Using Transaction Tracing to Determine Issues with Remote MQ Transactions

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INTRODUCTION

Introduction

- **Richard Nikula**
  - VP of Product Development and Support

- **Developing software for management of “middleware” since 1985**
  - MAINVIEW for CICS, MQ
  - BMC PATROL
  - IBM CICSPLEX System Manager (CPSM)

- **Involved in “MQ” since early 90’s**
  - Primarily at the technology layer
  - Various certifications

- **About Nastel Technologies**
  - Founded in 1994
  - Middleware-centric Application Performance Management software supplier
  - Core competency : Messaging Middleware, Java Application Servers, ESB's and other SOA technologies

Overview

- MQ transactions can run on a number of different platforms and locations. They typically interact with other environments such as IBM Integration Bus (Broker) and DataPower. It can be challenging to track the flow of activities in these environments.

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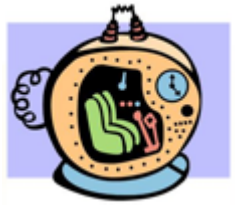
- In this session, you will learn:
  - The facilities provided by MQ for tracking MQ activity without changing application code
  - The facilities provide by IIB/Broker for tracking activity within message flows
  - Techniques for correlating data between broker and MQ for cross platform visibility
  - How similar techniques could be used for extending tracking to application servers, DataPower or other platforms

PRESENTATION…

Time Travel



1993

Your workstation

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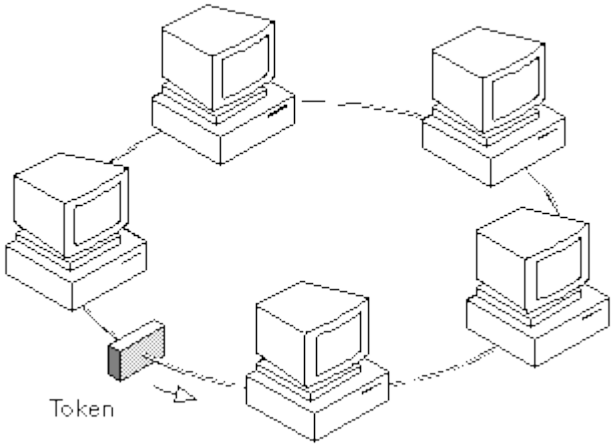
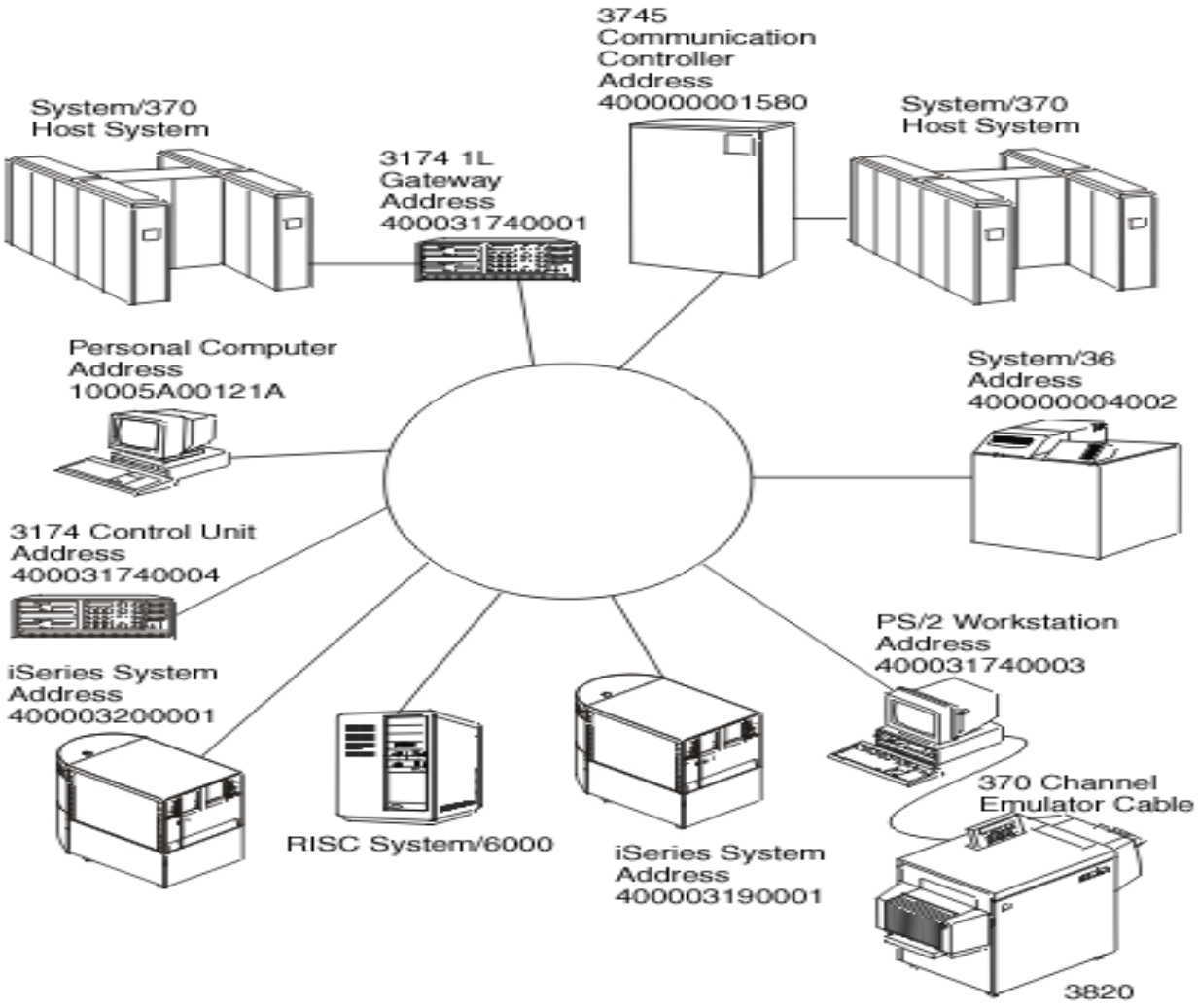
Operating system PC DOS 4.01
CPU Intel 80386SX @ 16 MHz
Memory 2 MB ~ 6 MB

7 color
Reverse video and blink
Graphical display capable

Your Network



Your Enterprise



Your remote network

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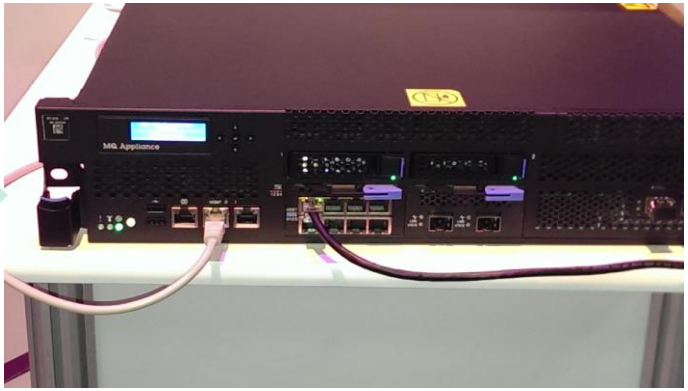
Network Speed: 2400/4800/9600 Baud
Reliability?

MQ Timeline from 1993 to Today

1993 1.0 → 1995 2.0 → 1997 5.0 → 2002 5.3 → 2005 6.0 → 2008 7.0 → 2011 7.1 → 2012 7.5 → 2014 8.0

2015 M2000



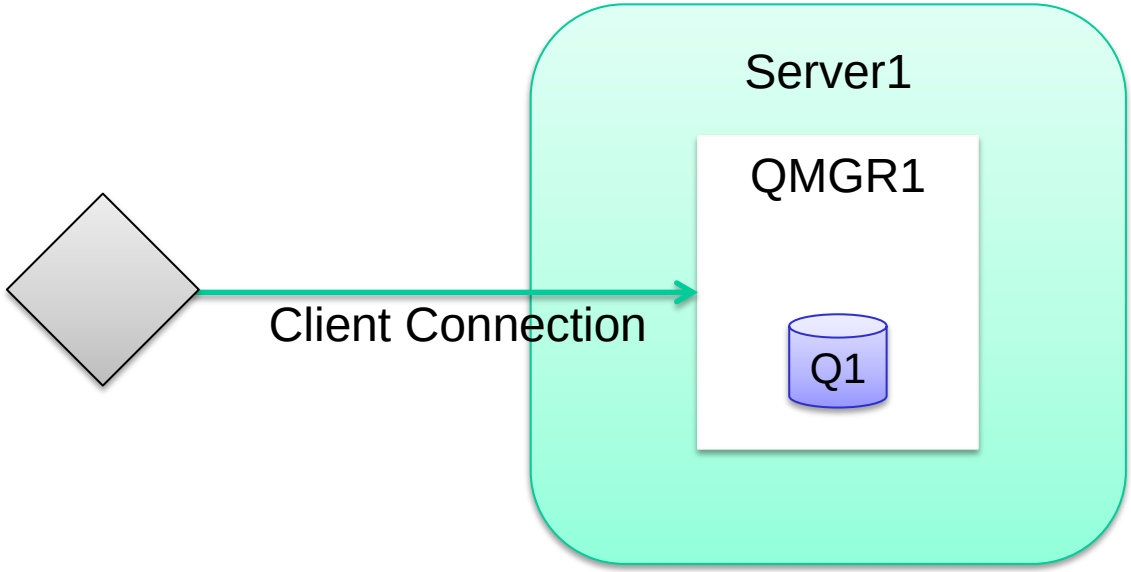
Why use our time machine?

Why use our time machine?

Because we wouldn't have had this discussion in the past.
Today's environments make remote operation of MQ a requirement.

CONCEPTS OF REMOTE MANAGEMENT

You are remote to the system being managed



Not Remote Desktop or Telnet

No install of software on the Server1 (M2000 doesn't allow)

Types of Remote Access

- **Application**

- **The reason MQ exists**
  - But new considerations in a fully remote environment

- **Administrative**

- **Configuring MQ**
  - Traditional MQ Explorer or similar 3rd party tools

- **Diagnostic**

- **Looking at queue managers, queues and messages**
  - Traditional MQ Explorer or similar 3rd party tools

- **Tracking messages**
  - New tools are needed

Primary Consideration for Remote Access

- **Connectivity**

- **Have to have access**
  - Firewalls and network

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- **Security**

- **Must be authorized to perform the actions requested**
  - Access control (e.g. setmqaut)
  - AMS (Advanced Message Security)
  - SSL (communication)
  - Channel Authorization (V7.1 and higher)
  - Connection Authentication (V8 and higher)

