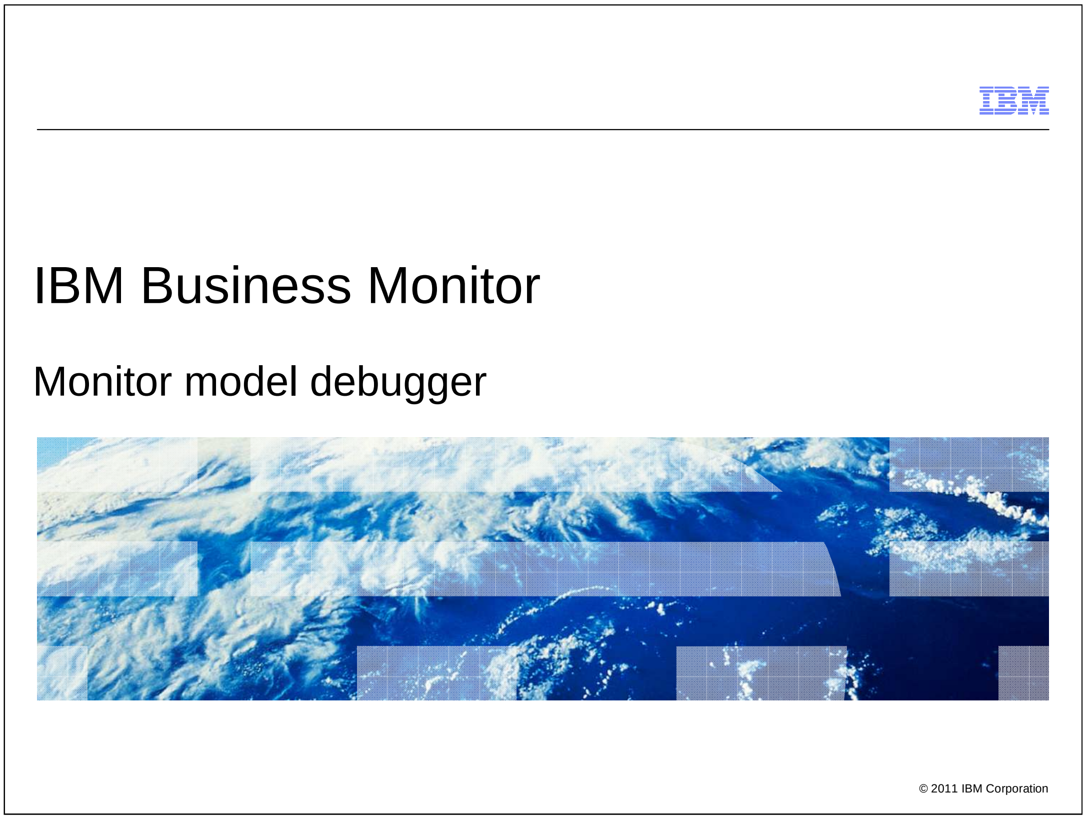

IBM Business Monitor

Monitor model debugger

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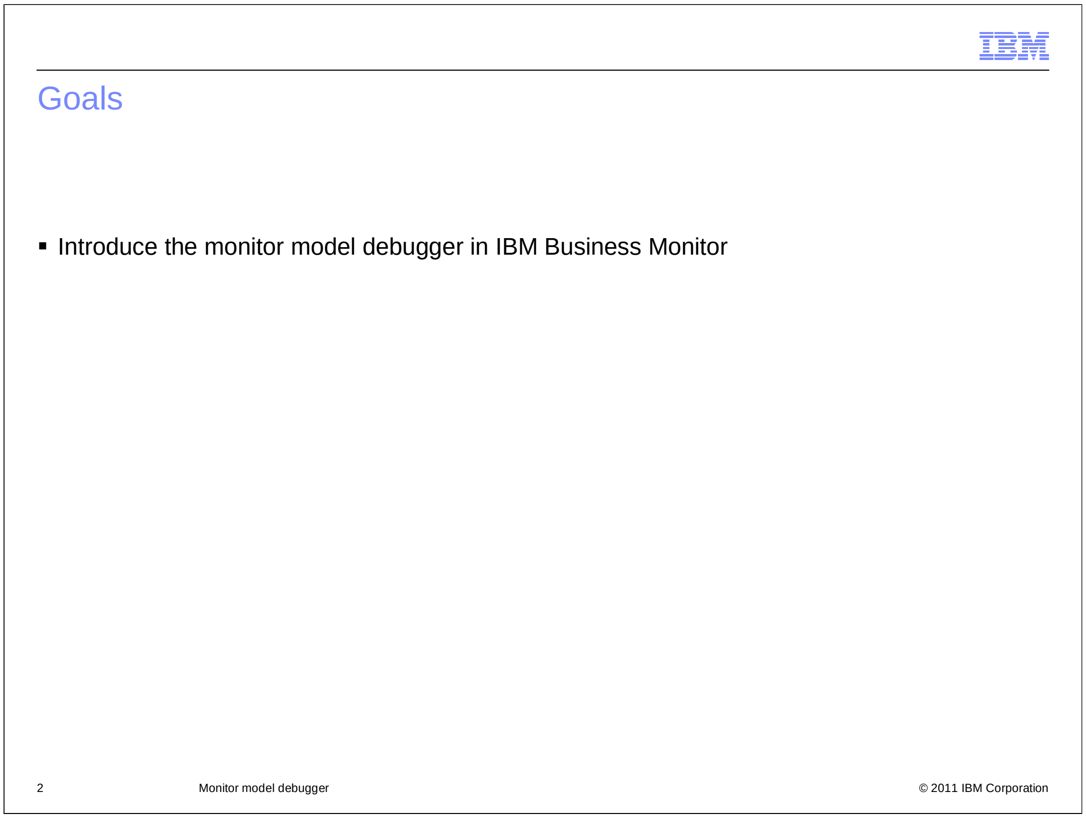
This presentation provides an overview of the monitor model debugger in IBM Business Monitor.

