IBM Tivoli Composite Application Manager for SOA Event Handler for WebSphere Service Registry and Repository User Guide

Introduction

The IBM Tivoli Composite Application Manager (ITCAM) for SOA Event Handler for WebSphere Service Registry and Repository (referenced herein as Event Handler) is designed to reside between WebSphere Service Registry and Repository and IBM Tivoli Monitoring (ITM), providing coarse-grained information about service health to registry users, such as mediations that dynamically select services, and humans choosing a specific service to access. When an ITCAM for SOA situation event is detected by ITM for a service, ITM sends out an event to the Event Handler (optionally via Tivoli Enterprise Console) which updates metadata in the registry for that service. The Event Handler creates, updates or removes properties on the WSDLPort and/or SCA Export logical objects in the registry.

The Event Handler can be configured to process ITCAM for SOA situation events generated from the Services Inventory_610 table. ITCAM for SOA provides a set of pre-defined situations for this table. The ITM Situation Editor can also be used to define custom situations for the Services Inventory_610 table. The ITCAM for SOA situation events contain a list of property-value pairs. Event properties are also called event class attributes or attributes in the ITCAM for SOA and ITM documentation.

The Event Handler uses the port name and port namespace event properties to identify the WSDLPort and/or SCA Export to update in the registry. ITCAM for SOA forwards events detected for service requesters and service providers to the Event Handler. However, the Event Handler only updates properties in the registry when it receives an event for a service provider. There may be other cases where the Event Handler is unable to unambiguously locate the service in the registry to apply properties to, such as in an environment where the registry holds information about proxy endpoints rather than the actual provider endpoints.

ITM can be configured to send events directly to the Event Handler or to the Tivoli Enterprise Console. When events are sent to the Tivoli Enterprise Console, a resend rule can be used to forward ITCAM for SOA events to the Event Handler.

Pre-requisites

The following are pre-requisites for the ITCAM for SOA Event Handler:

- IBM WebSphere Application Server V6.0.2 and Fix Pack 11 or later. This can be the same application server to which the registry is installed.

- IBM WebSphere Service Registry and Repository 6.0.0.1 installed and configured.
- IBM Tivoli Monitoring V6.1 Fixpack 4
- IBM Tivoli Composite Application Manager for SOA V6.1.
- Tivoli Enterprise Console V3.9 (optional)

Event Handler Installation

Download sa04.ear and save it to a temporary location. Using the WebSphere Application Server administration console or command line wsadmin tool, deploy sa04.ear to the chosen instance of WebSphere Application Server. For more information on this refer to the WebSphere Application Server [Information Center](#).

If installing to an instance of WebSphere Application Server other than that with WebSphere Service Registry and Repository installed two client jars are required. ServiceRegistryClient.jar (from the registry's default installation directory) and sdo-int.jar (from $WAS_HOME/classes after having run the installall script) should be copied to the $WAS_HOME/classes directory on the server where the Event Handler is intended to reside.

Event Handler Configuration

Configuration of the ITCAM for SOA Event Handler is performed via a web user interface. The URL for this is http://<server name>:<port number>/ITCAMWeb/admin, for example http://myserver:9080/ITCAMWeb/admin.

From this page the registry which is to be updated by the Event Handler is specified, along with any required security information and logging information. On the left hand side are links to the status page, where the Event Handler is stopped and started, and the EventMappings page where the incoming events that are to be mapped to custom properties in the registry are specified.

Pressing Submit saves the configuration and pressing Refresh reverts the configuration page back to the currently saved configuration.

ITCAMListener

Port is the TCP/IP port that the Event Handler listens on for events. It should be left as 1111 unless there in a port clash with an existing service on the server on which the Event Handler is installed. IBM Tivoli Monitoring or the Tivoli Enterprise Console must also be configured to use this same port number. See the sections *Configuring IBM Tivoli Monitoring to Send Events to the Event Handler* and *Configuring Tivoli Enterprise Console to Send Events to the Event Handler* for more details.

WSRRLocation

Endpoint is the web services endpoint of the WebSphere Service Registry and Repository which the Event Handler updates. Assuming security is off for the server where the WebSphere Service Registry and Repository instance is running, then it should be http://<server name>:<port number>/WSRRCoreSDO/services/WSRRCoreSDOPort, for example http://myserver:9080/WSRRCoreSDO/services/WSRRCoreSDOPort. If security is enabled for the server where the WebSphere Service Registry and Repository instance is running, then the endpoint should be https://<server name>:<secure port number>/WSRRCoreSDO/services/WSRRCoreSDOPort, for example, https://myserver:9443/WSRRCoreSDO/services/WSRRCoreSDOPort.