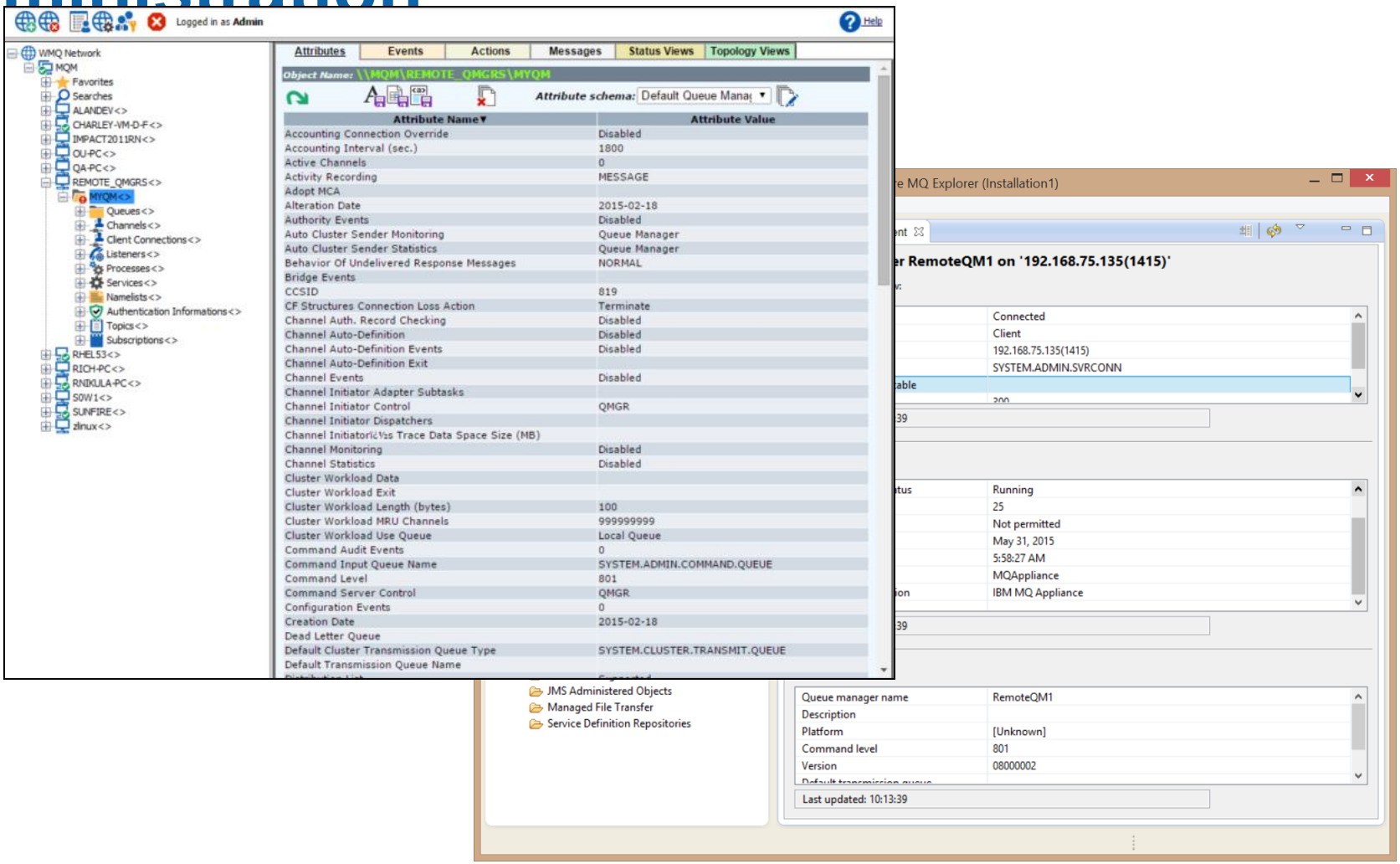
- **Performance**

- **Has to be able to provide the bandwidth required**

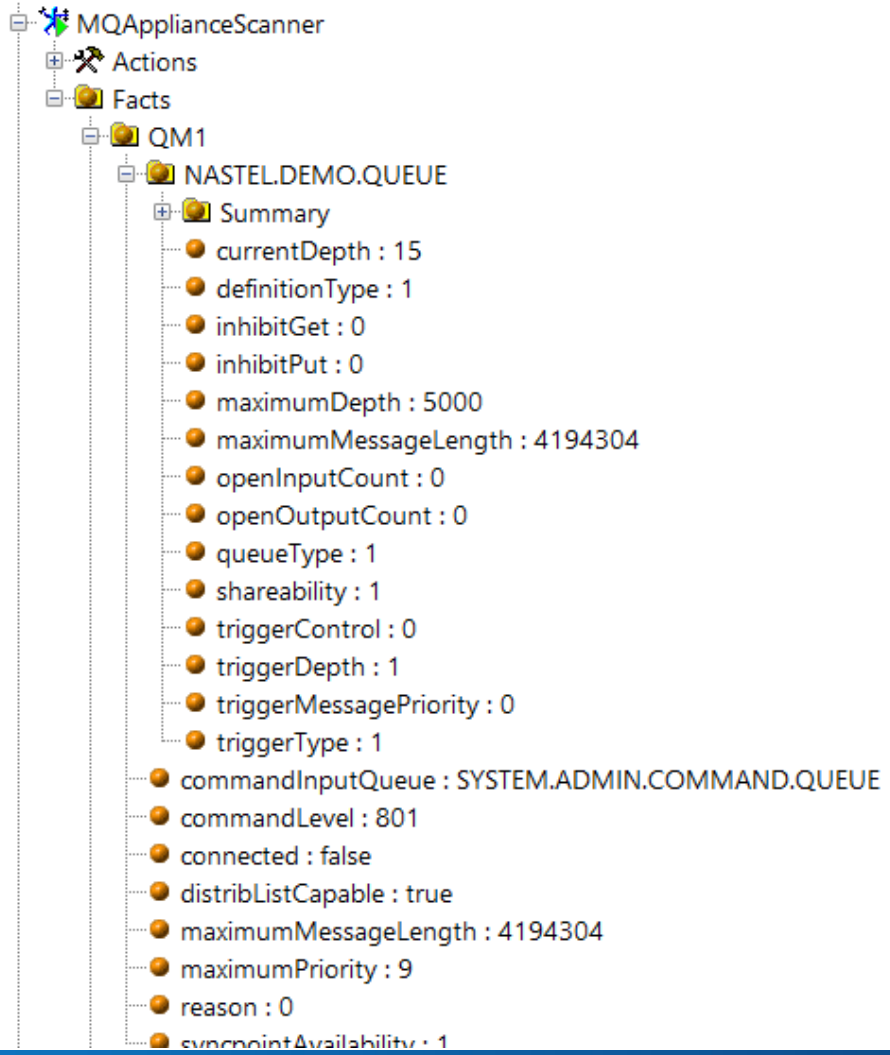
- **Not always the right choice**

ADMINISTRATION

Administration



Remote Management Example



This slide was added to show how easily remote management is. This was an MQ appliance being demonstrated by IBM at the conference to which they provided access. It shows that the advantage of remote access is how easily it can be done and the disadvantage is how easily it can be done.

TRACKING USING APPLICATION ACTIVITY TRACE

Application Activity Trace

- Creates an event message for MQ calls
  - Similar to using MQ API before/after exits

- Introduced in MQ 7.1
  - Expanded with MQ Appliance
  - Continuing improvements being made in V8

- Not available for MQ on zOS ☹

Using in MQ V7.1, 7.5 and V8*

- Configure mqat.ini (to add application)
- Execute Application to be analyzed

- Configure mqat.ini
- Configure mqat.ini (to remove application)
  - If running, change something in QMGR
- Data captured on SYSTEM.ADMIN.TRACE.ACTIVITY.QUEUE
- View Data

- amqsact
- Amqsactz (“freeware”)
- Ms0P
- 3rd Party tooling

Global Monitoring

Alternately, turn on/off Activity trace for “everything”

- **Alter QMGR ACTVTRC(ON/OFF)**

Change mqat.ini to exclude “everything” by default

- **Applications that you don’t want**
- **Monitoring tools**
- **IBM tools (amqsact)**

MQAT.INI


```
#*******************************************************************#
#* Module Name: mqat.ini                                           *#
#* Type       : WebSphere MQ queue manager configuration file      *#
#  Function   : Define the configuration of application activity   *#
#*              trace for a single queue manager.                  *#
#*                                                                 *#
#*******************************************************************#

AllActivityTrace:            # Global settings stanza
  ActivityInterval=1         # Time interval between trace messages
                             #   Values: 0-99999999 (0=off)
                             #   Default: 0
  ActivityCount=100          # Number of operations between trace msgs
                             #   Values: 0-99999999 (0=off)
                             #   Default: 0
  TraceLevel=MEDIUM          # Amount of data traced for each operation
                             #   Values: LOW | MEDIUM | HIGH
                             #   Default: MEDIUM
  TraceMessageData=0         # Amount of message data traced
                             #   Values: 0-104857600
                             #   Default: 0
  StopOnGetTraceMsg=ON       # Stop trace on get of activity trace message
                             #   Values: ON | OFF
                             #   Default: ON
```

MQAT.INI (application specific)


```
############################################################
# specific application activity trace entry from generating data #
############################################################
ApplicationTrace:            # Application specific settings stanza
  ApplClass=ALL              # Application type
                             #   Values:  (USER | MCA | ALL)
                             #   Default: USER
  ApplName=amqsput*          # Application name (may be wildcarded)
                             #   (matched to app name without path)
                             #   Default: *
  ApplFunction=*             # Application function (may be wildcarded)
                             #   (matched to app function)
                             #   Default: *
  Trace=ON                   # Activity trace switch for application
                             #   Values:  ( ON | OFF )
                             #   Default: OFF
  ActivityInterval=0         # Time interval between trace messages
                             #   Values: 0-99999999 (0=off)
                             #   Default: 0
  ActivityCount=0            # Number of operations between trace msgs
                             #   Values: 0-99999999 (0=off)
                             #   Default: 0
  TraceLevel=HIGH            # Amount of data traced for each operation
                             #   Values: LOW | MEDIUM | HIGH
                             #   Default: MEDIUM
  TraceMessageData=1000      # Amount of message data traced
                             #   Values: 0-104857600
                             #   Default: 0
```

MQAT.INI (application specific)

```
############################################################
# Prevent the sample activity trace program from generating data #
############################################################
ApplicationTrace:            # Application specific settings stanza
  ApplClass=ALL              # Application type
                             #   Values:  (USER | MCA | ALL)
                             #   Default: USER
  ApplName=amqsact*          # Application name (may be wildcarded)
                             #   (matched to app name without path)
                             #   Default: *
  ApplFunction=*             # Application function (may be wildcarded)
                             #   (matched to app function)
                             #   Default: *
  Trace=OFF                  # Activity trace switch for application
                             #   Values:  ( ON | OFF )
                             #   Default: OFF
  ActivityInterval=0         # Time interval between trace messages
                             #   Values: 0-99999999 (0=off)
                             #   Default: 0
  ActivityCount=0            # Number of operations between trace msgs
                             #   Values: 0-99999999 (0=off)
                             #   Default: 0
  TraceLevel=MEDIUM          # Amount of data traced for each operation
                             #   Values: LOW | MEDIUM | HIGH
                             #   Default: MEDIUM
  TraceMessageData=0         # Amount of message data traced
                             #   Values: 0-104857600
                             #   Default: 0
```

amqsact

```
Usage: amqsact
    [-m QMgrName]      # Queue manager to connect to
    [-q QName]         # Override default queue name
    [-t TopicString]   # Subscribe to event topic
    [-b]               # Only browse records
    [-v]               # Verbose output
    [-d <depth>]       # Number of records to display
    [-w <timeout>]     # Time to wait (in seconds)
    [-s <startTime>]   # Start time of record to process
    [-e <endTime>]     # End time of record to process
Example:
  amqsact -m QMGR1 -b -v
```

Sample AMQSACT amqsact –m LocalQM1 –v (edited)

MonitoringType: MQI Activity Trace
Correl_id:
00000000: 414D 5143 4C6F 6361 6C51 4D31
2020 2020 'AMQCLocalQM1....'
28 00000010: 7186 6B55 2000 3602
'qåkU..6.   '
QueueManager: 'LocalQM1'
Host Name: 'RNIKULA-PC'
CommandLevel: 800
SeqNumber: 1
ApplicationName: 'bSphere
MQ\bin64\amqsput.exe'
Application Type: MQAT_WINDOWS_NT
ApplicationPid: 5004
UserId: 'Richard'
Pointer size: 8
Platform: MQPL_WINDOWS_NT
Operation Id: MQXF_PUT
OperationDate: '2015-05-31'
OperationTime: '17:21:46'

High Res Time: 1433110906406803
QMgr Operation Duration: 70
Completion Code: MQCC_OK
Reason Code: 0
Msg length: 28
Object_type: MQOT_Q
Object_name: 'Q1'
Object_Q_mgr_name: ''
Resolved_Q_Name: 'Q1'
Resolved_Q_mgr: 'LocalQM1'
Resolved_local_Q_name: 'Q1'
Resolved_local_Q_mgr: 'LocalQM1'
Resolved_type: MQOT_Q
Report Options: 0
Msg_type: MQMT_DATAGRAM
Expiry: -1
Format_name: 'MQSTR'
Priority: -1
Persistence: 2

MQCFH (PCF Header)

Use this page to view the PCF values contained by the MQCFH structure for an activity trace message

For an activity trace message, the MQCFH structure contains the following values: Type

Description: Structure type that identifies the content of the message.
Data type: MQLONG.
Value: MQCFT_APP_ACTIVITY
StrucLength

Description: Length in bytes of MQCFH structure.
Data type: MQLONG.
Value: MQCFH_STRUC_LENGTH
Version

Description: Structure version number.
Data type: MQLONG.
Values: MQCFH_VERSION_3
Command

Description: Command identifier. This field identifies the category of the message.
Data type: MQLONG.
Values: MQCMD_ACTIVITY_TRACE
MsgSeqNumber

Description: Message sequence number. This field is the sequence number of the message within a group of
Data type: MQLONG.
Values: 1
Control

Description: Control options.
Data type: MQLONG.
Values: MQCFC_LAST
CompCode

Notes

- **What are you Tracing?**

- **If you turn on at the Queue Manager Level, most applications**

- **Unless application connects using MQCONNX using**
  - MQCNO_ACTIVITY_TRACE_DISABLED

- **Need to edit MQAT.INI to specific applications**
  - How to know which applications read which queues?

- **Who can view the trace?**

- **Anyone with access to the queue**

- **Information mixed with other users**

- **Other users could remove your information**

- **Tricky to get just your information**

Using in MQ Appliance using V8*

- (Configure mqat.ini to change defaults)
- Use Dynamic mode to collect trace data

- View Data
  - amqsact (c)
  - Ms0P
  - 3rd Party tooling

dspmqini

M2000(mqcli)# dspmqini -m MQAPP_QM1

```
AllActivityTrace:
  ActivityInterval     = 1
  ActivityCount        = 100
  TraceLevel           = MEDIUM
  TraceMessageData     = 0
  StopOnGetTraceMsg    = ON
  SubscriptionDelivery = BATCHED
```

Setmqini

M2000(mqcli)# setmqini
Usage: setmqini -m QMgrName -s StanzaName -k KeyName [-d | -v Val

-d Delete the attribute.
-k Key name of attribute to set.
-m Queue manager name.
-s Stanza name.
-v Attribute value to set.