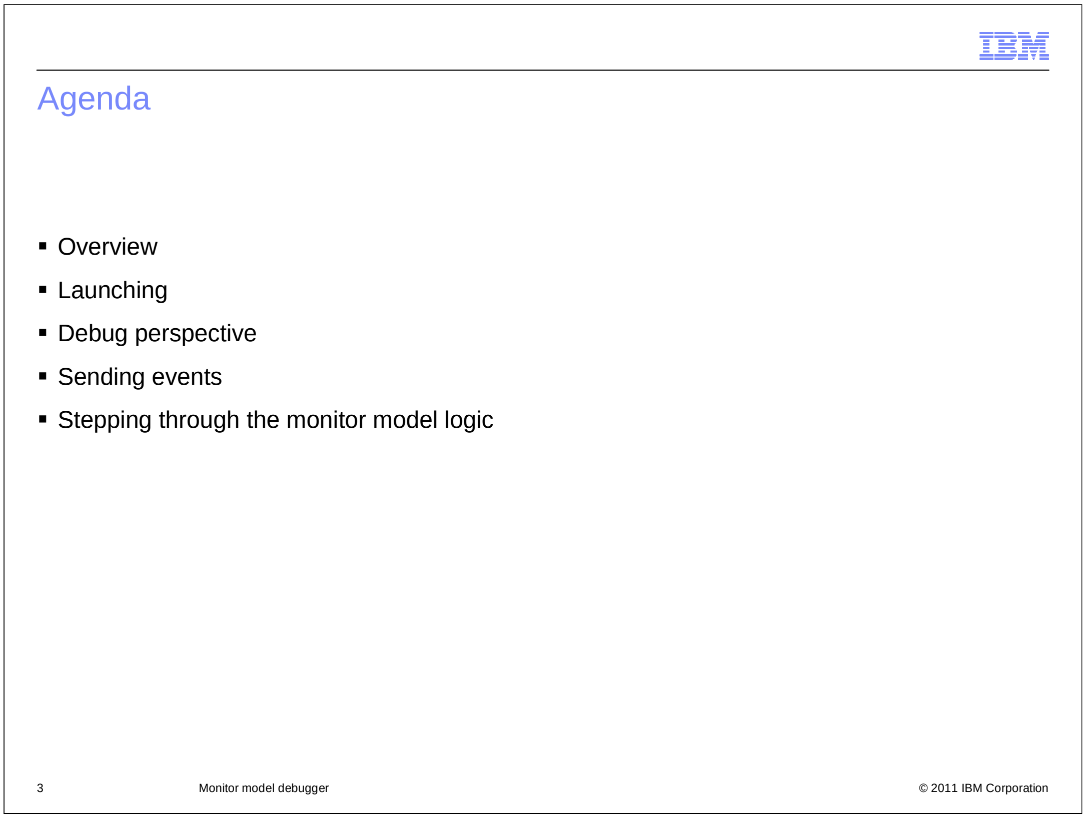


Goals

- Introduce the monitor model debugger in IBM Business Monitor

2 Monitor model debugger © 2011 IBM Corporation

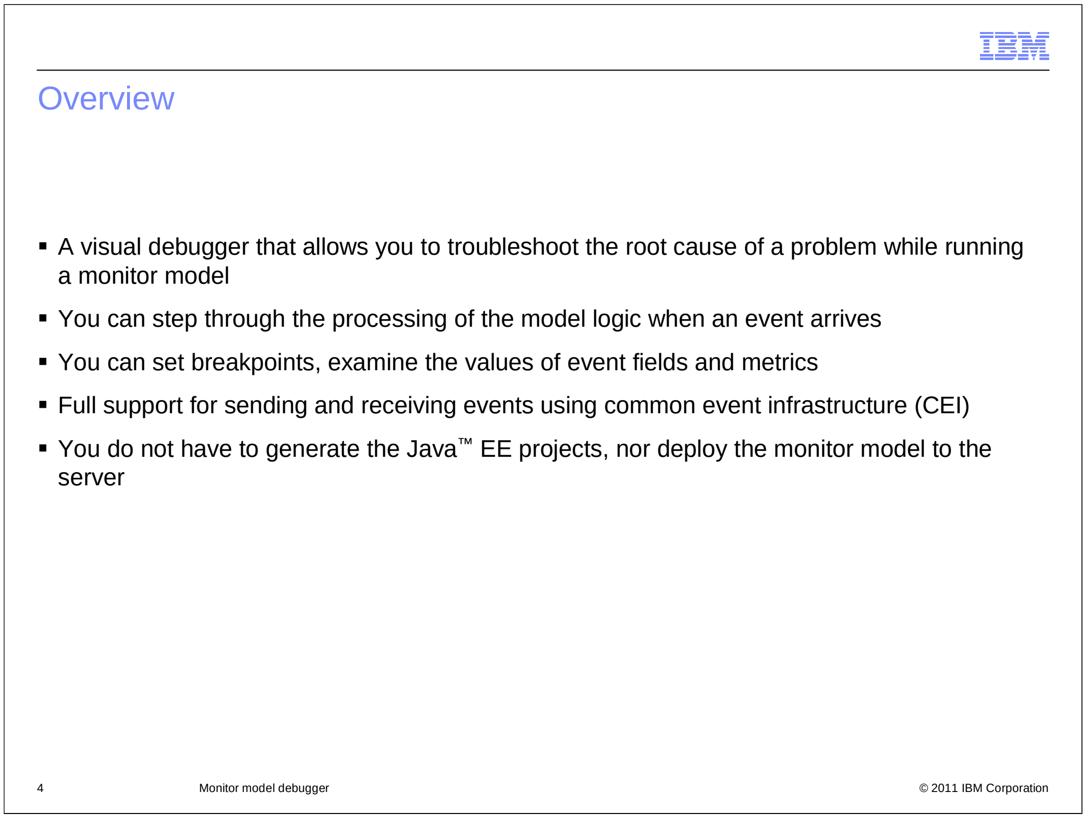
This presentation will give you an overview of the monitor model debugger and how you can use it to resolve problems in the processing logic in your monitor models.



Agenda

- Overview
- Launching
- Debug perspective
- Sending events
- Stepping through the monitor model logic

This is the agenda for this presentation. You will see an overview of the debugger. In addition you will review the debug perspective and how to launch it and how to use it, including how to send events using the integrated test client. Then you will learn how to step through the logic of your monitor model, including instances, KPI's and measures.



Overview

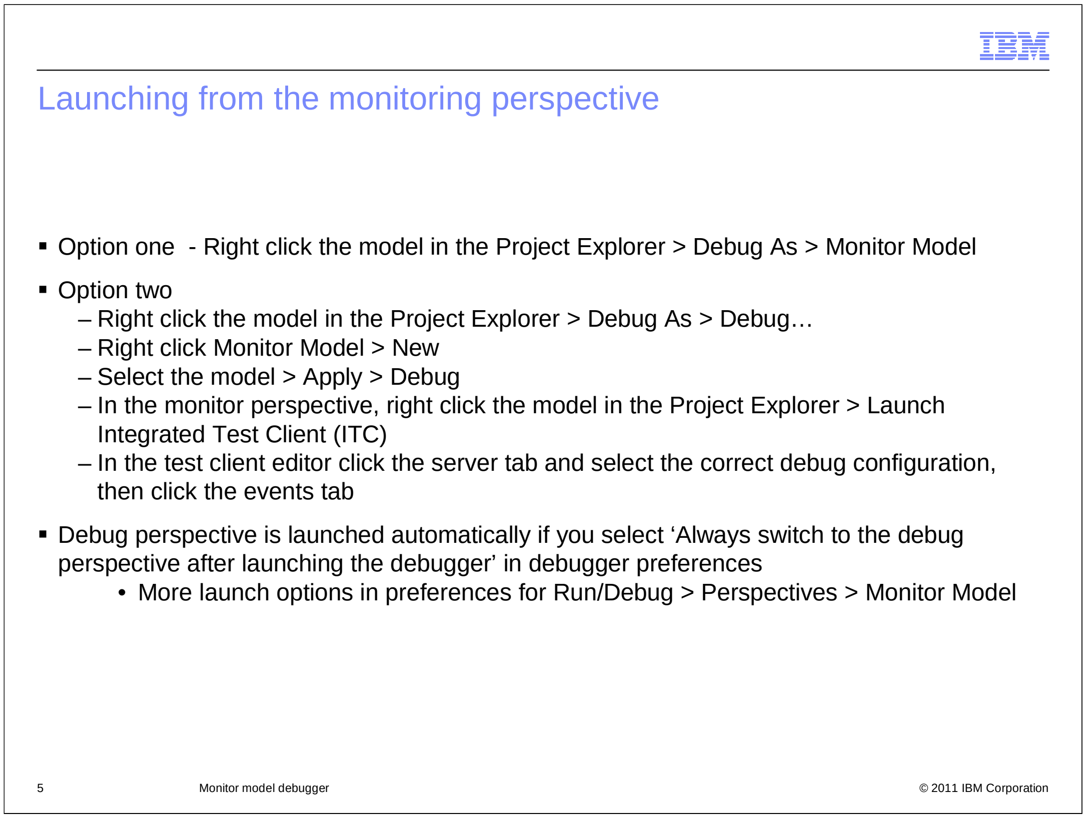
- A visual debugger that allows you to troubleshoot the root cause of a problem while running a monitor model
- You can step through the processing of the model logic when an event arrives
- You can set breakpoints, examine the values of event fields and metrics
- Full support for sending and receiving events using common event infrastructure (CEI)
- You do not have to generate the Java™ EE projects, nor deploy the monitor model to the server

4 Monitor model debugger © 2011 IBM Corporation

The debugger tool is integrated with the Monitor development toolkit and is used to debug monitor models as they run on the Monitor test server. It is very helpful when you have a monitor model that is not processing events due to a problem with correlation or filters. The debugger is also useful when the monitored data seems to be incorrect in your dashboards or if you have missing outbound events.

The debugger provides a graphical user interface so that you can step through the monitor model logic. You can set breakpoints anywhere in the model, and examine values of metrics and event data.

There is support for sending and receiving events using the common event infrastructure (CEI). To use CEI it is not necessary to generate the Java EE projects or deploy the monitor model to the server. And you have many options for sending events including using the integrated test client, the BPC explorer, recorded events manager or any application that submits events to CEI.



Launching from the monitoring perspective

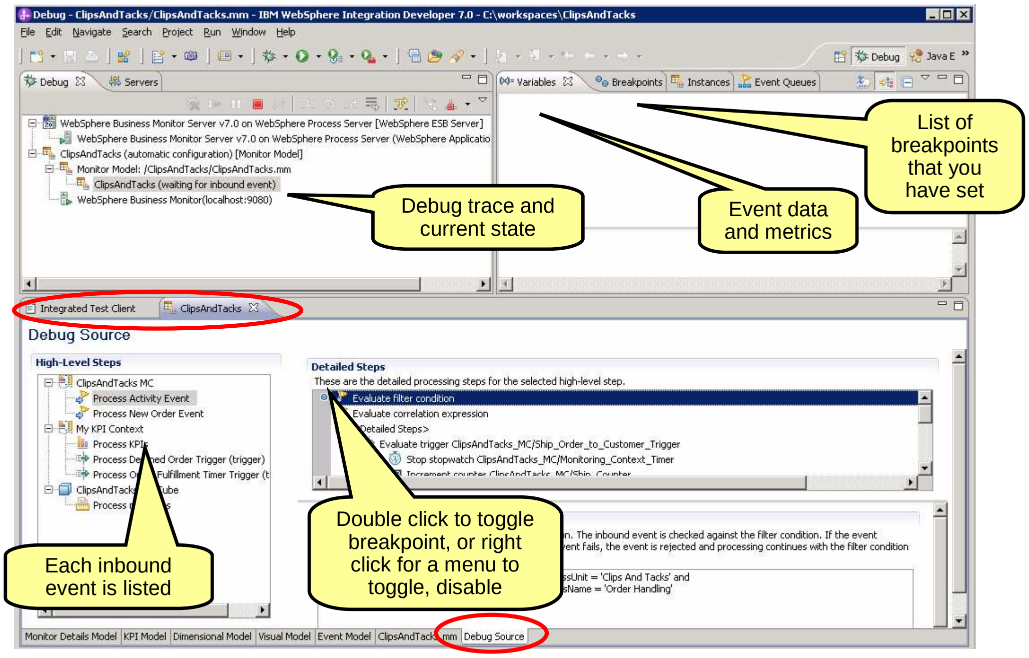
- Option one - Right click the model in the Project Explorer > Debug As > Monitor Model
- Option two
  - – Right click the model in the Project Explorer > Debug As > Debug…
  - – Right click Monitor Model > New
  - – Select the model > Apply > Debug
  - – In the monitor perspective, right click the model in the Project Explorer > Launch Integrated Test Client (ITC)
  - – In the test client editor click the server tab and select the correct debug configuration, then click the events tab
- Debug perspective is launched automatically if you select ‘Always switch to the debug perspective after launching the debugger’ in debugger preferences
  - • More launch options in preferences for Run/Debug > Perspectives > Monitor Model

5 Monitor model debugger © 2011 IBM Corporation

You can launch the debugger in two different ways. Option one is the simplest way to do it, because it automatically creates a debug configuration and opens the integrated test client. Option two provides some debug session options on the debug launcher that you can use to tailor to your needs. However you can also access these same options in the Monitor debugger preferences for the workspace. With the second option, you must create the debug configuration yourself, and you must also manually start the integrated test client and configure it for your debug session.

