Q Replication: a Solution for Continuous DB2 Availability and Lots of Cool New Features!
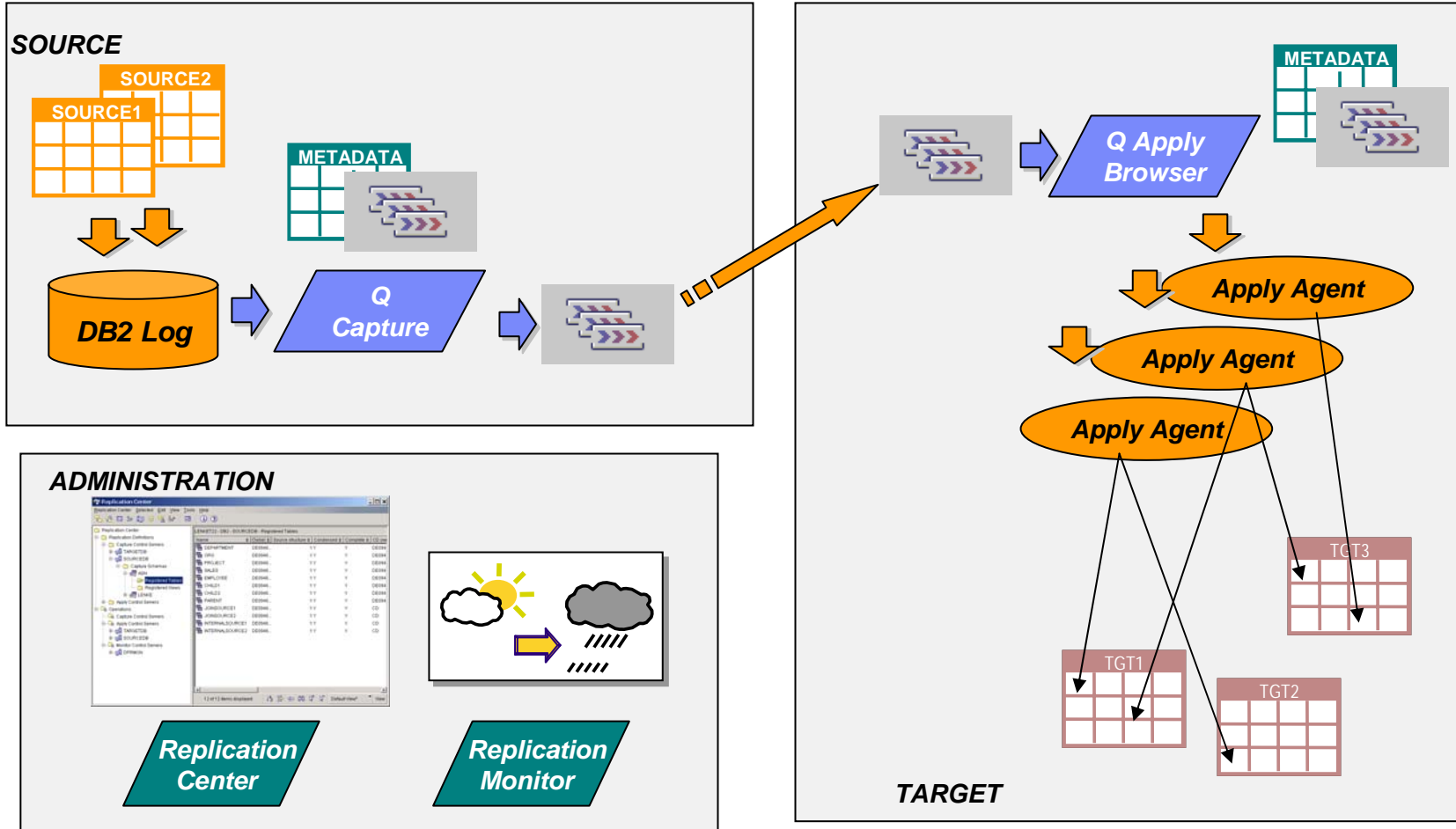
IBM Information Management software

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ON DEMAND BUSINESS

Agenda Topics

- A quick review of the basics

- Q Replication as a continuous availability solution

- New Product Features

- New Features on the Web

Q Replication Basics

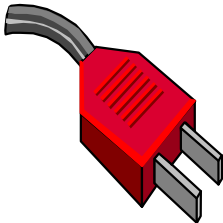# Continuous Availability – What is your Scenario?

- **Planned Outage**
  - ▸ scheduled outages are still a necessity for most organizations
  - ▸ includes application changes, software and hardware upgrades, and migrations in addition to utility operations
  - ▸ typically handled with a local copy
- **Unplanned Outage - Failover or Hot Standby**
  - ▸ localized failure
  - ▸ temporary or permanent outage of primary source
  - ▸ typically handled with a local copy
- **Disaster Recovery**
  - ▸ widespread failure
  - ▸ temporary or permanent outage of primary source
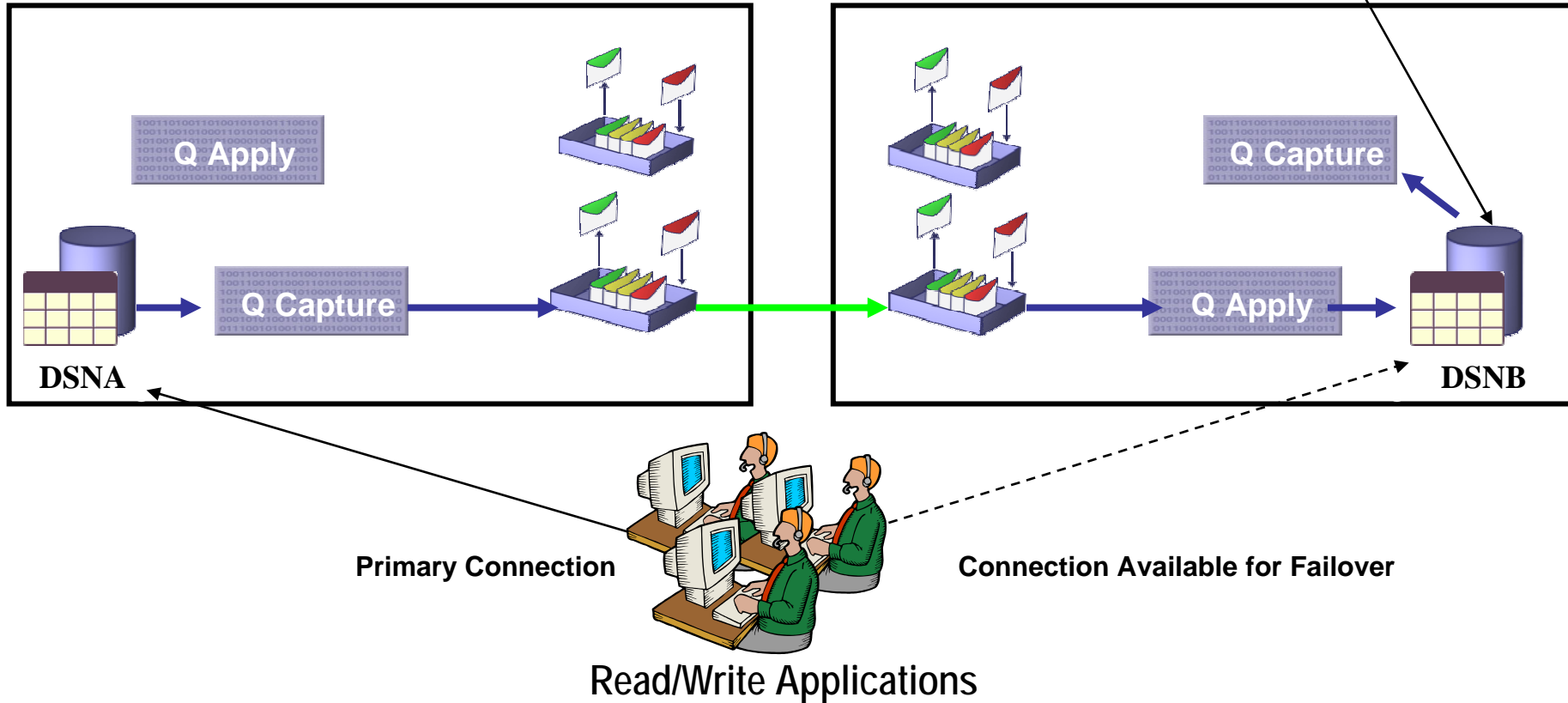 - ▸ typically handled with a remote copy
- **Global Distribution and Redundancy of Data**
  - ▸ geographical distribution of data for improved local access
  - ▸ redundancy of data for continuity of business
  - ▸ typically handled with multiple remote copies