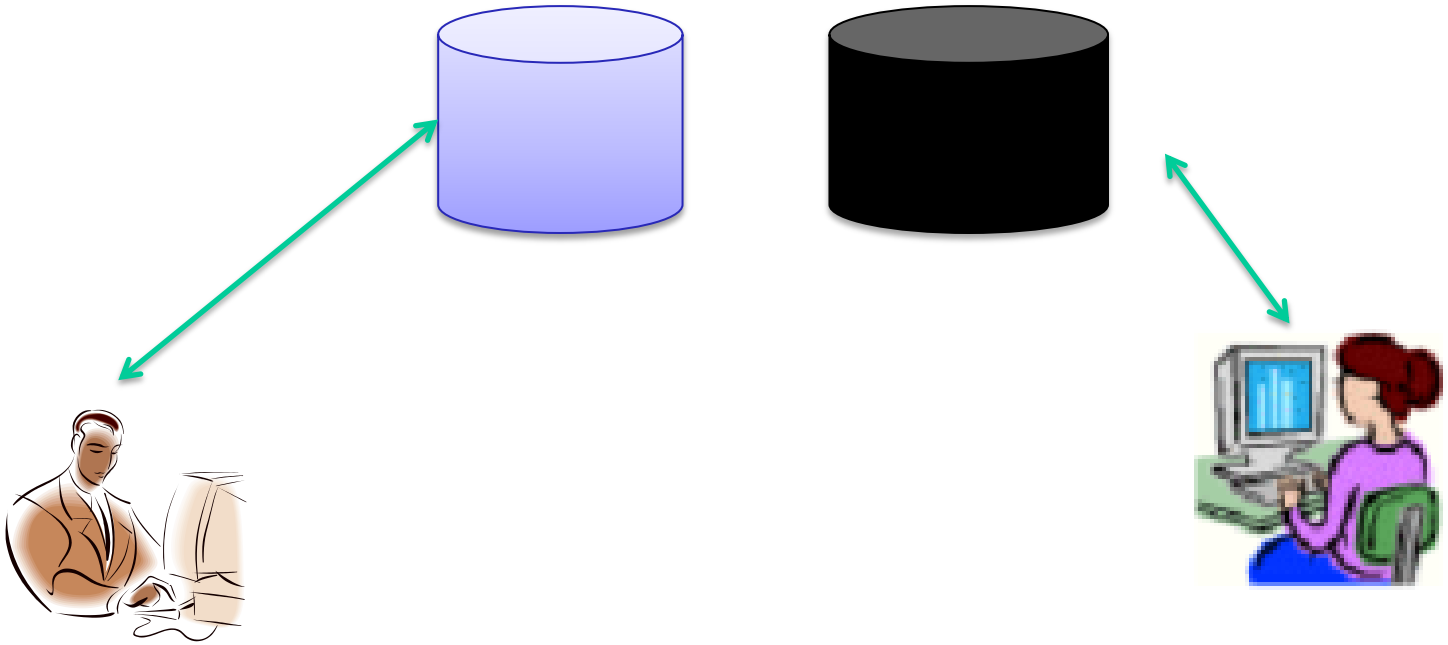
Example:
setmqini -m QMAPP_QM1 -s AllActivityTrace -k TraceLevel -v HIGH

Use Case for Application Activity Tracing (V8*)

- **Opens up new use cases**

- **Traditionally tracing an administration function**

- **Now can be done at individual developer level**

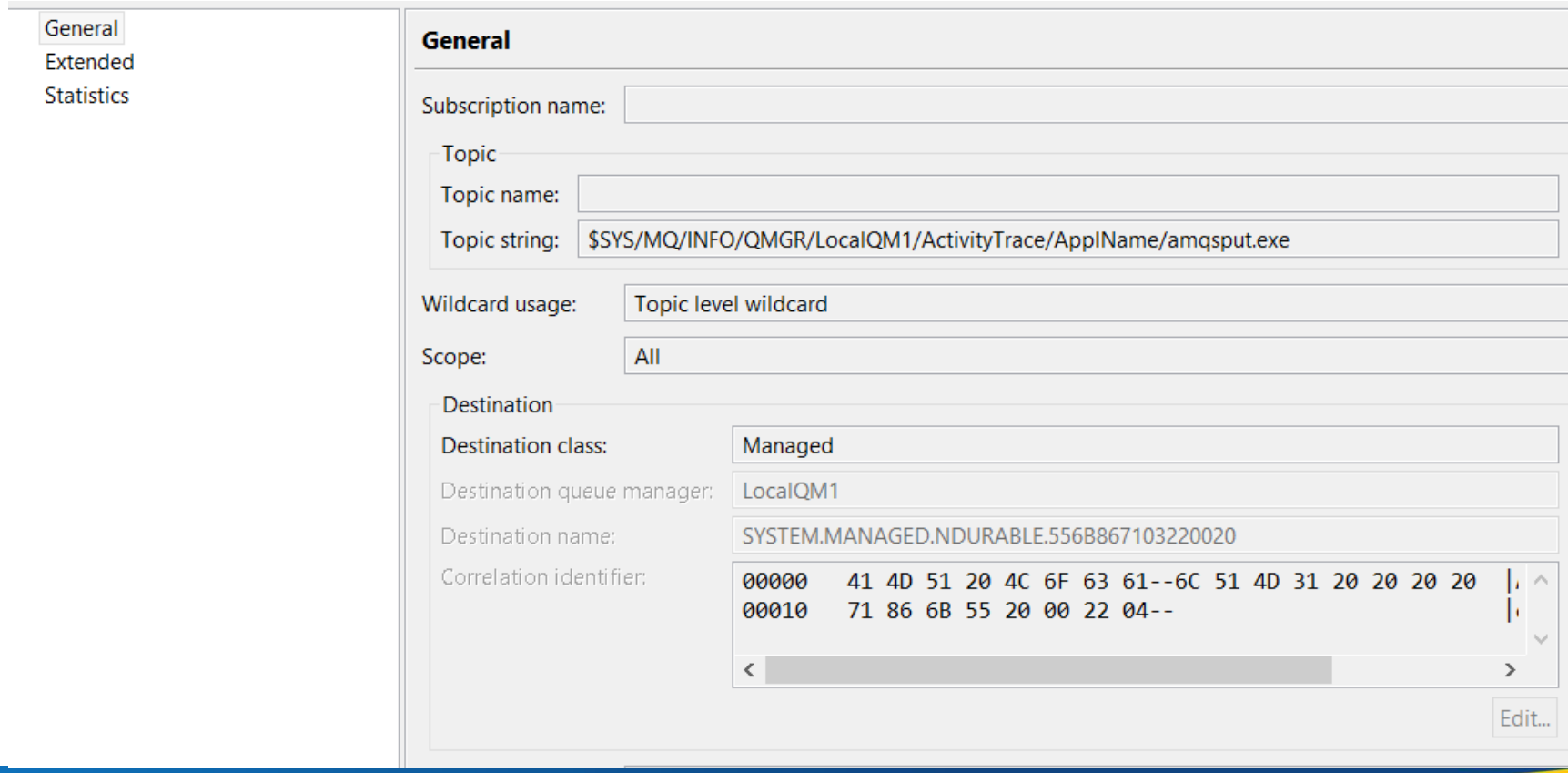


Amqsact(c)

```
Usage: amqsact(c)
    [-m QMgrName]      # Queue manager to connect to
    [-a ApplName]      # Name of application to trace
    [-c ChannelName]   # Name of channel to trace
    [-i ConnId]        # Unique connection id to trace
    [-q QName]         # Override default queue name
    [-t TopicString]   # Subscribe to event topic
    [-b]               # Only browse records
    [-v]               # Verbose output
    [-d <depth>]       # Number of records to display
    [-w <timeout>]     # Time to wait (in seconds)
    [-s <startTime>]   # Start time of record to process
    [-e <endTime>]     # End time of record to process
Example:
  amqsact -m QMGR1 -w 30 -a amqsput.exe
```

Dynamic Subscription

amqsact -mLocalQM1 -w 60 -a amqsput.exe
Subscribing to the activity trace topic:
'$SYS/MQ/INFO/QMGR/LocalQM1/ActivityTrace/ApplName/amqsput.exe'



Amqsact(c) remote access


```
amqsactc -m RemoteQM1 -w 60 -a amqsputc.exe -v
Subscribing to the activity trace topic:
  '$SYS/MQ/INFO/QMGR/RemoteQM1/ActivityTrace/ApplName/amqsputc.exe'

MonitoringType: MQI Activity Trace
Correl_id:
00000000:  414D 5120 5265 6D6F 7465 514D 3120 2020  'AMQ.RemoteQM1.
00000010:  0D4D 6B55 1023 0020                      '.MkU.#..
QueueManager: 'RemoteQM1'
CommandLevel: 801
SeqNumber: 0
ApplicationName: 'Sphere MQ\bin64\amqsputc.exe'
Application Type: MQAT_WINDOWS_NT
ApplicationPid: 14666
UserId: 'mqm'
API Caller Type: MQXACT_EXTERNAL
API Environment: MQXE_MCA_SVRCONN
Channel Name: 'SYSTEM.ADMIN.SVRCONN'
ConnName: '192.168.75.1'
Channel Type: MQCHT_SVRCONN
```

Tracking activity from a Business Partner

amqsactc -m RemoteQM1 -w 60 -c From.BP0302.Primary -v
Subscribing to the activity trace topic:
'$SYS/MQ/INFO/QMGR/RemoteQM1/ActivityTrace/ChannelName/From.BP0302.Primary

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MonitoringType: MQI Activity Trace
Correl_id:
00000000: 414D 5120 5265 6D6F 7465 514D 3120 2020 'AMQ.RemoteQM1..
00000010: 0D4D 6B55 0429 0020 '.MkU.).. '
QueueManager: 'RemoteQM1'
ApplicationName: 'amqrmppa'
Application Type: MQAT_QMGR
ApplicationPid: 14666
UserId: 'mqsystem'
API Caller Type: MQXACT_INTERNAL
API Environment: MQXE_MCA
Channel Name: 'From.BP0302.Primary'
ConnName: '192.168.75.1'
Channel Type: MQCHT_RECEIVER

