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# IBM Rational ClearCase
# Oplog Divergence

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## IBM Rational ClearCase MultiSite Oplog Divergence

ClearCase MultiSite oplog divergence happens when two or more replicas disagree on the content of the oplogs originating at one or more siblings. The epoch table can be used to try and detect an occurrence of this, but it is not directly part of divergence.

The most common error message that appears when Oplog divergence is detected is the following syncreplica import failure. Note, however, that there are instances where this error does not appear.

Multitool: Error: OPLOG DIVERGENCE DETECTED.
Starting MultiSite import…
Error: OPLOG DIVERGENCE DETECTED. Please contact IBM Rational Customer Service immediately.

The most common reasons for oplog divergence are:
- After a recovery from backup, the recovering site fails to run or does not finish running restorereplica.
- A site runs chmaster –all –force (chmaster –all –obsolete_replica in ClearCase 2002.05.00 and higher) and fails to notify the other sites of this change.

ClearCase MultiSite oplog divergence is a potentially serious problem. When there are multiple replicas in a family, and each site has been making changes, there may not be a way to incorporate all of those changes that were made since the divergence occurred. This whitepaper will describe the troubleshooting steps that you can take before contacting IBM Rational Customer Service, to make the recovery process as fast as possible. Oplog divergence infers that at least one replica will have to be recreated. IBM Rational Customer Service will assist in determining which replica knows the most information about the family; however one or more replicas in a given family may need to be removed or recreated.

### Information to Gather When Troubleshooting ClearCase MultiSite Oplog Divergence

When troubleshooting ClearCase MultiSite oplog divergence, it is essential that you contact IBM Rational Customer Service as soon as the problem is detected. Please note that oplog divergence cannot be easily remedied. IBM Rational Customer Service is able to help you locate the point of divergence, so that you can recover the missing data from each site, and then recreate the necessary replicas in the family. In that case, IBM Rational Customer Service will ask you to gather the following information:

1. Entire error message, if any. Generate the import error (if any) from within the context of a ClearCase view. Open a command window. Change directory into a view. Change directory into the replica. Run the multitool syncreplica –import command.
2. Whether you have recently recovered from backing up any replica in the VOB family. If so, when and which replica?
3. A map of affected replicas. Which replicas are affected by the problem, and where are they located? What is the synchronization pattern? (Which replicas sync directly to which others?)
4. Output from multisiteinfo.pl at all affected replicas. IBM Rational Customer Service will provide this diagnostic tool to you. Multisiteinfo.pl requires Perl 5.
5. Output from vers_info.pl at all affected replicas in the family. This is a diagnostic tool that IBM Rational Customer Service will provide to you.

IBM Rational Customer Service will analyze the data that you send in, and help you to identify data that may need to be saved out of the replica(s) to be replaced. If engineering requests it, IBM Rational Customer Service may ask you to gather and send oplogs from the affected replicas.

## Maintenance: Using Epoch_watchdog

Epoch_watchdog is a ClearCase MultiSite Perl script that monitors one or more VOB replicas for oplog divergence. It determines if the replica's epoch numbers have been rolled back without a restorereplica command having been run. This script can be used regularly, as part of your MultiSite maintenance, to check the consistency of epoch tables in replicated VOBs.

Epoch_watchdog is included in the following MultiSite patches, and it ships with ClearCase MultiSite version 2002.05.00:
Multisite_p3.2.1-10
Multisite_p3.2.1.NT-9
Multisite_p4.0-4
Multisite_p4.0.NT-5
Multisite_p4.1-4
Multisite_p4.1.NT-4
Multisite_p4.2-1
Multisite_p4.2.NT-1

Epoch_watchdog can be invoked by the ClearCase Job Scheduler in ClearCase releases 4.0 and later. Note that on UNIX, this job must be run as root. On Windows, this job must be run as a member of the ClearCase group.

Syntax for epoch_watchdog:
Epoch_watchdog [-h][-all | <VOB-tag> | list_file]\n
-help *Prints epoch_watchdog syntax and exits.*
-all  *Checks all local replicated VOBs. Other –vob parameters on command line and any list files specified will be ignored if –all is specified.*
-vobs *Full VOB-tag, in comma-separated list. No whitespace.*
List_file *Path to file containing a set of directives execute. Must be the final parameter specified on the command line. Default is no list_file. List_file may contain the following directives:*
> *vob:<VOBtag1>*
> *vob:<VOBtag2>*
> *…*
*One entry per line, no whitespace.*

The first time epoch_watchdog is run, it creates a log file and writes the replica's current epoch number to that file. The log files can be found in: /var/adm/atria/log/epoch_logs or C:\Program Files\Rational\ClearCase\var\log\epoch_log. On subsequent runs, it checks the value stored in the log file against the value currently known in the VOB. If the VOB's value is greater, epoch_watchdog overwrites the log file with the new value. If the values are equal, it does nothing. However, if the VOB's value is smaller, and the replica is not undergoing restorereplica, epoch_watchdog attempts to lock the VOB, and create an error message. The error messages will appear in the ClearCase error_log on UNIX, or the Windows Event Viewer.

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