TECHNICAL WHITE PAPER

Avaya Communication Server 1000E /1000M DCH PING PONG root cause and Troubleshooting

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Objectives and Overview:

This paper discusses some of the known DCH PING PONG issue and recommendations that need to be performed to avoid DCH PING PONG or Looping on CS1000 Servers.

Symptoms:

System Slowdown, delay to dial tone or no dial tone, ELAN's dropping etc.

This document is applicable for all CS1000 Processor Types.

Background:

MIK - Message Indication Key
VNR - Vacant Number Routing
    VNR direct calls to a designated route list index if a user dials a
    CDP or NARS number that cannot be translated.
NMS - Network Message Service
CDP - Coordinated Dialing Plan
DSC - Distant Steering Code

Abstract:

This whitepaper gives more insights on various issue caused PING PONG problem.

Condition-1:

PROBLEM DESCRIPTION:

DCH ping pong form features/non-call related features like SIP FACILITY MWI (message waiting indication).

ROOT CAUSE AND FIX:

MWI is used by CallPilot (and other voicemail systems) to send a message across the network to the target Telephone DN to light or make dark the Message Waiting Lamp on the telephone.

CallPilot sends MWI FACILITY message through the CS1000 to the target DN. If that target DN does not exist on the CS1000, we can end up in a Ping-Pong situation because the CS1000 Call server does not recognize the DN, so uses VNR (vacant number routing) to send the message to NRS or Session Manager. NRS or Session Manager sends the message back to CS1000 Call Server, and so on. When you have a number of these type of messages looping, it can create large and increasing load on the CS1000 call server, which can then result in symptoms System Slowdown, delay to dial tone or no dial tone, ELAN's dropping, etc.

CallPilot does an AUDIT at every night. During this audit it will send a FACILITY MWI message for EVERY CallPilot mailbox that exists in CallPilot. If some of these DN's do not exist on the CS1000, this can result also in the above.

The problem really is caused by a configuration error: mismatch of DN's between CallPilot and CS1000.

Just by deleting the mailboxes the problem would not be solved.

If a message ping pong has started, we would have to take other actions to stop the ping pong, such as creating the actual sets DN on the CS1000 so that the message had somewhere to terminate. Other options to stop the Ping-Pong could be manual INI of the call server, or installing the preventative patches.

Below patches work together to prevent SIP FACILITY message "Ping-Pong" or "looping" scenarios. SIP FACILITY messages are used for features/non-call related features. Typically the problem is with SIP FACILITY MWI (message waiting indication) feature.

Call Server: MPLR33004

Sig Server: vtrk 16.23-5

These patches are included in CS1000 7.6 sw service pack (SP6).

Condition-2:

PROBLEM DESCRIPTION:

Session Manager 6.1 sends MWI FAC message to all ranks in routing policy to CS1000 Send to all MWI FACILITY message to all entries makes system more vulnerable to looping with program error With Session Manager interaction to CS1000 facility none call Associated MWI message gets sent to all ranks in routing policy.

487 Request Terminated is positive acknowledgment to CS1K, but its considered a negative response to Avaya Session Manager .So Session Manager tries all the fail over routes, in which was observed to cause a major PING-PONG condition state of messaging on the DCH back to the originator.
The failover routes are what many have referred to as "RANK" in the Avaya Session Manager

Excessive amount of FACILITY messages are flooded between CS1000 and Avaya Session Manager with identical FAC messages are sent over DCH virtual D-Channel .

This issue was resolved within Avaya Session manager database change.
The Plano PFC system also a 1000E on R7.5 system has a SRG in Session managed Routing policies there were two entry's first with entry 1 has a rank 0. The second entry rank 1 was invalid pointing to the ALT call server of the second Plano 1000e.
Removing the Entry with the rank of one solved this issue.
This invalid entry caused our looping MWI message impact.

SETUP:

CS1000E main site has the central voice mail system and has a Session manager 6.1
CS1000E main also has a session manager with 3 or 4 SRG's
CS1000E Plano PFC 2 SRG's
All three on R7.5
Attempt to light message lamp from 1000E Dallas Main to SRG registered with Plano PFC
With the second routing policy rank 1 entry pointing to incorrect Alt call server this causes the outage.

The Plano Virtual trunks resetting looks to break the MWI ping pong however takes more than 5 minutes to do reset MWI looping condition lying up system resources causing system in Dallas to lockup for a few minutes and the Call Pilot and CCMS to go up and down several times. There is no diction on the Signaling Server of this ping pong looping condition and either the software should detect this condition and release the ping pong before it causes system outage.

ROOT CAUSE:

In an integration between two CS1Ks hanging off one SM, if one side wants to send an MWI update to the other side, they convert ISDN facility messages to SIP Invites and include the ISDN update in the form of hex message in the body. SM forwards the Invite ok. The far end CS1k replies to the none-call associated Invite with a 487 "request terminated", which in the CS1k world is the expected (200OK) reply to that MWI Invite. Because of the 487 SM thinks this did not complete and attempts to alternate route the call following the SM Call-associated logic. Issue is now pending a decision from CS1K and SM development and product houses to determine the issue and fixed in SM 6.2.