Operation 0

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```
MQI Operation: 0
  Operation Id: MQXF_CONNX
  ApplicationTid: 21
  OperationDate: '2015-05-31'
  OperationTime: '14:33:35'
  ConnectionId:
  00000000:  414D 5143 5265 6D6F 7465 514D 3120 2020  'AMQCRemoteQM
  00000010:  0D4D 6B55 0128 0020                      '.MkU.(..       '
  QueueManager: 'RemoteQM1'
  QMgr Operation Duration: 96098215
  Completion Code: MQCC_OK
  Reason Code: 0
  Connect Options: 1
```

Operation 1

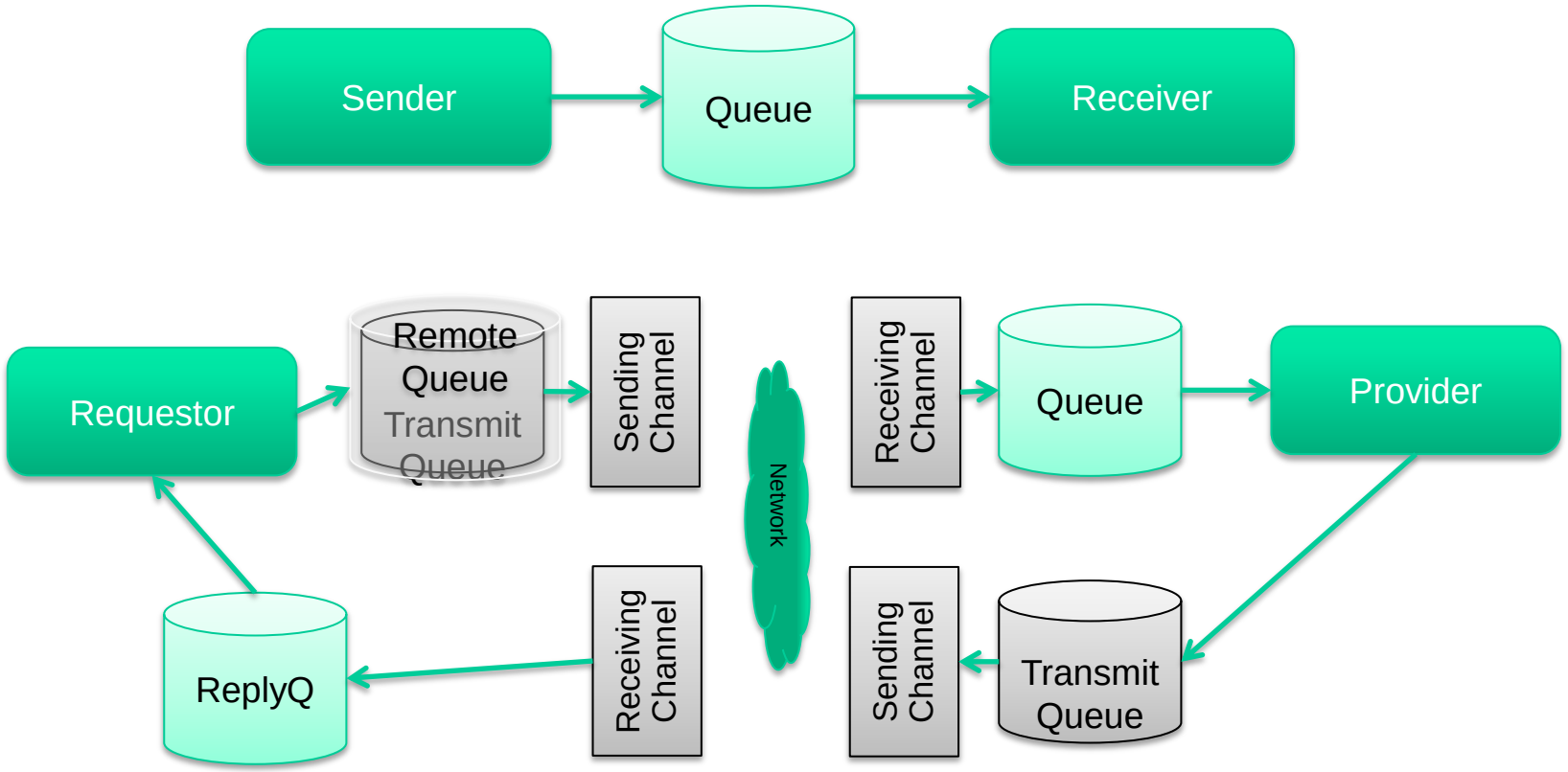
```
MQI Operation: 1
  Operation Id: MQXF_OPEN
  ApplicationTid: 21
  OperationDate: '2015-05-31'
40  OperationTime: '14:33:35'
  Object_type: MQOT_Q
  Object_name: 'Q1'
  Object_Q_mgr_name: 'RemoteQM1'
  QMgr Operation Duration: 74
  Completion Code: MQCC_OK
  Reason Code: 0
  Open_options: 43024
  Object_type: MQOT_Q
  Object_name: 'Q1'
  Object_Q_mgr_name: 'RemoteQM1'
  Resolved_Q_Name: 'Q1'
  Resolved_Q_mgr: 'RemoteQM1'
  Resolved_local_Q_name: 'Q1'
  Resolved_local_Q_mgr: 'RemoteQM1'
  Resolved_type: MQOT_Q
```

Operation 2

MQI Operation: 2
Operation Id: MQXF_PUT
ApplicationTid: 21
OperationDate: '2015-05-31'
OperationTime: '14:33:35'
High Res Time: 143309721549922 6
QMgr Operation Duration: 44
Completion Code: MQCC_OK
Reason Code: 0
Hobj: 2
Put Options: 272388
Msg length: 20
Object_Q_mgr_name: 'RemoteQM1'
Resolved_Q_Name: 'Q1'
Resolved_Q_mgr: 'RemoteQM1'
Resolved_local_Q_name: 'Q1'
Resolved_local_Q_mgr: 'RemoteQM1'
Resolved_type: MQOT_Q
Expiry: -1
Format_name: 'MQSTR'

Considerations

- How to Pair up put and get of the same messages?
- Dealing with complex message flows.



Sample display

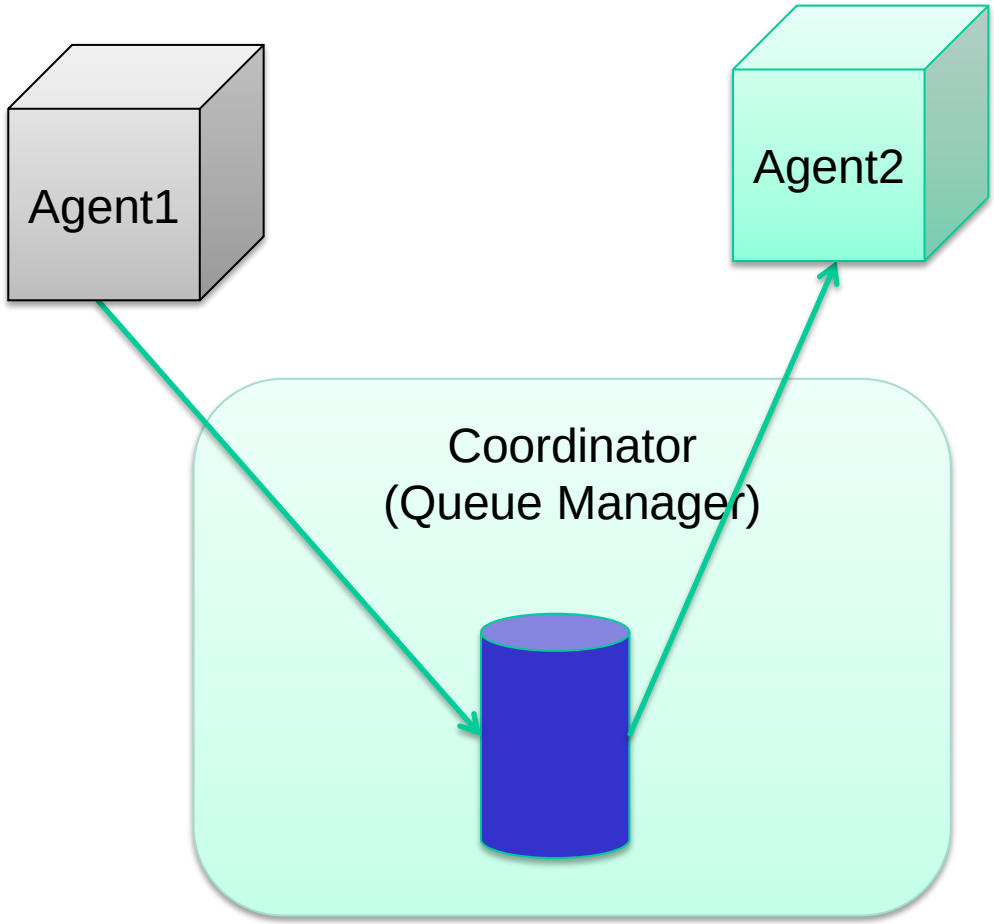
Transaction Flow Diagram | Transaction Timeline | Transaction Trace(3) | Transaction Milestones

☐ Show Hierarchy

Time	Application	Operation Name	Resource	Resource Manager	Elapsed Time (usec)	Completion Code	Reason Code
2015-06-01 10:52:15.000	amqsput	MQPUT	To.PayRoll.Primary	LocalQM1	69	Succeeded	0
2015-06-01 10:52:18.000	WMQ_ChannelPooling...	MQPUT	PayRoll.Primary	RemoteQM1	68	Succeeded	0
2015-06-01 10:52:24.000	amqsgetc	MQGET	PayRoll.Primary	RemoteQM1	39	Succeeded	0

FTE/MFT

What is it?

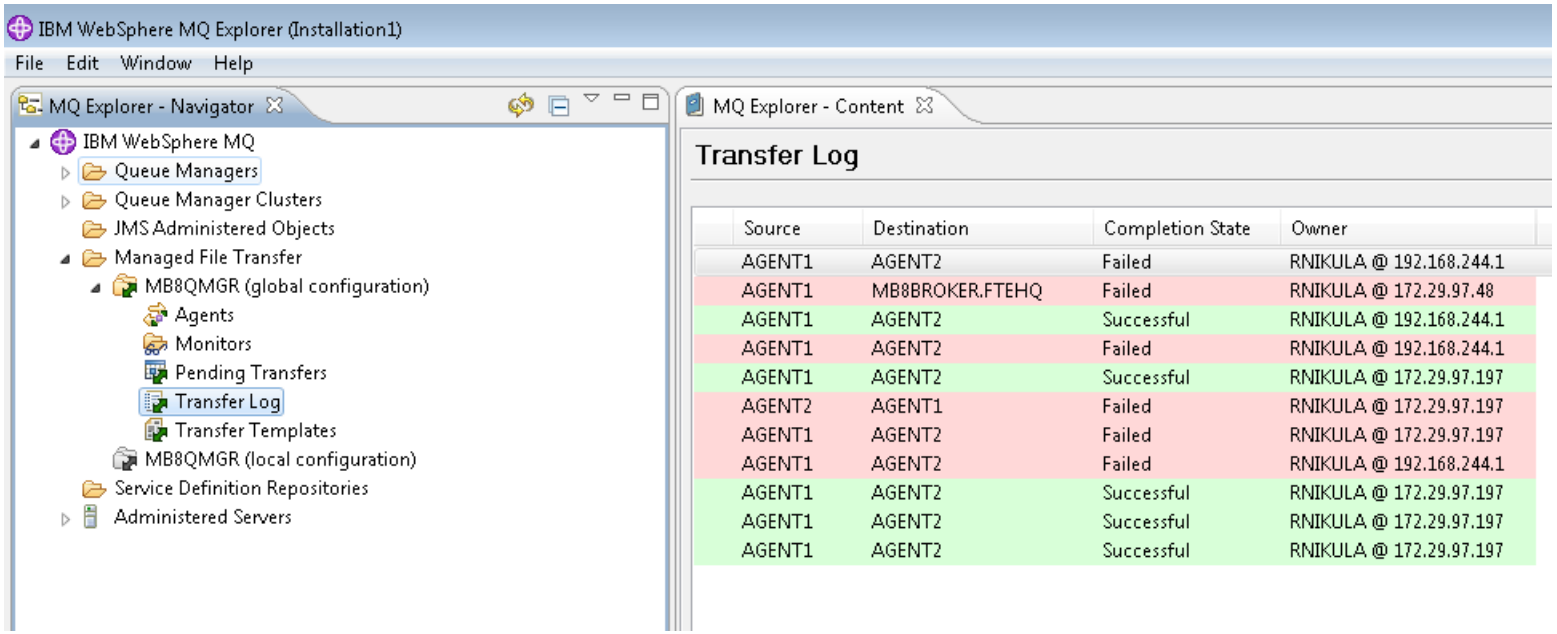


Subscribing to events

- SYSTEM.FTE/Log/#

- Types of data
  - Agents
  - Transfers
  - Schedules
  - Logs

MQ Explorer Views



Sample log Entry

```
<?xml version="1.0" encoding="UTF-8"?>
<transaction version="6.00" ID="414d5120434f52442020202020202020a59e525520118c24" agentRole="sourceAgent" xml
      <action time="2015-05-13T14:08:07.568Z">completed</action>
      <sourceAgent agent="AGNT1A" QMgr="AGNT1" agentType="STANDARD">
            <systemInfo architecture="x86" name="Windows 7" version="6.1 build 7601 Service Pack 1"/>
      </sourceAgent>
      <destinationAgent agent="AGNT2A" QMgr="AGNT2">
      </destinationAgent>
      <originator>
            <hostName>192.168.188.1</hostName>
            <userID>user</userID>
            <mqmdUserID>user</mqmdUserID>
      </originator>
      <status resultCode="49">
      <supplement>BFGEL0013E: The transfer with id &apos;414d5120434f52442020202020202020a59e525520118c23&apo
      a reason code of &apos;2087&apos; from WebSphere MQ when sending a message to destination queue &apos;S
      </status>
      <transferSet startTime="2015-05-13T14:08:07.552Z" total="1" bytesSent="0">
      </transferSet>
      <job>
      <name>Job1</name>
      </job>
</transaction>
```

Starting

```
<?xml version="1.0" encoding="UTF-8"?>
<transaction ID="414d51204d4238514d475220202020201d07c9552030d113" agentRole="sourceAgent" …>
  <action time="2015-08-13T23:59:33.917Z">started</action>
  <sourceAgent QMgr="MB8QMGR" agent="AGENT1" agentType="STANDARD">
    <systemInfo architecture="x86" name="Windows 7" version="6.1 build 7601 Service Pack 1"/>
  </sourceAgent>
  <destinationAgent QMgr="MB8QMGR" agent="AGENT2"/>
  <originator>
    <hostName>192.168.244.1</hostName>
    <userID>RNIKULA</userID>
    <mqmdUserID>RNIKULA</mqmdUserID>
  </originator>
  <transferSet bytesSent="0" startTime="2015-08-13T23:59:33.917Z" total="1">
    <metaDataSet>
      <metaData key="com.ibm.wmqfte.SourceAgent">AGENT1</metaData>
      <metaData key="com.ibm.wmqfte.DestinationAgent">AGENT2</metaData>
      <metaData key="com.ibm.wmqfte.MqmdUser">RNIKULA</metaData>
      <metaData key="com.ibm.wmqfte.OriginatingUser">RNIKULA</metaData>
      <metaData key="com.ibm.wmqfte.OriginatingHost">192.168.244.1</metaData>
      <metaData key="com.ibm.wmqfte.TransferId">414d51204d4238514d475220202020201d07c9552030d113</metaDat
      <metaData key="com.ibm.wmqfte.ScheduleId">10</metaData>
      <metaData key="com.ibm.wmqfte.JobName">AAAAA</metaData>
      <metaData key="com.ibm.wmqfte.Priority">0</metaData>
    </metaDataSet>
  </transferSet>
  <job>
    <name>AAAAA</name>
  </job>
  <scheduleLog ID="10"/>
</transaction>
```

In Progress


