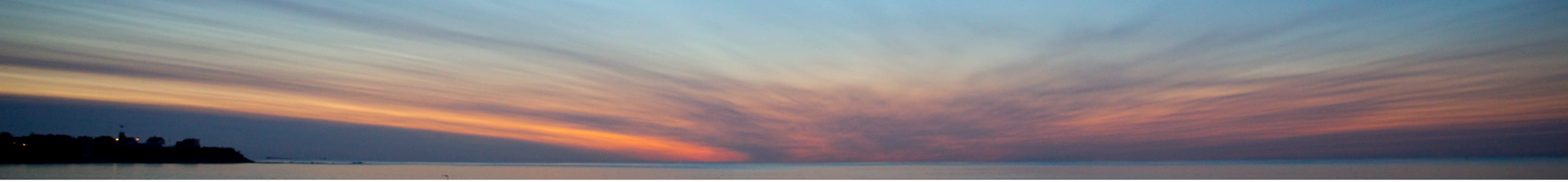

CPIAD09 Message Analysis - Examples

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Two CPIAD09 with QSYS2.SET_SERVER_SBS_ROUTING()

- If you are routing work to subsystems by user profile, there are two CPIAD09 messages in the history log for each connection
- Both of the CPIAD09 messages are sent from a server job in the QUSRWRK subsystem
- RFE, "Routing Work by User Profile results in two CPIAD09 Message in QHST, both sent from a job in QUSRWRK"
- Examples follow where results are skewed because of two messages

Issues with Two CPIAD09 Messages to the History Log

- The CPIAD09 message can be used to gain insights into the work requests coming into the system for the host servers. I have a variety of use cases, all of which use the QSYS2.HISTORY_LOG_INFO() service to retrieve the information from the history log.

- The duplicate messages causes issues with these use cases for two reasons:
  1. There are two messages if routing work by user profile, so the results get skewed.
     - There is only one message if no subsystem routing is done (which is the case when using the secure servers)
     - There is only one message if subsystem routing is done by IP address
     - You cannot route the secure servers by user profile, so there is no way to get consistent results

  2. Both messages are sent from the same job, so you cannot use FROM_JOB to identify the actual servicing job
     - you must parse the job name in the replacement text to get the correct job number (if you need this)
       - This is where the example from Mark Anderson can be used
     - It's my opinion this second message needs to be sent for the actual job that will be handing the work requests

- Following are several examples with the SQL statements I used and the results.

Analyzing Workload Using CPIAD09

- Use this message to:
  - Gain insight into what users are connecting to your partition
  - Determine where in the network the requests are coming from
  - Review your subsystem configuration to verify work is running where you expect it
  - Assess whether connection pooling is being used effectively

- The second CPIAD09 message skews the results since you get two messages for each user that runs one job in the target subsystem

- I would prefer the first message have different text and a different message ID so I can distinguish between the intermediate job and the job that's actually handling the work.

CPIAD09

- **CPIAD09** message logged to the history log
  - `User USERNAME from client 127.0.0.1 connected to job 123456/QUSER/QZDASOINIT in subsystem QUSRWRK in QSYS on 11/12/18 00:13:23.`
- You will note, that I do not use the actual job number in any of my examples
  - I'm looking at times things are done by IP address, subsystem, type of server jobs.
  - Thus, the duplicate CPIAD09 skews the results when looking at how many times it was done
- Several use cases and examples follow

Verifying my IP and Subsystem Configuration for the following examples

```
select * from qsys2.tcpip_info;
```

COLLECTED_TIME	LOCAL_HOST_NAME	CLIENT_IP_ADDRESS_TYPE	CLIENT_IP_ADDRESS	CLIENT_PORT_NUMBER	SERVER_IP_ADDRESS_TYPE	SERVER_IP_ADDRESS
2019-06-21 10:54:49.000000	Common1.Frankeni.com	IPV4	4.35.251.66	51167	IPV4	172.29.5.242

I have logged into Run SQL Scripts with user DAWNM at the above IP address.