In either case, if the debug perspective is not opened automatically, then you can go to the workspace preferences and adjust the settings to control this.

Debug perspective



Debug - ClipsAndTacks/ClipsAndTacks.mm - IBM WebSphere Integration Developer 7.0 - C:\workspaces\ClipsAndTacks
File Edit Navigate Search Project Run Window Help
Debug
Servers
Variables
Breakpoints
Instances
Event Queues
WebSphere Business Monitor Server v7.0 on WebSphere Process Server [WebSphere ESB Server]
WebSphere Business Monitor Server v7.0 on WebSphere Process Server (WebSphere Applicatio
ClipsAndTacks (automatic configuration) [Monitor Model]
Monitor Model: /ClipsAndTacks/ClipsAndTacks.mm
ClipsAndTacks (waiting for inbound event)
WebSphere Business Monitor(localhost:9080)
Integrated Test Client
ClipsAndTacks
Debug Source
High-Level Steps
ClipsAndTacks MC
Process Activity Event
Process New Order Event
My KPI Context
Process KPIs
Process Defined Order Trigger (trigger)
Process Order Fulfillment Timer Trigger (t
Detailed Steps
Evaluate filter condition
Evaluate correlation expression
Detailed Steps>
Evaluate trigger ClipsAndTacks_MC/Ship_Order_to_Customer_Trigger
Stop stopwatch ClipsAndTacks_MC/Monitoring_Context_Timer
Monitor Details Model
KPI Model
Dimensional Model
Visual Model
Event Model
ClipsAndTacks.mm
Debug Source

These are the detailed processing steps for the selected high-level step.

List of breakpoints that you have set

Event data and metrics

Debug trace and current state

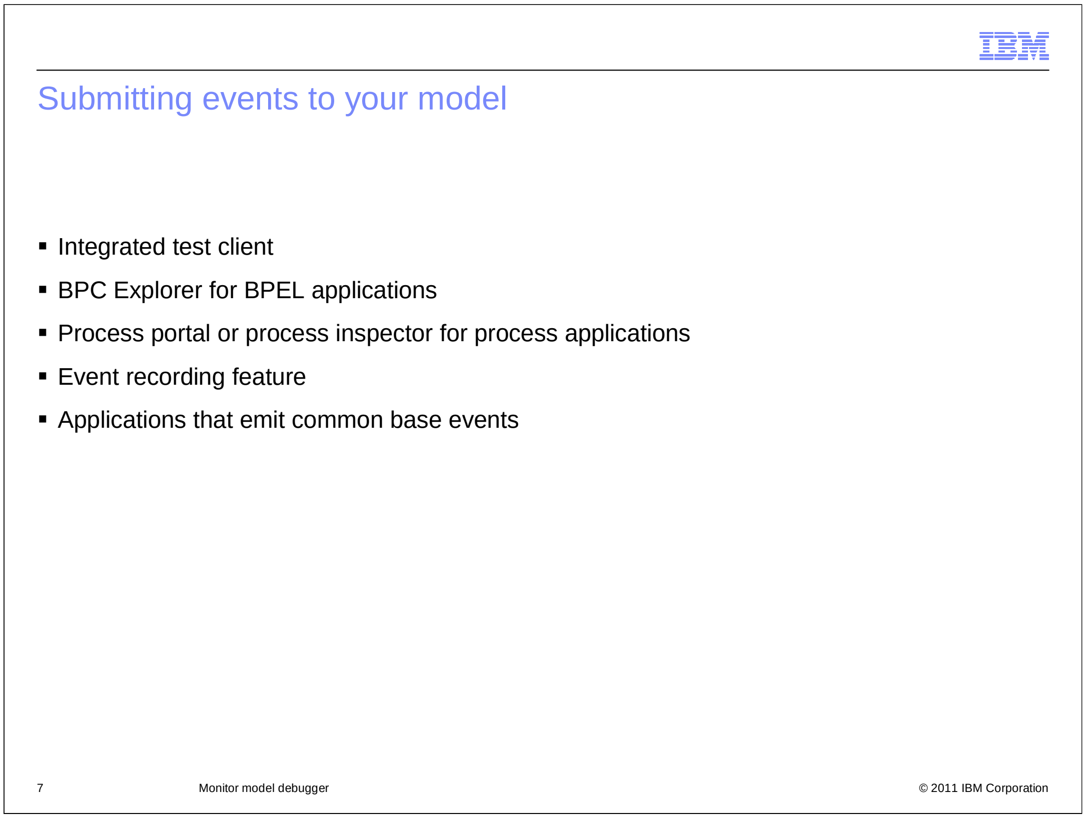
Each inbound event is listed

Double click to toggle breakpoint, or right click for a menu to toggle, disable

6 Monitor model debugger © 2011 IBM Corporation

This is a screen capture of the debug perspective immediately after a debug session has been started for a monitor model. The debug tab in the upper left pane shows you the name of the monitor model and shows that the debugger is waiting for an inbound event. The variables tab in the upper right corner will eventually show you the values of fields in your inbound events and the metric values in the monitoring context instances. The breakpoints tab shows a list of all of your breakpoints in the model. The instances tab shows you the current list of monitoring instances that have been created. The event queues tab shows a list of the inbound events in the queue.

In the middle of this screen capture you see that the integrated test client is opened in a tab and the monitor model ‘ClipsAndTacks’ has been opened in the monitor model editor. At the bottom of the window a new tab has been added for the debug source view. This is where you can see the detailed steps that the debugger takes through your model. In the debug source view, there is a list of the high level steps in the model which shows you the inbound events and triggers for each monitoring context. When you select one of them, then the associated detailed steps are shown to the right. In the detailed steps, there is a gray bar where you can double click to toggle breakpoints.



Submitting events to your model

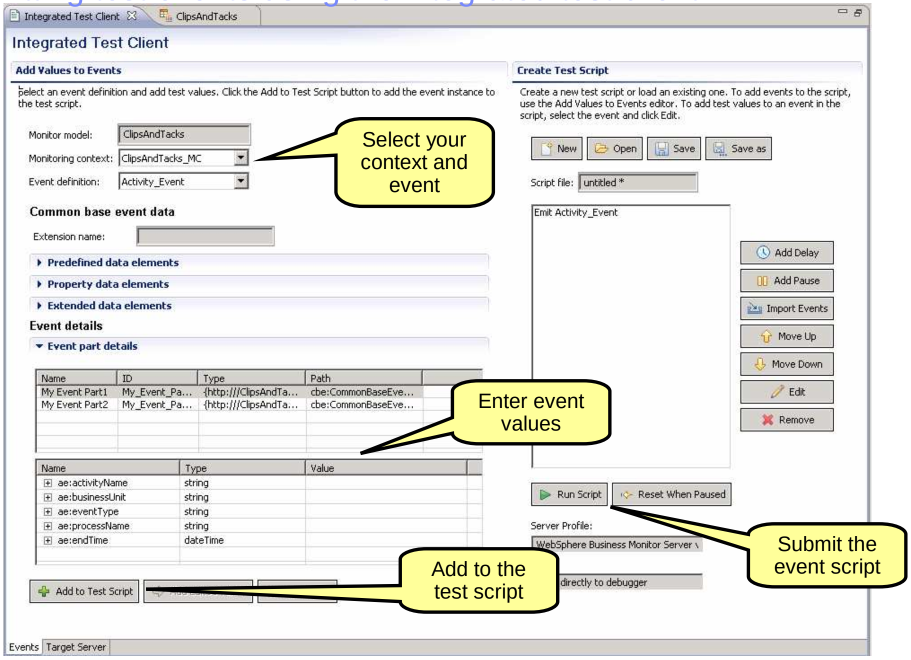
- Integrated test client
- BPC Explorer for BPEL applications
- Process portal or process inspector for process applications
- Event recording feature
- Applications that emit common base events

7 Monitor model debugger © 2011 IBM Corporation

You can send events to the monitor model debugger as you normally send events to be monitored. You do not need to generate Java projects or add the projects to the server.

You can use the integrated test client to send events to your monitor model in the debugger. In this client you can easily create events based on the event definitions in the model, import files containing events, and create scripts containing event streams. You can use the BPC Explorer if your monitor model is monitoring BPEL processes. If you are monitoring process applications, then you can use the process portal or process inspector to instantiate processes which will send the events. You can use the event recording feature in the administrative console. This makes it easy to capture a series of events to be played back at any time. You can also use any application that emits common base events to the common event infrastructure.

Submitting test events using the integrated test client



Integrated Test Client

Add Values to Events

Select an event definition and add test values. Click the Add to Test Script button to add the event instance to the test script.

Monitor model: ClipsAndTacks
Monitoring context: ClipsAndTacks_MC
Event definition: Activity_Event

Common base event data

Extension name:

- Predefined data elements
- Property data elements
- Extended data elements

Event details

- Event part details

Name	ID	Type	Path
My Event Part1	My_Event_Pa...	{http:///ClipsAndTa...	cbe:CommonBaseEve...
My Event Part2	My_Event_Pa...	{http:///ClipsAndTa...	cbe:CommonBaseEve...

Name	Type	Value
ae:activityName	string	
ae:businessUnit	string	
ae:eventType	string	
ae:processName	string	
ae:endTime	dateTime	

Create Test Script

Create a new test script or load an existing one. To add events to the script, use the Add Values to Events editor. To add test values to an event in the script, select the event and click Edit.

