MQ Pub/Sub:
topic host routing clusters

http://www.ibm.com/support/docview.wss?uid=swg27050294

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Related presentations

This presentation is one of a series.
For the complete list, please see:

https://developer.ibm.com/answers/questions/40207
4/mq-pubsub-training-presentations.html
  MQ Pub/Sub: training presentations

In particular, the following will be referenced often:
http://www.ibm.com/support/docview.wss?uid=swg27050262
MQ Pub/Sub: Direct Route Clusters and Proxy Subscriptions

Related zip file

This techdoc has 1 zip file with files that are discussed in this presentation:

topic-host-routing-clusters.zip

The included files are:

amqrfdm_CTHPR4.txt => cluster cache for PR 4
amqrfdm_CTHPR6.txt => cluster cache for PR 6
amqrfdm_CTHPR7.txt => cluster cache for PR 7
runmqsc_CTHPR4.txt => display commands

Agenda

▪Creating a topic host routing cluster

▪Examination of the behavior in a cluster when a clustered topic is added and specifying the attribute:

▪ CLROUTE(TOPICHOST)

▪Discussion of proxy subscribers

Topic Host routing

Introduced in MQ 8.0 as alternative for the potentially large performance impact of direct routing.

Messages published on one queue manager are sent to another queue manager that hosts a definition of the administered topic object (this is called a "topic host queue manager").

That **topic host queue manager** routes the message on to every subscription on any other queue manager in the cluster.

Topic Host routing

That is, one queue manager DELEGATES to the topic host queue manager, the broadcast of published messages

A topic host routing queue manager is created by using the following attribute during the DEFINE TOPIC for a **Clustered Topic**:
CLROUTE(TOPICHOST)

Tutorials for creating a cluster

The cluster for this presentation was based on the following tutorials:

http://www-01.ibm.com/support/docview.wss?uid=swg27038687
Cluster setup and basic usage of clustered queues and topics in MQ 7

The above WSTE is based on these tutorials:

http://www.ibm.com/support/docview.wss?uid=swg27037038
Setup of a cluster and basic usage of clustered queues in MQ 7

http://www.ibm.com/support/docview.wss?uid=swg27038974
Basic usage of clustered topics in WebSphere MQ 7

Initial topology of Topic Host Routing cluster

There are 2 hosts.

Each host has 4 queue managers:
 - 1 Full Repository (FR)
 - 3 Partial Repositories (PR)

Each FR is connected to the 6 PRs
Each PR is connected to the 2 FRs

There are no connections between the PRs.
There are no clustered queues, nor clustered topics

Initial topology of Topic Host Routing cluster

Cluster-sender and cluster-receiver channels that connect the queue managers.
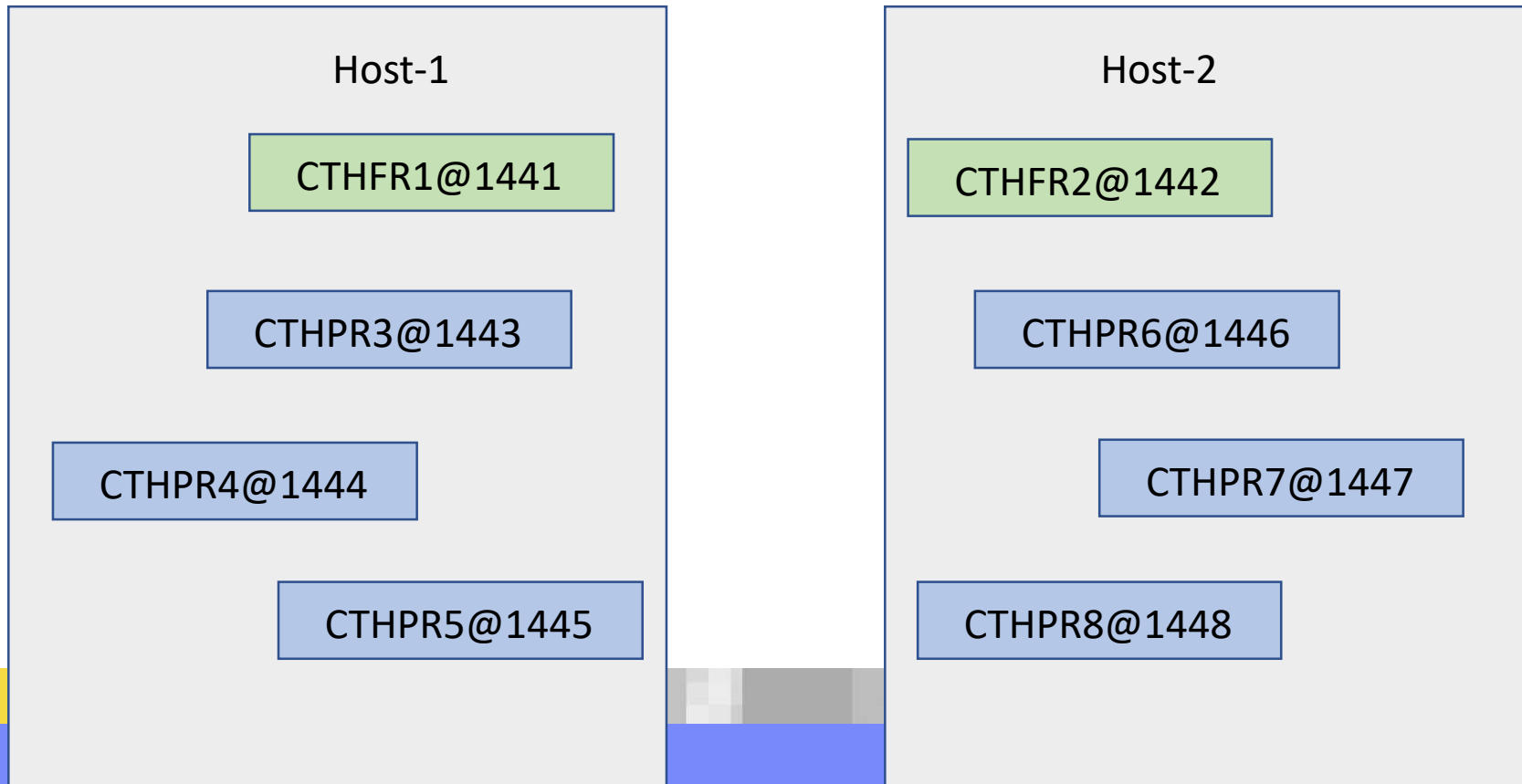Dotted line: manually created   Solid line: automatically
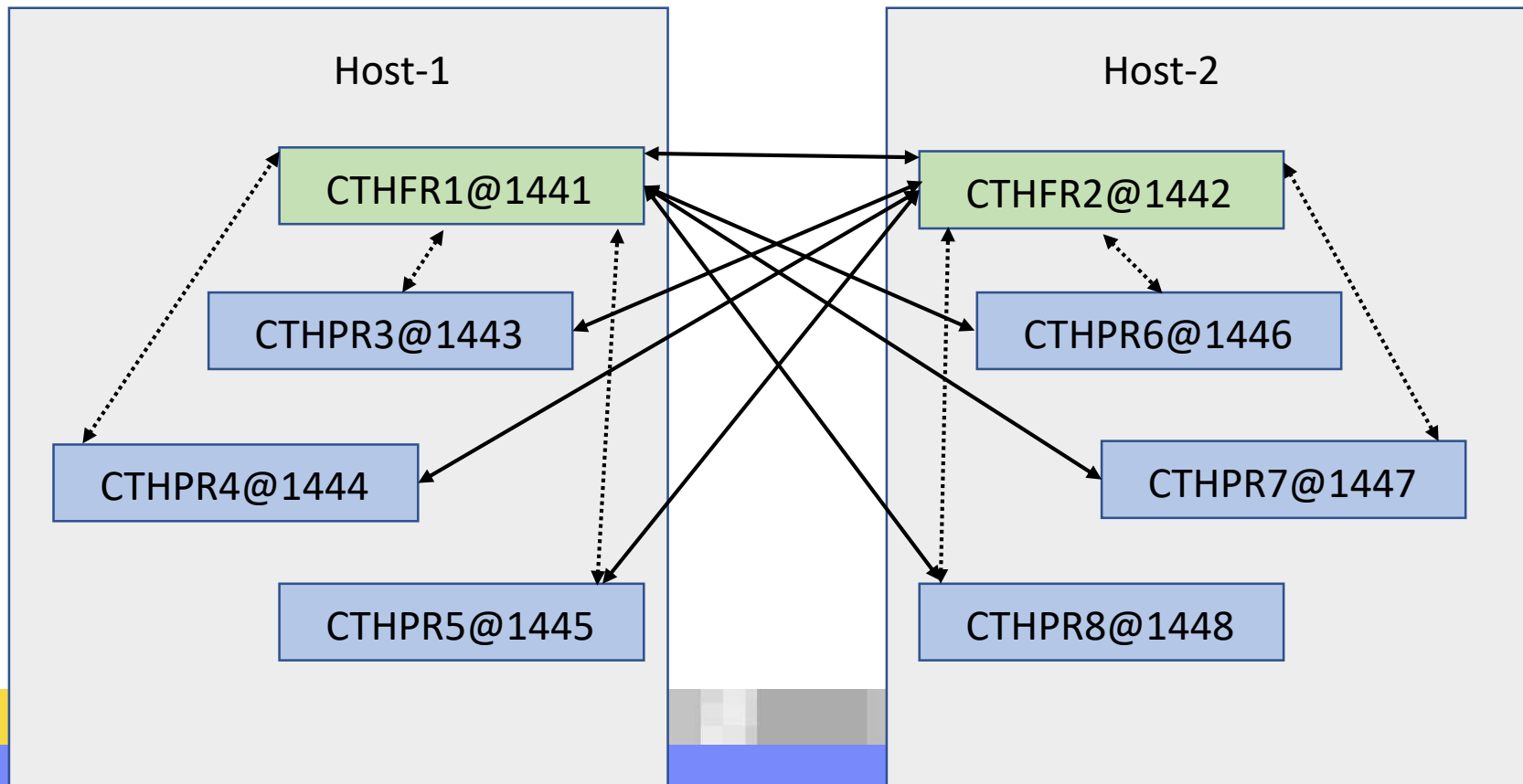
Simpler view of the topology

To simplify the view, let's hide the cluster channels for the infrastructure.
Only NEW channels will be shown later on.