# Continuous Availability using Q Replication

Read Only Applications

Q Apply

Q Capture

Q Capture

Q Apply

DSNA

DSNB

Primary Connection

Connection Available for Failover

Read/Write Applications

- Q Replication provides a solution for continuous availability where the active secondary system is also available for other applications

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Possible Q Replication Configurations for CA
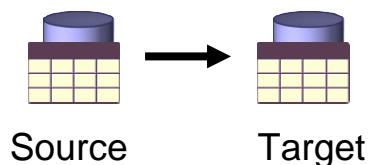
Source → Target

- **Unidirectional**
  - ▸ Changes are replicated in one direction between two servers (i.e. from source to target)
  - ▸ Changes can be filtered and transformed

Primary ⇄ Secondary/backup
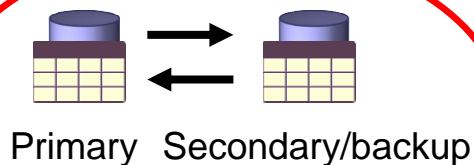
- **Bidirectional**
  - ▸ Changes are replicated in two directions between two servers
  - ▸ Conflicts determined based on data values, one server designated as winner
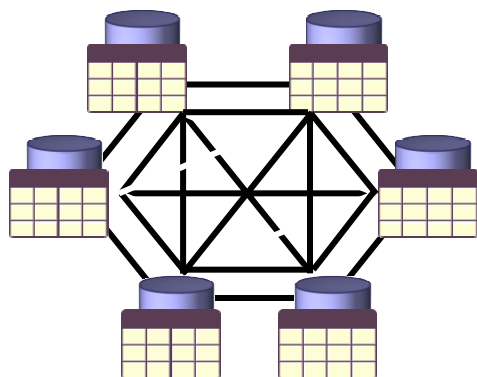
- **Peer to peer**
  - ▸ Changes are replicated between 2 or more servers
  - ▸ Conflicts determined by most recent timestamp, no master copy

Why Use Q Replication for Continuous Availability?

- Advantages
  - ▶ Allows the fastest switchover with transactionally consistent data
  - ▶ Excellent solution for scheduled outage
    - Allows flexibility of OS level, DB level, application level, data format
    - Can be easily tested and monitored
  - ▶ Allows for database read or write activity on secondary
    - secondary site may be used for other applications
    - is the only solution for geographically dispersed updateable databases
  - ▶ Can supplement other HA solutions
    - eg hardware for local failover + Q Replication for long distance DR
  - ▶ Allows for lower cost hardware or platform
  - ▶ Low impact on source applications

- Disadvantages
  - ▶ Asynchronous
    - Data can be temporarily or permanently lost in a failure scenario
  - ▶ Application awareness is required (triggers for example)

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New Product Features

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New in 2005 – MQ Client Support
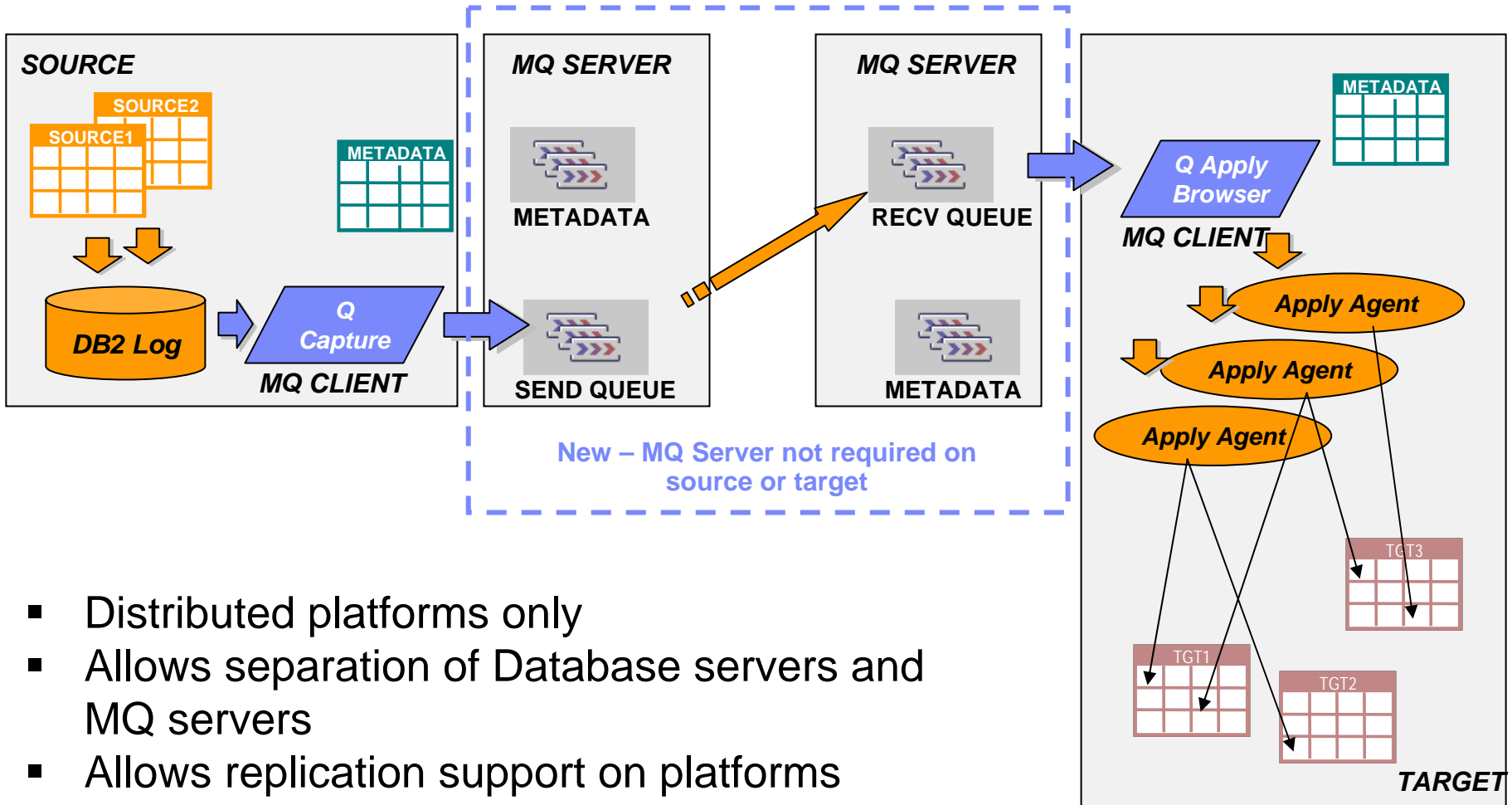
- Distributed platforms only
- Allows separation of Database servers and MQ servers
- Allows replication support on platforms which currently lack MQ Server support