Script file: untitled *

Emit Activity_Event

Server Profile: WebSphere Business Monitor Server \

directly to debugger

Select your context and event

Enter event values

Add to the test script

Submit the event script

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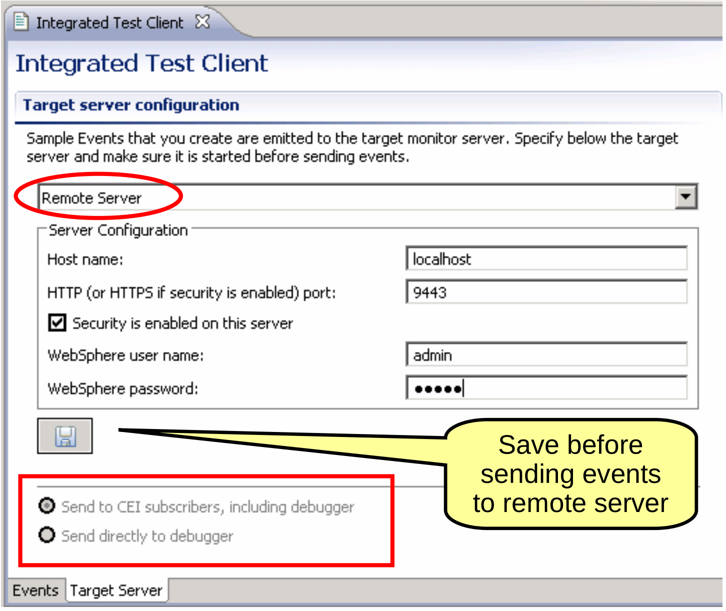
When using the integrated test client to submit events to the debugger, you can select the monitoring context and event definition, and then enter values for the fields in the event. You can create a script containing one or more events to submit. When you have finished building your event script, then press the button to run the script.

Integrated test client – Target server



Integrated Test Client

Integrated Test Client

Target server configuration

Sample Events that you create are emitted to the target monitor server. Specify below the target server and make sure it is started before sending events.

Remote Server ▾

Server Configuration

Host name:	localhost
HTTP (or HTTPS if security is enabled) port:	9443
☑ Security is enabled on this server	
WebSphere user name:	admin
WebSphere password:	●●●●●

● Send to CEI subscribers, including debugger

○ Send directly to debugger

Save before sending events to remote server

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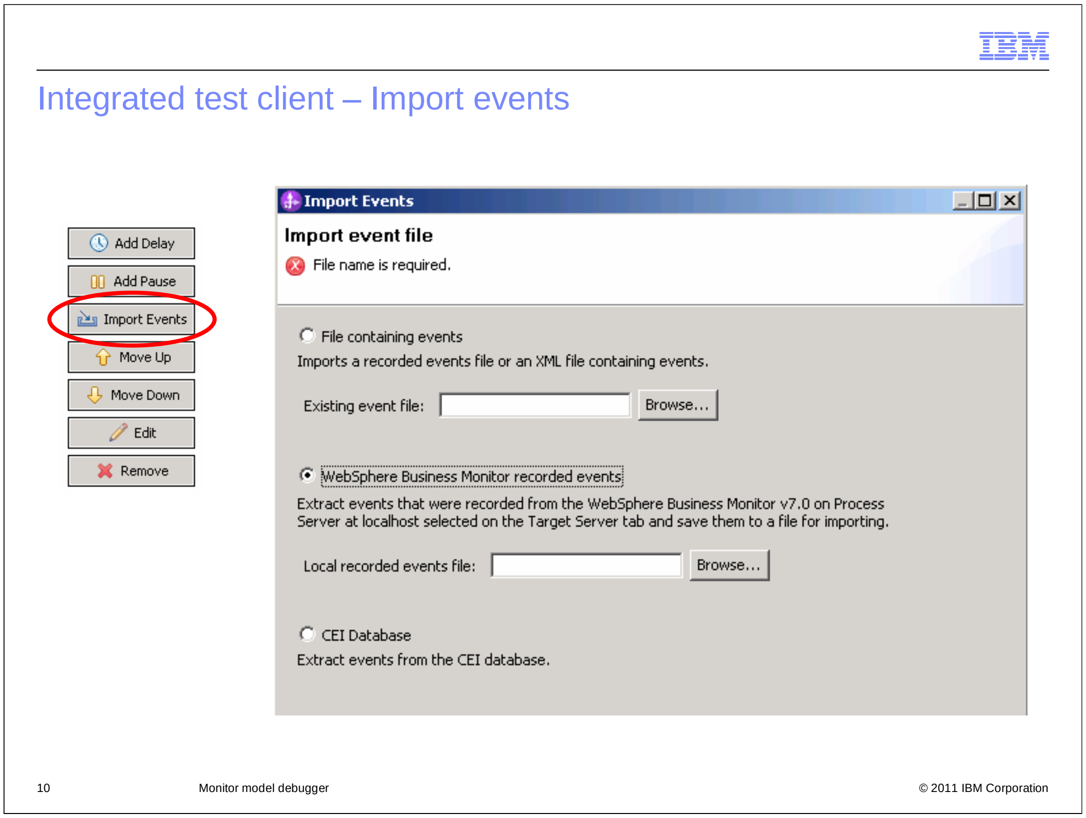
The Integrated Test Client automatically selects the Monitor test environment server where the generated application for your Business Monitoring project was published. You can use the Target Server page in the Integrated Test Client to specify a different server. You can also specify a remote server. Be sure to save the configuration before submitting the events. You are also given the choice to send the events to the debugger only or to all CEI subscribers.



Integrated test client – Import events

Import Events

Import event file

File name is required.

○ File containing events

Imports a recorded events file or an XML file containing events.

Existing event file: [ ] Browse...

● WebSphere Business Monitor recorded events

Extract events that were recorded from the WebSphere Business Monitor v7.0 on Process Server at localhost selected on the Target Server tab and save them to a file for importing.

Local recorded events file: [ ] Browse...

○ CEI Database

Extract events from the CEI database.

10 Monitor model debugger © 2011 IBM Corporation

You can use the Integrated Test Client to import events when the test script runs. These events can come from an existing file or you can choose to create a file from previously recorded events. Recording and playing back events enables you to iteratively test your monitor model without having to rerun the monitored application..

For more control over recording and playing back events, including filtering and managing the events, use Recorded Events Management in the WebSphere® Application Server administrative console.

Here you see the dialog for importing events.

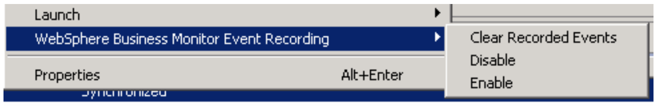
The first option allows you to import an existing event file. This file can be a Monitor recorded events file that has been exported from the administrative console or it can be an XML file that contains Common Base Events.

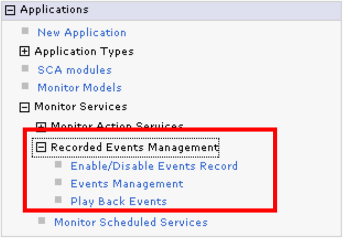
The second option allows you to use the events that were recorded while the server was running. Enter a name for a file to be created based on the recorded events. Make sure that the Target Server tab of the Integrated Test Client refers to the server where the events were recorded. Recording events is enabled by default in the test environment. You can change the settings by right-clicking a test server in the Servers view and selecting WebSphere Monitor Event Recording. You can enable or disable recording, and clear recorded events.

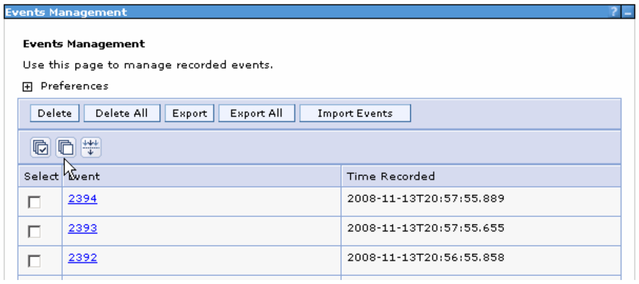
The third option allows you to extract events from the CEI database. To import events from CEI, you must have a running test server selected in the Target Server tab of the Integrated Test Client. Click the Target Server tab and select a running test server from the drop-down list to import Common Base Events. After you specify the events, re-select the debugger from the drop-down list for sending the events. Then click Next to limit the events that are put into the file from the CEI database. You can filter events based on extension name, start time, end time, severity and total count.

Event recording and playback

- Use the administrative console to select events to playback or export
- Use toolkit server menu to manage recording during development cycle







Events Management

Use this page to manage recorded events.