All of the DAWN* user profiles are routed to subsystem DAWNMAY for all server jobs

AUTHORIZATION_NAME	QRWTSRVR_SUBSYSTEM	QZDASOINIT_SUBSYSTEM	QZRCSRVS_SUBSYSTEM	QZHQSSRV_SUBSYSTEM	QZSCSRVS_SUBSYSTEM	QNPSERVS_SUBSYSTEM
DAWN	DAWNMAY	DAWNMAY	DAWNMAY	DAWNMAY	DAWNMAY	DAWNMAY
DAWNM	DAWNMAY	DAWNMAY	DAWNMAY	DAWNMAY	DAWNMAY	DAWNMAY
DAWNMAY	DAWNMAY	DAWNMAY	DAWNMAY	DAWNMAY	DAWNMAY	DAWNMAY
DAWNTEST	DAWNMAY	DAWNMAY	DAWNMAY	DAWNMAY	DAWNMAY	DAWNMAY
DAWNUSER	DAWNMAY	DAWNMAY	DAWNMAY	DAWNMAY	DAWNMAY	DAWNMAY
JOEUSER	ADHOCSBS	ADHOCSBS	ADHOCSBS	ADHOCSBS	ADHOCSBS	ADHOCSBS
TIMMR	KIDDIESBS	KIDDIESBS	KIDDIESBS	KIDDIESBS	KIDDIESBS	KIDDIESBS

User DAWNMAY signs into Navigator for i

- History log messages:

```
 User DAWNMAY from client 127.0.0.1 connected to job 553637/QUSER/QZDASOINIT i
*** subsystem is QUSRWRK
*** sent from job  QZDASOINIT   QUSER    553637


 User DAWNMAY from client 127.0.0.1 connected to job 474066/QUSER/QZDASOINIT i
*** subsystem is DAWNMAY
*** sent from job  QZDASOINIT   QUSER    553637


 User DAWNMAY from client 127.0.0.1 connected to job 554260/QUSER/QZRCSRVS in
*** subsystem is QUSRWRK
*** sent from job  QZRCSRVS  QUSER   554260


 User DAWNMAY from client 127.0.0.1 connected to job 474053/QUSER/QZRCSRVS in
*** subsystem is DAWNMAY
*** sent from job  QZRCSRVS  QUSER   554260
```

The remote command server job 554260/QUSER/QZRCSRVS ends after the connection is routed to the desired subsystem.

Examine Job 553637/QUSER/QZDASOINIT

- Once the connection to the system is made, this job is returned to the pool of available prestart jobs and is no longer used
  - I.e., it is a *transient* job just used to route the work request to the final job
  - Current user is back to QUSER

```
Job:    QZDASOINIT      User:    QUSER            Number:    553637

Status of job . . . . . . . . . . . . . . . . :   ACTIVE
Current user profile  . . . . . . . . . . . . :   QUSER
```

- Job log messages:

```
Job . . :   QZDASOINIT    User . . :   QUSER          Number . . . :   553637

    Job 553637/QUSER/QZDASOINIT started on 06/19/19 at 11:43:18 in subsystem
      QUSRWRK in QSYS. Job entered system on 06/19/19 at 11:43:18.
    Printer device PRT01 not found.
    ACGDTA for 553637/QUSER/QZDASOINIT not journaled; reason 1.
    Job changed successfully; however errors occurred.
    User DAWNMAY from client 127.0.0.1 connected to server.
    User DAWNMAY from client 127.0.0.1 connected to job
      474066/QUSER/QZDASOINIT in subsystem DAWNMAY in DAWNM on 06/19/19
      15:45:54.
```

CPIAD09 Insights with QSYS2.HISTORY_LOG_INGO()

- In several of my examples, I created a temp table in QTEMP to only work with CPIAD09 messages

```
CREATE TABLE QTEMP.QHST AS (SELECT * FROM TABLE(QSYS2.HISTORY_LOG_INFO()) x
WHERE MESSAGE_ID = 'CPIAD09') WITH DATA;
```

