



IBM Software Group

What's New in Mach 11?



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Delayed Apply

Overview



- User Stories
- Feature Summary
- Feature Details
- Known Issues

User Stories



- **Accidentally dropping the wrong table.**
Sally created a temporary working table inside the HR database called sallys and when she was finished with the table she dropped it. Unfortunately, she typed salaries instead of sallys and payroll was due that day.
- **Deleting the wrong rows.**
Dan was tasked with doing the periodic maintenance of deleting last year's data from the salespromo table. Dan made a big mistake when he typed the wrong year and deleted this year's data.
- **Dropping a database.**
Dan's job as junior DBA just wasn't going well and he felt his skills were not appreciated. After the big salespromo debacle things only got worse. Dan decided to get a job at another company and right before he quit he decided to drop the sales database as a going away present.

Feature Summary – Quick Reference (1 of 2)



■ Delayed Apply Description

- With the Delayed Apply feature you can either delay or stop the application of logical logs to Remote Standalone Secondary (RSS).
- Supported only for RSS.
- RSS may still be configured for writing, but since this will also be delayed, it may not make sense to do this.
- A log staging directory with secure privileges must be created before delayed apply or stop apply can be turned on.
- Delayed/Stop Apply are enabled or disabled with the new onconfig parameters: `DELAY_APPLY`, `STOP_APPLY`, and `LOG_STAGING_DIR`

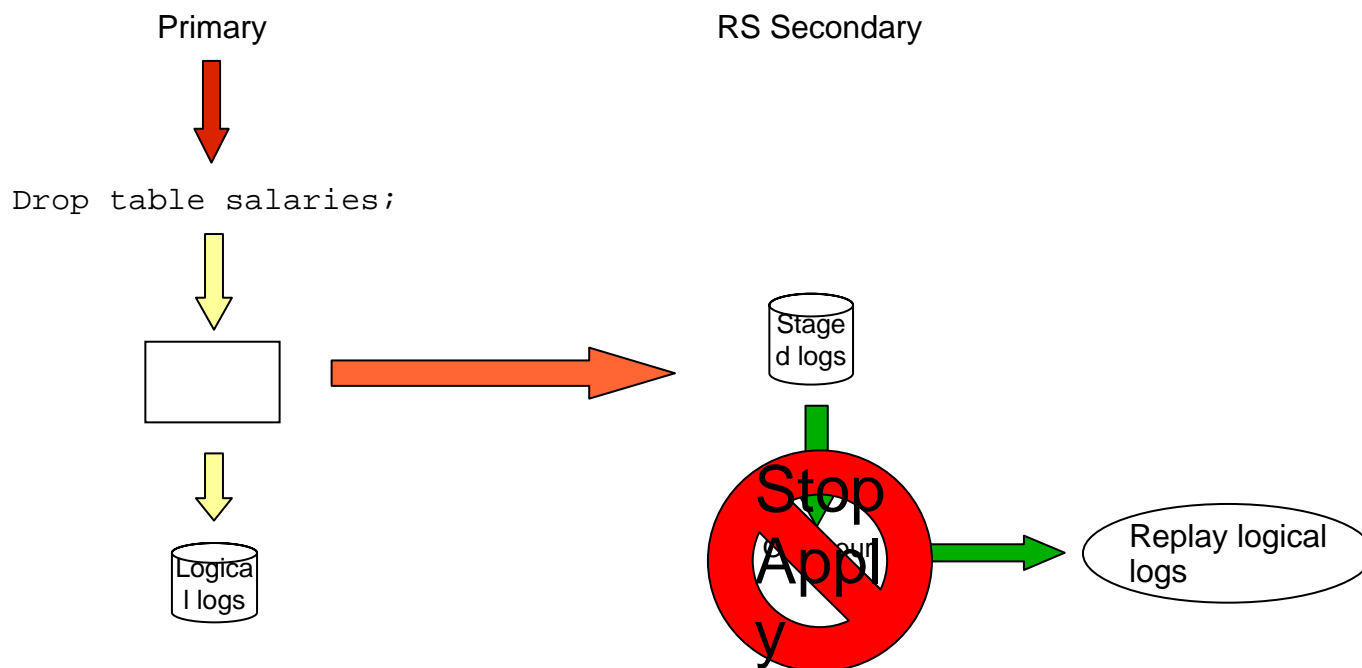
Feature Summary – Quick Reference (2 of 2)

- High level details
 - Delayed Apply began as a feature in 11.50 xC5.
 - Documented in the IDS Administrator's Guide and the IDS Administrator's Reference.

Feature Details – How Delayed Apply Works



- RSS logical log records are not applied until the time delay value set in the onconfig parameter DELAY_APPLY has passed.