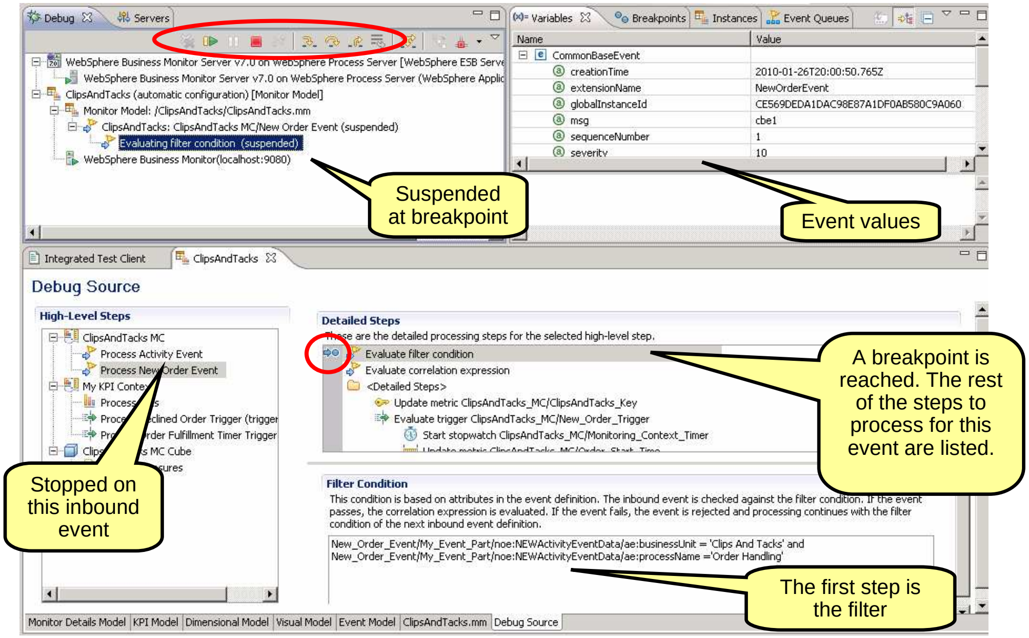
Select	Event	Time Recorded
□	2394	2008-11-13T20:57:55.889
□	2393	2008-11-13T20:57:55.655
□	2392	2008-11-13T20:56:55.858

The event recording feature allows you to record an event sequence for subsequent playback. This is very useful if you want to iteratively test a monitor model as you continually change and develop the model. For any application you can enable event recording, then manually step through the process or the application which will then generate the event sequence. The event sequence is saved to a database, so then you can replay the event sequence later to re-run the test. You can use scripts or the administrative console to manage these functions. Also, you can activate the event recording in the monitor toolkit. And you can import these events into an integrated test console script.

To enable event recording, you can use the administrative pages or you can also use the server menu in the monitor toolkit.

You can use the administrative console to manage the events. On the events management page, you can list the events that have been recorded, and you can click an event to see the details of an individual event. You can also select options to delete, import and export. The import and export functions allow you to save events to the file system. On the play back page, you can select events and model version and then you can initiate a play back.

Event filtering



```
WebSphere Business Monitor Server v7.0 on WebSphere Process Server [WebSphere ESB Serve
  WebSphere Business Monitor Server v7.0 on WebSphere Process Server (WebSphere Applic
ClipsAndTacks (automatic configuration) [Monitor Model]
  Monitor Model: /ClipsAndTacks/ClipsAndTacks.mm
    ClipsAndTacks: ClipsAndTacks MC/New Order Event (suspended)
      Evaluating filter condition  (suspended)
  WebSphere Business Monitor(localhost:9080)
```

Name	Value
CommonBaseEvent	
creationTime	2010-01-26T20:00:50.765Z
extensionName	NewOrderEvent
globalInstanceId	CE569DEDA1DAC98E87A1DF0AB580C9A060
msg	cbe1
sequenceNumber	1
severity	10

Suspended at breakpoint

Event values

Debug Source

High-Level Steps

```
ClipsAndTacks MC
  Process Activity Event
  Process New Order Event
My KPI Contex
  Process   s
  Proce   eclined Order Trigger (trigger
  Pr   rder Fulfillment Timer Trigger
Clips   s MC Cube
        sures
```

Detailed Steps

These are the detailed processing steps for the selected high-level step.

```
Evaluate filter condition
Evaluate correlation expression
<Detailed Steps>
  Update metric ClipsAndTacks_MC/ClipsAndTacks_Key
  Evaluate trigger ClipsAndTacks_MC/New_Order_Trigger
    Start stopwatch ClipsAndTacks_MC/Monitoring_Context_Timer
```

Filter Condition

This condition is based on attributes in the event definition. The inbound event is checked against the filter condition. If the event passes, the correlation expression is evaluated. If the event fails, the event is rejected and processing continues with the filter condition of the next inbound event definition.

```
New_Order_Event/My_Event_Part/noe:NEWActivityEventData/ae:businessUnit = 'Clips And Tacks' and
New_Order_Event/My_Event_Part/noe:NEWActivityEventData/ae:processName ='Order Handling'
```

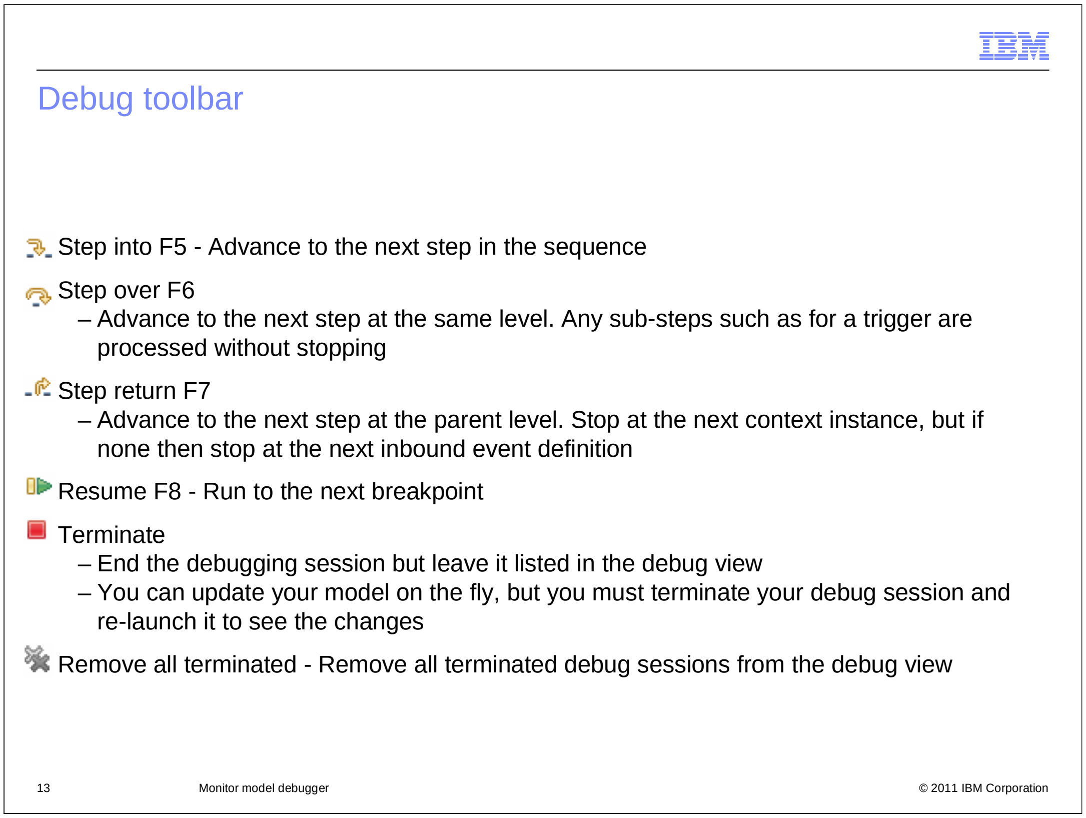
A breakpoint is reached. The rest of the steps to process for this event are listed.

Stopped on this inbound event

The first step is the filter

12 Monitor model debugger © 2011 IBM Corporation

When an event has been received then the debugger processes the event as it steps through the model logic. When it reaches a breakpoint, then you see the results as shown in this screen capture. In the debug tab, you can use the icons to step through the logic, resume processing or terminate the session. Here you see that the status of the model is suspended which means that the debugger has found a breakpoint and has stopped processing. In the variables tab you see the values for each field in the inbound event. In the high level steps you see that the corresponding inbound event is highlighted and that the breakpoint is highlighted in the detailed steps. In this case, there is a breakpoint on the filter condition, and below the detailed steps you see the filter condition that is processed. If the filter condition resolves to true then the next step to process is the correlation expression.



IBM

Debug toolbar

- Step into F5 - Advance to the next step in the sequence
- Step over F6
  - Advance to the next step at the same level. Any sub-steps such as for a trigger are processed without stopping
- Step return F7
  - Advance to the next step at the parent level. Stop at the next context instance, but if none then stop at the next inbound event definition
- Resume F8 - Run to the next breakpoint
- Terminate
  - End the debugging session but leave it listed in the debug view
  - You can update your model on the fly, but you must terminate your debug session and re-launch it to see the changes
- Remove all terminated - Remove all terminated debug sessions from the debug view

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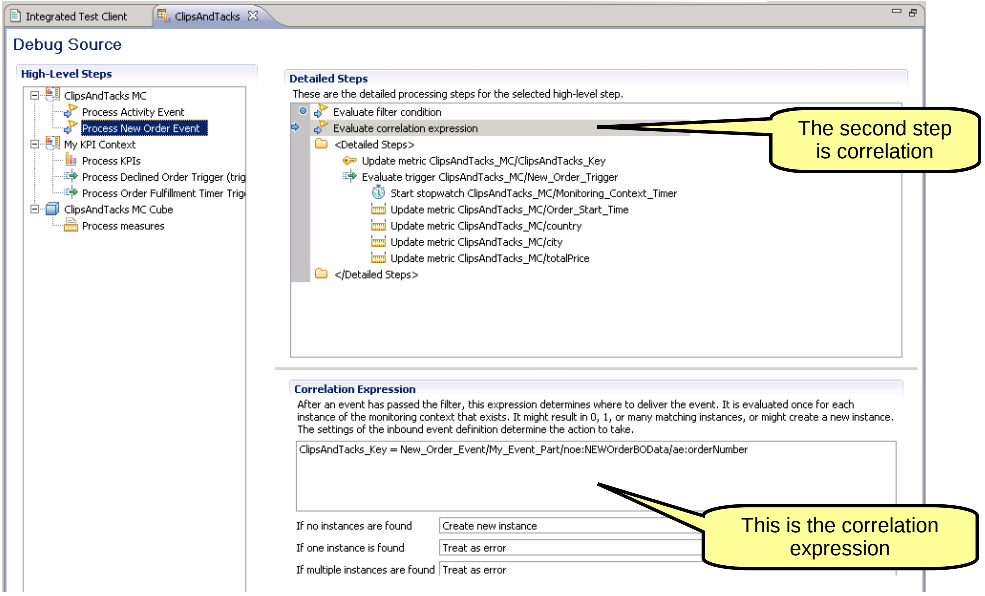
On the debug toolbar you can select different options for controlling the behavior of the debugger. ‘Step into’ is used to continue to the next step in the sequence. ‘Step over’ advances to the next step but only if it is at the same level as the current level. So, for example, if the next step was a trigger which has sub-steps then it is processed without stopping in the sub-steps. ‘Step return’ advances to the next step at the parent level, so the debugger stops at the next monitoring context instance or the next inbound event definition.