CPIAD09 Insights with QSYS2.HISTORY_LOG_INFO()

- What server jobs were used when DAWNMAY logged into Navigator for i?

```
SELECT COUNT(*) AS "Total", SUBSTRING(FROM_JOB, LOCATE('/',
SUBSTRING(FROM_JOB, 8)) + 8) AS
     "Job", FROM_USER AS "Current User"
     FROM QTEMP.QHST WHERE MESSAGE_ID = 'CPIAD09' AND FROM_USER LIKE 'DAWN%'
     GROUP BY SUBSTRING(FROM_JOB, LOCATE('/', SUBSTRING(FROM_JOB, 8)) + 8),
FROM_USER
     ORDER BY 1 DESC;
```

Total	Job	Current User
7	QZRCSRVS	DAWNM
2	QZDASOINIT	DAWNMAY
2	QZRCSRVS	DAWNMAY
2	QZDASOINIT	DAWNM
1	QZDASSINIT	DAWNM

Work for DAWNMAY was really done in just one QZDAOINIT and one QZRCSRVS job.

The numbers are double due to the two messages due to the intermediate job to route the work to subsystem DAWNMAY.

WRKACTJOB

- The remote command server job was only used briefly

- WRKACTJOB shows that DAWNMAY has one active PJ

```
                      Current
Subsystem/Job         User          Type
  QZRCSRVS            DAWNM         PJ
  QZDASOINIT          DAWNMAY       PJ
  QP0ZSPWP            DRIVEWAY      BCI
```

Summary of all connections for DAWN*

- Use case:

  - I want to review my subsystem configuration for users DAWN* to make sure everything is running in subsystem DAWNMAY.

    I have some work routed by IP address and some by user profile name.

  - I am confused because the results show me jobs for DAWNMAY in subsystem DAWNMAY and QUSRWRK.

Summary of all connections for DAWN* - SQL

```
SELECT COUNT(*) AS "Count", SUBSTRING(TRIM(message_tokens), 45,10) AS
"Subsystem", SUBSTRING(TRIM(message_tokens), 65) AS "IP Address",
SUBSTRING(FROM_JOB, LOCATE('/', SUBSTRING(FROM_JOB, 8)) + 8) AS
    "Job", FROM_USER AS "Current User"
FROM TABLE (QSYS2.HISTORY_LOG_INFO(CURRENT TIMESTAMP - 1 DAY) ) X   WHERE
MESSAGE_ID = 'CPIAD09' and FROM_USER LIKE 'DAWN%'
    GROUP BY SUBSTRING(FROM_JOB, LOCATE('/', SUBSTRING(FROM_JOB, 8)) + 8),
SUBSTRING(TRIM(message_tokens), 45,10), FROM_USER,
SUBSTRING(TRIM(message_tokens), 65)   ORDER BY 2 DESC;
```

Summary of all connections for DAWN* - Results

The results in green boxes are the intermediate connections.

The results in pink are what I care about

Count	Subsystem	IP Address	Job	Current User
2	QUSRWRK	127.0.0.1	QZDASOINIT	DAWNM
1	QUSRWRK	127.0.0.1	QZDASOINIT	DAWNMAY
3	QUSRWRK	127.0.0.1	QZRCSRVS	DAWNM
1	QUSRWRK	4.35.251.66	QZDASSINIT	DAWNM
3	QUSRWRK	4.35.251.66	QZRCSRVS	DAWNM
1	QUSRWRK	127.0.0.1	QZRCSRVS	DAWNMAY
1	DAWNMAY	4.35.251.66	QZRCSRVS	DAWNM
1	DAWNMAY	127.0.0.1	QZDASOINIT	DAWNMAY
2	DAWNMAY	127.0.0.1	QZDASOINIT	DAWNM
1	DAWNMAY	127.0.0.1	QZRCSRVS	DAWNMAY
3	DAWNMAY	127.0.0.1	QZRCSRVS	DAWNM
1	DAWNMAY	4.35.251.66	QZDASSINIT	DAWNM

The 4.35.251.66 IP subsystem configuration was done in the middle of this test. The connections to QUSRWRK were prior to the configuration change.