UID and PWD refer to the username and password required to log in to WebSphere Service Registry and Repository. These are only needed when security is enabled, otherwise leave blank.

Https

If security is not enabled for the server where the WebSphere Service Registry and Repository instance is running, leave this check box unchecked and continue to the next section. If security is enabled, check this box and specify the locations and passwords of the trust store and key store. Find more information in the WebSphere Application Server V6.0 Information Center.

EIFLogger

Logging and tracing parameters for the Event Integration Facility (EIF) used by the Event Handler are specified in this section. The file where the logging is saved is specified as LogFileName, and the tracing file is specified as TraceFileName. They are in the usual format for the operating system. LogLevel and TraceLevel specify the level of logging (or tracing). Use the default values unless otherwise instructed by IBM support personnel. The Event Handler's traces are specified in the WebSphere Application Server Admin Console, see the Information Center for more details. The Event Handler's log messages are written to the application server's SystemOut.log file.

EventMap

The EventMap configuration is accessed by following the EventMapping link on the left hand side of the page. Here events of interest are identified for mapping to property updates in the WebSphere Service Registry and Repository.

Each row in the table represents one mapping for events with a given situation name, which is also called an EventID. Each event has a status of either Y, N or P, representing, respectively: the situation is open meaning the situation event is received, the situation is closed meaning the situation has been cleared, and the situation is no longer being monitored. When a status=Y event of interest is received by the Event Handler, it attempts to create or update a property as specified by the Received type and value in the EventMap table, explained below. When a status=N event is received by the Event Handler, it attempts to update the property using the Cleared type and value

information. A status=P event received by the Event Handler causes all properties associated with that EventID to be removed from the repository.

When the Event Handler is first installed there are several event mappings preconfigured. For each mapping there are the following settings:

Setting		Explanation
EventID		The name of the ITCAM for SOA situation
WSRRPropertyName		The name of the property to be created, updated or removed in the WSRR
Compound		Appends the name of the service operation that triggered the event to the front of the property name, for example methodname.propertyname. This differentiates properties associated with different operations that share a service endpoint.
WSRRPropertyValue	Received Type	The Received Type section is used for events received with a status of Y. Possible values: Property Value or Static String: . • A value of Property Value indicates that the WSRR property will contain the value of the event property entered in the Received Value column. See the *ITCAM for SOA Event Properties* section for the list of event property names that can be specified. • A value of Static String indicates that the WSRR property will contain the value specified in the Received Value column.
	Received Value	Used for ReceivedTypes of PropertyValue and StaticString, this value is used to specify which event property of the incoming event to put in the registry property value, or the static string to put in the registry property value. See the *ITCAM for SOA Event Properties* section for the list of event property names that can be specified for this setting when the Received Type is set to Property Value.

	Cleared Type	The Cleared Type selection is used for events received with a status of N. Possible values: Removal, Property Value or Static String: • A value of Removal indicates the WSRR property associated with the received event will be removed. • A value of Property Value indicates the value of the WSRR property associated with the received event will be updated with the value of the event property entered in the Cleared Value column. • A value of Static String indicates the value of the WSRR property associated with the received event will be updated with the value of the string entered in the Cleared Value column.
	Cleared Value	Used for Cleared Types of PropertyValue and Static String, this value is used to specify which event property of the incoming clearing event to place in the registry property value, or the static string to place in the registry property value. Disabled when Cleared Type is Removal. See the *ITCAM for SOA Event Properties* section for the list of event property names that can be specified for this setting when the Cleared Type is set to Property Value.

New event mappings can be introduced by pressing the Create button which creates an empty row in the table. When this page is revisited the EventIDs are ordered alphabetically, so a new event map may no longer be seen at the bottom of the table. Pressing Submit saves the configuration and pressing Refresh reverts the configuration page back to the last saved configuration.

Any ITCAM for SOA situation can be configured to write corresponding properties in the WSRR. Each situation should be assigned to a unique property name. Sharing properties among situations causes unpredictable results due to the random ordering of events that clear situations.

ITCAM for SOA Message Arrival events are ignored by the Event Handler as they are pure events and do not originate from the Services Inventory_610 table.

NOTE: In addition to the WSRR property defined in the event map, the Event Handler also writes or removes correlation properties in the registry. The name of the correlation property is a concatenation of values received in the event: <situation_name>---<situation_displayitem>---<situation_origin>, e.g. ResponseTimeCritical_610---343e64e14341cc26267585b1f84a2e8d---D4--467c60d6--cs-gr2qh5jaqiz-serve. Its value is the name of WSRR property that is written for the received event, e.g. ResponseTime. The correlation property allows the Event Handler to identify the WSRR property that needs to be changed or removed when the situation clears.

