         -   Originating Point Code.

    <si>          -   Service Indicator.

    Optional Parameters
    <traffic-mode>    -   There can be two or more AS defined for each route.
                          The M3UA Stack will do load-balancing between these
                          AS depending on the traffic-mode set for this m3ua
                          route. Possible values are:
                          1. Override
                          2. Loadshare
                          3. Broadcast (Broadcast is not yet supported by M3UA)

    <stack-name>  -   Name of the stack on which this command is executed.
                          If this is not passed, the first stack configured in
                          ShellExecutor will be used.

EXAMPLES
    m3ua route add AS1 2 -1 -1
```

Using GUI

Procedure: Create a new M3UA Route using GUI

1. Navigate to the 'Routers' tab in the M3UA Management Unit window and click on the 'Create/Remove' button.
2. This will launch the pop-up 'Create/Remove Route', where you can add values for DPC, OPC, SI, traffic-mode and Application Server Name. For definition of these parameters, please refer to

the description of the CLI command for the same in the preceding section.

3. Verify the details entered and then click on the 'Create' button. A new Route will be configured with parameters as specified. If there is an error in creating the Route then you will find the details of the error in the Management Console Log section below.

Delete a M3UA Route

Using CLI

You can delete a M3UA Route by issuing the command `m3ua route remove` with appropriate parameters as described below:

```
Name
    m3ua route remove

SYNOPSIS
    m3ua route remove <as-name> <dpc> <opc> <si> stackname <stack-name>

DESCRIPTION
    This command is used to remove a previously configured route.

PARAMETERS

    Standard Parameters

    <as-name>     -   Name of the AS assigned to route message for
                      this dpc.

    <dpc>         -   Destination Point Code.

    <opc>         -   Originating Point Code.

    <si>          -   Service Indicator.

    Optional Parameters

    <stack-name>  -   Name of the stack on which this command is executed.
                      If not passed, the first stack configured in ShellExecutor
                      will be used.

EXAMPLES
    m3ua route remove AS1 2 -1 -1
```

Using GUI

Procedure: Delete a M3UA Route using GUI

1. Navigate to the 'Routers' tab in the M3UA Management Unit window and click on the 'Create/Remove' button.
2. This will launch the pop-up 'Create/Remove Route'. Enter the values for DPC, OPC, SI and Application Server Name that you wish to remove from the list of Routes. For definition of these parameters, please refer to the description of the CLI command for the same in the preceding section.
3. Click on the 'Remove' button to delete the Route corresponding to the parameters specified.