Feature Details – How Stop Apply Works



- When stop apply is enabled we stop queuing log records to the apply thread.
- All log records are staged from the primary.
- When stop apply is disabled we apply staged log records.
- Because we stage logs, LOG_STAGING_DIR must be setup correctly.

Feature Details – How it Works



- Delayed Apply onconfig parameters:
 - DELAY_APPLY – length of time to delay in seconds, minutes, hours, or days.
 - STOP_APPLY – can stop apply immediately, not stop, or specify a point in time to stop the apply of log records.
 - LOG_STAGING_DIR – a directory with proper security permissions to store log files.
- Can be set dynamically with onmode -wf with the exception that LOG_STAGING_DIR cannot change while delayed apply is active.

DELAY_APPLY

- ###[units]
- ### - how many units
- Units
 - Seconds – s/S
 - Minutes – m/M
 - Hours – h/H
 - Days – d/D
- Onconfig
 - DELAY_APPLY 5m
- Onmode
 - onmode -wf DELAY_APPLY=1h



STOP_APPLY



- Values
 - 0 – do not stop apply.
 - 1 – stop apply immediately.
 - YYYY:MM:DD-hh:mm:ss – stop apply at point in time.
- `onmode -wf STOP_APPLY=2009:07:07-13:00:00` – stops apply on July 7, 2009 at 1:00pm.
- `onmode -wf STOP_APPLY=1` – stops apply now.

LOG_STAGING_DIR



- Values:
 - The path of an existing directory with correct security settings
 - Must be owned by informix and group informix.
 - No read/write/execute permissions for public.
- Must be set for delayed apply or stop apply to work.
- Engine will not come up if this is not set while delayed apply or stop apply is enabled.
- Make sure to delete any files from previous instance as this would present a possible conflict.
- Cannot be set dynamically if delayed apply is active.
- Onmode `-wf LOG_STAGING_DIR=/foo/bar`

Feature Details – How it Works



Example of Logs and LOG_STAGING_DIR:

From onstat -l on primary:

Logical Logging

Buffer	bufused	bufsize	numrecs	numpages	numwrits	recs/pages	pages/io
L-1	0	32	0	0	0	0.0	0.0

Subsystem	numrecs	Log Space used

address	number	flags	uniqid	begin	size	used	%used
110fc5b0	1	U-B----	7	1:25263	5000	12	0.24
110fc5f8	2	U-----	8	1:30263	5000	5000	100.00
110fc640	3	U-----	9	1:35263	5000	5000	100.00
110fc688	4	U---C-L	10	1:40263	5000	2856	57.12
110fc6d0	5	U-B----	5	1:45263	5000	5000	100.00
110fc718	6	U-B----	6	1:50263	5000	988	19.76

6 active, 6 total

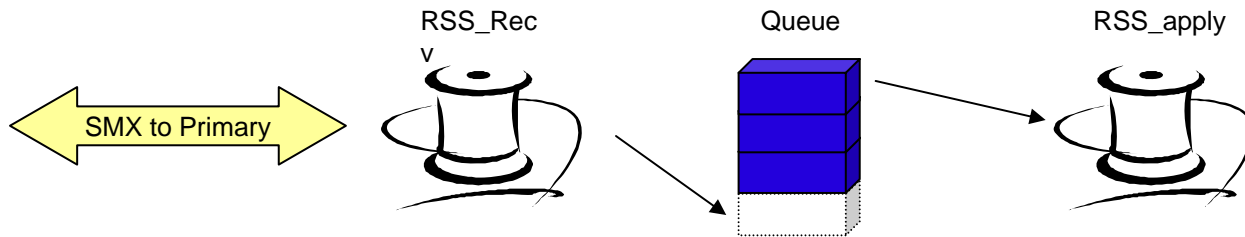
Ls on log staging directory on RS secondary:

```
# ls -ltr logdir/ifmxlog_13
total 31456
-rw-rw---- 1 root      informix 10240000 Jul  1 13:19 ifmxUniqueLog_9
-rw-rw---- 1 root      informix 5849088  Jul  2 10:44 ifmxUniqueLog_10
```