Host-1

CTHFR1@1441

CTHPR3@1443

CTHPR4@1444

CTHPR5@1445

Host-2

CTHFR2@1442

CTHPR6@1446

CTHPR7@1447

CTHPR8@1448

PR 7 only has CS channels to the FRs

The PR number 7 (CTHPR7) will be used later on.

Currently, it has ONLY 2 **cluster-sender** channels, one to each of the FRs:

▪TO.CTHFR2 was manually created when PR was added to cluster.

▪TO.CTHFR1 was automatically created.

Both channels are shown in the tab **"Cluster-sender Channels"**, in the folder "Queue Manager Clusters" of the MQ Explorer (next page)

PR 7 only has CS channels to the FRs

PR 7 is connect to both FRs via cluster-senders.

PR 7 only has CS channels to the FRs

The MQ Explorer, under the **Channels folder** for the queue manager, shows ONLY the manually created channels (TO.CTHFR2)

The automatically created channels are NOT shown. In this case, TO.CTHFR1 is NOT shown.
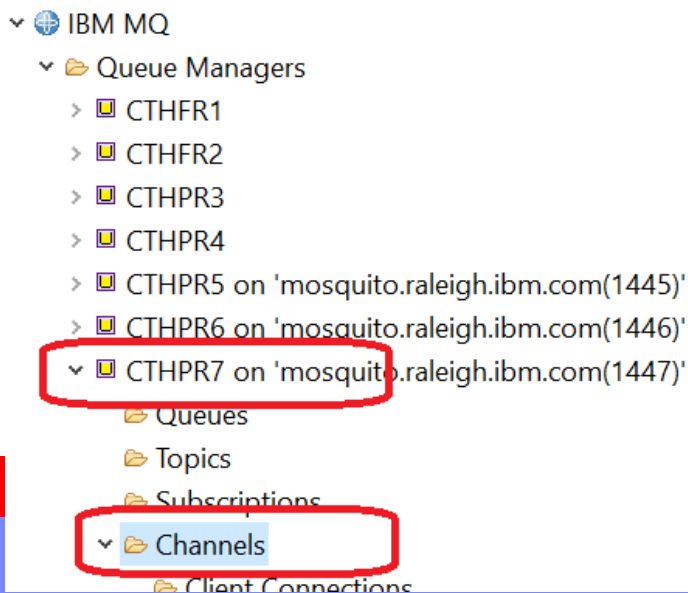
Notes: runmqsc shows manual channels

Notice that **the 2 channels that were manually created are shown.**

The cluster-sender channels that are created automatically are NOT shown (for example, TO.CTHFR1 for FR1)

runmqsc CTHPR7
<u>display channel(TO.*)</u>
   1 : display channel(*)
AMQ8414I: Display Channel details.
  CHANNEL(TO.CTHFR2)   **CHLTYPE(CLUSSDR)**
AMQ8414I: Display Channel details.
  CHANNEL(TO.CTHPR7)   CHLTYPE(CLUSRCVR)

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MQ cluster utility: amqrfdm to view cache

The MQ utility "**amqrfdm**" can be used to view the cluster cache for a queue manager.
Used by "runmqras" with **"-section cluster"**.
You can also run it manually (must specify **-d**).

Unix example: For the Partial Repository CTHPR7
amqrfdm -m CTHPR7 -d > amqrfdm_CTHPR7.txt

Windows example: For the Full Repository CTHFR1
"C:\Program Files\IBM\MQ\bin64\amqrfdm.exe" -m CTHFR1 -d > "C:\temp\amqrfdm_CTHFR1.txt"

Notes: amqrfdm shows automatic channels

The following entry is for the auto cluster sender channel to the other FR: CTHFR1
To keep listing brief, some lines were removed.

Qm(CTHFR1) Live Seq(1507028268)
 Channel(TO.CTHFR1) Running ChlSeq(4) DestSeqFactor(0)
 CLWLChannelRank(0) CLWLChannelPriority(0) CLWLChannelWeight(50)
 XmitQ(SYSTEM.CLUSTER.TRANSMIT.QUEUE)
 Conname('mosquito.raleigh.ibm.com(1441)')
Desc( )
 UUID(CTHFR1_2017-10-03_06.57.26)
 QMFlags(2272: Repos CLUSSDR Auto Joined InUse Refresh)
 State: Flags(0) MsgId(414D51204354485052372020202020E96CD359FE8F3324)
 Product: MQMM Version: 09000300
 ChosenCount(2)
 Prev: @0 nQmgr: @0 nUUID: @0 nCh: @0 Ascii: @AE10
 Cluster(CLUSTERTH) Live Seq(1507028268)
 Exp(Thu 02 Nov 2017 12:26:09 PM GMT) Raw(x59FB0EE1)
  Upd(Tue 03 Oct 2017 12:26:10 PM GMT) Raw(x59D381E2)
 QMFlags(2032: Repos CLUSSDR Auto Joined)

Notes: CLROUTE (from manual)

n o t e s

From the online manual:
https://www.ibm.com/support/knowledgecenter/en/SSFKSJ_9.0.0/com.ibm.mq.con.doc/q017435_.htm
IBM MQ 9.0 > Configuring > Configuring publish/subscribe messaging > Configuring distributed publish/subscribe networks
Configuring a publish/subscribe cluster

When you define a topic on a queue manager in a cluster, you need to specify whether the topic is a cluster topic, and (if so) the routing within the cluster for publications and subscriptions for this topic.

To make the topic a cluster topic, you configure the CLUSTER property on the TOPIC object with the name of the cluster. By defining a cluster topic on a queue manager in the cluster, you make the topic available to the whole cluster.

To choose the message routing to use within the cluster, you set the CLROUTE property on the TOPIC object to one of the following values:
DIRECT (the default)
TOPICHOST

Notes: CLROUTE (from manual, cont)

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From IBM MQ Version 8.0, you can configure topic routing as TOPICHOST.

When you use topic host routing, all queue managers in the cluster become aware of the cluster queue managers that host the routed topic definition (that is, the queue managers on which you have defined the topic object).

When performing publish and subscribe operations, queue managers in the cluster connect only to these topic host queue managers, and not directly to each other.

The topic host queue managers are responsible for routing publications from queue managers on which publications are published to queue managers with matching subscriptions.

Now let's add a clustered topic

Let's define:

a clustered topic object and publisher in PR 4
and **a subscriber in PR 7**

The clustered topic will have:

CLROUTE(TOPICHOST)

Which means that PR 4 will be the host for any
PUBLISHING activity related to this topic,
that is, PR 4 will be the "topic host routing qmgr".

Notice that at this point, there are no cluster-sender
channels between these 2 PRs.

Pub Topic in PR 4 and subscriber in PR 7

PR 4 will have a Clustered Topic and a Publisher
PR 7 will have a Subscriber
At this point, there is NO channel between them.

Host-1

CTHFR1

CTHPR3

CTHPR4 clustered topic SALES

Publisher Clst Topic SALES

CTHPR5

Host-2

CTHFR2

CTHPR6

CTHPR7 Sub

CTHPR8

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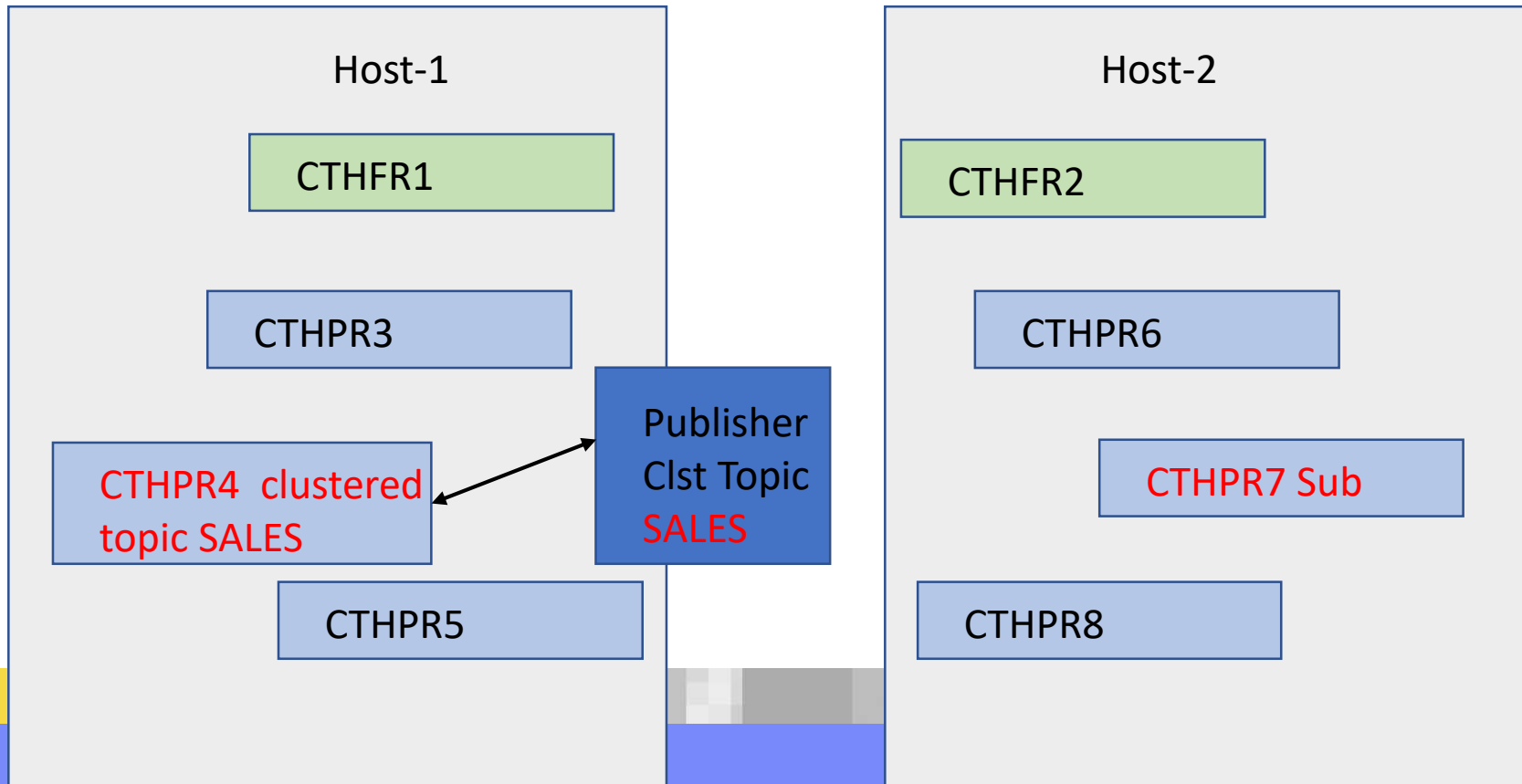
Now let's add a clustered topic