New in 2005 – Federated Targets
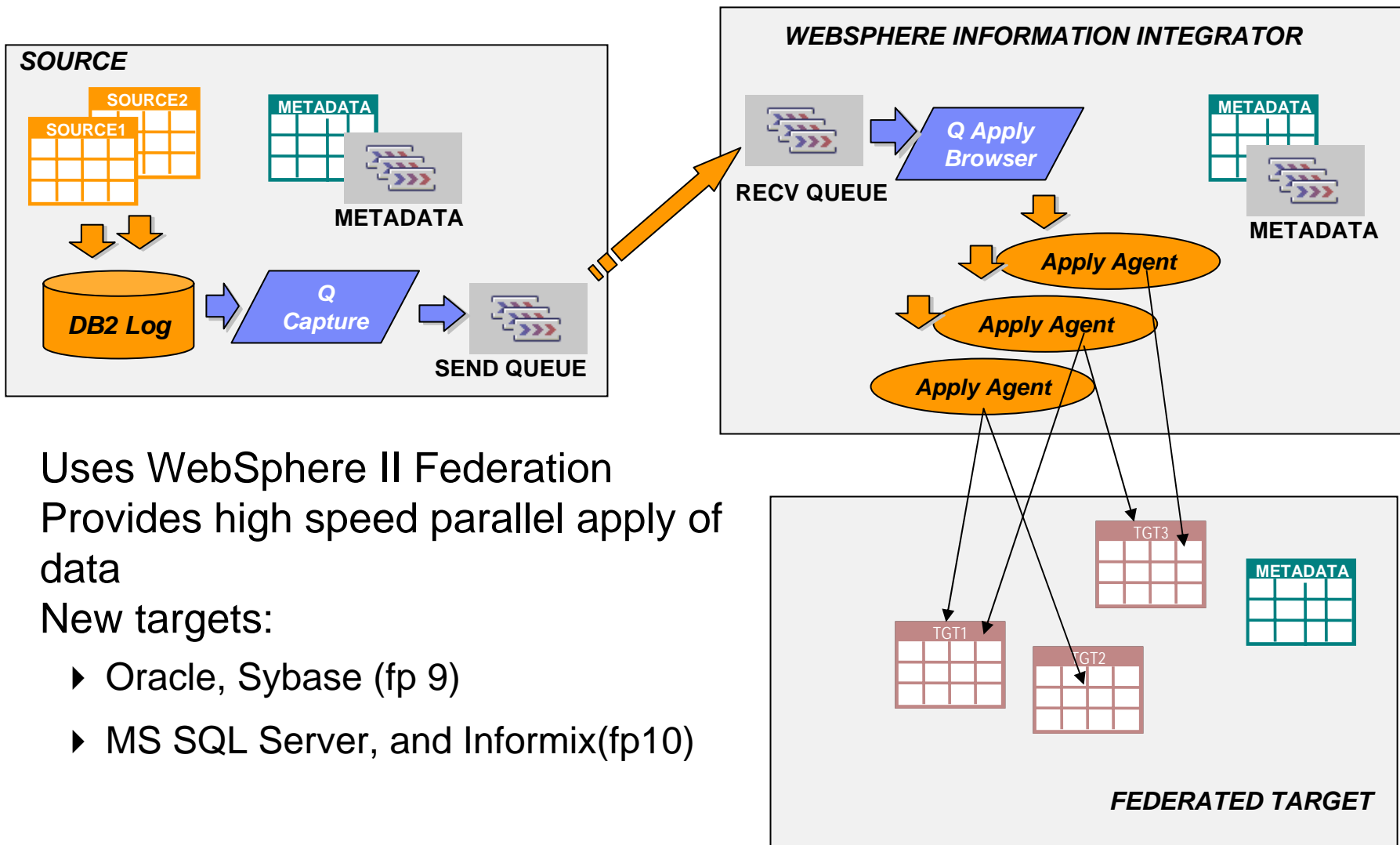
- Uses WebSphere II Federation
- Provides high speed parallel apply of data
- New targets:
    - ▸ Oracle, Sybase (fp 9)
    - ▸ MS SQL Server, and Informix(fp10)

Other Improvements in 2005

- Allow user provided model queue name
  - ▶ For dynamic spill queues

- Replication Center – support for single sign on

- Replication center – queue map dialog "facelift"
  - ▶ We'll take a look at that in the next section

- Alter Add Column Signal extended to P2P and Bidirectional

- Remove nuisance exceptions in applying cascade deletes

- Replication Center and Q Apply now support tables with no unique index defined

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New Features on the Web

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Replication Queue Maps
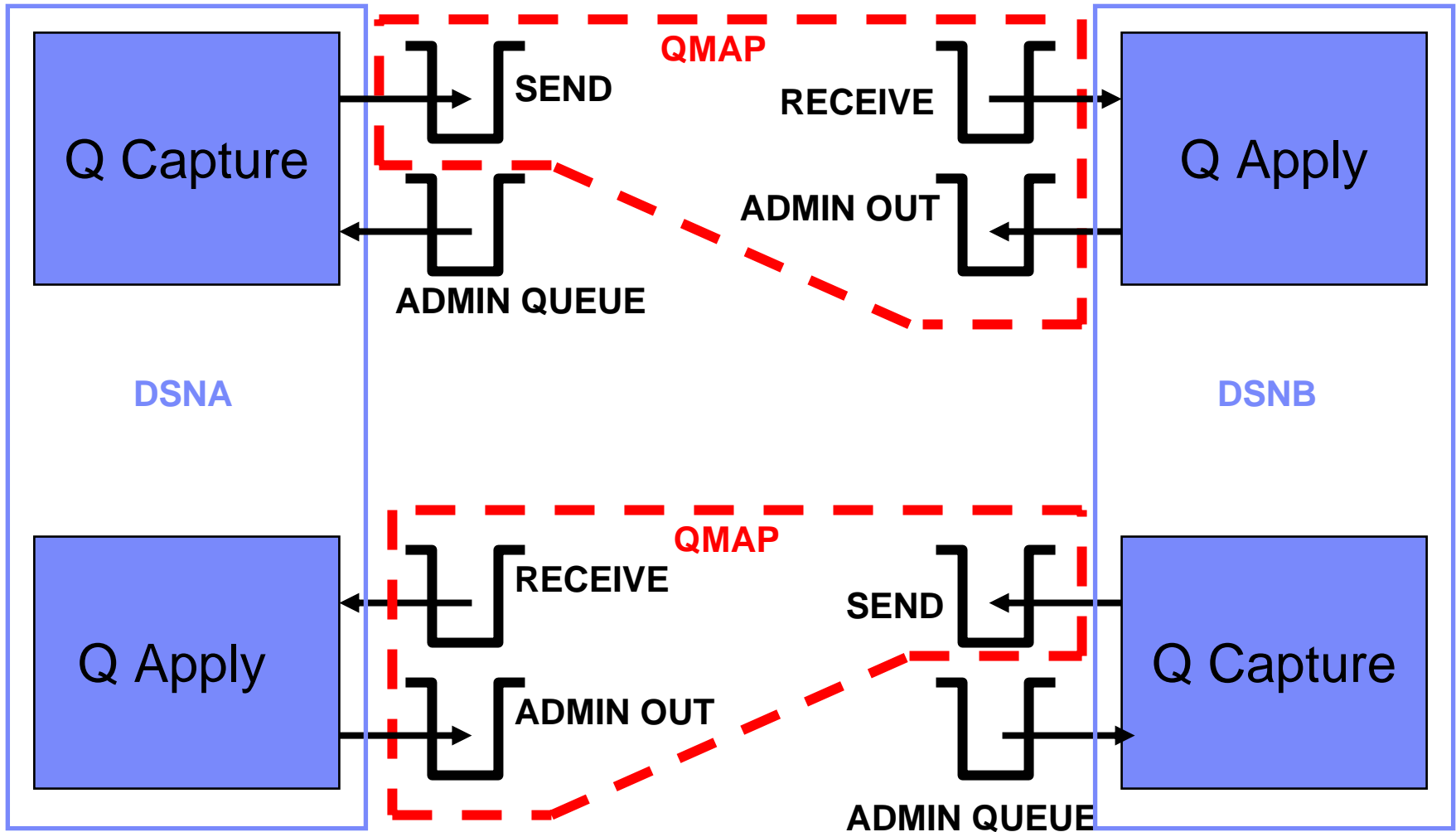
- Early users found defining these was a bit tricky….