```
<?xml version="1.0" encoding="UTF-8"?>
<transaction ID="414d51204d4238514d475220202020201d07c9552030d113" agentRole="sourceAgent" …>
  <action time="2015-08-13T23:59:34.198Z">progress</action>
  <sourceAgent QMgr="MB8QMGR" agent="AGENT1" agentType="STANDARD">
    <systemInfo architecture="x86" name="Windows 7" version="6.1 build 7601 Service Pack 1"/>
  </sourceAgent>
  <destinationAgent QMgr="MB8QMGR" agent="AGENT2" agentType="STANDARD">
    <systemInfo architecture="x86" name="Windows 7" version="6.1 build 7601 Service Pack 1"/>
  </destinationAgent>
  <originator>
    <hostName>192.168.244.1</hostName>
    <userID>RNIKULA</userID>
    <mqmdUserID>RNIKULA</mqmdUserID>
  </originator>
  <transferSet bytesSent="14285" index="0" size="1" startTime="2015-08-13T23:59:33.917Z" total="1">
    <item mode="binary">
      <source disposition="leave" type="file">
        <file last-modified="2014-12-10T14:57:18.000Z" size="14237">C:\TEMP\setup.ini</file>
        <checksum method="MD5">dec47d003341090ce9007ab5eca38623</checksum>
      </source>
      <destination exist="overwrite" type="file">
        <file last-modified="2015-08-13T23:59:34.073Z" size="14237">C:\nastel2\setup.ini</file>
        <checksum method="MD5">dec47d003341090ce9007ab5eca38623</checksum>
      </destination>
      <status resultCode="0"/>
    </item>
  </transferSet>
  <job>
    <name>AAAAA</name>
  </job>
</transaction>
```

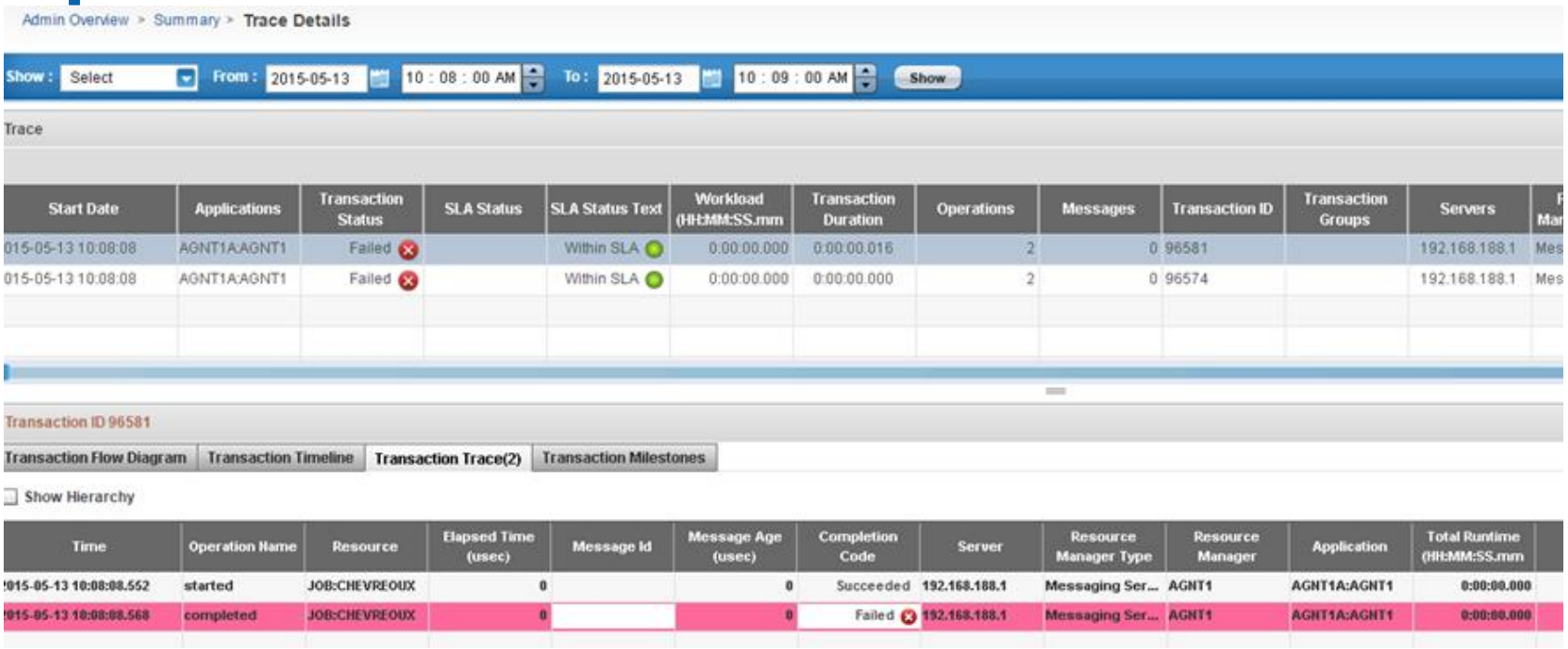
SUCCESSFUL


```
<?xml version="1.0" encoding="UTF-8"?>
<transaction ID="414d51204d4238514d475220202020201d07c9552030d113" agentRole="sourceAgent" …>
  <action time="2015-08-13T23:59:34.213Z">completed</action>
  <sourceAgent QMgr="MB8QMGR" agent="AGENT1" agentType="STANDARD">
    <systemInfo architecture="x86" name="Windows 7" version="6.1 build 7601 Service Pack 1"/></sourceAgent>
  <destinationAgent QMgr="MB8QMGR" agent="AGENT2" agentType="STANDARD">
    <systemInfo architecture="x86" name="Windows 7" version="6.1 build 7601 Service Pack 1"/></destinationA
  <originator>
    …
    <mqmdUserID>RNIKULA</mqmdUserID>
  </originator>
  <status resultCode="0">
    <supplement>BFGRP0032I: The file transfer request has successfully completed.</supplement>
  </status>
  <transferSet bytesSent="14285" startTime="2015-08-13T23:59:33.917Z" total="1">
    <metaDataSet>
      <metaData key="com.ibm.wmqfte.SourceAgent">AGENT1</metaData>
      <metaData key="com.ibm.wmqfte.DestinationAgent">AGENT2</metaData>
      …
      <metaData key="com.ibm.wmqfte.TransferId">414d51204d4238514d475220202020201d07c9552030d113</metaData>
      <metaData key="com.ibm.wmqfte.ScheduleId">10</metaData>
      <metaData key="com.ibm.wmqfte.JobName">AAAAA</metaData>
      <metaData key="com.ibm.wmqfte.Priority">0</metaData>
    </metaDataSet>
  </transferSet>
  <job>
    <name>AAAAA</name>
  </job>
  <statistics>
    <actualStartTime>2015-08-13T23:59:34.010Z</actualStartTime>
    <retryCount>0</retryCount>
    <numFileFailures>0</numFileFailures>
    <numFileWarnings>0</numFileWarnings>
  </statistics>
</transaction>
```

Failure