You also have icons to resume, terminate and ‘remove all terminated’. Note that if you update your monitor model in the middle of a debug session, then you need to terminate and then restart your debug session in order to see the updates.

Note that for ‘Step over’ and ‘Step return’, breakpoints are respected.

Correlation



Debug Source

High-Level Steps

- ClipsAndTacks MC
  - Process Activity Event
  - Process New Order Event
- My KPI Context
  - Process KPIs
  - Process Declined Order Trigger (trig
  - Process Order Fulfillment Timer Trig
- ClipsAndTacks MC Cube
  - Process measures

Detailed Steps

These are the detailed processing steps for the selected high-level step.

```
Evaluate filter condition
Evaluate correlation expression
<Detailed Steps>
    Update metric ClipsAndTacks_MC/ClipsAndTacks_Key
    Evaluate trigger ClipsAndTacks_MC/New_Order_Trigger
        Start stopwatch ClipsAndTacks_MC/Monitoring_Context_Timer
        Update metric ClipsAndTacks_MC/Order_Start_Time
        Update metric ClipsAndTacks_MC/country
        Update metric ClipsAndTacks_MC/city
        Update metric ClipsAndTacks_MC/totalPrice
</Detailed Steps>
```

Correlation Expression

After an event has passed the filter, this expression determines where to deliver the event. It is evaluated once for each instance of the monitoring context that exists. It might result in 0, 1, or many matching instances, or might create a new instance. The settings of the inbound event definition determine the action to take.

```
ClipsAndTacks_Key = New_Order_Event/My_Event_Part/noe:NEWOrderBOData/ae:orderNumber
```

If no instances are found	Create new instance
If one instance is found	Treat as error
If multiple instances are found	Treat as error

The second step is correlation

This is the correlation expression

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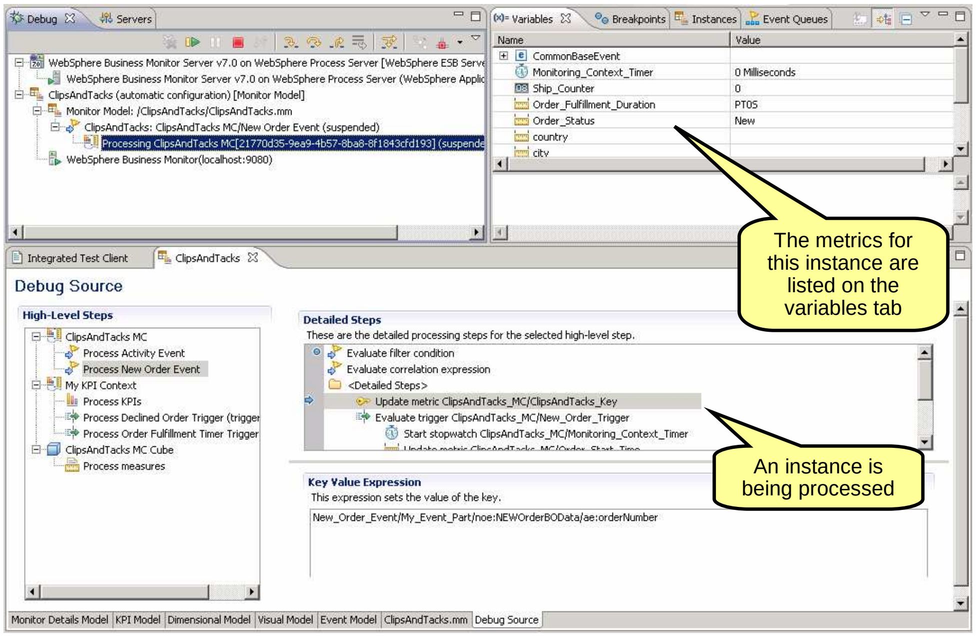
In this screen capture the debugger is stopped on the correlation step which follows the filtering step, and you can see this in the detailed steps. Below the detailed steps you can view the correlation expression. If the correlation expression resolves to true then the next steps in the sequence will process the monitoring context instances, so a new monitoring context is created or an attempt is made to match to existing instances.

Processing a monitoring context



WebSphere Business Monitor Server v7.0 on WebSphere Process Server [WebSphere ESB Serve
WebSphere Business Monitor Server v7.0 on WebSphere Process Server (WebSphere Applic
ClipsAndTacks (automatic configuration) [Monitor Model]
Monitor Model: /ClipsAndTacks/ClipsAndTacks.mm
ClipsAndTacks: ClipsAndTacks MC/New Order Event (suspended)
Processing ClipsAndTacks MC[21770d35-9ea9-4b57-8ba8-8f1843cfd193] (suspende
WebSphere Business Monitor(localhost:9080)

Name	Value
CommonBaseEvent	
Monitoring_Context_Timer	0 Milliseconds
Ship_Counter	0
Order_Fulfillment_Duration	PT0S
Order_Status	New
country	
city	

Debug Source

High-Level Steps

ClipsAndTacks MC
Process Activity Event
Process New Order Event
My KPI Context
Process KPIs
Process Declined Order Trigger (trigger
Process Order Fulfillment Timer Trigger
ClipsAndTacks MC Cube
Process measures

Detailed Steps

These are the detailed processing steps for the selected high-level step.

Evaluate filter condition
Evaluate correlation expression
<Detailed Steps>
Update metric ClipsAndTacks_MC/ClipsAndTacks_Key
Evaluate trigger ClipsAndTacks_MC/New_Order_Trigger
Start stopwatch ClipsAndTacks_MC/Monitoring_Context_Timer
Update metric ClipsAndTacks_MC/Order_Start_Time

Key Value Expression

This expression sets the value of the key.

New_Order_Event/My_Event_Part/noe:NEWOrderBOData/ae:orderNumber

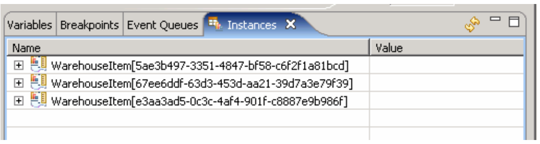
The metrics for this instance are listed on the variables tab

An instance is being processed

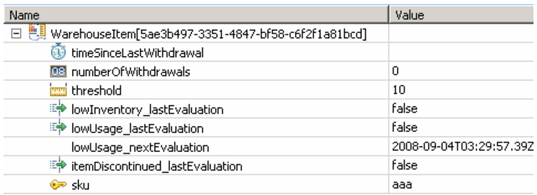
In this screen capture you can see in the detailed steps that the debugger is stopped at the first step in the monitoring context instances. So, either a new instance has been created or an existing instance has been matched. You can view all the metrics for this instance in the variables tab. Also, you can view the key for the instance, so it is easy to determine which instance is being processed by observing the value of the key metric.

Instances view

- Lists monitoring context instances including context that is being processed
- Metrics are listed for each instance, but you cannot update metric values here



Name	Value
⊞ WarehouseItem[5ae3b497-3351-4847-bf58-c6f2f1a81bcd]	
⊞ WarehouseItem[67ee6ddf-63d3-453d-aa21-39d7a3e79f39]	
⊞ WarehouseItem[e3aa3ad5-0c3c-4af4-901f-c8887e9b986f]	



Name	Value
⊟ WarehouseItem[5ae3b497-3351-4847-bf58-c6f2f1a81bcd]	
timeSinceLastWithdrawal	
numberOfWithdrawals	0
threshold	10
lowInventory_lastEvaluation	false
lowUsage_lastEvaluation	false
lowUsage_nextEvaluation	2008-09-04T03:29:57.39Z
itemDiscontinued_lastEvaluation	false
sku	aaa

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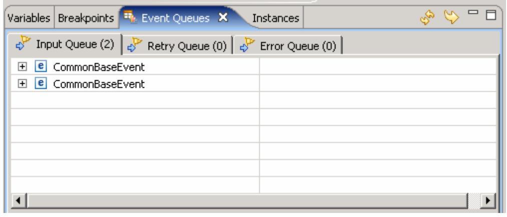
There is a tab for viewing monitoring context instances. This view lists all instances that have been created during your debug session. For each instance the view also lists the metrics associated with that instance. The contents of the instances view are refreshed automatically when you are stepping through the processing of an inbound event. You can also refresh the Instances view by clicking Refresh in the upper right corner of the view. You can also view parent and child instances in the Instances view.

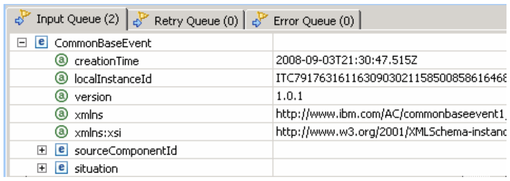
Note that you cannot update the value of metrics in the instances tab.