NEW!!! In Fixpak 10 – Replication Queue Map "Facelift"
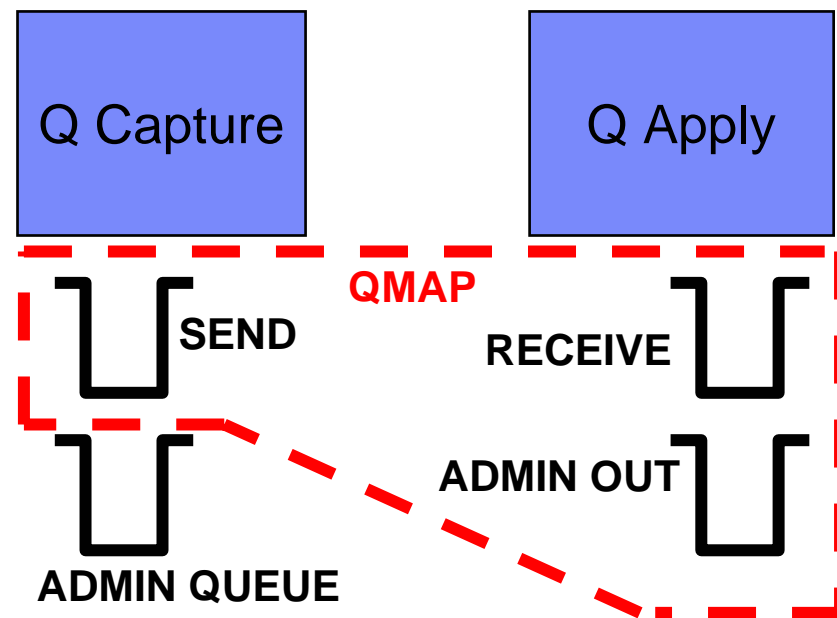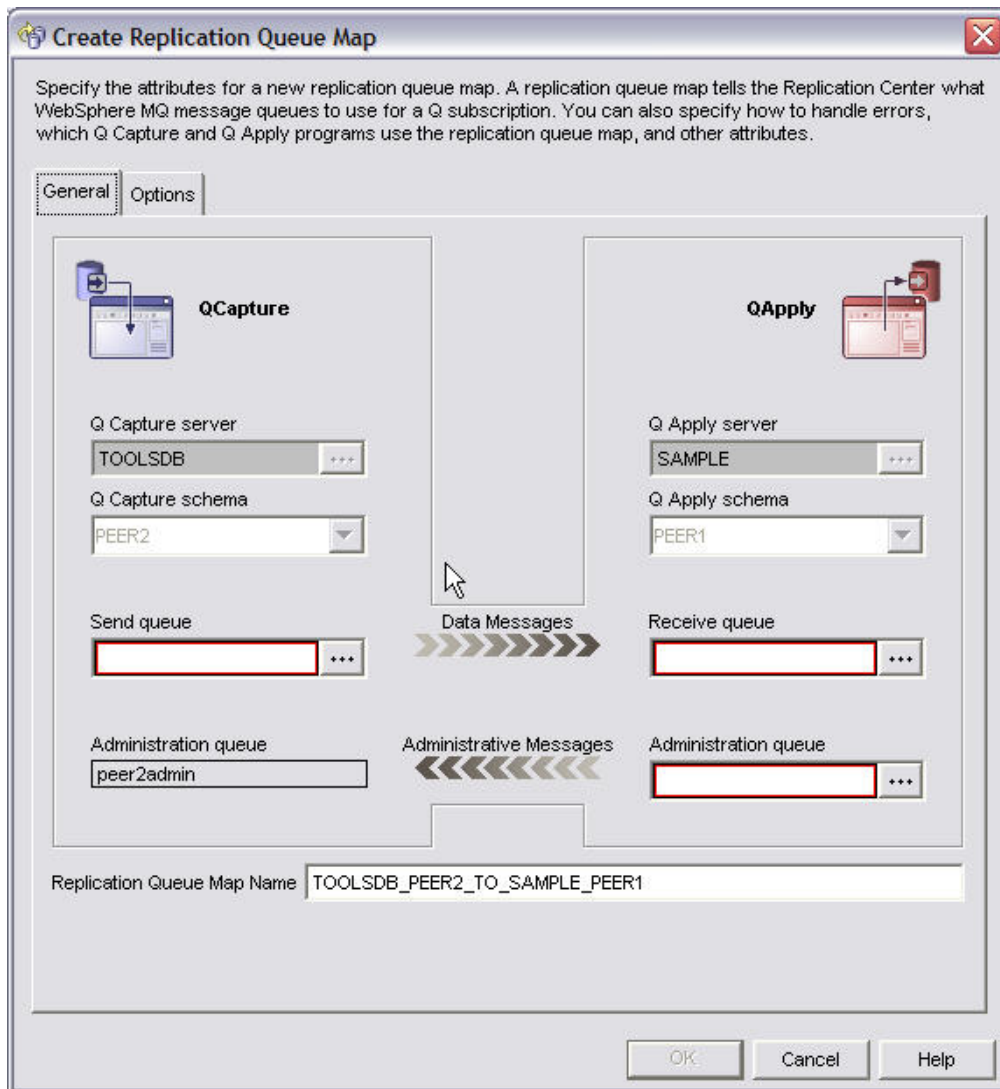
- ## So we made it easier!!!

NEW!!! In Fixpak 10 – Replication Queue Map "Facelift"