```
<?xml version="1.0" encoding="UTF-8"?>
<transaction ID="414d51204d4238514d47522020202020dd843f552004d50c"  agentRole="sourceAgent" …>
  <action time="2015-08-13T23:59:01.121Z">completed</action>
  <sourceAgent QMgr="MB8QMGR" agent="AGENT1" agentType="STANDARD">
    <systemInfo architecture="x86" name="Windows 7" version="6.1 build 7601 Service Pack 1"/>
  </sourceAgent>
  <destinationAgent QMgr="MB8QMGR" agent="AGENT2" agentType="STANDARD">
    <systemInfo architecture="x86" name="Windows 7" version="6.1 build 7601 Service Pack 1"/>
  </destinationAgent>
  <originator>
    <hostName>192.168.244.1</hostName>
    <userID>RNIKULA</userID>
    <mqmdUserID>RNIKULA</mqmdUserID>
  </originator>
  <status resultCode="40">
    <supplement>BFGRP0034I: The file transfer request has completed with no files being transferred.</s
  </status>
  <transferSet bytesSent="0" startTime="2015-08-13T23:58:59.247Z" total="1">
    <metaDataSet>
      <metaData key="com.ibm.wmqfte.SourceAgent">AGENT1</metaData>
      <metaData key="com.ibm.wmqfte.DestinationAgent">AGENT2</metaData>
      <metaData key="com.ibm.wmqfte.MqmdUser">RNIKULA</metaData>
      <metaData key="com.ibm.wmqfte.OriginatingUser">RNIKULA</metaData>
      <metaData key="com.ibm.wmqfte.OriginatingHost">192.168.244.1</metaData>
      <metaData key="com.ibm.wmqfte.TransferId">414d51204d4238514d47522020202020dd843f552004d50c</metaD
      <metaData key="com.ibm.wmqfte.Priority">0</metaData>
    </metaDataSet>
  </transferSet>
  <statistics>
    <actualStartTime>2015-08-13T23:59:00.700Z</actualStartTime>
    <retryCount>0</retryCount>
    <numFileFailures>1</numFileFailures>
    <numFileWarnings>0</numFileWarnings>
  </statistics>
</transaction>
```

Sample Formatted



IIB (BROKER)

Type of Broker Management Data Available Remotely

- **Resource Statistics**
  - Resources used by execution groups
- **Monitoring Statistics**
  - Usage Statistics of execution groups, nodes and threads
- **Flow Tracking**
  - Tracking of execution flow through message flows

Broker Monitoring Statistics

- **The broker provides detailed statistics**

- **Message Flow Level (for the flow)**
  - Total Messages Processed
  - Total Messages in Error
  - CPU Time Spent
  - Message Statistics

- **Node Level (for each processing node)**
  - Invocations
  - CPU Time
  - Information

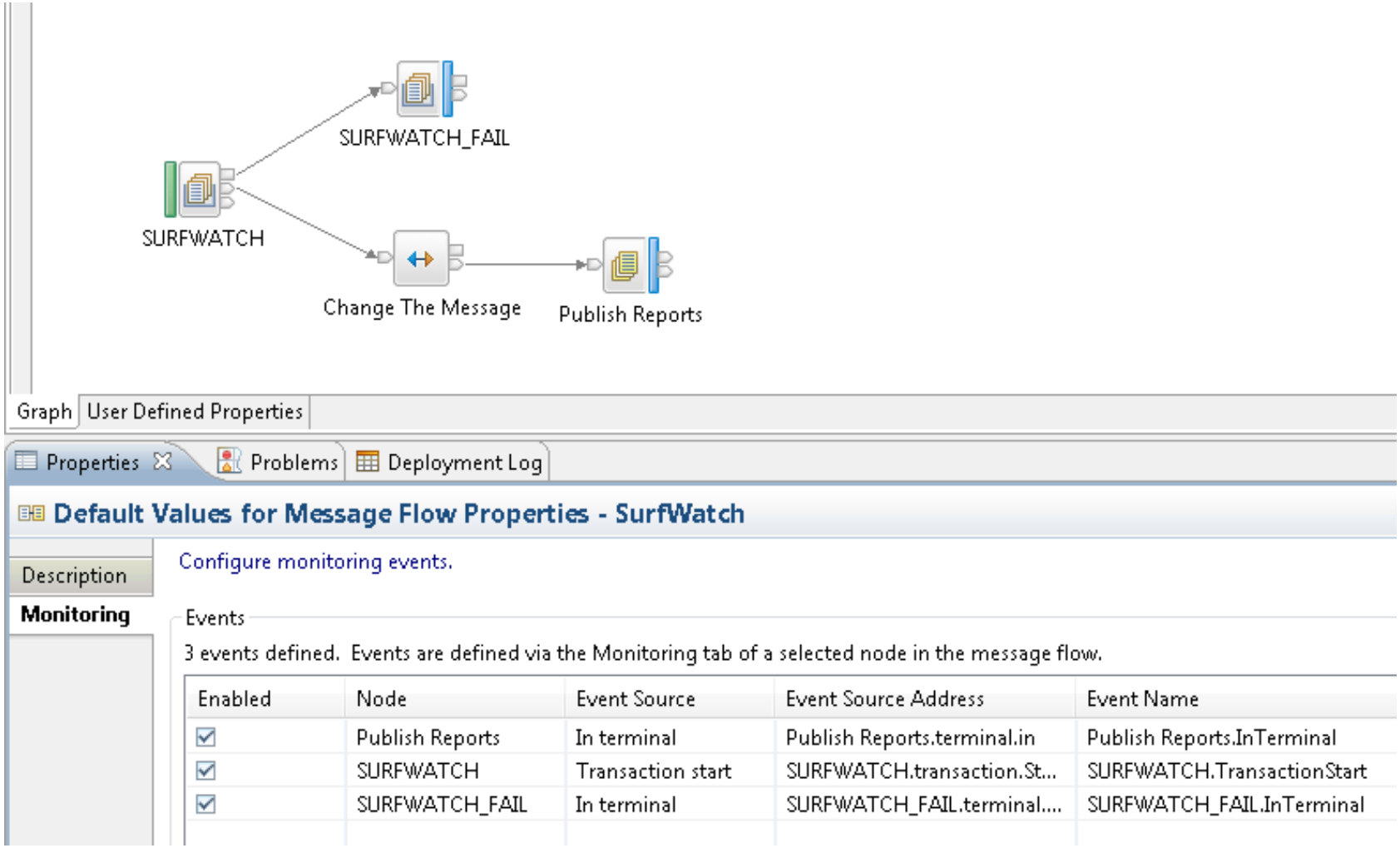
- **Thread Level (for each thread)**
  - Messages Processed
  - CPU Time Spent
  - Message Statistics

Tracking within the Message Flows

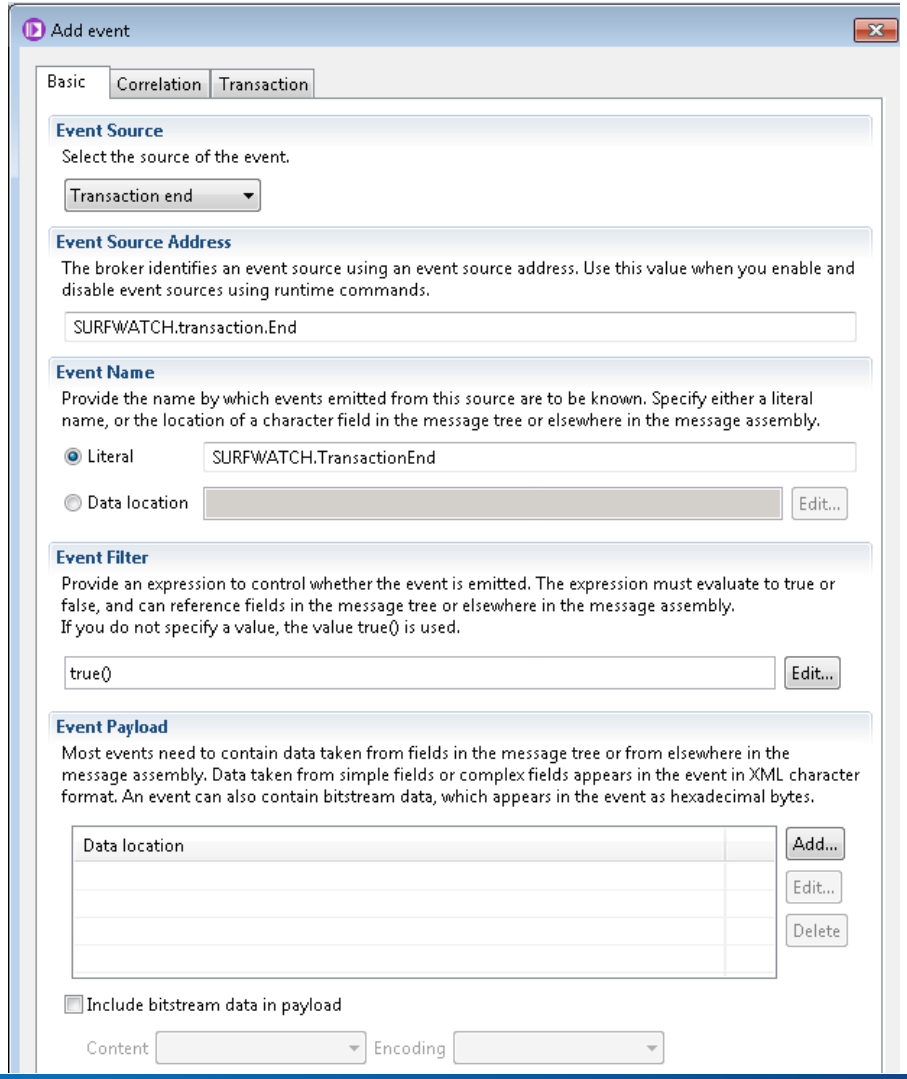
- The Broker Supports Tracking within the Message Flows
  - Transaction Start / Stop (default)
  - See when a given node was processed