Traditional RSS



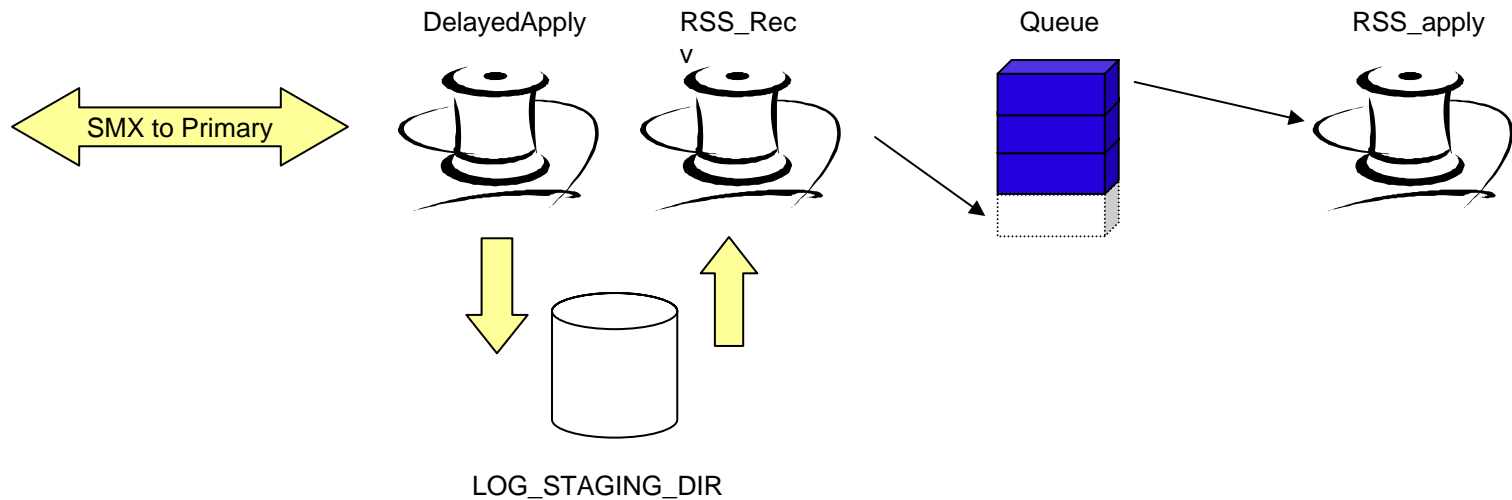
RSS without delayed apply enabled.



RSS With Delayed Apply Enabled



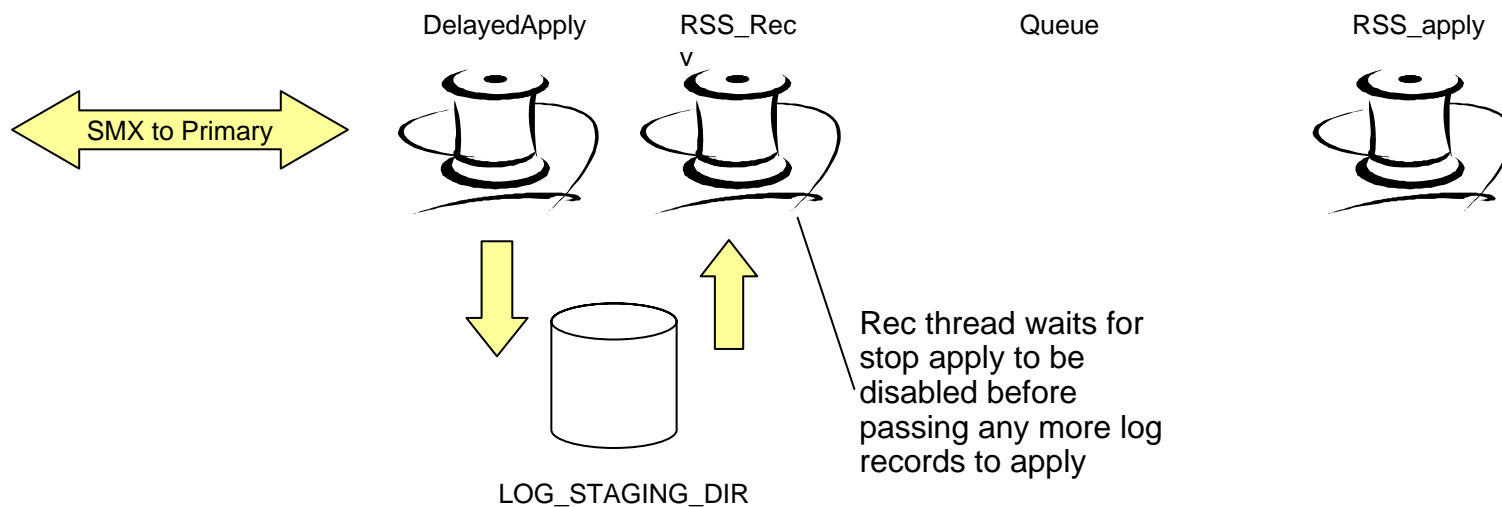
RSS with delayed apply enabled.



RSS With Stop Apply Enabled



RS secondary with stop apply enabled (with or without delayed apply enabled).