Adding a clustered topic in PR 4:

```
DEFINE TOPIC(SALES) TOPICSTR('sales') +
   CLUSTER(CLUSTERTH) CLROUTE(TOPICHOST)
AMQ8690I: IBM MQ topic created.


DISPLAY TOPIC(SALES)
AMQ8633I: Display topic details.
```

TOPIC(SALES)	TYPE(LOCAL)
TOPICSTR(sales)	DESCR( )
CLUSTER(CLUSTERTH)	**CLROUTE(TOPICHOST)**
DURSUB(ASPARENT)	PUB(ASPARENT)
SUB(ASPARENT)	DEFPSIST(ASPARENT)
DEFPRTY(ASPARENT)	DEFPRESP(ASPARENT)
PMSGDLV(ASPARENT)	NPMSGDLV(ASPARENT)
PUBSCOPE(ASPARENT)	SUBSCOPE(ASPARENT)
PROXYSUB(FIRSTUSE)	WILDCARD(PASSTHRU)
MDURMDL( )	MNDURMDL( )
MCAST(ASPARENT)	COMMINFO( )
USEDLQ(ASPARENT)	CUSTOM( )

Both FRs know about clustered topic

Both FRs know that there is a clustered topic called SALES and CTHPR4 is the topic host.

Pubs and Subs can be done from any PR

One feature of distributed Pub/Sub is that you can use Publishers in one or more PRs, and you can use Subscribers in one or more PRs

In a "Pub/Sub cluster", the knowledge about a clustered topic needs to be broadcasted to all PRs.

That is, all PRs will know the existence of the clustered topic and in which host the object was created.

All PRs know about the Clustered Topic

All the PRs receive notification about
the Clustered Topic SALES:

View of
CTHPR6

View of
CTHPR8

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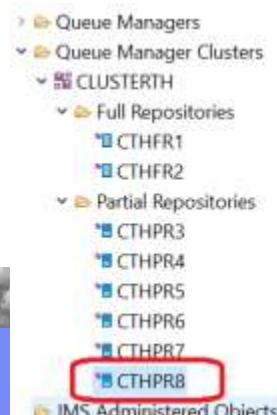
Notes: amqrfdm shows clustered topic

Partial view of the cluster cache for PR 6.

This PR is not going to be used in the scenario, but for that reason it is chosen for this example.

This clustered topic is now included in the cluster cache for this PR.

Why? Because in the future a Publisher or a Subscriber could run in this PR.

** Clustered Topic Object: refers to PR 4

Notice: **Routing(1) means "Topic Host"   Routing(0) means "Direct Route"**

TOPIC(SALES   ) 2 Live   Seq(1507029709)

 UUID(CTHPR4_2017-10-03_07.21.29   )

 DefPersistence(-1) DefPriority(-2) DefPutResponse(0) InhibitPub(0) InhibitSub(0)

 DurableSubs(0) NonPersMsgDlv(0) PersMsgDlv(0) PubScope(1) SubScope(1)

 ProxySub(2) Wildcard(2) **Routing(1)**

Cluster(CLUSTERTH   ) Live   Seq(1507029709)

** Topic String for the topic object

TOPSTR Topic(SALES   )

 UUID(CTHPR4_2017-10-03_07.21.29   )

Str('sales')

All PRs know about the clustered topic

At this point, all the queue managers know the existence of the clustered topic SALES and that the topic host is CTHPR4

Host-1

CTHFR1
cls topic SALES@PR4

CTHPR3
cls topic SALES@PR4

CTHPR4
cls topic SALES@PR4

CTHPR5
cls topic SALES@PR4

Host-2

CTHFR2
cls topic SALES@PR4

CTHPR6
cls topic SALES@PR4

CTHPR7
cls topic SALES@PR4

CTHPR8
cls topic SALES@PR4
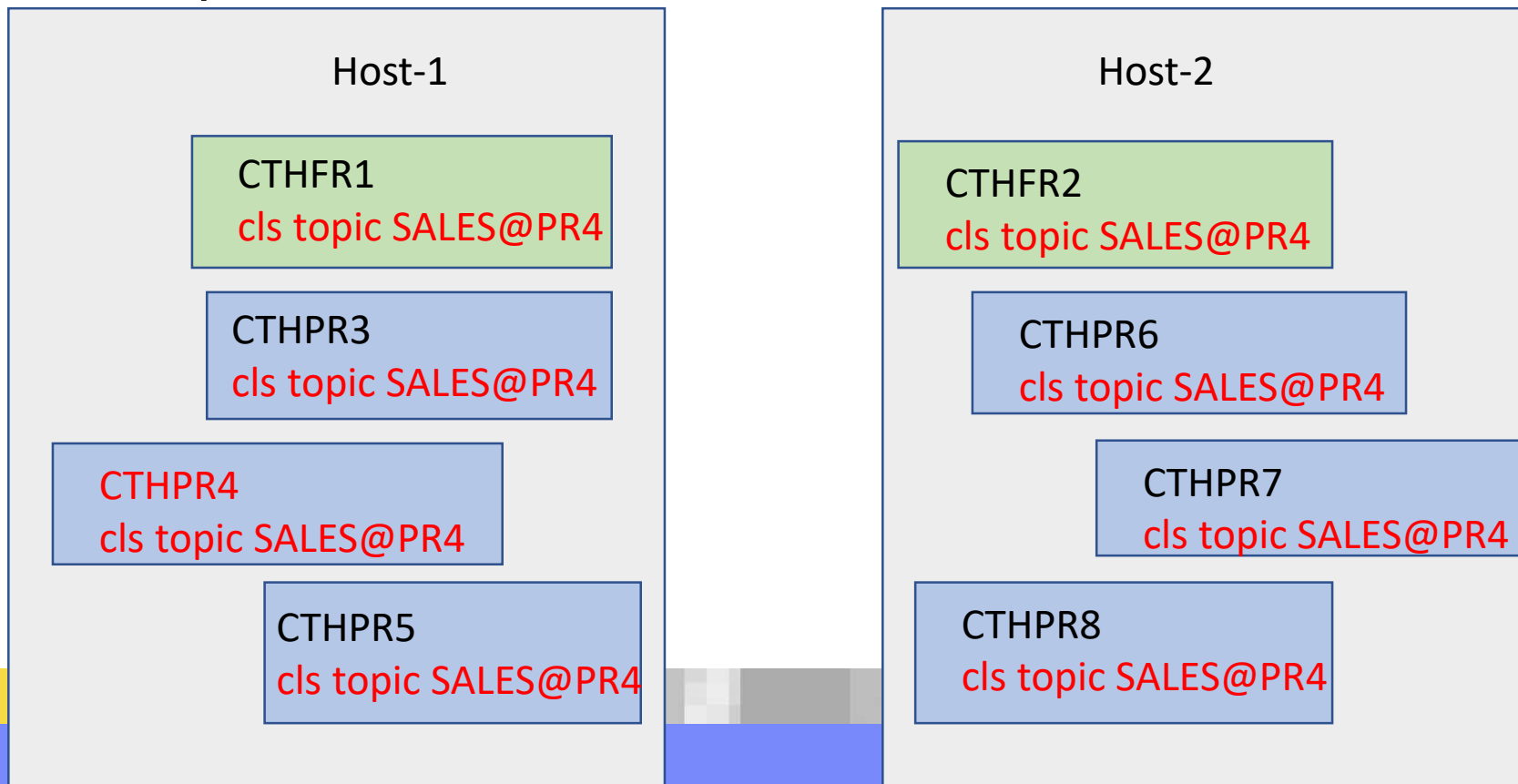
CS channels are created for the Topic Host

Auto cluster-sender channels are created from the Topic Host PR 4 for all other PRs.
This PR 4 is the only one with full connectivity.

CS channels are created for the Topic Host

In addition, auto cluster-sender channels are created in all PRs ONLY towards the Topic Host PR 4. The following shows CTHPR7, which does not connect to all other PRs (only to PR 4).