Event queues

- Shows incoming events, retries and errors
- You can click the refresh icon in the upper right corner
  - – It is refreshed only when an event is completed
- You can expand each event to see the payload



CommonBaseEvent	
CommonBaseEvent	



CommonBaseEvent	
creationTime	2008-09-03T21:30:47.515Z
localInstanceId	ITC791763161163090302115850085861646
version	1.0.1
xmlns	http://www.ibm.com/AC/commonbaseevent1
xmlns:xsi	http://www.w3.org/2001/XMLSchema-instanc
sourceComponentId	
situation	

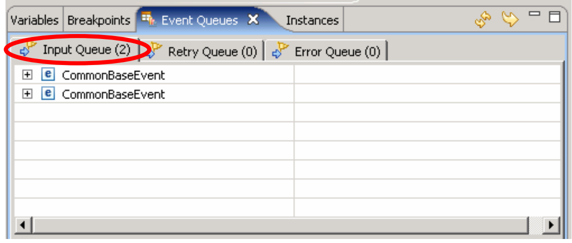
The event queues view shows the input queue, retry queue, and error queue. The number of events in each queue is shown on the tab next to the queue name. You can open an event in any of the queues and inspect the content. You cannot change the content of an event in a queue, nor the order of the events.

The Event Queues view refreshes each time the debugger finishes processing an event. Sometimes you might want to refresh the view manually, such as if you send more events while stepping through processing in the debugger.

You can also expand each event to see the payload on the event.

Input queue

- The event that is currently being processed is not listed here but is listed in the Variables tab
- Processed top down in the queue



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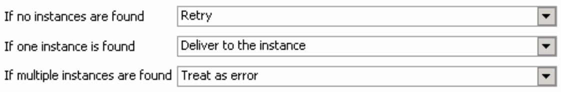
The input queue shows the sequence of events that are waiting to be processed by the debugger. For example, if you run a script that submits three events, you will see two events show up on the input queue. And one event is sent to the debugger immediately, and can be seen in the variables view.

Events are processing by the debugger from the top down in the list.

Retry queue

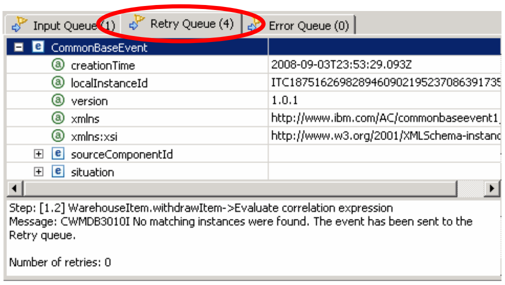
- In the monitor model, the inbound event is specified as ‘Retry’ if no instance is found
- Fix the missing instance, then resubmit to the input queue using menu item ‘Retry event’
- Message shows the number of retries for the selected retry event



If no instances are found: Retry

If one instance is found: Deliver to the instance

If multiple instances are found: Treat as error



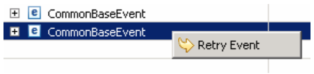
CommonBaseEvent	
creationTime	2008-09-03T23:53:29.093Z
localInstanceId	ITC187516269828946090219523708639173
version	1.0.1
xmlns	http://www.ibm.com/AC/commonbaseevent1
xmlns:xsi	http://www.w3.org/2001/XMLSchema-instanc
sourceComponentId	
situation	

Step: [1.2] WarehouseItem.withdrawItem->Evaluate correlation expression
Message: CWMDB3010I No matching instances were found. The event has been sent to the Retry queue.

Number of retries: 0

Retry event payload

Message indicates retry reason and number of retries



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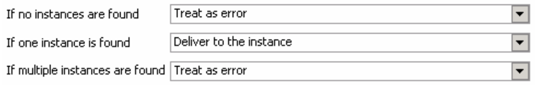
The retry queue shows the events that failed because an inbound event returned no matching instances and retry is the event delivery option. For a selected event, a message at the bottom of the view shows the number of times that the event has been retried, and the reason that the event was placed on the retry queue.

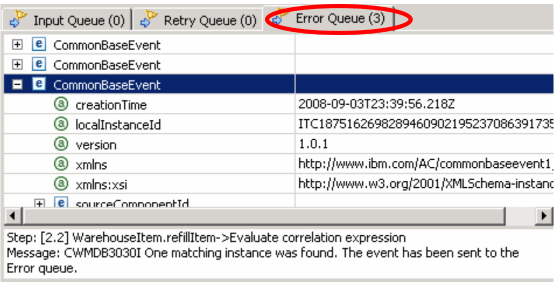
You should fix the problem by submitting appropriate events to create the missing instance, and then you can resubmit the event by using the pop-up menu item to retry the event.

Error queue

- Error sources
  - In the monitor model, the inbound event is specified as ‘Treat as error’ if no instance is found
  - The event causes a failure for other reasons such as division by zero or other expression evaluation errors
- Error message is shown for the selected error event



If no instances are found	Treat as error
If one instance is found	Deliver to the instance
If multiple instances are found	Treat as error



CommonBaseEvent	
CommonBaseEvent	
CommonBaseEvent	
creationTime	2008-09-03T23:39:56.218Z
localInstanceId	ITC1875162698289460902195237086391735
version	1.0.1
xmlns	http://www.ibm.com/AC/commonbaseevent1_
xmlns:xsi	http://www.w3.org/2001/XMLSchema-instanc
sourceComponentId	

Step: [2.2] WarehouseItem.refillItem->Evaluate correlation expression
Message: CWMDB3030I One matching instance was found. The event has been sent to the Error queue.

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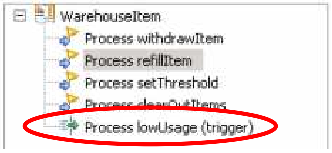
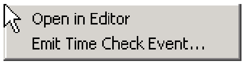
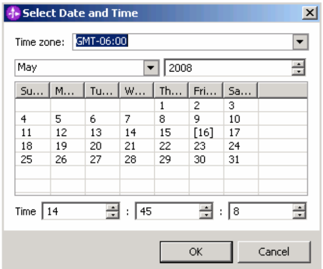
The error queue shows the events that failed because an inbound event was processed and no instance was found and the event delivery option specifies "Treat as error”. The error queue also shows the events that failed because an unexpected error, such as division by zero, occurred during processing. When you click an event, a message at the bottom of the view shows the step that failed. The step information is followed by the error message.

Time based triggers

- Any time-based trigger, for example a trigger that is evaluated every minute, is shown in the high-level steps along with inbound events.
- To test these triggers during debugging, you must send a time check event to the debug server.
  - Generic - target all time-based triggers in the model
  - Specific - target a specific time-based trigger
- Submitting the events
  - Create an XML file and submit using the ITC
  - Right click the trigger in the debug source view > Emit Time Check Event…







Time zone: GMT-06:00

May 2008

Su…	M…	Tu…	W…	Th…	Fri…	Sa…
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	[16]	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

Time 14 : 45 : 8

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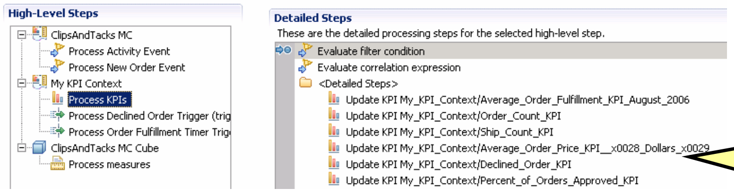
For triggers which are based on a recurring time interval, you can specify a special time check event to fire the trigger so that you can debug the steps based on the trigger. You can create an XML file and identify a generic or specific time check event. The generic type of event applies to all time based triggers in the model, but the specific type of event applies to a single named trigger in the model. You submit the XML file using the integrated test client. Optionally, you can submit the time check event graphically by using the pop-up menu on the trigger. When you use the menu to emit the time check event, it is created as a specific type event that is for the selected trigger.

KPIs and measures



High-Level Steps

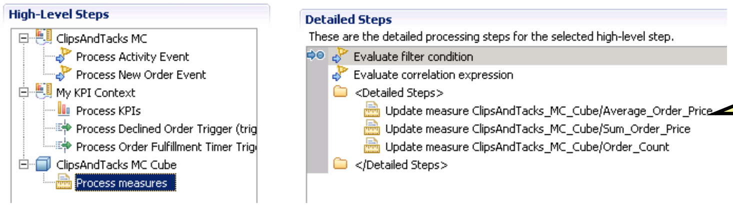
- ClipsAndTacks MC
  - Process Activity Event
  - Process New Order Event
- My KPI Context
  - Process KPIs
  - Process Declined Order Trigger (trig
  - Process Order Fulfillment Timer Trig
- ClipsAndTacks MC Cube
  - Process measures

Detailed Steps

These are the detailed processing steps for the selected high-level step.

- Evaluate filter condition
- Evaluate correlation expression
- <Detailed Steps>
  - Update KPI My_KPI_Context/Average_Order_Fulfillment_KPI_August_2006
  - Update KPI My_KPI_Context/Order_Count_KPI
  - Update KPI My_KPI_Context/Ship_Count_KPI
  - Update KPI My_KPI_Context/Average_Order_Price_KPI__x0028_Dollars_x0029
  - Update KPI My_KPI_Context/Declined_Order_KPI
  - Update KPI My_KPI_Context/Percent_of_Orders_Approved_KPI

You can step through the processing for each KPI. Data filters are evaluated and applied



High-Level Steps

- ClipsAndTacks MC
  - Process Activity Event
  - Process New Order Event
- My KPI Context
  - Process KPIs
  - Process Declined Order Trigger (trig
  - Process Order Fulfillment Timer Trig
- ClipsAndTacks MC Cube
  - Process measures

Detailed Steps

These are the detailed processing steps for the selected high-level step.