What happens on a secondary restart? (1 of 2)



- When the RSS_Recv thread starts we determine the current unique log id.
- Standard RSS's request the primary start sending logs beginning with the current id.
- With delayed apply enabled we potentially already have logs staged that have not yet been applied:
 - We check to see what the highest unqid we have in the staging directory then request the primary start sending logs with that id.

What happens on a secondary restart? (2 of 2)



- From here things proceed as normal:
 - If this is a standard RSS, the RSS_Recv thread starts receiving logs from the primary and queueing them to the apply thread.
 - If delayed apply is enabled, the RSS_Recv thread starts up the DelayedApply thread which starts receiving logs from the primary – the RSS_Recv thread then starts reading logs from the staging directory.

Known Issues – What to Look for



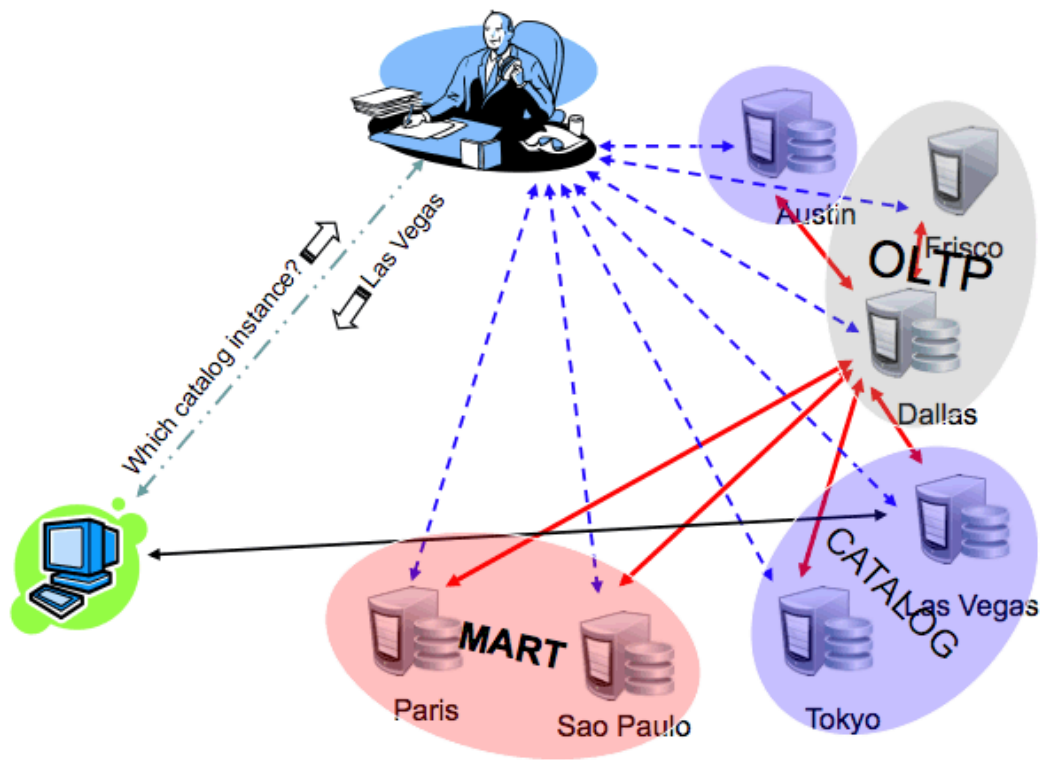
- Make sure the log staging directory has owner informix and group informix without read permissions for the world.
- Look for online log messages about the log staging directory if problems occur.
- Example:
11:16:34 Value of LOG_STAGING_DIR has been changed to /usr4/11.50.UC5B1/mbishop/RS/RS2/logdir.
11:19:16 The delay apply directory (/usr4/11.50.UC5B1/mbishop/RS/RS2/logdir) is not secure
11:19:16 Delay Apply has been disabled
- Make sure to have enough file system free space to store all the logical logs for the duration of the delay configured.
- As mentioned in the quick reference, the RS secondary can be configured to be writable – this may not make sense.



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Dynamic ONCMSM

MACH-11 Enhancement – Dynamic ONCMSM



```

NAME doe_test
SLA oltp=primary
SLA report=HDR+SDS
SLA test=RSS
DEBUG 1
LOGFILE /opt/IBM/informix/logs/cm.log
    
```

MACH-11 Enhancement – Dynamic ONCMSM

- Previously, changes to the ONCMSM config file required stopping and restarting the agent.
- New flag: `-r` causes the agent to re-read file and use new configuration information.
- Examples:

```
oncmsm -r (if the only agent on a server)
```

or

(if multiple agents on a server
or using a different name/path
to the configuration file)

```
oncmsm -c path_to_config_file -r
```