Repository data for queue manager CTHPR7

Cluster Queues | Cluster Topics | **Cluster-sender Channels** | Cluster-receiver Channels

Cluster-sender channels:

CTHFR1 - Full Repository

CTHPR7 ──────────→ 1 CTI
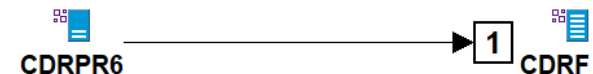
	Channel name	Cluster queue manager	Queue manager type	Definition type
	TO.CTHFR1	CTHFR1	Repository	Auto cluster-sender
	TO.CTHFR2	CTHFR2	Repository	Auto explicit cluster-sender
	TO.CTHPR4	CTHPR4	Normal	Auto cluster-sender

Tree pane:
3M MQ
- Queue Managers
- Queue Manager Clusters
- CLUSTERTH
  - Full Repositories
    - CTHFR1
    - CTHFR2
  - Partial Repositories
    - CTHPR3
    - CTHPR4
    - CTHPR5
    - CTHPR6
    - CTHPR7
    - CTHPR8
- JMS Administered Objects
- Managed File Transfer
- Service Definition Repositories

DR: CS's are created for ALL PRs !

In contrast, in a "direct routing cluster", all PRs have cluster-sender channels between them.
The following shows CDRPR6 which did NOT have a clustered topic defined in it.

Connections between PR 4 and other PRs

▪In a "topic host routing cluster":

- all PRs have cluster-sender channels to the topic host

- only the topic host has full connectivity

30
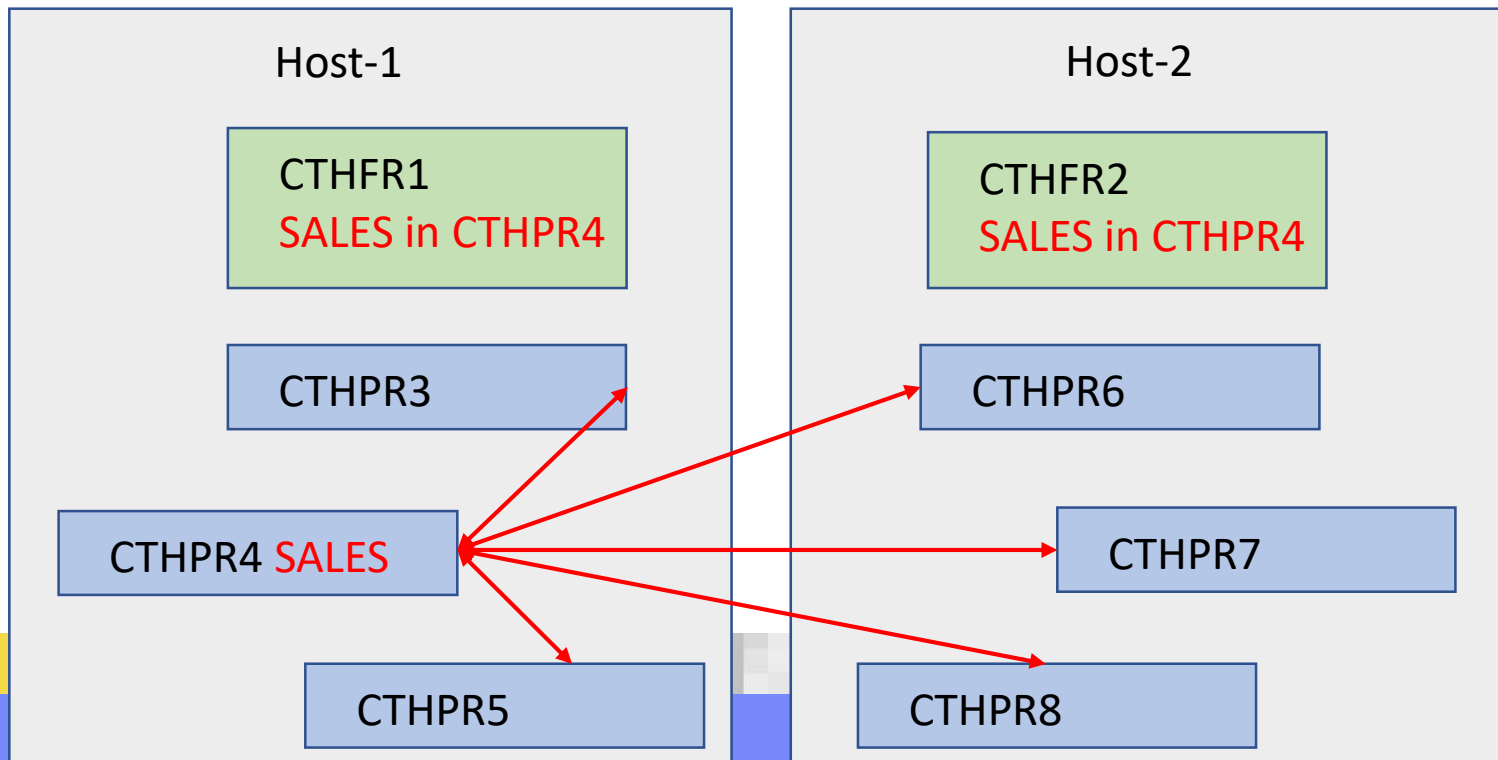
Connections between all PRs (Direct route)

- In contrast, in a "direct routing cluster", all PRs have cluster-sender channels between them.

Host-1

CDRFR1
SALES in CDRPR4

CDRPR3

CDRPR4 SALES

CDRPR5

Host-2

CDRFR2
SALES in CDRPR4

CDRPR6

CDRPR7

CDRPR8
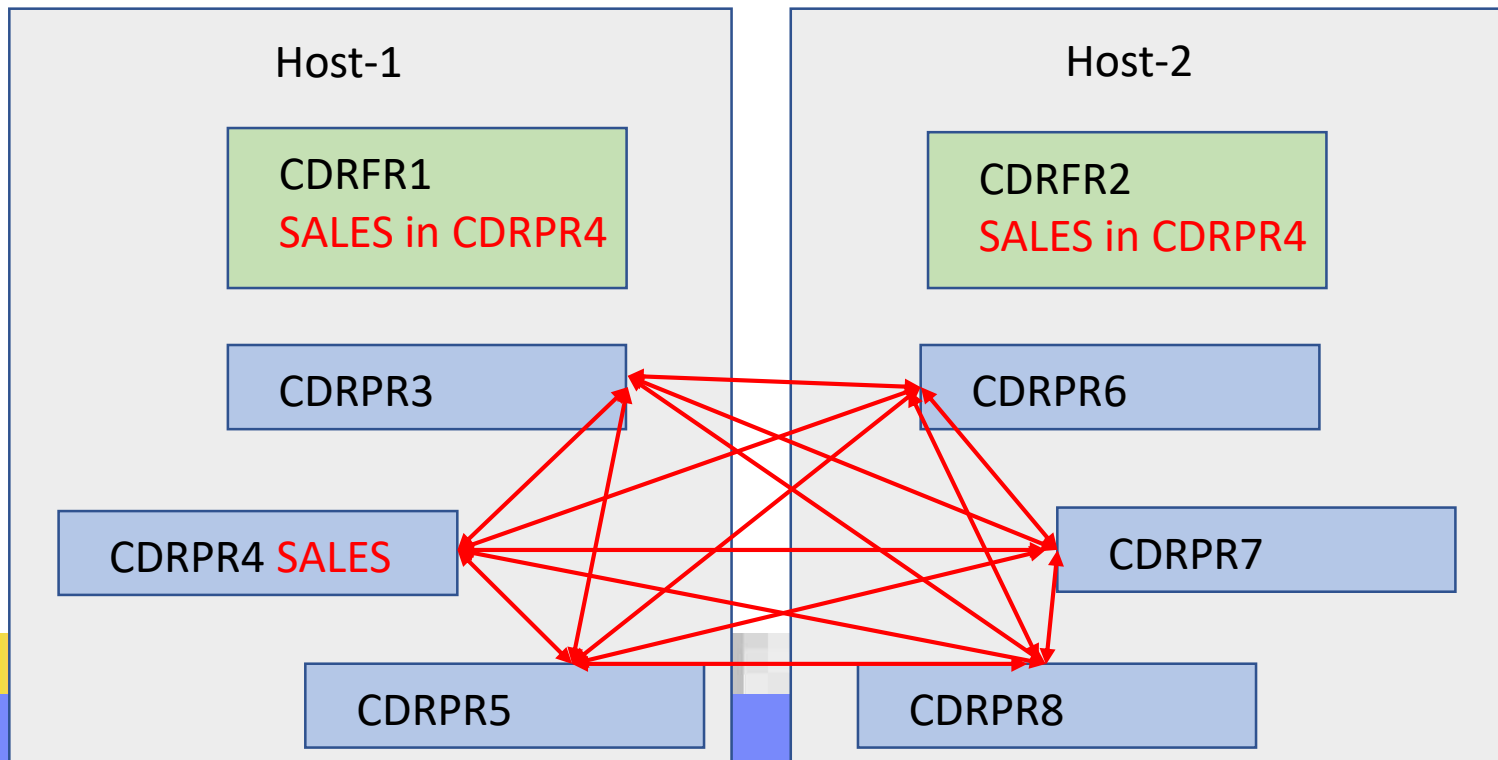
Notes: amqrfdm shows auto cluster-senders

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Partial view of the cluster cache for PR 7 showing the only cluster-sender with other PR.
This PR does NOT have a clustered topic defined to it.