Event Handler Runtime

Once the configuration of the Event Handler has been saved it does not take effect until the Event Handler application has been [re]started. Start the Event Handler by clicking on the State link on the left hand side of the page, then click Submit so that the Event Handler state changes to active. To restart the Event Handler application, click Submit twice: once to stop the application and again to start it. When the application server is restarted, the Event Handler and its listener will automatically be started.

Configuring IBM Tivoli Monitoring to Send Events to the Event Handler

If IBM Tivoli Monitoring has not been configured to forward events to an event server, you should configure IBM Tivoli Monitoring to forward ITCAM for SOA events from the Hub Tivoli Enterprise Monitoring Server directly to the Event Handler.

Note: Currently you cannot forward events directly from a Tivoli Enterprise Monitoring Server running in zOS to the Event Handler. If you want to forward events detected for zOS monitoring to the Event Handler, there are a couple of options to achieve that:

a) You can run the Tivoli Enterprise Monitoring Server in zLinux and from there forward the situations to the Event Handler.
b) You can run the Tivoli Enterprise Monitoring Server in a distributed system and then forward the events to the Event Handler.

To configure IBM Tivoli Monitoring to forward events, perform the following procedure:

1. Enable event forwarding for the Tivoli Enterprise Monitoring Server as described below:

   For Windows monitoring servers *only*, do the following:

   a. Open the *Manage Tivoli Enterprise Monitoring Services* application.
   b. Right-click the *Tivoli Enterprise Monitoring Server* and click **Reconfigure**.
   c. On the configuration options window, select **TEC Event Integration Facility**.
   d. Click **OK** and **OK**.

e. Complete the following fields on the **TEC Server: Location and Port Number** window and click **OK**:

  i. **TEC Server Location:** Type the host name or IP address for the server where the Event Handler is installed.

  ii. **TEC Port Number:** Type the port number that the Event Handler is listening on. By default, the Event Handler uses port number 1111. The port number must match the port number value specified when you configured the Event Handler.

For UNIX and Linux monitoring servers, do the following on the server where Tivoli Enterprise Monitoring Server is installed:

a. At the command line change to the /opt/IBM/ITM/bin directory (or the directory where you installed IBM Tivoli Monitoring).

b. Run the following command:

```
./itmcmd config -S -t tems_name
```

where *tems_name* is the name of your monitoring server (for example, HUB_itmdev17).

c. You will be prompted for the monitoring server configuration values. Enter the same values that you provided when you installed the monitoring server until you are asked about the **TEC Event Integration Facility**. Answer YES for this question and press Enter. Complete the following additional steps:

- At the **TEC Server** prompt, type the hostname or IP address of the server where the Event Handler is installed.

- At the **TEC Port** prompt, type the port number that the Event Handler is listening on. By default, the Event Handler uses port number 1111. The port number must match the port number value specified when you configured the Event Handler.

2. Edit the Event Integration Facility (EIF) configuration file which is the following file on the server where Tivoli Enterprise Monitoring Server is installed:

- On a Windows system: C:\IBM\ITM\cms\TECLIB\OM_TEC.CONFIG
- On a UNIX or Linux system:
  /opt/IBM/ITM/tables/*host name*/TECLIB/om_tec.config

where /opt/IBM/ITM and C:\IBM\ITM are the default locations where the Tivoli Enterprise Monitoring Server is installed and *host name* is the value supplied during the Tivoli Enterprise Monitoring Server configuration.

The following parameters should be added or modified in the EIF configuration file:

Parameter name	Value	Parameter Description
FilterMode=	IN	Enables event filtering
Filter:Class=	ITM_Services_Inventory_610;	Event filter which forwards all ITCAM for SOA events for the Services_Inventory_610 table to the Event Handler.
FilterCache:Class=	ITM_Services_Inventory_610;	Filter that specifies which events to cache when IBM Tivoli Monitoring is unable to forward an event to the Event Handler.

Notes:

a) If the EIF configuration file already contains values for any of the parameters listed above, you should replace the current values with the values described in the table.

b) The EIF configuration file also contains other parameters, including ServerLocation and ServerPort parameters which are set to the values you configured in step 1. However, you must use the procedure described in step 1 to specify the hostname and port number for the Event Handler rather than editing the EIF configuration file directly with these values.