  - See details about the message being processed by the flow
  - Track message flows in and across brokers

- Activated at the Message Flow and Node Level
  - Whether to collect
  - Data to Collect

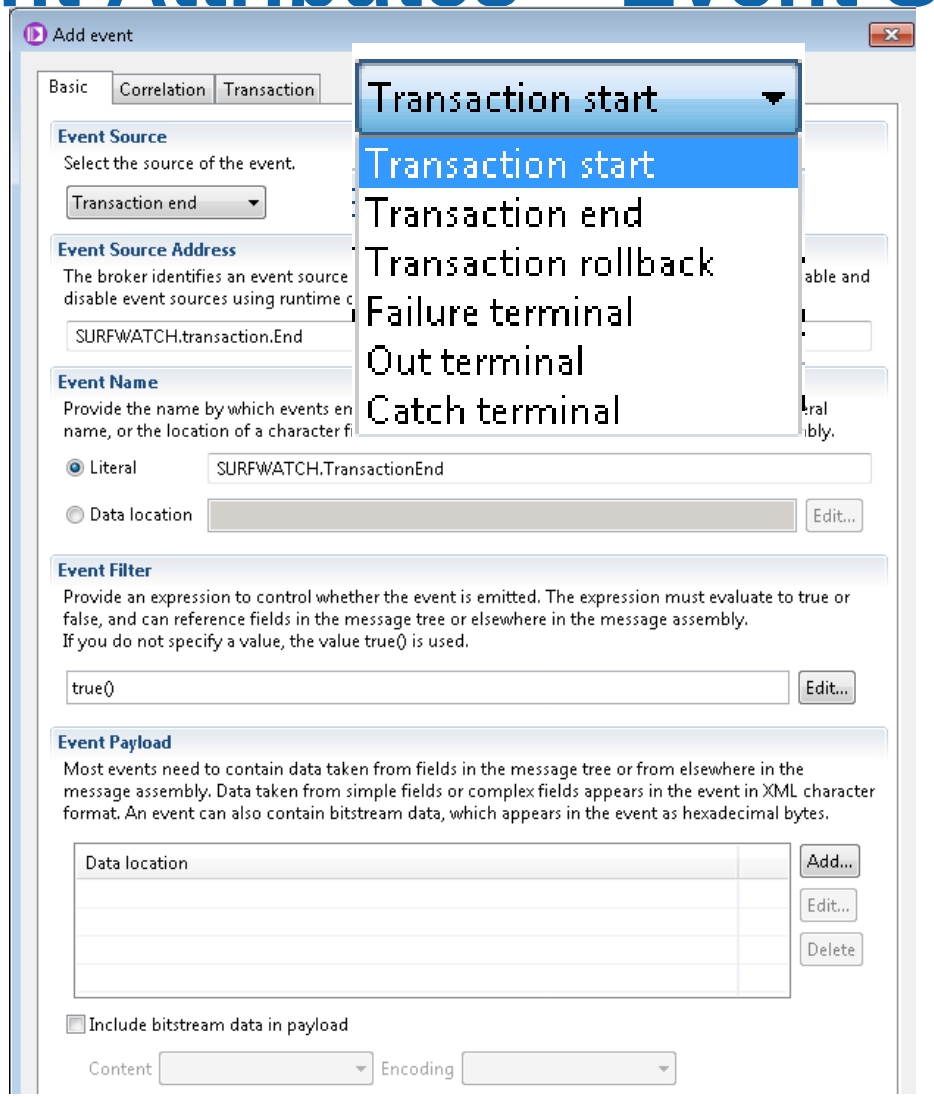
Configuring Message Flow Events



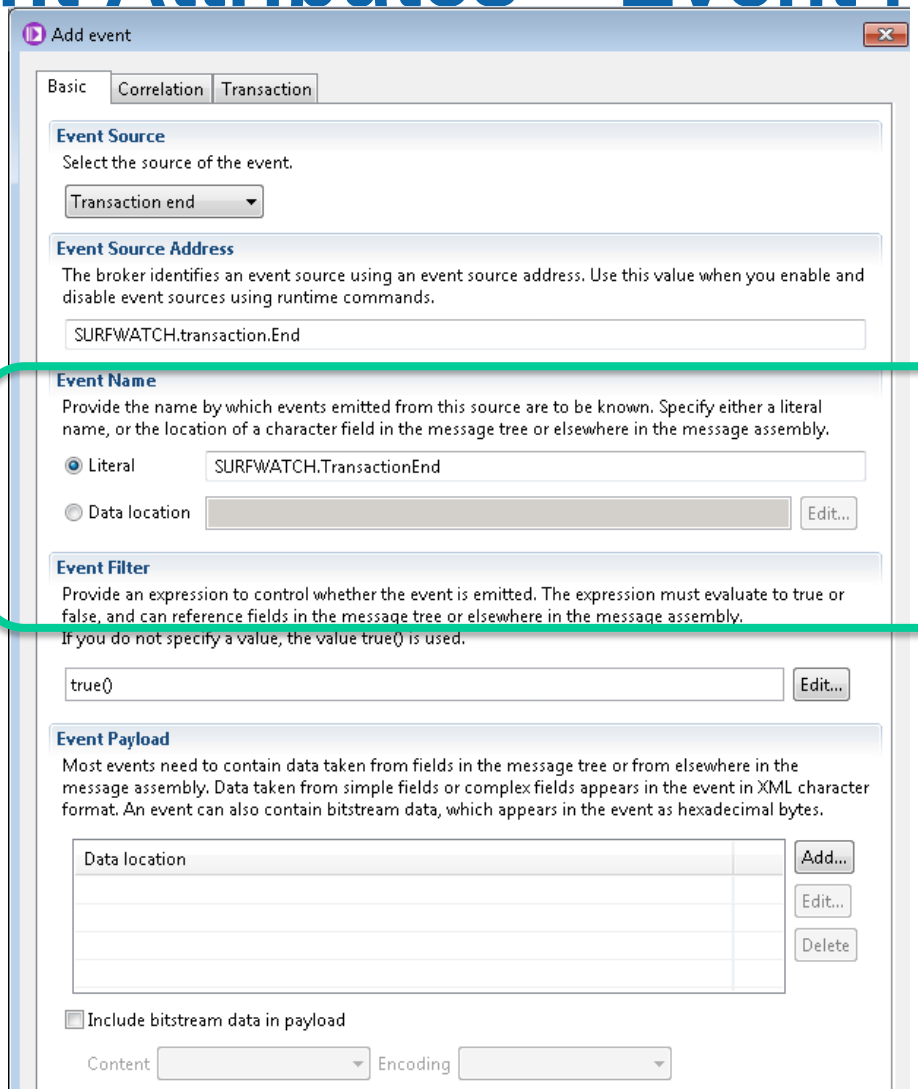
Event Attributes – Basic



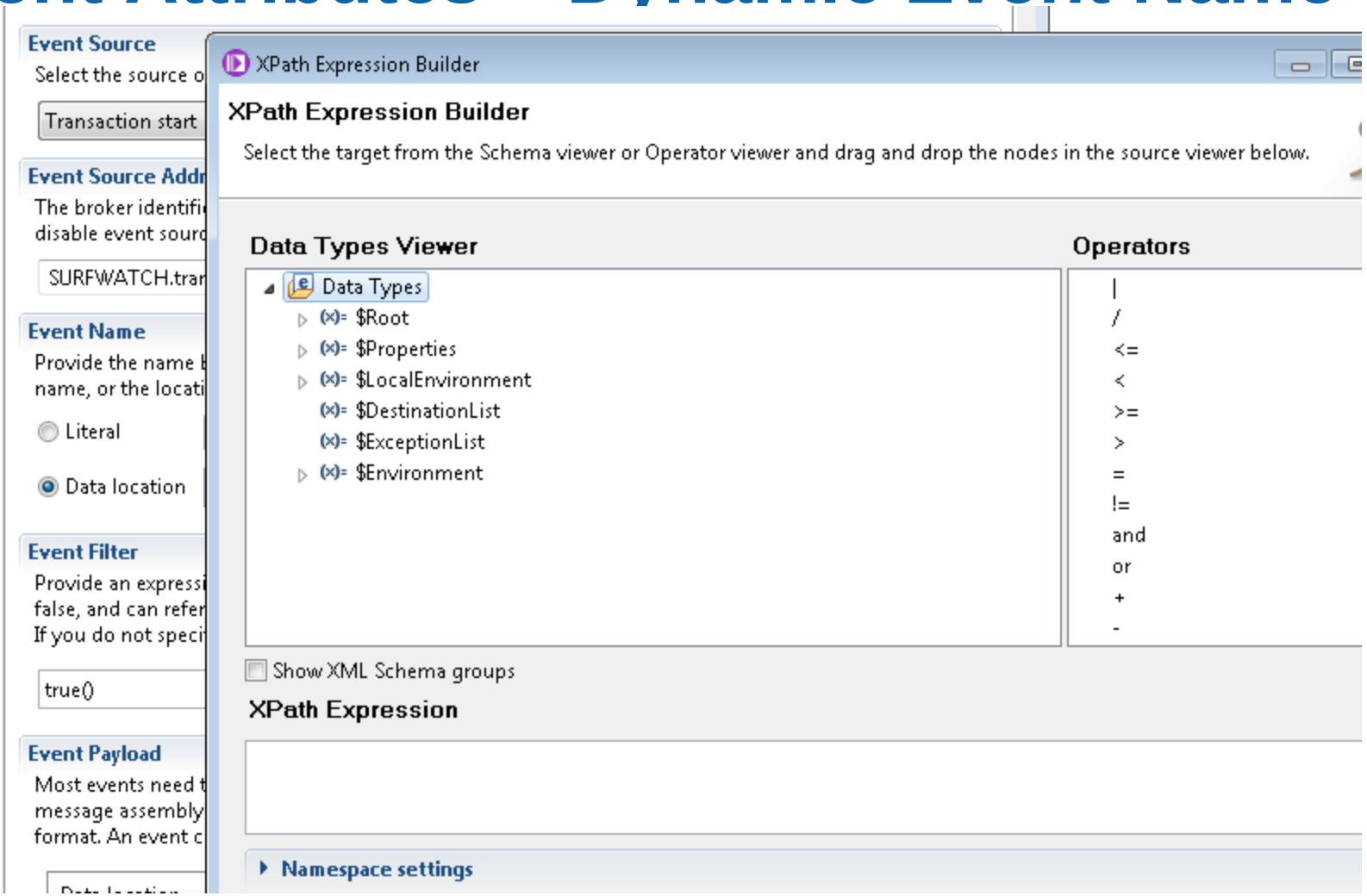
Event Attributes – Event Source



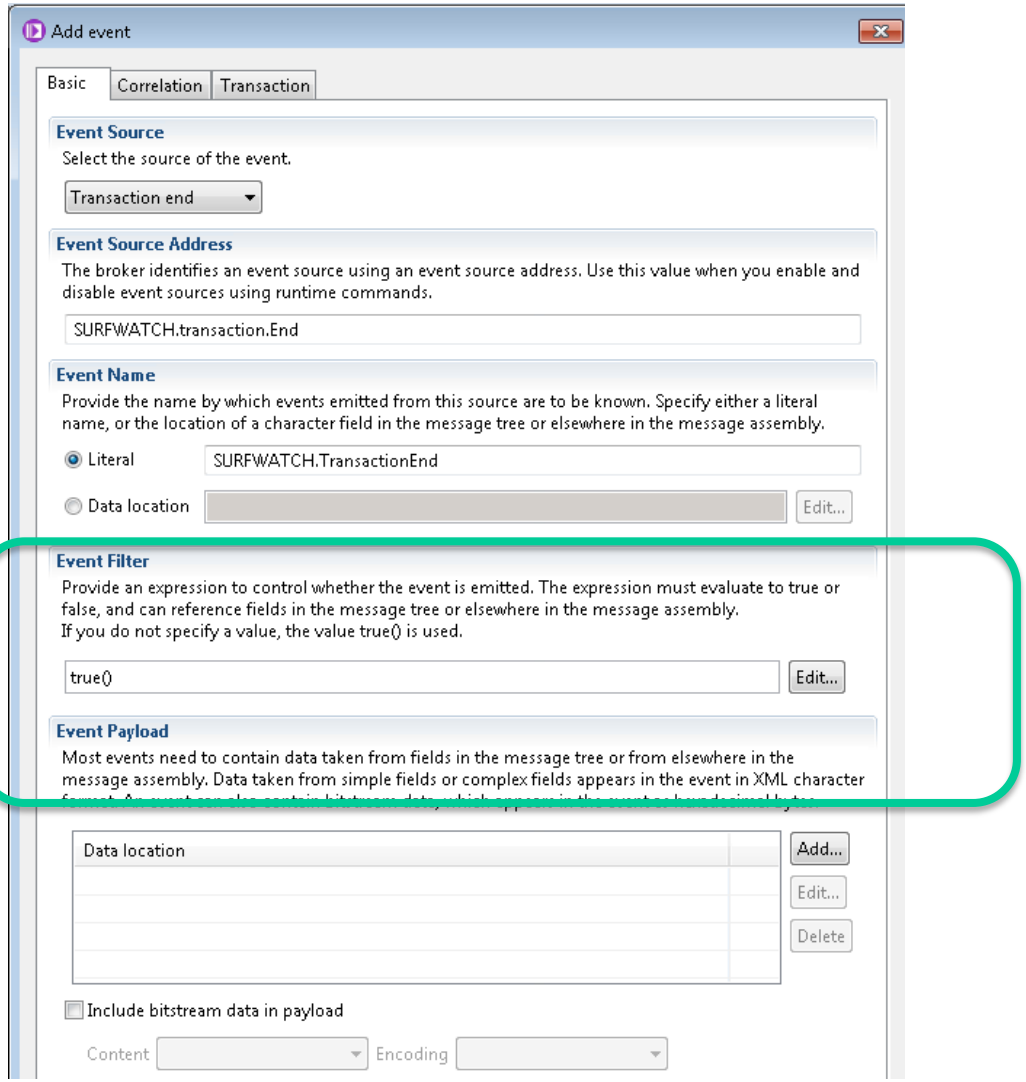
Event Attributes – Event Name



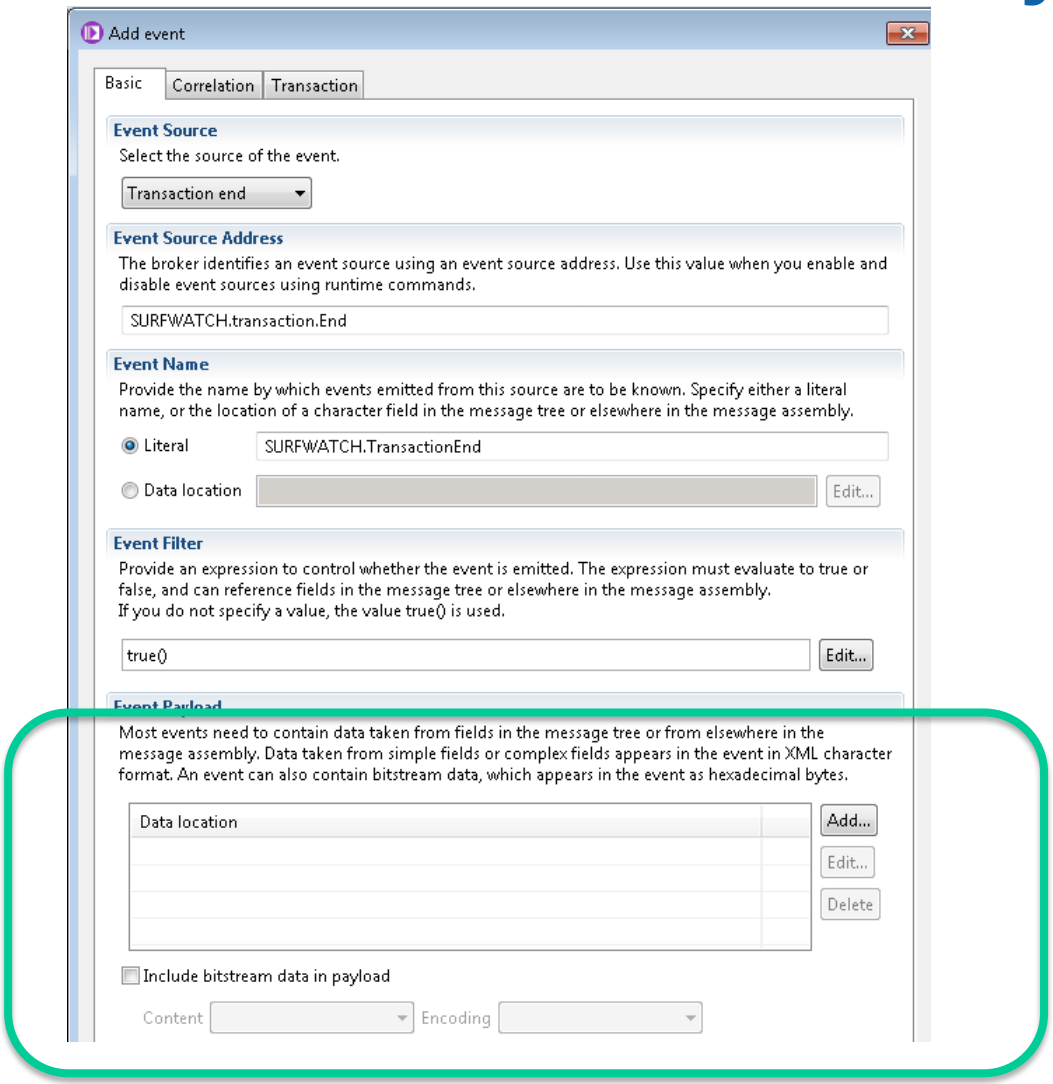
Event Attributes – Dynamic Event Name



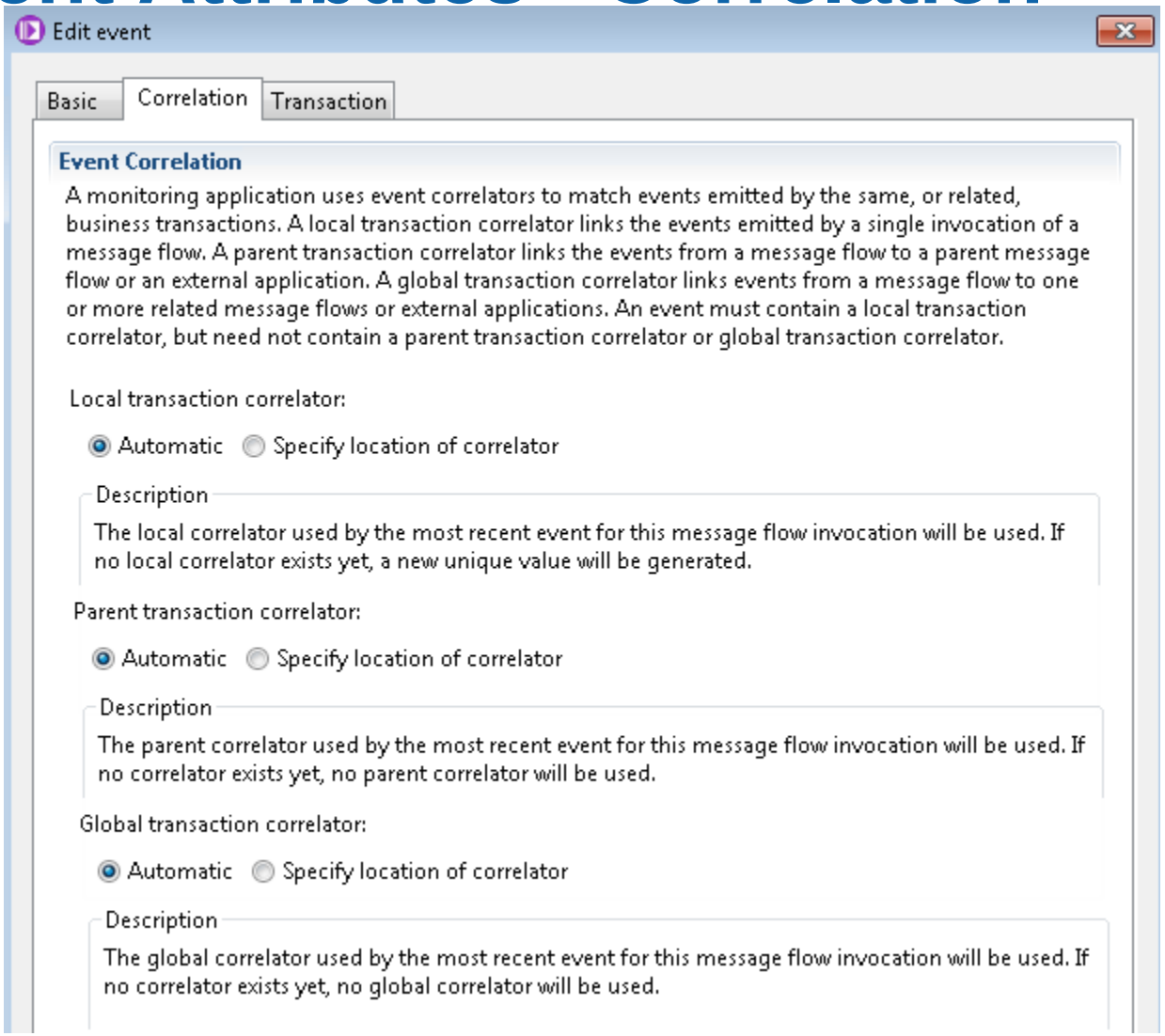
Event Attributes – Event Filter



Event Attributes – Event Payload



Event Attributes - Correlation



mqsichangeflowmonitoring Examples

- mqsichangeflowmonitoring BROKER -c active -g –j
- > Activate event flow monitoring for all execution groups and flows

- mqsichangeflowmonitoring BROKER -c active -e default -k application1 -f myflow1
- > Activate monitoring for message flow *myflow1* referenced by application *application1*, in execution group *default*

- mqsichangeflowmonitoring BROKER -c inactive -g –j
- > Deactivate event flow monitoring for everything

Getting Tracking Data

- The statistics Tracking data is published

- $SYS/Broker/<brokerName>/Monitoring/<executionGroupName>/<flowName>

- Example Subscriptions

- $SYS/Broker/Broker1/Monitoring/#
- $SYS/Broker/+/Monitoring/#
- $SYS/Broker/Broker2/Monitoring/EGRP/Flow1

The resultant data is then processed directly by a subscribing application or placed on a queue for processing by an application.

Tracking Data

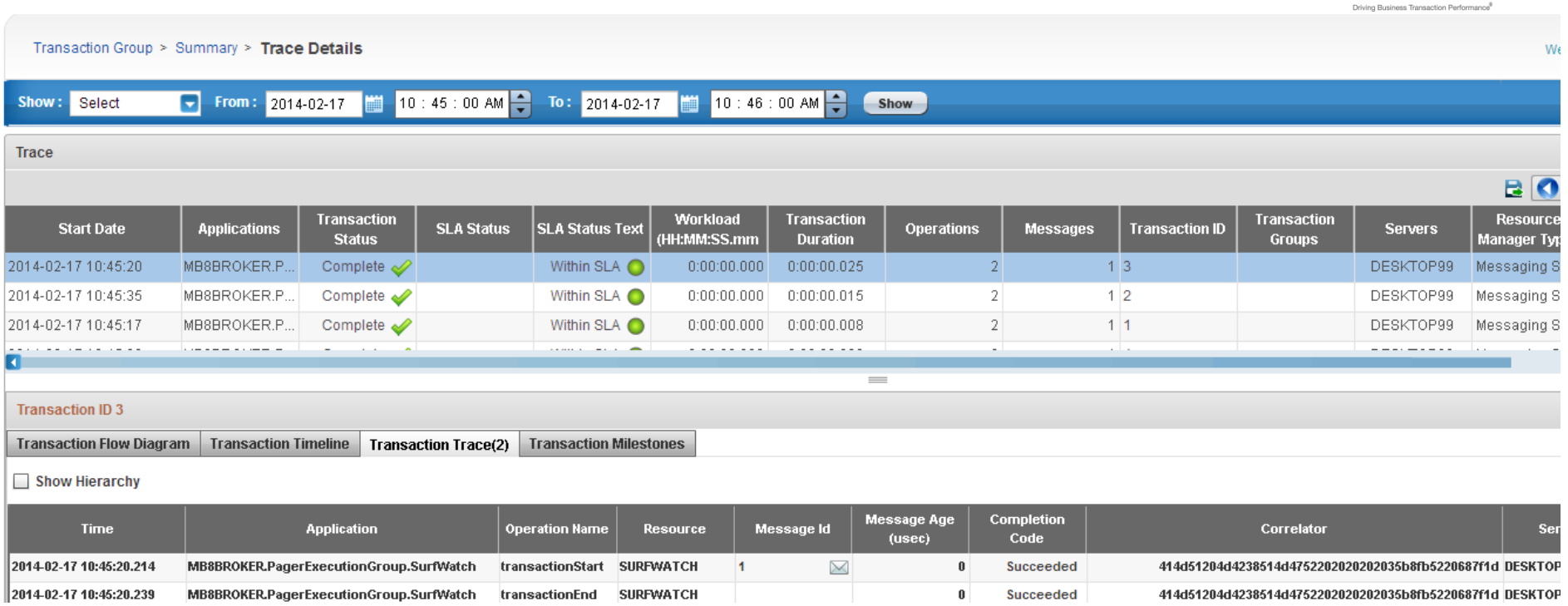
```
<wmb:event
xmlns:wmb="http://www.ibm.com/xmlns/prod/websphere/messagebroker/6.1.0/monitor
/event">
<wmb:eventPointData>
<wmb:eventData wmb:productVersion="8001" wmb:eventSchemaVersion="6.1.0.2">
  <wmb:eventIdentity wmb:eventName="transactionStart" />
  <wmb:eventSequence wmb:creationTime="2015-09-25T21:06:10.008Z" wmb:counter="1" />
  <wmb:eventCorrelation
wmb:localTransactionId="414d51204d4238514d47522020202020bf172454201558fe"
        wmb:parentTransactionId="" wmb:globalTransactionId="" />
  </wmb:eventData>
<wmb:messageFlowData>
  <wmb:broker wmb:name="MB8BROKER" wmb:UUID="61f8eda0-81f5-43b6-8cf5-
b9a1fef8f91b" />
  <wmb:executionGroup wmb:name="PagerExecutionGroup"
        wmb:UUID="a4f0fff6-4501-0000-0080-c644e460ccff" />
  <wmb:messageFlow
wmb:uniqueFlowName="MB8BROKER.PagerExecutionGroup.SurfWatch"
        wmb:name="SurfWatch" wmb:UUID="6c0000f7-4501-0000-0080-d6b3e1d5c115"
        wmb:threadId="10044" />
  <wmb:node wmb:nodeLabel="SURFWATCH" wmb:nodeType="ComIbmMQInputNode"
        wmb:detail="SURFWATCH" />
  </wmb:messageFlowData>
  </wmb:event> Unit Data
```

Tracking Data