- Evaluate filter condition
- Evaluate correlation expression
- <Detailed Steps>
  - Update measure ClipsAndTacks_MC_Cube/Average_Order_Price
  - Update measure ClipsAndTacks_MC_Cube/Sum_Order_Price
  - Update measure ClipsAndTacks_MC_Cube/Order_Count
- </Detailed Steps>

You can step through the processing for each measure

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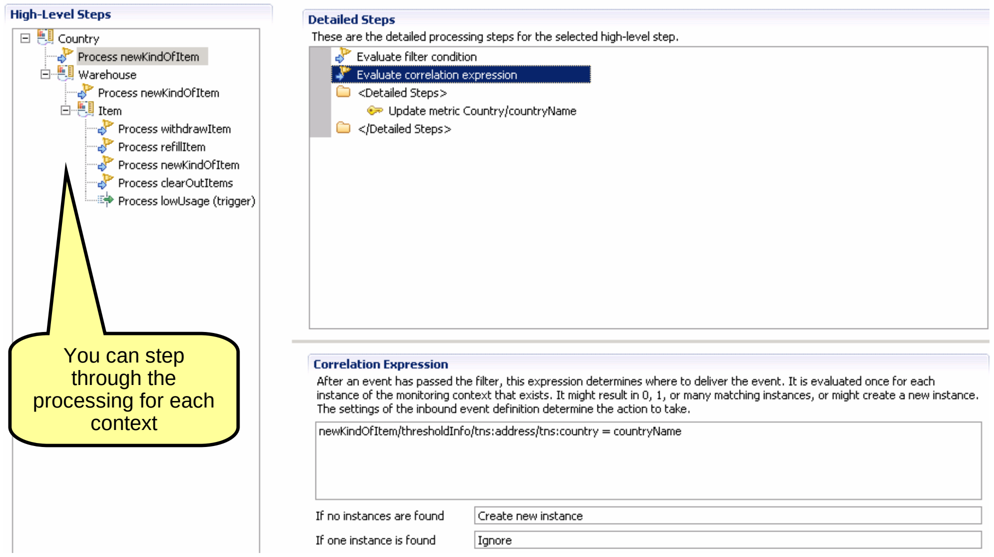
You can debug your KPIs and measures in the same way that you debug monitoring contexts. Each KPI context is listed in the high level steps and underneath each context there are triggers and an entry for the KPIs called ‘Process KPIs’. If you select ‘Process KPIs’, then you see all of the KPIs listed in the detailed steps, where you can step through their processing.

Each cube is listed in the high level steps and underneath each cube is an entry for the measures called ‘Process measures’. If you select ‘Process measures’, then you can see all of the measures listed in the detailed steps, where you can step through their processing.

Nested monitoring contexts



High-Level Steps

```
⊟ Country
     Process newKindOfItem
  ⊟ Warehouse
       Process newKindOfItem
    ⊟ Item
         Process withdrawItem
         Process refillItem
         Process newKindOfItem
         Process clearOutItems
         Process lowUsage (trigger)
```

Detailed Steps

These are the detailed processing steps for the selected high-level step.

```
Evaluate filter condition
Evaluate correlation expression
<Detailed Steps>
    Update metric Country/countryName
</Detailed Steps>
```

Correlation Expression

After an event has passed the filter, this expression determines where to deliver the event. It is evaluated once for each instance of the monitoring context that exists. It might result in 0, 1, or many matching instances, or might create a new instance. The settings of the inbound event definition determine the action to take.

```
newKindOfItem/thresholdInfo/tns:address/tns:country = countryName
```

If no instances are found	Create new instance
If one instance is found	Ignore

You can step through the processing for each context

If your monitor model contains multiple monitoring contexts or nested monitoring contexts then you can debug all of them. All of the contexts are listed in the high level steps in the order that they are processed and you can select each context so that you can set breakpoints and step through processing for each monitoring context.

Summary

- Covered an overview of the debugger in IBM Business Monitor

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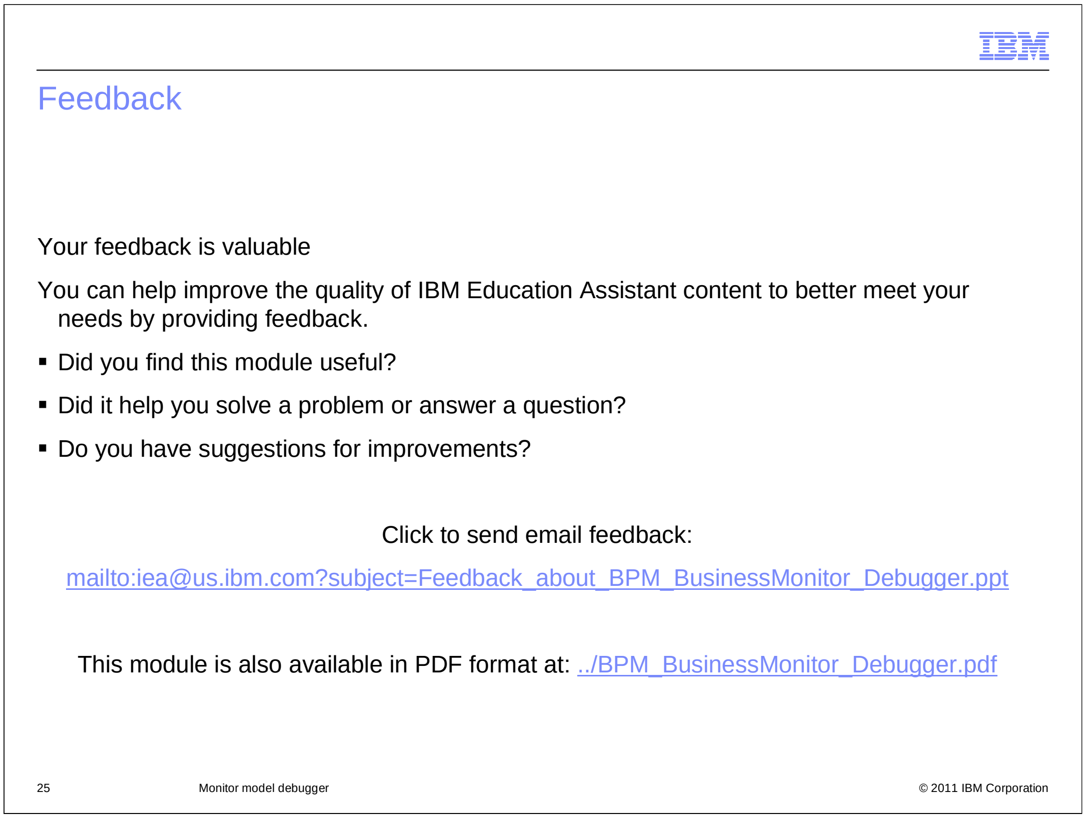
In summary, this presentation covered an overview of debugging monitor models in IBM Business Monitor.



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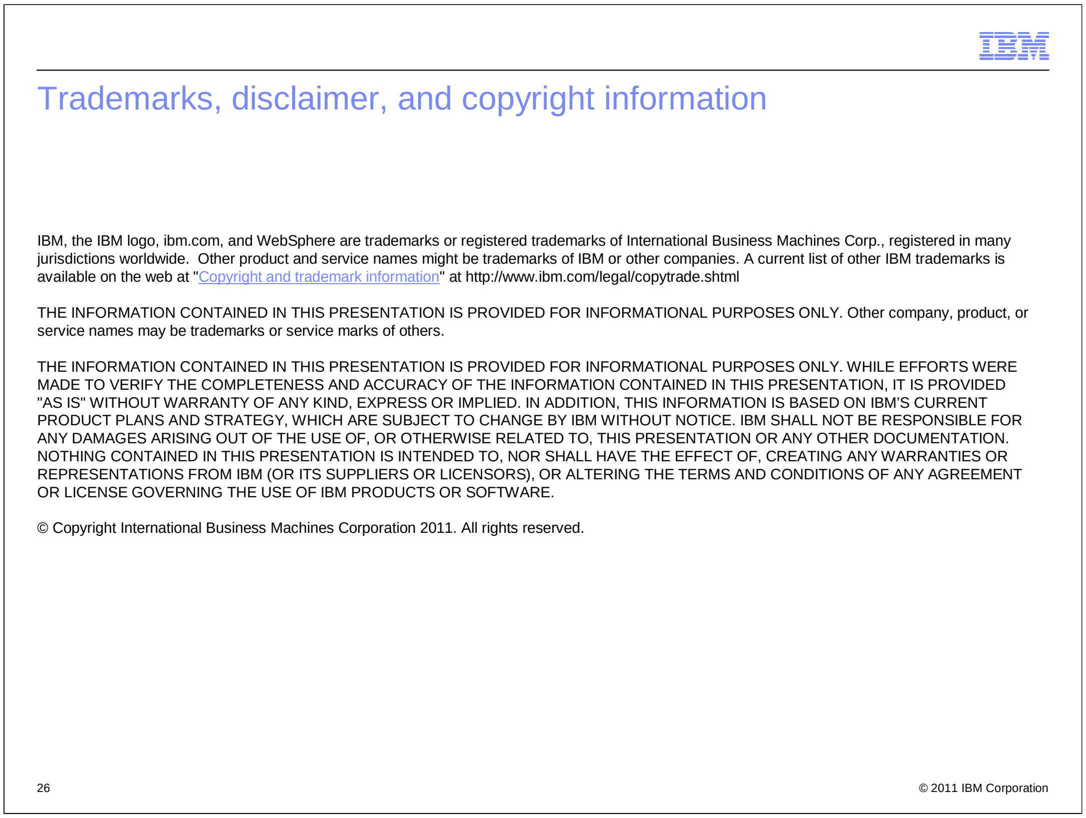

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