For more information on configuring IBM Tivoli Monitoring to forward events, see the IBM Tivoli Monitoring Version 6.1 Administrator's Guide topics on configuring Tivoli Event Console integration.

3. Ensure the kd4.map file is copied to the directory where the EIF configuration file is located. The kd4.map file is available on the ITCAM for SOA V6.1 installation media and also in the itcam4soa-tec-file.zip file that is included in the sa04.zip and sa04.tgz files that are downloaded from the Event Handler SupportPAC web page.

4. Restart the Tivoli Enterprise Monitoring Server.

For Windows monitoring servers only, use the *Manage Tivoli Enterprise Monitoring Services* application to restart the monitoring server.

For UNIX and Linux monitoring servers, do the following:
*   At the command line, change to the /opt/IBM/ITM/bin directory (or the directory where you installed IBM Tivoli Monitoring).
*   Run the following commands:

```
./itmcmd server stop tems_name
```

```
./itmcmd server start  tems_name
```

where *tems_name* is the name of your monitoring server (for example, HUB_itmdev17).

See the **Commands Reference** in the IBM Tivoli Monitoring Version 6.1 Installation and Setup Guide for more information on these commands.

Configuring Tivoli Enterprise Console to Send Events to the Event Handler

If IBM Tivoli Monitoring has already been configured to forward events to Tivoli Enterprise Console, you should perform the steps in this section. If you want to use Tivoli Enterprise Console but have not installed the Event Synchronization support for IBM Tivoli Monitoring, see the IBM Tivoli Monitoring Version 6.1 Installation and Setup Guide and Administrator's Guide for details on installing and configuring this function.

Once IBM Tivoli Monitoring has been configured to forward events to the Tivoli Enterprise Console, perform the steps described below. This procedure configuresTivoli Enterprise Console to send ITCAM for SOA events to the Event Handler. You should perform these steps on the server where Tivoli Enterprise Console is installed.

1. Create a temporary directory, for example C:\temp\itcamsoarules on a Windows system
2. Extract itcam4soa-tec-file.zip file from the sa04.zip or sa04.tgz file that is available on the Event Handler SupportPAC web page.
3. Extract the following files from the itcam4soa-tec-file.zip file to the temporary directory that you created in step 1:
   - install_itcam_rb.sh,
   - tec_itcam.rls,
   - tec_itcam.conf
   - kd4.baroc
   - kd4.map

   If Tivoli Enterprise Console is installed on a UNIX or Linux system, ensure install_itcam_rb.sh is granted execute permission.

4. Edit the following parameters in the tec_itcam.conf file:

Parameter name	Value	Parameter Description
ServerLocation=	Event Handler server address	Hostname or IP address of the server where the Event Handler is installed

ServerPort=	Event Handler port number	Port number that the Event Handler is listening on. By default, the Event Handler uses port number 1111. The port number must match the port number value specified when you configured the Event Handler.

3. Edit the following variables in itcam_rb.sh:

Variable name	Value Description
DIR=	Set this variable to the temporary directory that contains the install_rb.sh file. For example, DIR=C:\temp\itcamsoarules
RuleBase=	Set this variable to the rule base that was specified when IBM Tivoli Enterprise Console event synchronization was installed on the event server
RuleBasePath=	Set this variable to the rule base path that was specified when IBM Tivoli Enterprise Console event synchronization was installed on the event server.

4. Open a command line window

5. Set up the Tivoli Management Framework environment by running the following command:

   On a Windows system, run the following command:

   ```
   C:\WINDOWS\system32\drivers\etc\Tivoli\setup_env.cmd
   ```

   On a Linux or UNIX system, run the following command from a shell environment:

   ```
   . /etc/Tivoli/setup_env.sh
   ```

6. Change to the directory created in step 1.
7. Enter the following commands :

   bash

./install_itcam_rb.sh

Note: If the ITCAM for SOA monitoring agent .baroc file (kd4.baroc) is already loaded in the Tivoli Enterprise Console rule base, the install_itcam_rb.sh script will display error messages. You can ignore these messages.

8. Restart Tivoli Enterprise Console

Also ensure the kd4.map file is copied to the following directory on the system where Tivoli Enterprise Monitoring Server is installed:

- On a Windows system: C:\IBM\ITM\cms\TECLIB.
- On a UNIX or Linux system: /opt/IBM/ITM/tables/*host name*/TECLIB.

  where /opt/IBM/ITM and C:\IBM\ITM are the default locations where the Tivoli Enterprise Monitoring Server is installed and *host name* is the value supplied during the Tivoli Enterprise Monitoring Server configuration.