```
<wmb:event
xmlns:wmb="http://www.ibm.com/xmls/prod/websphere/messagebroker/6.1.0/monitoring/event">
<wmb:eventPointData>
  <wmb:eventData wmb:productVersion="8001" wmb:eventSchemaVersion="6.1.0.2">
   <wmb:eventIdentity wmb:eventName="transactionEnd" />
   <wmb:eventSequence wmb:creationTime="2015-09-25T21:06:48.273998Z"
wmb:counter="2" />
   <wmb:eventCorrelation wmb:localTransactionId="
414d51204d4238514d47522020202020bf172454201558fe "
        wmb:parentTransactionId="" wmb:globalTransactionId="" />
   </wmb:eventData>
   <wmb:messageFlowData>
   <wmb:broker wmb:name="MB8BROKER" wmb:UUID="61f8eda0-81f5-43b6-8cf5-
b9a1fef8f91b" />
   <wmb:executionGroup wmb:name="PagerExecutionGroup"
        wmb:UUID="a4f0fff6-4501-0000-0080-c644e460ccff" />
   <wmb:messageFlow
wmb:uniqueFlowName="MB8BROKER.PagerExecutionGroup.SurfWatch"
        wmb:name="SurfWatch" wmb:UUID="6c0000f7-4501-0000-0080-d6b3e1d5c115"
        wmb:threadId="10044" />
   <wmb:node wmb:nodeLabel="SURFWATCH" wmb:nodeType="ComIbmMQInputNode"
        wmb:detail="SURFWATCH" />
   </wmb:messageFlowData>
```

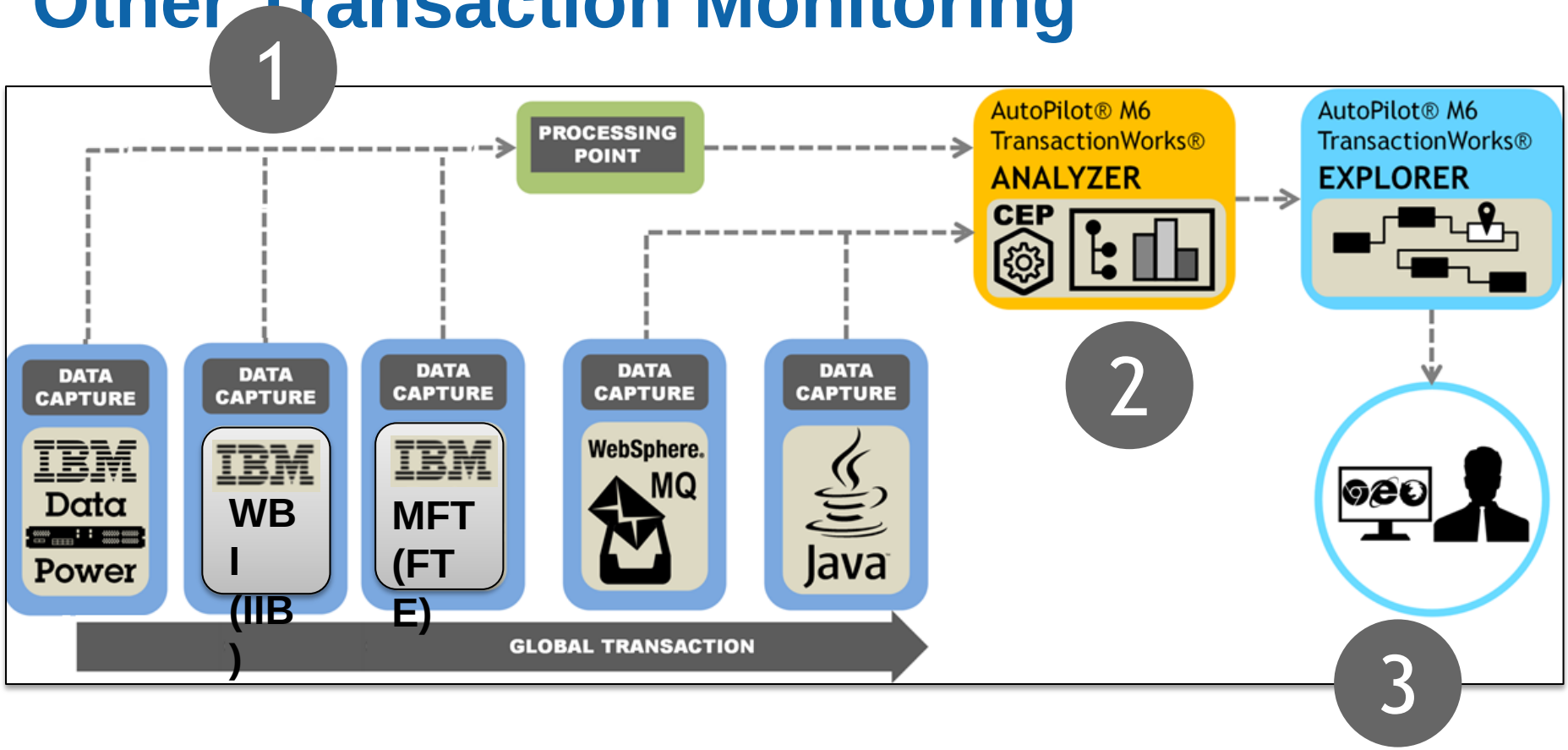
Example

- **Message Flows can be tracked by capturing the flow tracking events**

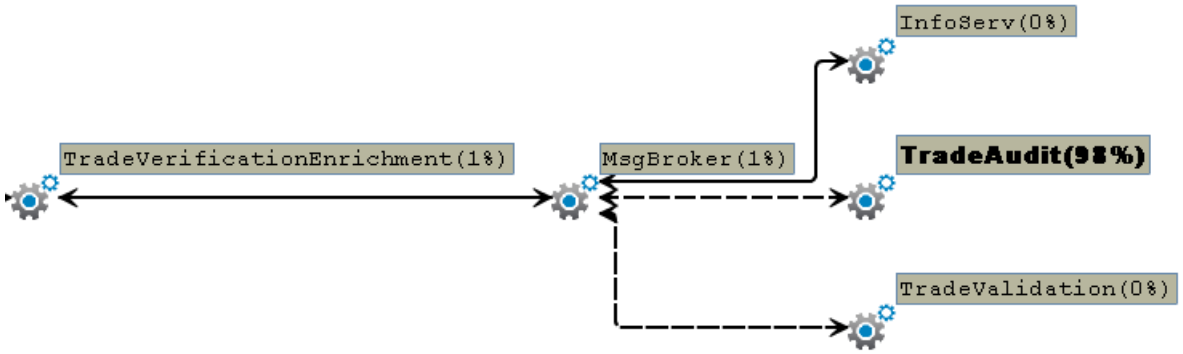


SUMMARY

Other Transaction Monitoring



Cross Application Tracking



Time	Operation Name	Resource	Elapsed Time (usec)	Message Id	Message Age (usec)	Completion Code	
2013-03-26 13:41:47.17	/trading/verification	/trading/verificati	7875		0	Succeeded	L
2013-03-26 13:41:47.19	com/acme/trading/verify.start	java	5749		0	Succeeded	L
2013-03-26 13:41:47.19	HTTP/GET/trading/verification	/trading/verificati	7665	2195	0	Succeeded	L
2013-03-26 13:41:47.19	Statement.executeQuery(String)	MySQL5.1:DBSer	1823	2196	0	Succeeded	L
2013-03-26 13:41:47.20	com/acme/trading/verify.request	java	1495		0	Succeeded	L
2013-03-26 13:41:47.20	QueueSender.send	queue://trading/	6565	2186	0	Succeeded	L
2013-03-26 13:41:47.20	MQPUT	TradeVerification.	10107	2186	0	Succeeded	L
2013-03-26 13:41:47.22	MQGET	TradeVerification.	10908	2186	834	Succeeded	B
2013-03-26 13:41:47.22	MQPUT	TradeValidation.I	9399	2187	0	Succeeded	B
2013-03-26 13:41:47.24	MQGET	TradeValidation.I	9507	2187	116	Succeeded	W
2013-03-26 13:41:47.24	MQPUT	TradeValidation.C	9803	2188	0	Succeeded	W
2013-03-26 13:42:23.22	MQGET	TradeValidation.C	35970000	2188	652	Succeeded	B
2013-03-26 13:42:23.22	MQPUT	TradeAudit.Input.	10511	2189	0	Succeeded	B

Additional Information

- For additional information on products provided by Nastel including AutoPilot services for IBM MQ, Integration Bus, Managed File Transfer, DataPower and WebSphere Application Server

- See http://www.nastel.com

- Or contact info@nastel.com

- Thank You

Questions