Sorry that this confuses things a bit.

But I was able to confirm only one CPIAD09 message when routing by IP.

CPIAD09 Insights with QSYS2.HISTORY_LOG_INFO()

- What IP addresses does DAWN* use to connect to my system?

```
SELECT COUNT(*) AS "Count", SUBSTRING(TRIM(message_tokens), 65) AS "IP
Address"
     FROM qtemp.qhst
     WHERE message_id = 'CPIAD09' and FROM_USER LIKE 'DAWN%'
     GROUP BY SUBSTRING(TRIM(message_tokens), 65)
     ORDER BY 1 DESC;
```

Count	IP Address
14	127.0.0.1
6	4.35.251.66

The results are inconclusive.

DAWNM from 4.35.251.66 has one CPIAD09 for the secure servers that run in QUSRWRK and one CPIAD09 for the work routed to subsystem DAWNMAY by IP address.

But there are two CPIAD09 messages for the work routed by user profile to subsystem DAWNMAY.

CPIAD09 Insights with QSYS2.HISTORY_LOG_INFO()

- What subsystems have work routed to them?

```
SELECT COUNT(*) AS "Count", SUBSTRING(TRIM(message_tokens), 45,10) AS
"Subsystem"
    FROM qtemp.qhst
    WHERE message_id = 'CPIAD09'
    GROUP BY SUBSTRING(TRIM(message_tokens), 45,10)
    ORDER BY 1 DESC;
```

Count	Subsystem
1587	QUSRWRK
58	QSERVER
3	DAWNMAY
1	KIDDIESBS

The results are inconclusive.

Numbers in QUSRWRK are inflated due to the first CPIAD09.

I only want to know the number of "real" connections, not the intermediate ones.

DDM/DRDA Also is Wrong - CPI3E34

- Navigator: Network -> Servers -> TCP/IP Servers to review a server's properties uses the DDM/DRDA server

- One message in QHST, but this is from the initial job in QUSRWRK
- Nothing is logged in QHST about the work actually running in a different subsystem

```
Message ID . . . . . :   CPI3E34       Severity . . . . . :   00
Message type . . . . . :   Information
Date sent  . . . . . :   06/19/19      Time sent  . . . . . :   16:22:59

Message . . . . :   User DAWNMAY from client 127.0.0.1 connected to job
  549903/QUSER/QRWTSRVR in subsystem QUSRWRK in QSYS on 06/19/19 at 16:22:59
Cause . . . . . :   The job is a server job for remote DDM or DRDA TCP/IP
  database requests.
```

DDM/DRDA Job Log - CPI9164

DDM/DRDA logs CPI9164 to the job log

```
                        Additional Message Information

 Message ID . . . . . :   CPI9164       Severity . . . . . :   00
 Message type . . . . . :   Information
 Date sent  . . . . . :   06/21/19      Time sent  . . . . . :   11:26:29

 Message . . . . :   Database connection rerouted from target job
   549903/QUSER/QRWTSRVR.
 Cause . . . . . :   User profile DAWNM was configured to reroute incoming
   distributed data management (DDM) TCP/IP connections using that user
profile
   to a user specified subsystem DAWNMAY.  This connection was rerouted from
   target job 549903/QUSER/QRWTSRVR to target job 559307/QUSER/QRWTSRVR.  This
   may also occur if the user profile is a member of a group profile or
   supplemental group profile that has been configured to reroute incoming
   distributed data management (DDM) TCP/IP connections.
```

What Dawn Wants

- Dawn wants the first CPIAD09 message logged from the intermediate job to be changed to a different message
  - CPI9164 that is sent to the DDM/DRDA job log as an example
- Dawn wants the second CPIAD09 message to be the only CPIAD09 message for the connection
- Dawn would like this second message to be sent from the final job that will handle the work requests
  - Mark Anderson's circumvention for this appears to be ok