New Improved Panel   **Old Panel**

NEW!!! Downloadable SP Provides Enhanced MQ Usability

- When you have the stored procedure installed at the DB2 LUW server…

- …The ellipsis allows you to choose existing queues

NEW!!! Downloadable SP Provides Enhanced MQ Usability
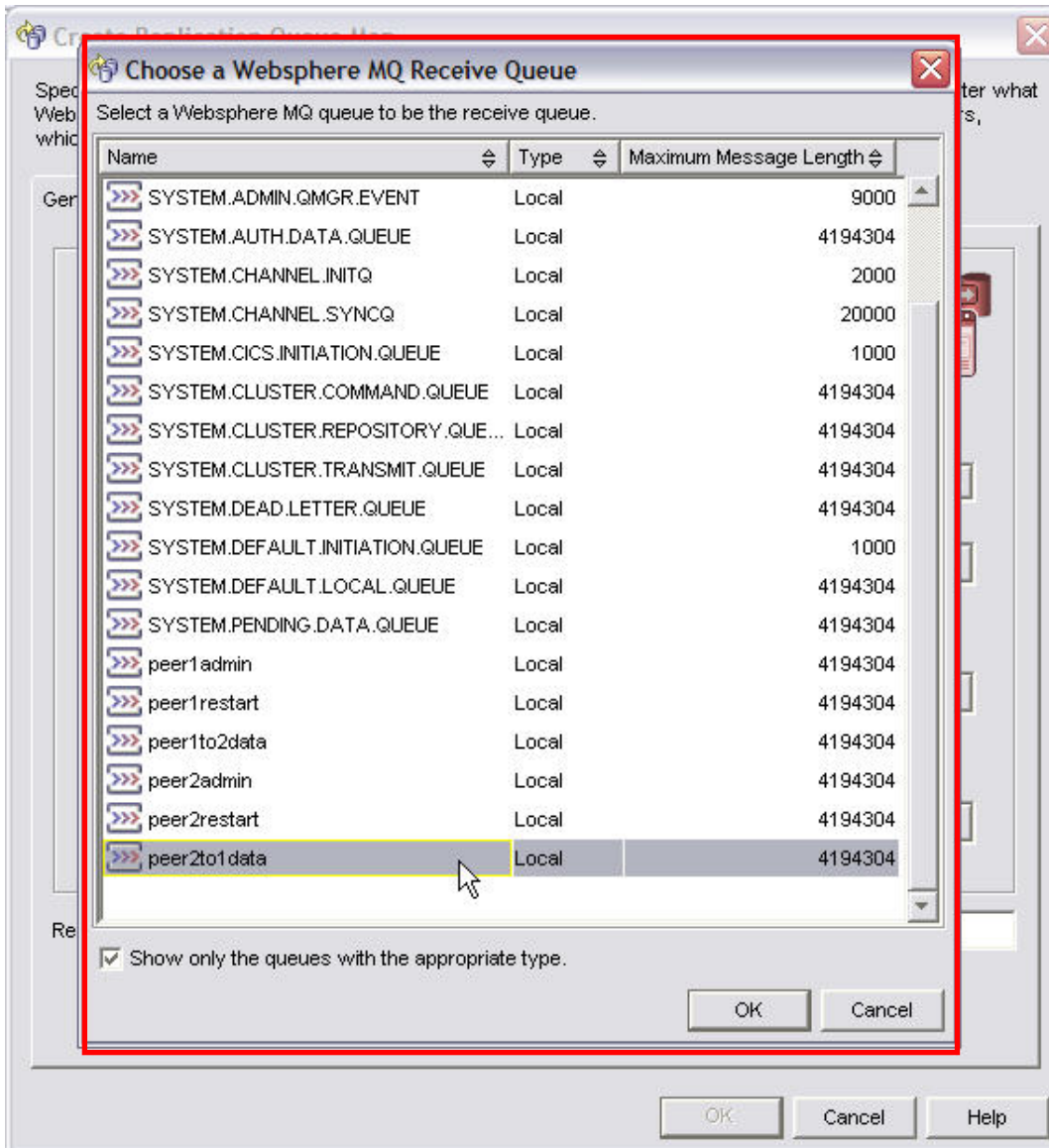
- **Enhanced MQ Features available only when using MQ Servers – not supported at sites with MQ Client**

- **Available only on DB2 LUW servers**

- **Stored Procedure available via web download – requires fixpak 10**

NEW!!! Downloadable SP Provides Enhanced MQ Usability

- When you have filled in the queue names on the page…

- The stored procedure enhancement allows you to validate existing queues

NEW!!! Downloadable SP Provides Enhanced MQ Usability
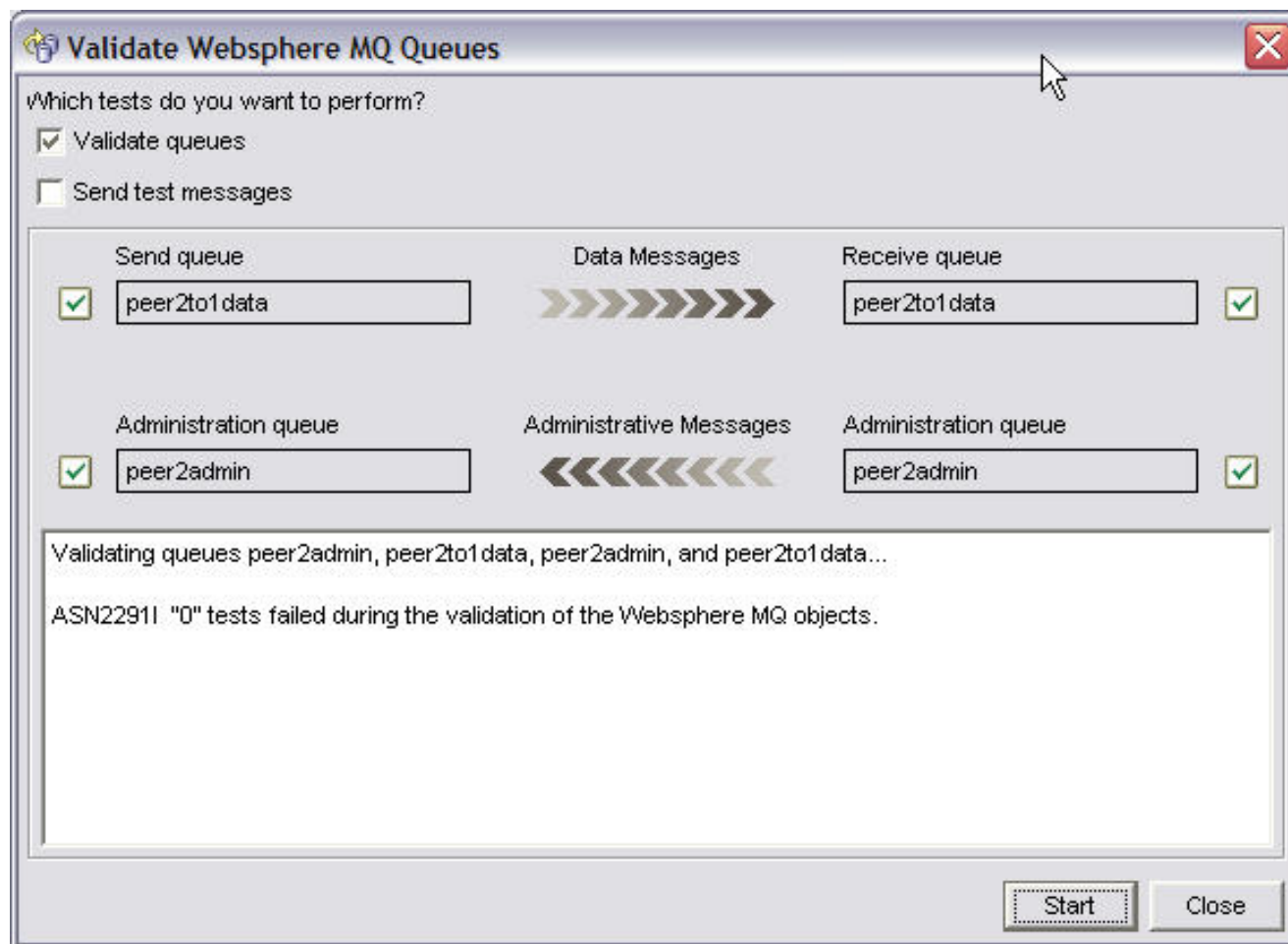
Reducing chances of configuration failures…