The kd4.map file is available on the ITCAM for SOA V6.1 installation media and also in the itcam4soa-tec-file.zip file.

The steps above install a re-send rule that forwards all ITCAM for SOA events to the Event Handler. All events, except events with the severity set to Harmless, are sent to the Event Handler.

ITCAM for SOA Event Properties

The table below lists the names of the event properties in the ITCAM for SOA events generated from the Services Inventory_610 table, also called an attribute group.

Note: If you define a custom situation for the Services Inventory_610 table that the Event Handler should process, you must select the Unique_Key_U event property as the value of the Display Item selection when configuring the advanced situation options.

Event Property Name	Description
appl_label	Application specific data related with the event, if any.
application_server_cellName_u	Name of the application server cell where the port and operation are deployed
application_servercluster_u	Name of the application server cluster where the port and operation are deployed
application_servername_u	Name of the application server where the port and operation are deployed
application_server_nodename_u	Node name of the application server where the port and operation are deployed
application_serverenv	Specifies the application server environment (1=WebSphere Application Server; 2=.NET; 3=WebLogic Server; 4=JBoss; 5=CICS; 6=SAP; 7=WebSphere Community Edition; 8=DataPower; 9=Service Component Architecture)
avg_elapsed_time	Average elapsed round trip time in milliseconds during this monitoring interval. This does not include values which were set to -1 to indicate entry requests.
avg_msg_length	The average message length, in bytes, observed during this monitoring interval (including headers when possible).
cms_hostname	TCP/IP host name of the Tivoli Enterprise Monitoring Server that forwards the event.
cms_port	Tivoli Enterprise Monitoring Server port on which the service is listening.
elapsed_time_msg_count	Number of messages observed during this monitoring interval that contain an elapsed time value.
fault_count	Number of faults observed during this monitoring interval.
hostname	Base event class attribute that contains the TCP/IP hostname of the managed system where the event originates, if available.
integration_type	Indicator to help Tivoli Enterprise Console performance. • N for a new event, the first time the event is raised • U for update event, subsequent event status changes
interval_begin_time	Inclusive beginning date and time of the monitoring interval.

interval_end_time	Exclusive ending date and time of the monitoring interval.
interval_length	Length of the monitoring interval in minutes.
interval_status	Specifies the status of this monitoring interval (1=Incomplete, 2=Complete). Incomplete means the end of this monitoring interval has not yet been reached.
local_hostname_u	Hostname of the machine where the port and operation are deployed
local_ipaddress_u	IP address of the machine where the port and operation are deployed
master_reset_flag	Master reset indicator set for master reset events. Value is NULL for all other events: • R for Tivoli Enterprise Monitoring Server recycle master_reset • S for hotstandby master_reset
max_elapsed_time	Largest elapsed time, in milliseconds, of any message observed during this monitoring interval.
max_msg_length	Length of the largest message, in bytes, observed during this monitoring interval.
min_elapsed_time	Smallest elapsed time, in milliseconds, of any message observed during this monitoring interval.
min_msg_length	Length of the smallest message, in bytes, observed during this monitoring interval.
msg	Base event class attribute that contains the situation name and formula.
msg_count	The number of messages observed during this monitoring interval.
operation_name_u	Web Services Description Language (WSDL) operation name
operation_namespace_u	Namespace used to fully qualify the operation name.
port_namespace_u	Namespace used to fully qualify the service port name.
port_number	The number of the port, 0 - 65535, on which the application container being monitored is listening. -1 if unknown.
severity	Base event class attribute that contains the resolved severity.
service_name_u	Service port name also known as the Web

	Services Description Language (WSDL) port name
situation_displayitem	Display item of associated situation, if available.
situation_eventdata	Event data attributes in key-value pair format. The event data can be truncated because the Event Integration Facility (EIF) imposes a 2k size limit.
situation_name	Name of the associated situation.
situation_origin	Same value as sub_source attribute.
situation_status	Current status of the situation event. • Y indicates the event has been opened. • N indicates the event has been closed • P indicates the situation has been stopped. Note: There are additional status values but the Event Handler does not take an action on those values.
situation_time	Timestamp of the situation event.
source	Base event class attribute that contains "ITM"
std_dev_elapsed_time	The standard deviation of all elapsed round trip times, in milliseconds, observed during this monitoring interval.
std_dev_msg_length	Standard deviation of all message lengths, in bytes, observed during this monitoring interval.
sub_source	Base event class attribute that contains the origin managed system name for the associated situation.
table_version_u	The version of this table definition.
unique_key_u	A unique hash of the service port namespace, service port name, operation namespace, operation name, and service type in this event.