This channel is expected between PR 7 and PR 4 (which has the clustered topic)
Qm(CTHPR4) Live   Seq(1507029709)
 Channel(TO.CTHPR4) Inactive   ChlSeq(0) DestSeqFactor(0)
 CLWLChannelRank(0) CLWLChannelPriority(0) CLWLChannelWeight(50)
 XmitQ(SYSTEM.CLUSTER.TRANSMIT.QUEUE **)**
 Conname('mosquito.raleigh.ibm.com(1444)')
Desc( )
 UUID(CTHPR4_2017-10-03_07.21.29)
 QMFlags(70: CLUSSDR Auto Joined InUse)
Product: MQMM   Version: 09000300
 ChosenCount(0)
 Prev: @0   nQmgr: @0   nUUID: @0   nCh: @0   Ascii: @8C20
 Cluster(CLUSTERTH) Live   Seq(1507029709)
Exp(Wed 08 Nov 2017 08:20:44 AM GMT) Raw(x5A02BE5C)
 Upd(Mon 09 Oct 2017 08:20:46 AM GMT) Raw(x59DB315E)
 QMFlags(30: CLUSSDR Auto Joined)

In contrast with Direct Route, there are NO other auto cluster-sender channels to other PRs

Create subscriber in PR 7

OK, up to now we have just created the clustered topic and observed what was broadcasted and what was automatically created.

Let's create a subscriber SUBSALES in PR 7, which uses a provided queue.

DEFINE QLOCAL(QS3)
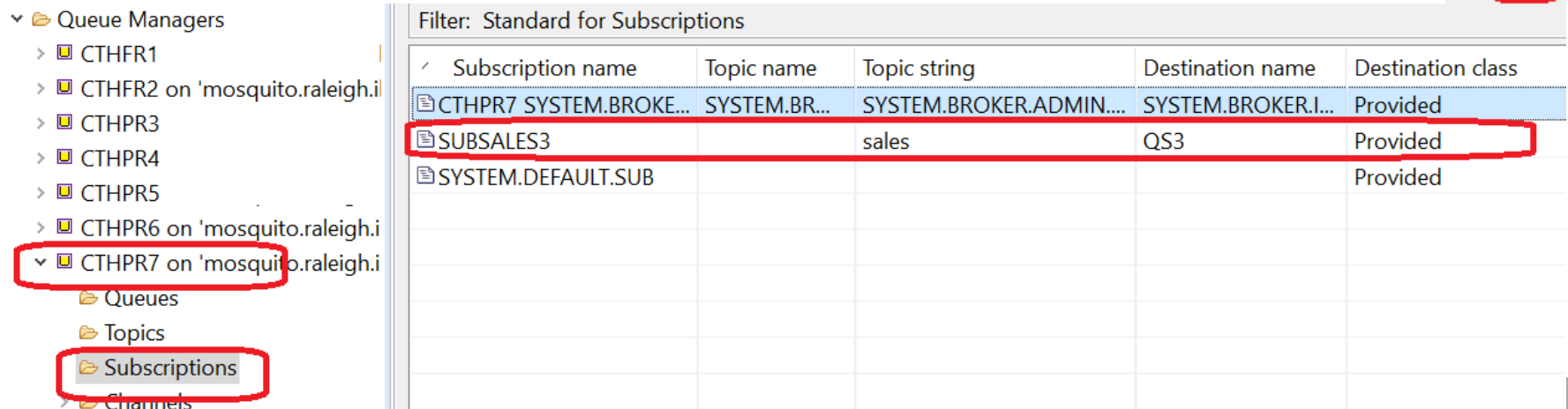
DEFINE SUB('SUBSALES3') TOPICSTR('sales') +
  DESTCLAS(PROVIDED) DEST(QS3)

View subscriber in PR 7

View in MQ Explorer of ALL the Subscribers for PR7. Notice the local subscriber SUBSALES3.

Note: You must enable the option to see all SYSTEM objects!

Publish in PR 4

We will publish in PR 4 and we expect the subscriber in PR 7 to receive a message.

amqspub sales CTHPR4
Sample AMQSPUBA start
target topic is sales
TEST_PUB
Sample AMQSPUBA end

Question: How does PR 4 know that it needs to send a message to a subscriber SUBSALES3 in PR 7?

Proxy Subscribers

When a subscriber is created for a clustered topic, the queue manager will broadcast an entity called:
   a proxy subscriber

- In Direct Route, the broadcast is to ALL the PRs.
- In Topic Host, the broadcast is ONLY for the topic host (PR 4)

This Proxy Subscriber will specify:
   Topic String: sales
   Destination queue manager: CTHPR7
   Cluster Name: CLUSTERTH

View subscribers in PR 6 (not a topic host)

View all the Subscribers in another PR that is not a topic host, such as PR 6.

Notice that there are no Proxy Subscribers, because we are using a Topic Host.

In Direct Route, this qmgr would have a Proxy Sub!!

View Topic Status in PR 6 (not a topic host)

View the Topic Status in another PR that is not a topic host, such as PR 6.
Notice that it knows about the clustered topic, but does not know about remote/proxy subscribers.

View Topic Status in PR 4 (topic host)

View the Topic Status in the topic host PR 4.
Notice the "Sub count" (counter of subscribers).
It has a value of "1" (for the proxy subscriber)

View Proxy Subscriber in PR 4 (topic host)

Display the Proxy Subscriber in the topic host PR 4.

```
display sub(*) subtype(proxy) all
AMQ8096I: IBM MQ subscription inquired.
   SUBID(414D5120435448505234202020202020CD72D359AE386621)
   SUB(SYSTEM.PROXY_2.SALES CLUSTERTH CTHPR7 sales)
   TOPICSTR(sales)                          TOPICOBJ( )
   DISTYPE(RESOLVED)                        DEST(SYSTEM.INTER.QMGR.PUBS)
   DESTQMGR(CTHPR7)                         PUBAPPID( )
   SELECTOR( )                              SELTYPE(NONE)
   USERDATA( )
   PUBACCT(033530031000000000000000000000000000000000000000000000000000000006)
   DESTCORL(000000000000000000000000000000000000000000000000000)
   DESTCLAS(PROVIDED)                       DURABLE(YES)
   EXPIRY(UNLIMITED)                        PSPROP(MSGPROP)
   PUBPRTY(ASPUB)                           REQONLY(NO)
   SUBSCOPE(ALL)                            SUBLEVEL(1)
   SUBTYPE(PROXY)                           VARUSER(FIXED)
   WSCHEMA(TOPIC)                           SUBUSER(mqm)
```

Only PR4 knows about the Proxy Subscriber

At this point, only the topic host queue mgr PR 4 knows the proxy subscriber in PR 7 (in addition to the clustered topic SALES)

Host-1

CTHFR1
cls topic SALES

CTHPR3
cls topic SALES

CTHPR4
cls topic SALES
proxy sub PR 7

CTHPR5
cls topic SALES

Host-2

CTHFR2
cls topic SALES

CTHPR6
cls topic SALES

CTHPR7
cls topic SALES
Local sub PR 7

CTHPR8
cls topic SALES
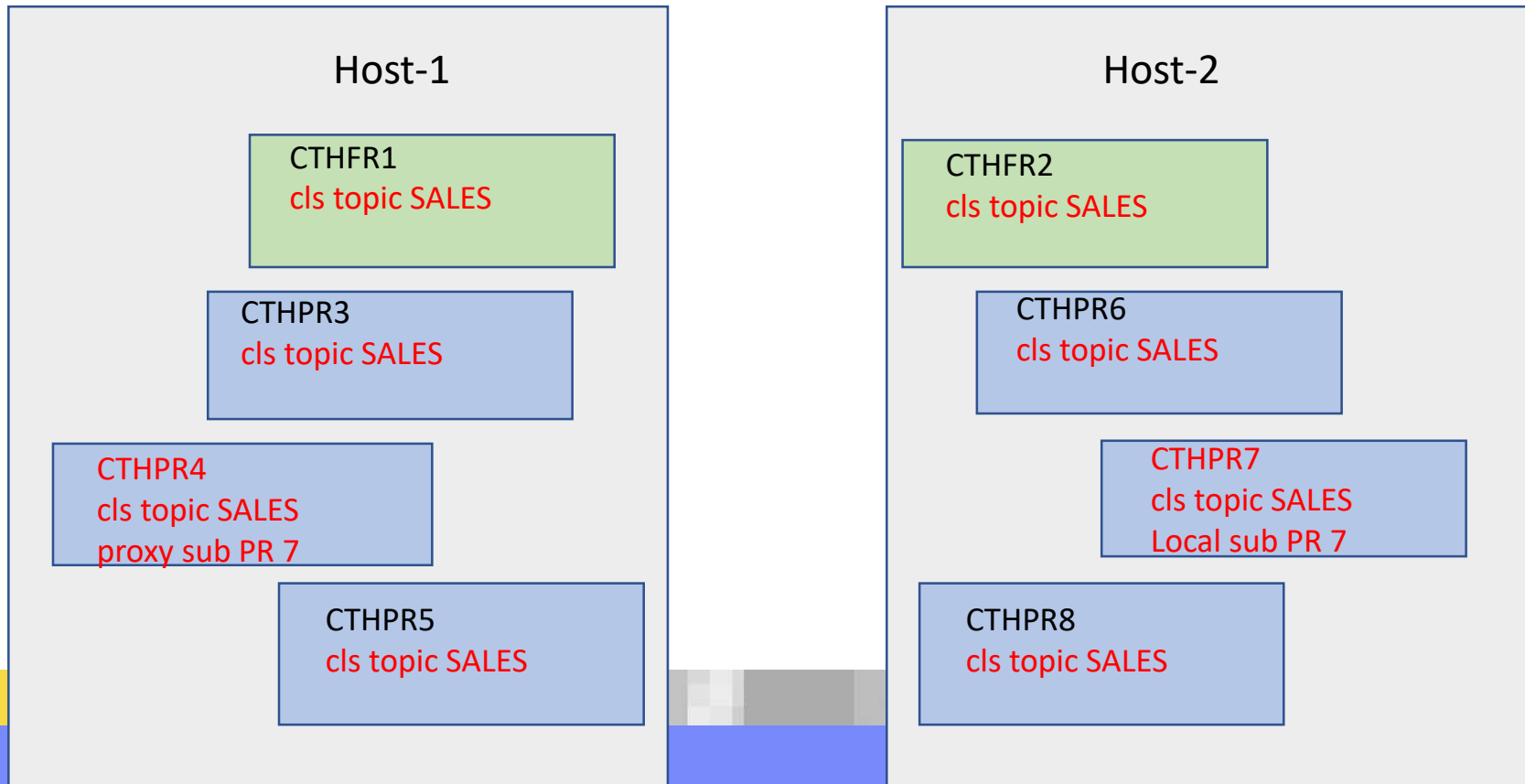
DR: All PRs know about Proxy Subscriber