NEW!!! Live Monitor – Q Apply
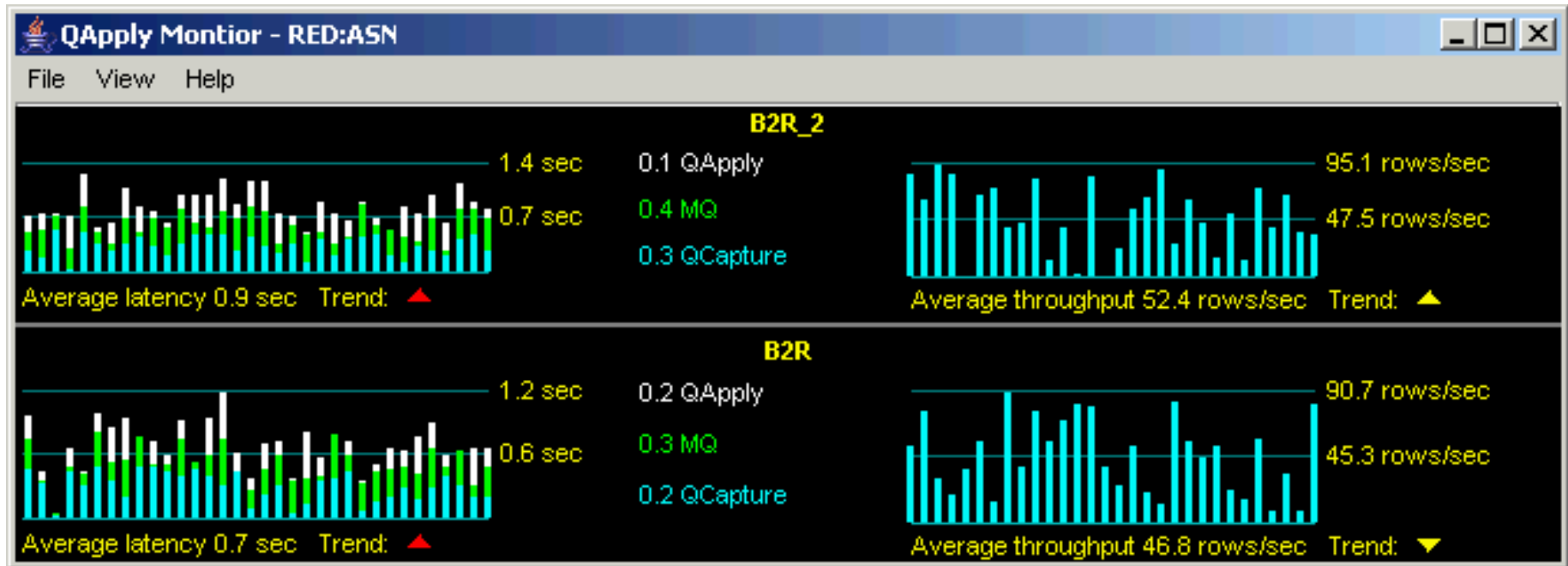
From the Q Apply side of the replication, we have an end to end view and a breakdown of where time is spent:

- End-to-end latency information per Queue (on left)

    - Color coded for different components of latency

- Throughput information per Queue (on right)

- Each bar represents one MONITOR_INTERVAL of time

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NEW!!! Live Monitor – Q Apply
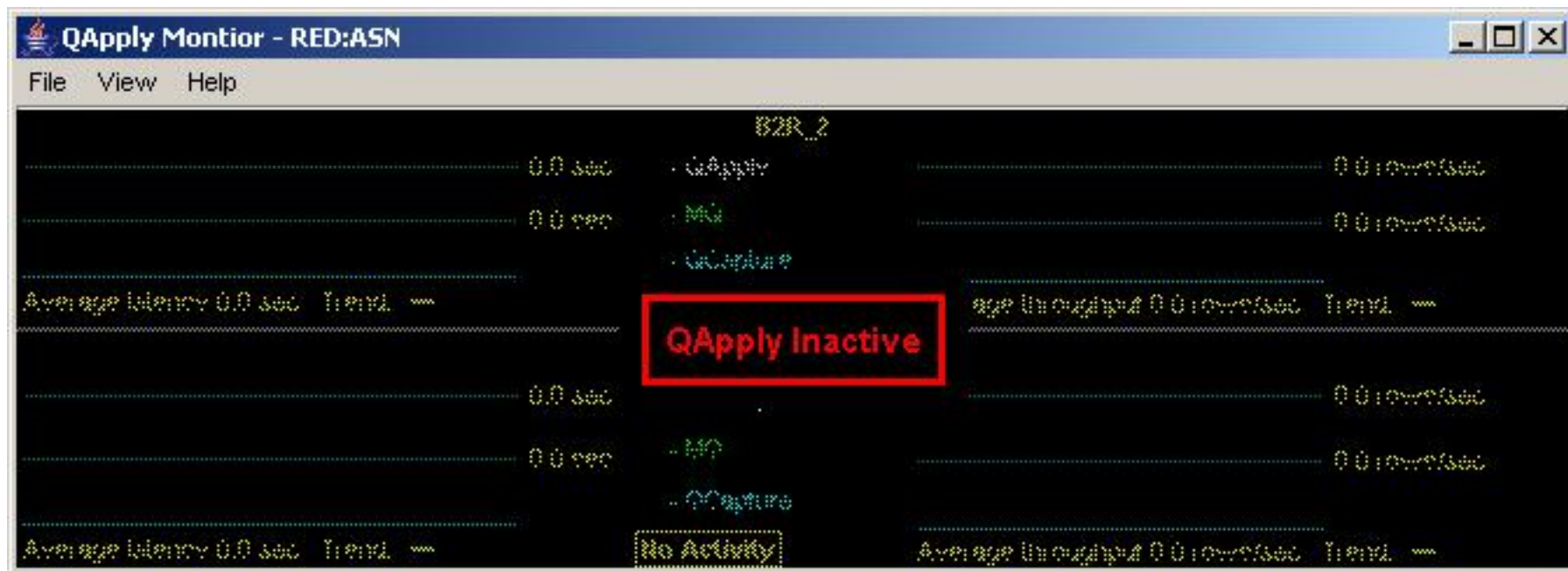
If the Q Apply becomes inactive, the live monitor will display this behavior

