



# Customer Release Notes

eRAD PACS  
Version 9.0  
Server Build 8

Release Date March 31, 2023

## Table of Contents

<b>New Features and Enhancements</b> .....	4
1. Add object table cache handling mechanism .....	4
2. Function to safely remove deleted study.....	4
3. Create self-contained cw3/4 web rendering module.....	4
4. Cleanup deleted and bad-state studies .....	4
5. Raise mysql connection limit.....	4
6. Viewer-compatible localization of the user profile manager.....	4
7. Build web client SDK as part of epservice.....	4
8. Increase list filter expression database field length.....	5
9. Possible repository handler caching issues .....	5
10. Convert invalid user preference value to default and save.....	5
11. Additional performance info needed to benchmark reheat image tasks.....	5
12. Over-locking impacts performance when processing the same study on multiple threads.....	5
13. Improve reheatStudies script.....	5
<b>Resolved Issues</b> .....	6
1. Previous study disables next/previous buttons when the study has zero images.....	6
2. Begins and contains filter on Other Lists page action filters doesn't work.....	6
3. Tomcat deadlock by WL.....	6
4. Stream server limited to 16 connections.....	6
5. Viewer is not included on a burned CD .....	6
6. Batch open doesn't load but the first study.....	6
7. Stream server cannot authenticate web viewer client on farm .....	6
8. .wasm mime type error.....	7
9. WebViewer open slow for studies with many images .....	7
10. Herpa repository times out when called with resource time preserver.....	7
11. Taskd crashes in jni grpc call.....	7
12. Printrep fails on infinite redirection.....	7



**13. Deadlock in taskd (LockMgrShared)..... 7**

**14. Review/update java VM DB connection pool sizes ..... 7**

## New Features and Enhancements

### 1. Add object table cache handling mechanism

REVERSIBILITY NOTICE: If uninstalling, object table entries purged by this feature must be reloaded beforehand by invoking the touch scripts manually. To prevent the object table from growing indefinitely and storing large amounts of unused data, the system purges the least used records. When object data is needed, the system restores it on the fly from the study's meta data (i.e., the blob). The time period data remains in the object table is defined by ObjectCacheTimeout in `~/var/conf/self.rec`. The default is 10 days. Checking for and purging expired data occurs hourly from a cron job. The script is `CleanupObjectTable`. It can be invoked manually from the command line, if necessary.

### 2. Function to safely remove deleted study

This class of core functions enables support for safely removing deleted studies from the system via the GUI. They remove all remnants of a study from a server farm, including the repository resources, database records, task files, reference counters, locks and temporary files.

### 3. Create self-contained cw3/4 web rendering module

An SDK using javascript has been developed and deployed to enable web clients (browsers) to download and render cw3 and cw4 image files. Toolkit details are available in the *eRAD PACS Web Client Image Library* manual.

### 4. Cleanup deleted and bad-state studies

The Study Cleanup page includes the list of study records in a deleted state and a tool to remove them. The expanded row lists the related studies. Log entries exist for each study removed from this GUI feature.

### 5. Raise mysql connection limit

The built-in MySQL connection limit has been raised from 150 to 600. Additionally, the connection pool size has been increased to 32. See HPS-445 for subsequent adjustments.

### 6. Viewer-compatible localization of the user profile manager

The viewer configuration setting labels on the copy settings page use the customized resource labels employed by the viewer, making the labels consistent between the viewer and web page.

### 7. Build web client SDK as part of epserver

The web client SDK is compiled and packaged as part of the epserver build process.

**8. Increase list filter expression database field length**

REVERSIBILITY NOTICE: Filters exceeding 2048 characters created after installing this change will be truncated if it is uninstalled, generating unintended results. In previous versions, worklist and other list page filters were stored in files, permitting filter parameters of unlimited length. Since moving filters to the database, a filter length limit is imposed. This length has been increased to 32K. Attempts to save longer filters from the GUI results in a warning. Attempts to import longer filters during an upgrade will result in truncation and invalid results.