In contrast, in Direct Route, all the queue managers know the existence of the proxy subscriber in PR 7 (in addition to the clustered topic SALES)

Host-1

CDRFR1
cls topic SALES
proxy sub PR 7

CDRPR3
cls topic SALES
proxy sub PR 7

CDRPR4
cls topic SALES
proxy sub PR 7

CDRPR5
cls topic SALES
proxy sub PR 7

Host-2

CDRFR2
cls topic SALES
proxy sub PR 7

CDRPR6
cls topic SALES
proxy sub PR 7

CDRPR7
cls topic SALES
proxy sub PR 7

CDRPR8
cls topic SALES
proxy sub PR 7
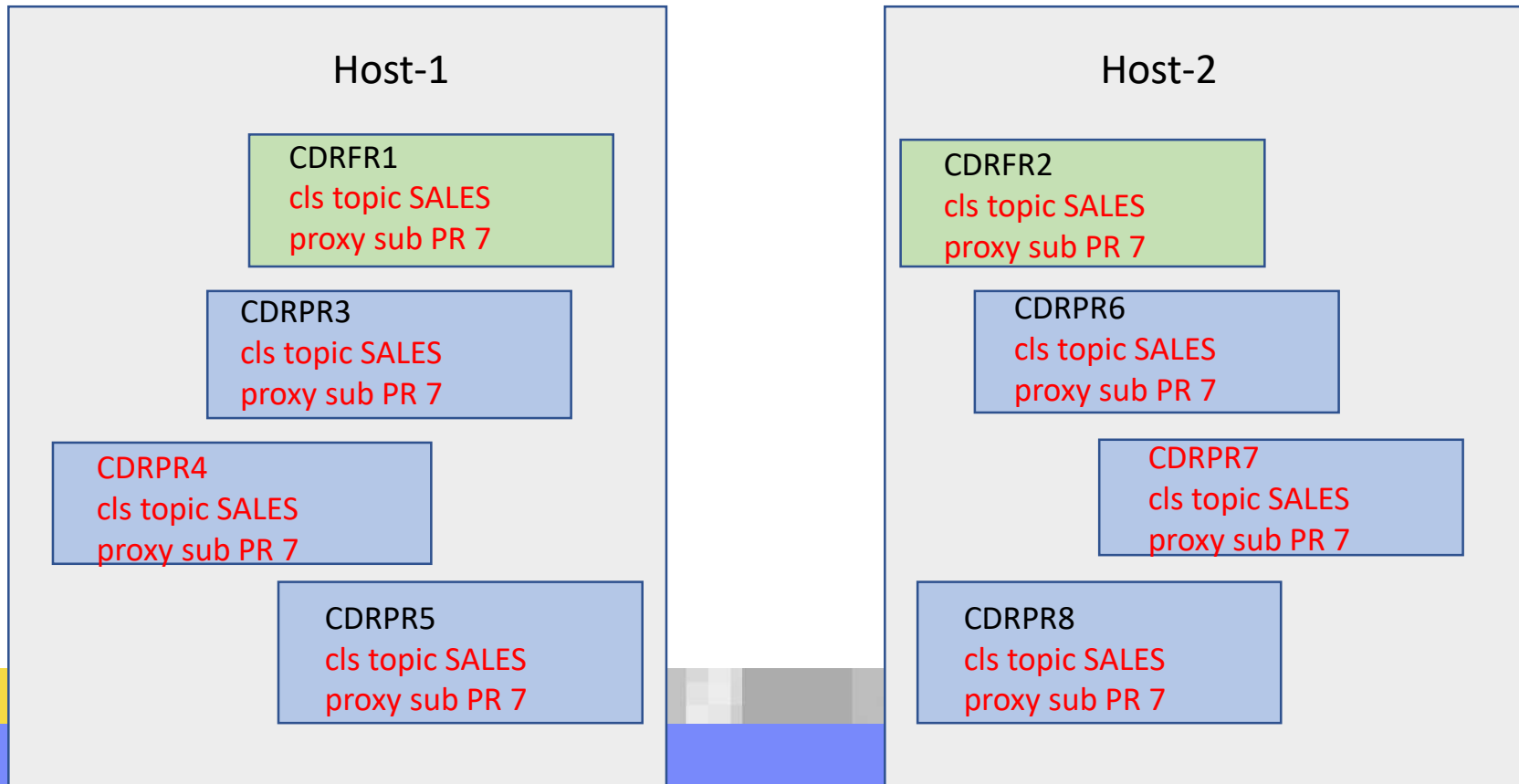
View subscribers in PR 4 (topic host)

Topic host PR 4 will be notified of ALL subscribers!

Notice the Proxy Subscriber for CTHPR7.

Name: SYSTEM.PROXY_2.SALES CLUSTERTH CTHPR7 sales

Topic String: sales

Destination name: SYSTEM.INTER.QMGR.PUBS

Destination queue manager: CTHPR7

Type: Proxy

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Subscriber in PR 7 receives

Because of Proxy Subscriber, the published message is routed to PR 7, using the auto cluster sender channel between PR 4 and PR 7.

Message is received by subscriber in PR 7 (stored in provided queue QS3)

Notes: message received in Subs in PR 7

Confirming receipt in PR 7 of the published message in PR 4 (notice that ReplyToQMgr indicates the queue manager of origin, in this case CTHPR4).

$ amqsbcg QS3 CTHPR7
 MQOPEN - 'QS3'
 MQGET of message number 1, CompCode:0 Reason:0
****Message descriptor****
 StrucId : 'MD ' Version : 2
 Report   : 0 MsgType : 8
 Expiry   : -1 Feedback : 0
 Format : 'MQSTR   '
 Priority : 0 Persistence : 0
 MsgId : X'414D5120435448505237202020202020E96CD359CF9E3324'
 CorrelId : X'414D5120435448505237202020202020E96CD359CF333424'
 BackoutCount : 0
 ReplyToQ   : '   '
 ReplyToQMgr   : 'CTHPR4   '

****   Message   ****
 length - 8 of 8 bytes
00000000: 5445 5354 5F50 5542   '**TEST_PUB**   '

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Channel active between PR 4 and PR 7

Notice that the channel between PR 4 and PR 7 became automatically active:

Summary: Pub in PR 4, Sub in PR 7

Publisher publishes for SALES in PR 4.

PR 4 is a topic host. PR 4 broadcasts to subscribers.

Subscriber in PR 7.

Host-1

CTHFR1
cls topic SALES

CTHPR3
cls topic SALES

Publisher
Clst Topic
SALES

CTHPR4
cls topic SALES
proxy sub PR 7

CTHPR5
cls topic SALES

Host-2

CTHFR2
cls topic SALES

CTHPR6
cls topic SALES

CTHPR7
cls topic SALES
Local sub PR 7

CTHPR8
cls topic SALES
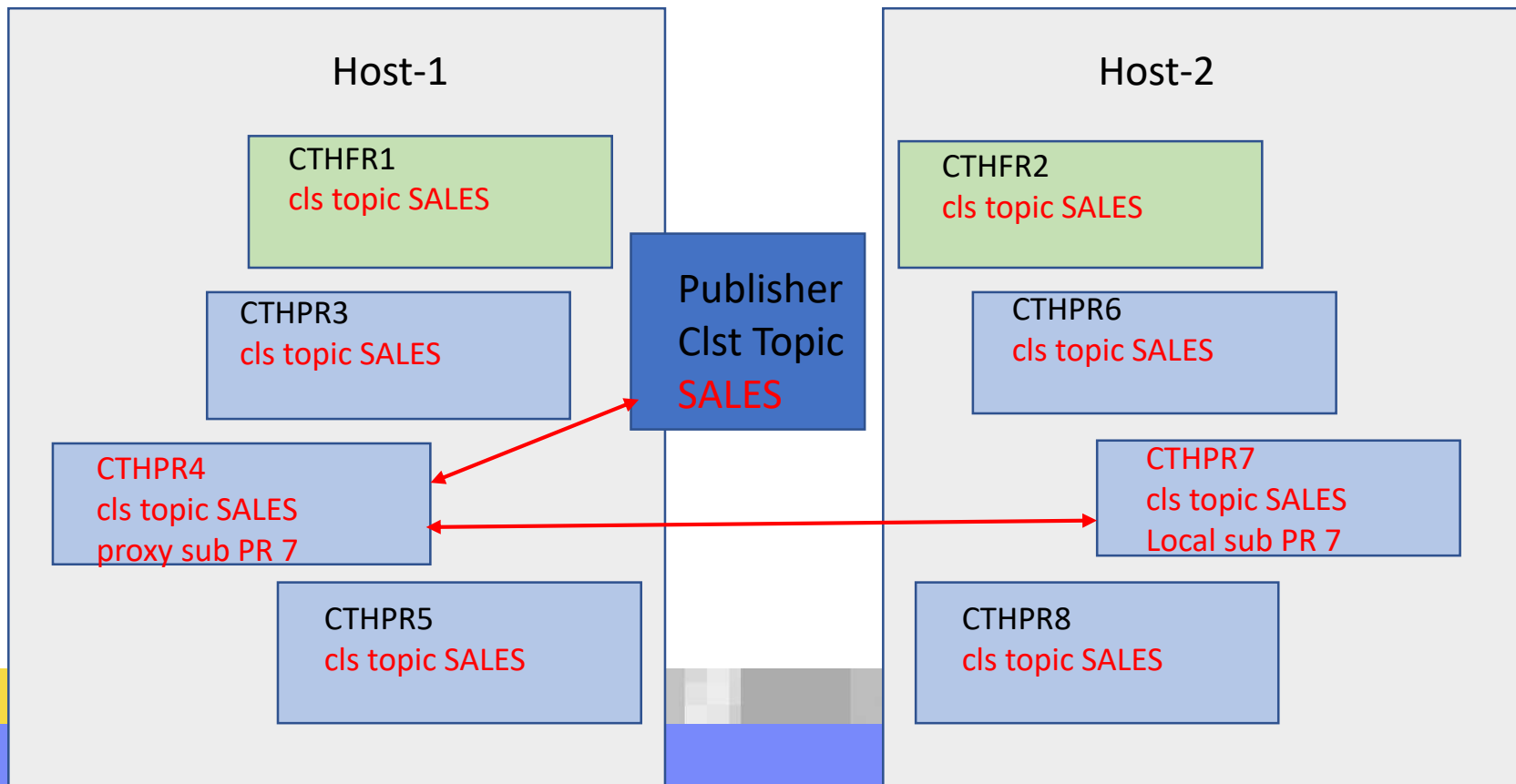
Let's extend the test