Identifying Exceptions

- The Live Monitor displays exception rows with a red bar
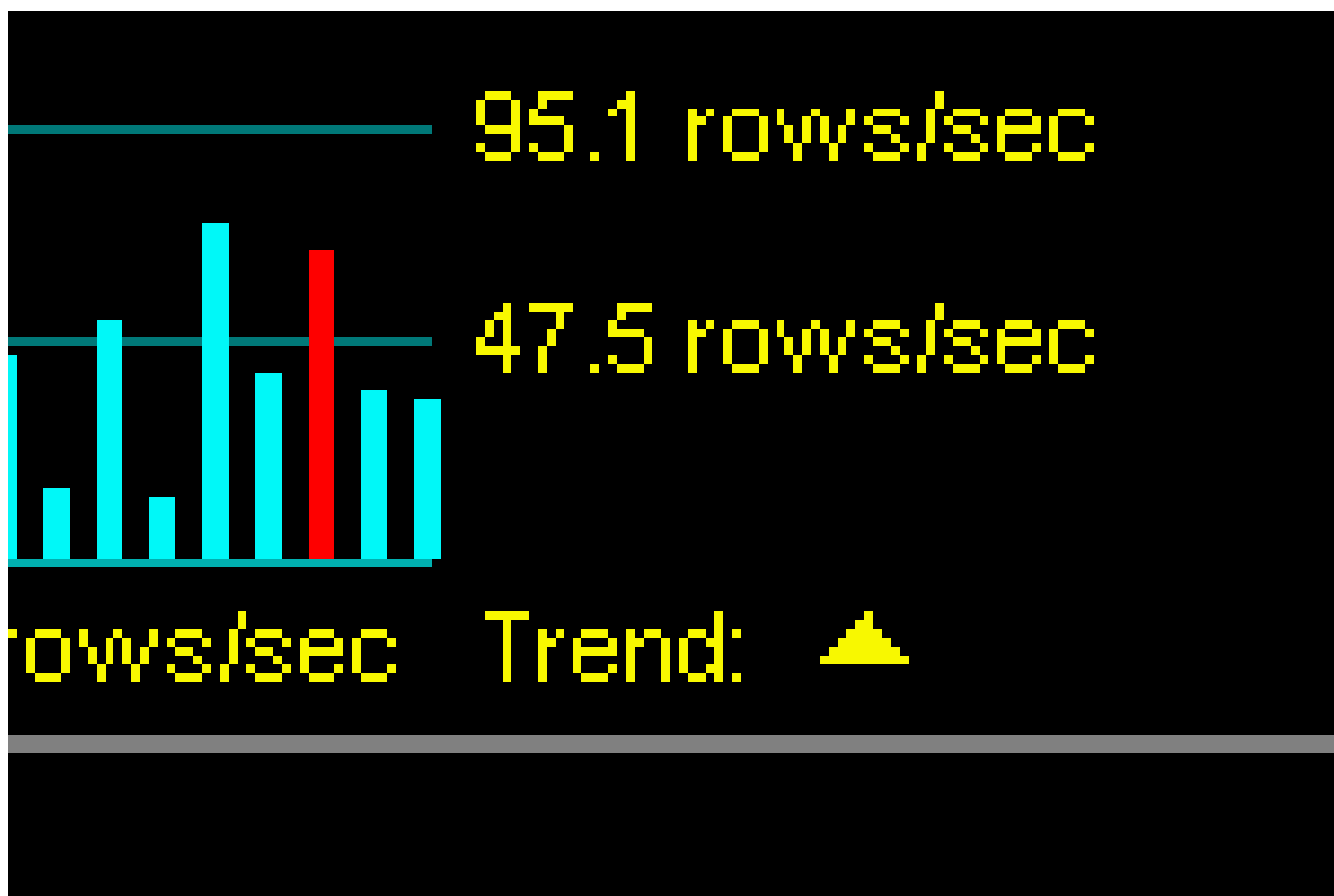
Exceptions Table Formatter

- Exceptions are viewable as text in a web browser.

NEW!!! Live Monitor – Q Capture
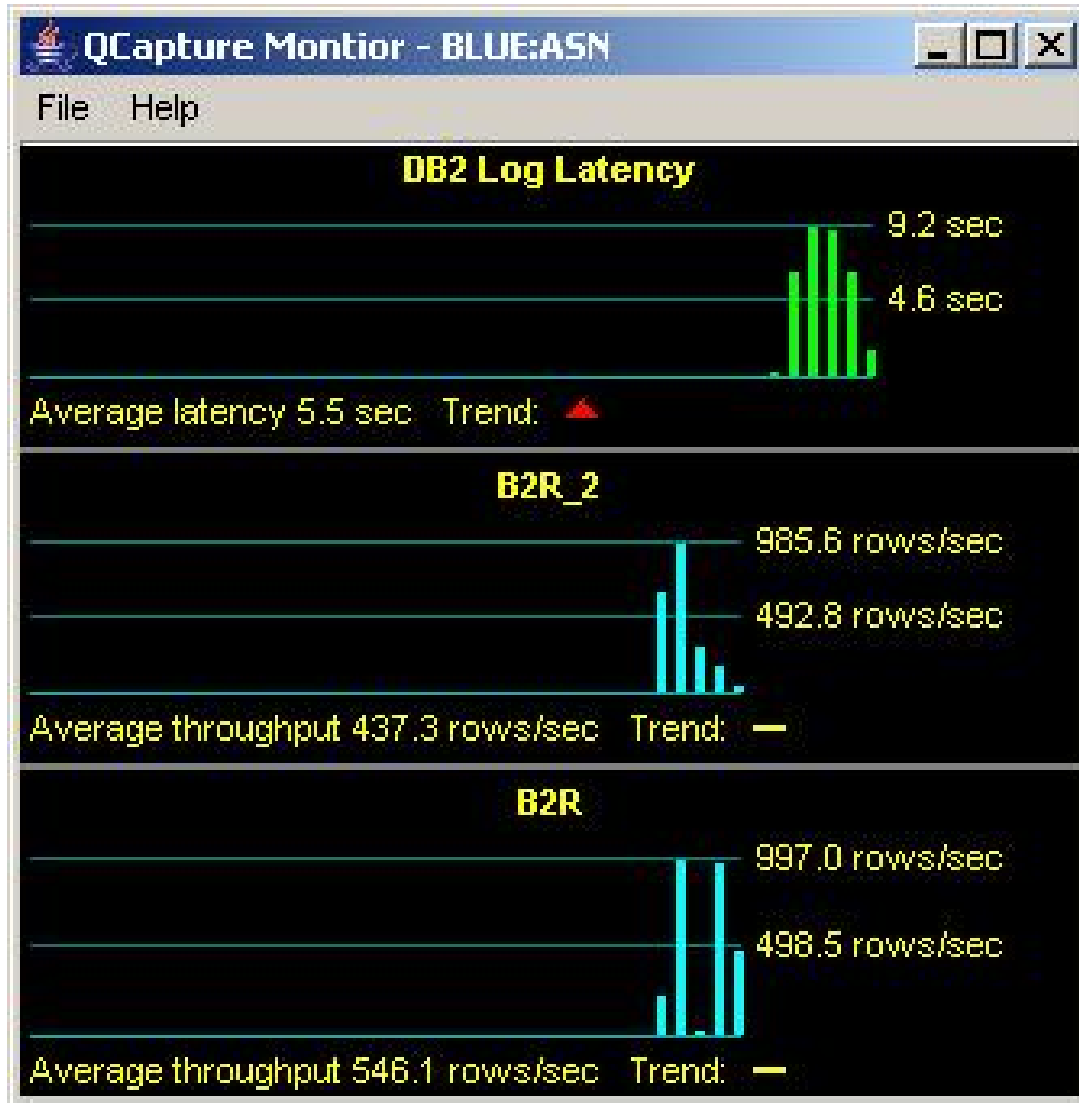
- **Overall QCapture log latency displayed**