**9. Possible repository handler caching issues**

When accessing multiple image objects from the same study, the repository wrapper intended to efficiently manage repository access was mired in overhead (locking, database access, etc.) before it hit the cache manager. This was resolved by moving the cache management before the wrapper.

**10. Convert invalid user preference value to default and save**

Some user preference settings, including worklist poll time and web viewer dynamic help labels, were not converted to current values when the system was upgraded from v7. When detected, these settings are now converted to the system default value and saved automatically. Log entries exist indicating the system made these changes.

**11. Additional performance info needed to benchmark reheat image tasks**

Additional performance metrics have been added to analyze system performance when reheating studies.

**12. Over-locking impacts performance when processing the same study on multiple threads**

When multiple threads process the same object at the same time, a race condition could negatively impact performance because cache locking was at a global level when it could (should) be localized.

**13. Improve reheatStudies script**

Some enhancements to the reheat script have been applied, including better completion handling, using environment variables when available, cleaning up cache before starting the reheat process, and using relative priority assignments.

## Resolved Issues

### 1. Previous study disables next/previous buttons when the study has zero images

When passing information to the viewer about the next/previous studies on the user's worklist, the server mishandled zero-image studies. As a result, the viewer might incorrectly disable the next/previous study buttons.

### 2. Begins and contains filter on Other Lists page action filters doesn't work

The action filter states in the Other Lists filter panel page have been changed from a text field to a list of enumerated values.

### 3. Tomcat deadlock by WL

Some toolbox functions call themselves redundantly, leading to a possible global locking issue. These locks have been changed to local locks to eliminate the possibility of a lock up.

### 4. Stream server limited to 16 connections

The number of connections a stream server supports has been increased to 8192. Note that each connection requires two threads, making 4096 the maximum number of simultaneous user connections.

### 5. Viewer is not included on a burned CD

None of the viewer files, including the viewer executable itself, were copied to DICOM media because after moving the media option settings to the database, the setting values were not converted properly to Boolean values and therefore misinterpreted when creating the media.

### 6. Batch open doesn't load but the first study

The access key inserted into the PBS file (to support stream server session authentication) was put in the wrong location, causing the viewer to misinterpret the study list when initiating a new session.

### 7. Stream server cannot authenticate web viewer client on farm

When configured as a server farm, the stream server and application server are separate and the session ID managed by the application server is unavailable to streaming connections. As a result, web viewer access from a stream server could not be authenticated until this change, which passes the session ID in the streaming protocol.

**8. .wasm mime type error**

The preferable web assembly code failed to load because the web viewer interface was missing a MIME type definition, forcing the web viewer to fall back to a sub-optimal technology.

**9. WebViewer open slow for studies with many images**

Redundant and time-consuming calls to obtain an object's repository location were removed because the study location doesn't change.

**10. Herpa repository times out when called with resource time preserver**

Herpa creation tasks preparing a study for cooking recursively locked the cache repository, causing timeout delays.

**11. Taskd crashes in jni grpc call**

Tasks that restore an object table record from the meta data could crash deep within JNI when invoking a gRPC client in JNI after database operations have also been performed in JNI. To avoid the situation, object cache mapping has been reimplemented in C/C++ to avoid invoking gRPC from JNI.

**12. Printrep fails on infinite redirection**

The inclusion of an unnecessary session ID when calling the PDF creation tool cause the conversion script into an infinite loop and ultimate failure when creating DICOM media.

**13. Deadlock in taskd (LockMgrShared)**

The inconsistent order of locking and unlocking of two different locks when reprocessing a study's data could cause the task manager to become deadlocked.

**14. Review/update java VM DB connection pool sizes**

After increasing the default MySQL connection limits (see HPS-371, released in this build), it was determined a single default is not sufficient. A better connection limit default for the system was the original 4, so this setting has been restored. Default limits for Tomcat and Hermes are now set to 32. Also, the connection pool now creates connections as needed meaning none are initialized by default. Default limits for other java VMs can be defined using the override file `~/var/conf/modules.xml`. See Jira for a list of affected java VMs and configuration details.