Refer to MPLR15748 as possible workaround on CS1K.

Condition-3:

PROBLEM DESCRIPTION**:**

Site with multiple D-channels to a third party system via ISGF QSIG is seeing BUG1009 7 234 OUTG_MSG_EXHAUSTED followed by BUG1009 7 230 MSG_HANDLER_NOT_FOUND and sometimes other bug messages.

The BUG1009 7 234 means that the error OUTG_MSG_EXHAUSTED was encountered.

This happens because there are 3 slots available to store C-code related QSIG information, and all three are filled earlier in the call scenario, then there is a request for another one later in the call scenario. It is normal for some of the slots to be filled at certain stages of the call progress. Sometimes a slot will be used, and then released immediately (for example to receive and reply to a FAC message).

IMPACT:

No apparent call processing impact, but lot of BUG messages in the system. MPLR33303 was installed for a BUG4001 and QSIG FAC message ping pong scenario.

SETUP**:**

 CS1K with ISGF QSIG trunks to a third party system.

- Far end system does not send path replacement messages.
- Set A, D, and E on the far end system
- Set B, and C and ACD queue on the CS1K.

- Set B Hunts to Set C.
- ACD queue is NCFW to route ACOD and DN back to the far end system.
- Set D has some sort of diversion to Set E.
- Set B and D are busy.

ACTIONS:

1. Set A calls Set B. Set B is busy so the call rings on Set C.
2. Set C answers call from Set A.
3. Set C blind transfers to the ACD (because of the delay added by the NCFW to the ACOD this   is possible).
4. Set D is busy so the call rings on Set E.
5. Set E answers.
6. Set E disconnects.

EXPECTED RESULTS:

1. Set C rings. Appropriate Divert Leg information is exchanged between the two systems.
2. Set A and Set C are connected. Appropriate Divert Leg information is exchanged between the two systems.
3. CT_COPMLETE and CT_UPDATE messages are sent to the far end. The far end is expected to reply with a CT_UPDATE message.
4. Appropriate Divert Leg information is exchanged between the two systems.
5. Set A and Set E are connected. Appropriate Divert Leg information is exchanged between the two systems.
6. Call disconnects. No BUG1009.

ACTUAL RESULTS:

1. As expected.
2. As expected.
3. As expected, except the far end is not sending the CT_UPDATE message (technically wrong, but should not cause BUG1009). The far end is also sending a progress message before the alerting message (not wrong, just different).
4. As expected, except the far end divert information is a bit unusual.
5. As expected.
6. Call disconnects. BUG1009 7 234 OUTG_MSG_EXHAUSTED followed by BUG1009 7 230 MSG_HANDLER_NOT_FOUND and sometimes other bug messages.

Install below patches to fix this issue:

Call Server: MPLR33004

Sig Server: vtrk 16.23-5

These patches are included in CS1000 7.6 sw service pack (SP6)

Condition-4:

PROBLEM DESCRIPTION**:**

QSIG Ping Pong ties up trunk resources and call registers.

SETUP**:**

In a network with VNR in the satellite switches, and DSC defined in the hub site, if a DN is removed from a satellite switch, and anyone calls that DN, a ping pong condition occurs until all the trunk resources are used. When QSIG interface is involved, non-call associated messages also are converted to setup messages, and these setups are also ping ponged. If a non -call associated message is ping ponged, the trunks are tied up for approximately 2 minutes, and one call register is used but not freed.

This problem also occurs with DSC going to CISCO. If CISCO removes a set, they automatically bounce back any attempt call that set, and any QSIG non call associated setup messages to that set.

MPACT:
QSIG trunks are out of service for several minutes, and QSIG features that require a call register eventually stop working, and require an INI to restore.

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    ===========              ===========
     Node 1   ========QSIG========  Node 2
    ===========              ===========
```

Interface between the two nodes is QSIG. Set A has MIK and MCK keys configured in Node 1. CDP is configured between the two Nodes. Customer in Node 2 has VNR programmed to Customer in Node 1. Customer in Node 1 has CDP DSC configured to nonexistent DN of Customer in Node 2.Trunk are QSIG TIE with RCAP as MQC and MQC_FEAT as NMS.

Problem 1:

Call is made from Set A on Node 1 to nonexistent DN on Node 2.The number dialed is a distant steering code to Node 1. But the customer in Node 2 has VNR configured for customer in Node 1. Setup Request Messages are sent until all the resources exhausted (Ping Pong) and ERR5132 is printed on the TTY.

Problem 2:

MIK Key at Set A attempts to lit the lamp for the nonexistent DN via QSIG TIE. The Non call setup Request message is sent as the customer in Node 1 has CDP DSC configured for the invalid DN. Since in Node 2 has VNR programmed for the Customer in Node 1 messages are ping ponging and the originator is dropped with no indication and then the ping pong calls are released, but each ping pong occurrence ties up one call register permanently from the idle queue. The number of call registers were configured in NCR prompt of LD 17 and the number of call registers after ping pong can be seen by the sl1qShow command from the pdt prompt.

Solution:

Above ping pong condition has been solved by the patch MPLR10321 and code integrated in Rls 3.0.