- **Queue by queue capture throughput**

Q Replication dashboard

- A new graphical tool.
- Gives a dashboard view of your replication setup.
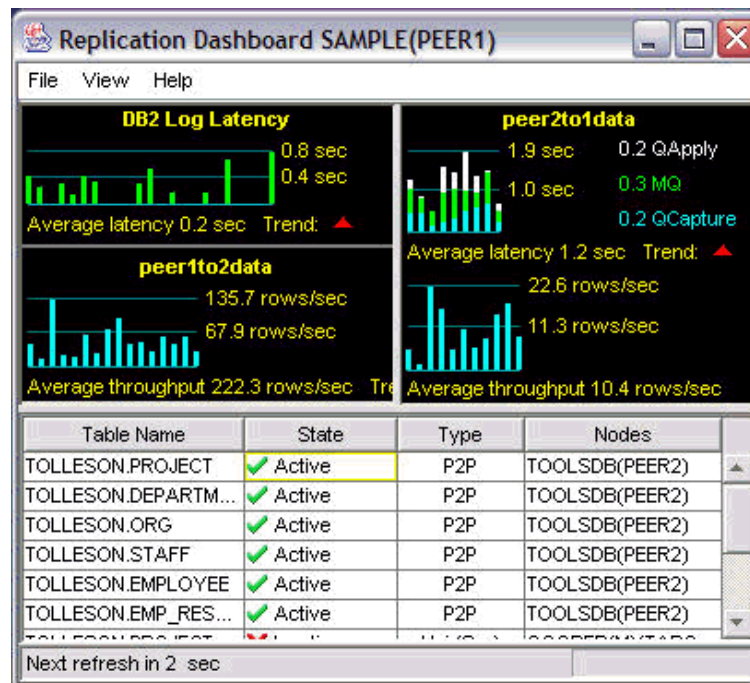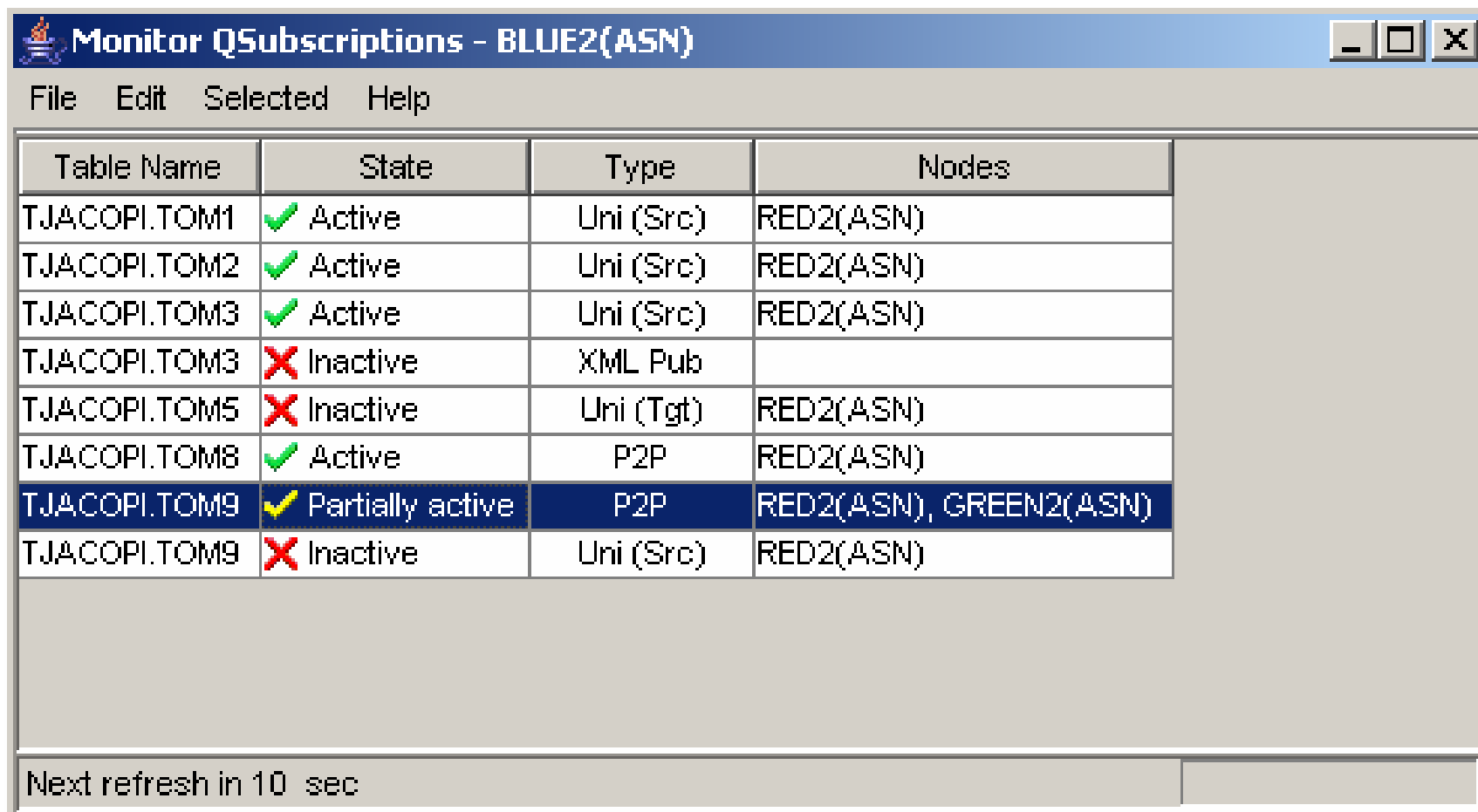
Table Level Information

- ## Dashboard can drill down to the table level:

Tools web site.

- ▪ The URL for the tools web site is:
http://www.ibm.com/support/docview.wss?&uid=swg27007070

- ▪ All of the tools run on windows machines and come as zip files.

NEW - Interactive PDF MQ Checklist

Interactive PDF MQ Checklist – clicked "sample entries"

Interactive PDF MQ Checklist – Sample Entries filled in

Interactive PDF MQ Checklist: Page 2 = source script

Interactive PDF MQ Checklist: Page 3 = target script
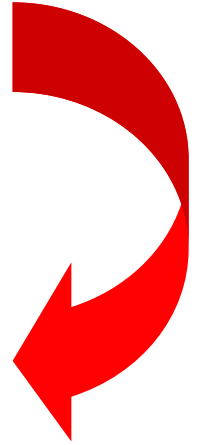
Adobe Reader - [uni_remote.pdf]

File Edit View Document Tools Window Help

Select   60%   Help ▾   One PDF, many files.

You cannot save data typed into this form.
Please print your completed form if you would like a copy for your records.

Print Form   ☐ Highlight fields

Options ▾ ✕

Setting up WebSphere MQ objects on the target system

1. On the target system, open a new command window and use the following command to create the queue manager:

crtmqm QM2

2. Open a text editor such as Notepad. Copy and paste the following code into a new file:

```
*T2. Receive queue
DEFINE QLOCAL('ASN.QM1_TO_QM2.DATAQ') DEFPSIST(YES)
*T3. Administration queue
DEFINE QREMOTE('ASN.QM1.ADMINQ') RNAME('ASN.QM1.ADMINQ') RQMNAME('QM1') XMITQ('QM1') DEFPSIST(YES)
*T4. Transmission queue
DEFINE QLOCAL('QM1') USAGE(XMITQ) DEFPSIST(YES)
*T5. Sender channel
DEFINE CHL ('QM2_TO_QM1') CHLTYPE(SDR) TRPTYPE(TCP) CONNAME('192.168.0.2(1414)') XMITQ('QM1') DISCINT (0)
*T6. Receiver channel
DEFINE CHL ('QM1_TO_QM2') CHLTYPE(RCVR) TRPTYPE(TCP)
*T7. Spill queue
DEFINE QMODEL('IBMQREP.SPILL.MODELQ') DEFSOPT(SHARED) MAXDEPTH(500000) MSGDLVSQ(FIFO) DEFTYPE(PERMDYN)
*Start the channel:
START CHL ('QM2_TO_QM1')
```

3. Save the file as uni_target.txt
4. Start the target queue manager:

strmqm QM2

5. Run the uni_target.txt script by issuing the following command:

Linux or UNIX:	runmqsc QM2 < filepath/uni_target.txt
Windows:	runmqsc QM2
< filepath\uni_target.txt	

6. Start the listener:

| Linux or UNIX: | runmqlsr -t tcp -m QM2 -p 1414 & |

(Runs in the background)

◀◀ ◀ 3 of 3 ▶ ▶▶

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Important Sources of Information/Education

- The Replication roadmaps:
  - ▶ Simply the best place to start any search for replication info - downloads, tutorials, JMS appl toolkit, performance paper, and pointers to all available documentation
  - ▶ http://www-128.ibm.com/developerworks/db2/roadmaps/qrepl-roadmap-v8.2.html
  - ▶ http://www-128.ibm.com/developerworks/db2/roadmaps/sqlrepl-roadmap-v8.2.html

- IBM Education for Q Replication:
  - ▶ DW240: 3 day course without MQ basics
  - ▶ DW241: 4 day course with MQ basics included

- Redbooks available for Q Replication , Event Publishing – new redbook this year on using Q Replication for High Availability

- Consider IBM Services as part of your implementation plan