Let's add into the scenario a pair of PRs that have not been used yet.

PR 5 will have a **Publisher** on the existing clustered topic SALES

PR 8 will have a **non durable subscriber** (MQ Explorer, by using Test Subscription)

Add Pub in PR 5, Sub in PR 8

1: Publisher publishes for SALES in PR 5.

2: PR 5 sends message to PR 4, which is a topic host.

3: PR 4 broadcasts to subscribers in PR 7 and in PR 8.

Host-1

CTHFR1
cls topic SALES

CTHPR3
cls topic SALES

CTHPR4
cls topic SALES
proxy sub PR 7 and PR 8

CTHPR5
cls topic SALES

Publisher
Clst Topic
SALES

Host-2

CTHFR2
cls topic SALES

CTHPR6
cls topic SALES

CTHPR7
cls topic SALES
Local sub PR 7

CTHPR8
cls topic SALES
Local sub PR 8

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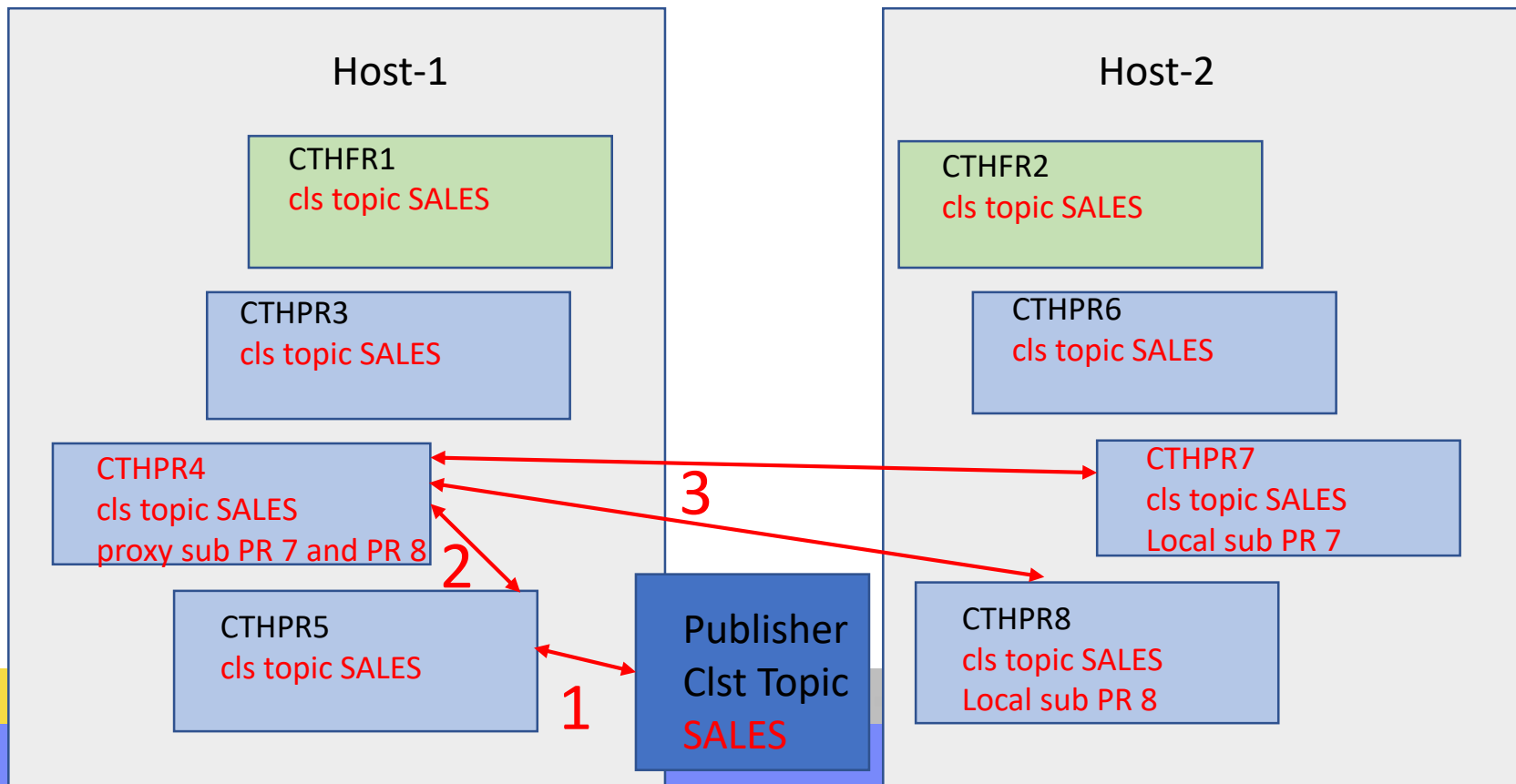
Baseline for PR 5

PR 5 knows about: clustered topic SALES

Which as a Cluster Route type of "Topic Host"
   CLROUTE(TOPICHOST)

And the topic host is PR 4.
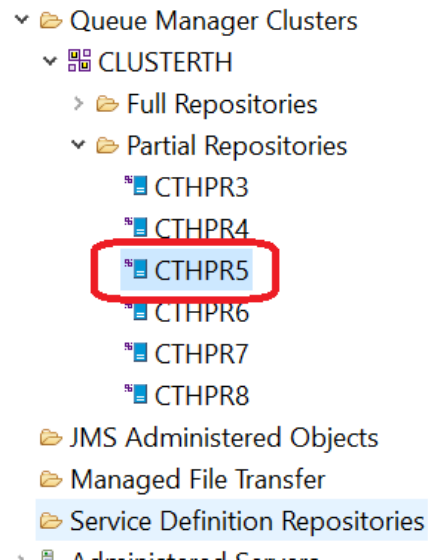
Baseline for PR 5: does not know about Sub
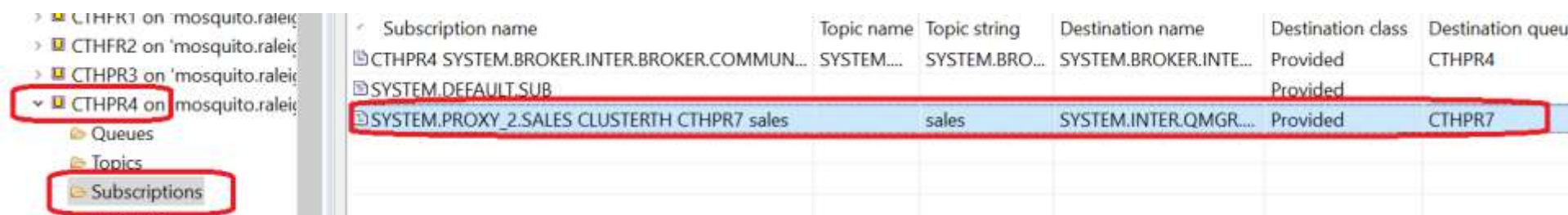
PR 5 does NOT know about remote subscribers.

But it knows that the topic host PR 4 is the one to broadcast messages to subscribers.

Baseline for PR 4: knows Sub PR 7

Currently PR 4 knows only about the sub in PR 7

Baseline for PR 5

PR 5 knows about:
The cluster sender to PR 4 exists, but it is inactive.

Baseline for PR 8

PR 8 knows about:

Clustered Topic SALES, with topic host in PR 4
This means that when a new subscriber is created in
PR 8, a notification needs to be sent to PR 4 (and
not broadcast it to all other PRs as in Direct Route).

MQ Explorer Test Subscription in PR 8

In PR 8, from Topic Status, select
"Test Subscription" on topic string 'sales'
Queue manager determines that is a clustered topic.
A Proxy Subscriber is sent only to topic host PR 4
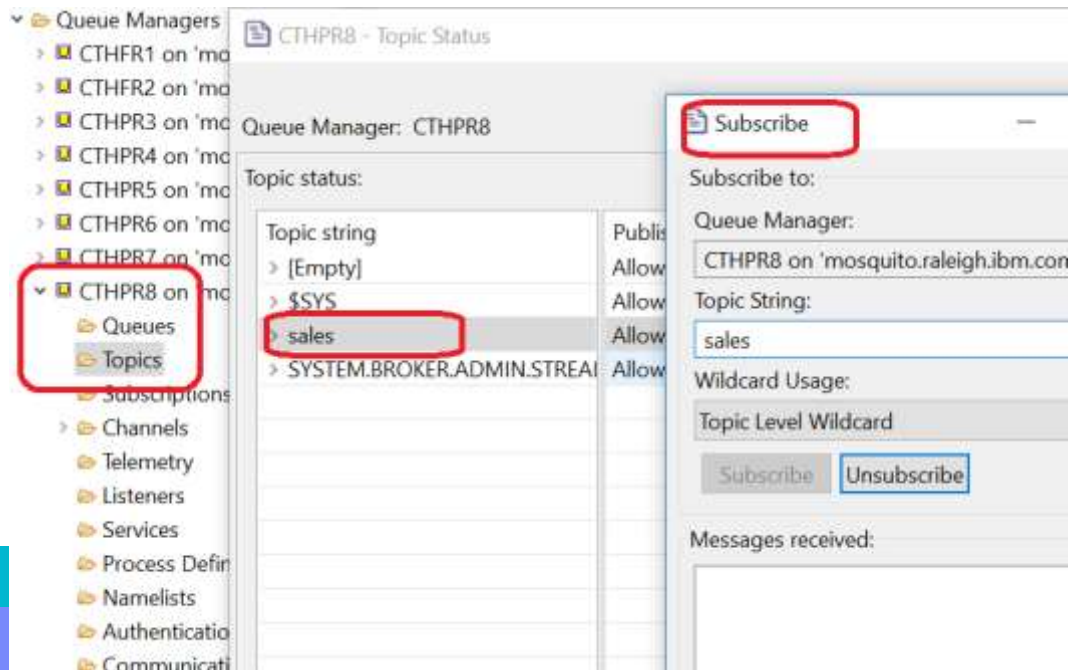
MQ Explorer Test Subscription in PR 8

A Proxy Subscriber is sent only to the topic host PR 4

Notice that now PR 4 shows a 2nd Proxy Subscriber, the one for PR 8.

MQ Explorer Test Subscription in PR 8

The Proxy Subscriber is NOT sent to the PRs who are not topic hosts.
For example, PR 6 is not a topic host.
Thus, PR 6 does NOT have proxy subscribers.

Publish in PR 5, message received in PR 8

In PR 5 publish a message (Test Publish).

PR 5 forwards it to topic host PR 4.

PR 4 knows from Proxy Subs that needs to send a message to PR 8.

The subscriber in PR 8 receives it.

Publish in PR 5, message received in PR 8

The cluster sender from PR 5 to PR 4 becomes active.

TO.CTHFR1	CTHFR1	Repository	Auto explicit cluster-sender	TCP	Inactive
TO.CTHFR2	CTHFR2	Repository	Auto cluster-sender	TCP	Inactive
TO.CTHPR4	CTHPR4	Normal	Auto cluster-sender	TCP	Running

> Full Repositories
> Partial Repositories
  - CTHPR3
  - CTHPR4
  - CTHPR5

Publish in PR 5, message received in PR 8

The cluster sender from PR 4 to PR 8 becomes active.
Notice that the cluster sender to PR 7 was already active, due to the previous scenario.

Closing Test Sub in PR 8, refreshes cluster

Now let's close the Test Subscriber in PR 8.
This will cause a notification sent to the topic host PR 4
to remove the corresponding Proxy Subscriber.
Notice that PR 4 shows now only 1 Proxy instead of 2.

Sub in PR 7 also receives a message

There is a durable subscriber in PR 7 for SALES, and it received a copy of the message published by the publisher in PR 5.

Question: Because PR 5 delegated the broadcast of the published message to the topic host PR 4, which is the queue manager that is labeled as the originator of the message, PR 5 or PR 4?

Answer: The initial originator, PR 5 (not PR 4)

Example from the message received in PR 7:

Using amqsbcg shows:

 ReplyToQMgr   : 'CTHPR5

Summary: Add Pub in PR 5, Sub in PR 8

1: Publisher publishes for SALES in PR 5.

2: PR 5 sends message to PR 4, which is a topic host.

3: PR 4 broadcasts to subscribers in PR 7 and in PR 8.

Host-1

CTHFR1
cls topic SALES

CTHPR3
cls topic SALES

CTHPR4
cls topic SALES
proxy sub PR 7 and PR 8

CTHPR5
cls topic SALES

Publisher
Clst Topic
SALES

Host-2

CTHFR2
cls topic SALES

CTHPR6
cls topic SALES

CTHPR7
cls topic SALES
Local sub PR 7

CTHPR8
cls topic SALES
Local sub PR 8

1

2

3
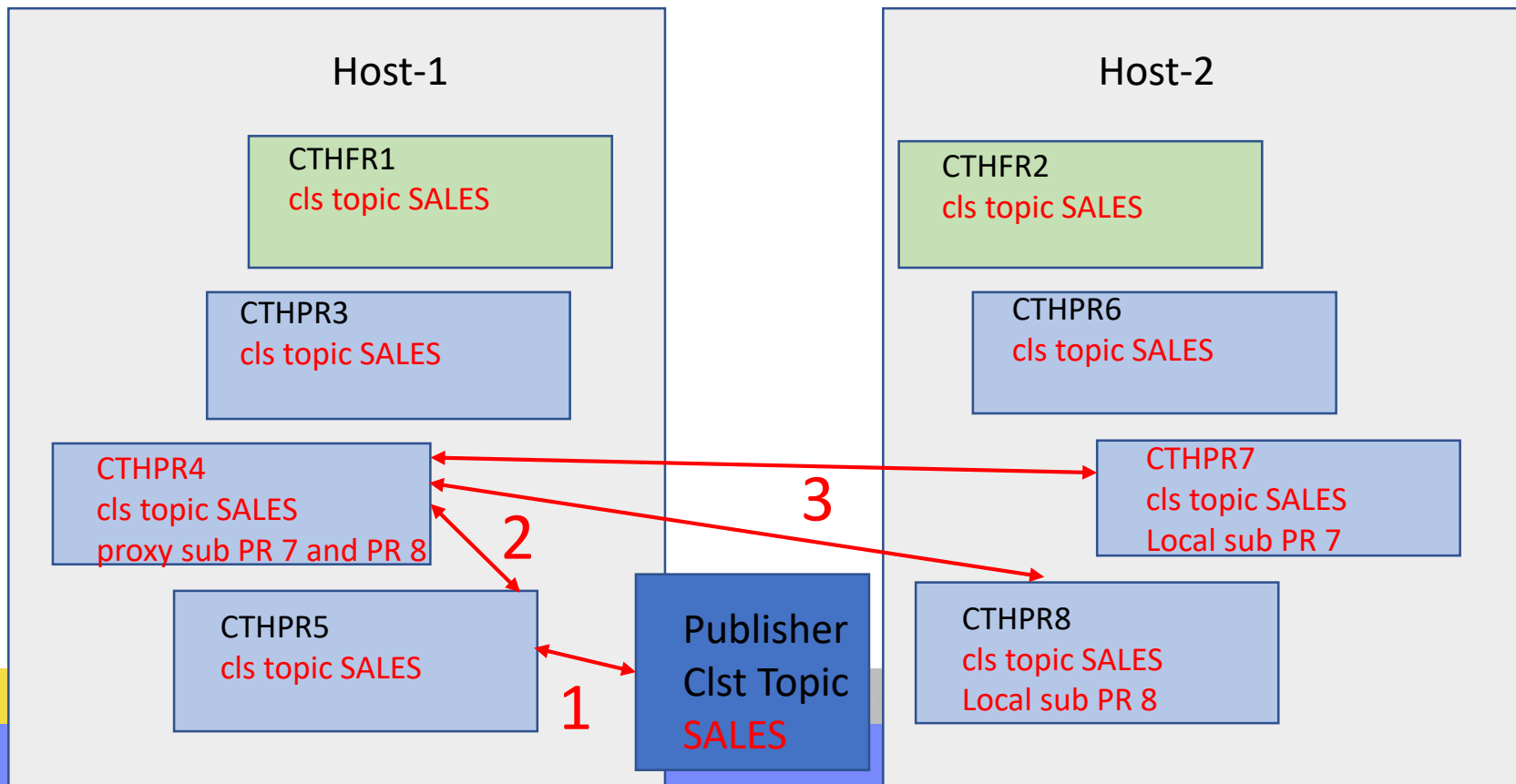
Comparison DR and TH - intermediary

Pub in PR 5 (not a topic host) and Sub in PR 7

Direct Route: PR 5 >> PR 7
Pub in PR 5 connects directly to PR 7.
No intermediary queue manager.

Topic Host: PR 5 >> PR 4 >> PR 7
Pub in PR 5 connects to topic host PR 4.
PR 4 broadcasts message to PR 7.
One intermediary queue manager (topic host).

Brief comparison DR and TH

```
                        DirectRoute   TopicHost(TH)

PRs know about
clustered topic      ALL             ALL


PRs know about
Proxy subscribers    ALL          Only TH


Cluster-Sender
Channels for PRs     ALL       Only between
                               TH and PRs


Intermediaries        None      1 = TH
("hops")
```

Topic Host routing

Drawback:

If the publishers or subscribers are not located on the topic host queue managers, this results in a longer route for publications.

Benefit:

The benefit is that only the topic host queue managers become aware of all other queue managers in the cluster, and potentially have cluster channels established with them.

The End

This is the end of the presentation.

THANKS!!