

**Clouds and the Earth's Radiant Energy System
(CERES)**

Data Management System

**CATALYST
Test Plan
Version 5**

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The Document Revision Record contains information pertaining to approved document changes. The table lists the date the Software Configuration Change Request (SCCR) was approved, the Version Number, the SCCR number, a short description of the revision, and the revised sections. The document authors are listed on the cover. The Head of the CERES Data Management Team approves or disapproves the requested changes based on recommendations of the Configuration Control Board.

Document Revision Record

SCCR Approval Date	Version Number	SCCR Number	Description of Revision	Section(s) Affected
09/25/12	V1	931	<ul style="list-style-type: none"> • New document. • Formatting issues were fixed and long hyphens were replaced with short hyphens for easier testing. (12/11/2012) 	All All
03/07/13	V2	937	<ul style="list-style-type: none"> • Updated for CATALYST Build 1. • Updated for CATALYST Build 1.0.3. (08/27/2013) • Updated for CATALYST Build 1.0.4. Added new information for activation code in the installer. (11/19/2013) • Removed manual steps that are now automatically handled by the CATALYST server. (11/19/2013) 	All All Sec. 2.1 Sec. 3.1
04/28/14	V3	1008	<ul style="list-style-type: none"> • Added "NOTE" for installing server updates. • Added '-daemonize' flag to server start instructions. • Added instructions for testing JIRA ticket CER-146. • Added instructions for testing JIRA ticket CER-122. • Added instructions for testing JIRA ticket CER-83. • Added additional promotion information. 	Sec. 2.1 Sec. 3.1 Sec. 3.1.4 Sec. 3.1.5 Sec. 3.1.6 Sec. 4.0
06/14/14	V4	1021	<ul style="list-style-type: none"> • Added new appendix to hold JIRA ticket specific test cases. Moved existing JIRA ticket test cases to the new appendix. Added test cases for CER-95 and CER-159. • A few minor corrections were made concerning formatting and heading titles. (06/24/2014) 	Sec. 3.1 & App. D App. D

Document Revision Record

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04/02/15	V5	1065	<ul style="list-style-type: none"> • Removed Appendix D. • Added explicit mentioning of actual user names of 'CATALYST administrator' to test cases and installation instructions. (09/16/2015) • Added instructions to installation steps to install patch. (09/29/2015) • Added instructions to installation steps to install patch #02. (10/22/2015) • Modified a few formatting issues. (10/28/2015) 	<p>App. D Secs. 2.0 & 3.0</p> <p>Sec. 2.1</p> <p>Sec. 2.1</p> <p>Sec. 2.1</p>

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1.0 Introduction

CERES is a key component of EOS and NPP. The first CERES instrument (PFM) flew on TRMM, four instruments are currently operating on the EOS Terra (FM1 and FM2) and Aqua (FM3 and FM4) platforms, and NPP (FM5) platform. CERES measures radiances in three broadband channels: a shortwave channel (0.3 - 5 μm), a total channel (0.3 - 200 μm), and an infrared window channel (8 - 12 μm). The last data processed from the PFM instrument aboard TRMM was March 2000; no additional data are expected. Until June 2005, one instrument on each EOS platform operated in a fixed azimuth scanning mode and the other operated in a rotating azimuth scanning mode; now all are typically operating in the fixed azimuth scanning mode. The NPP platform carries the FM5 instrument, which operates in the fixed azimuth scanning mode though it has the capability to operate in a rotating azimuth scanning mode.

CERES climate data records involve an unprecedented level of data fusion: CERES measurements are combined with imager data (e.g., MODIS on Terra and Aqua, VIIRS on NPP), 4-D weather assimilation data, microwave sea-ice observations, and measurements from five geostationary satellites to produce climate-quality radiative fluxes at the top-of-atmosphere, within the atmosphere and at the surface, together with the associated cloud and aerosol properties.

The CERES project management and implementation responsibility is at NASA Langley. The CERES Science Team is responsible for the instrument design and the derivation and validation of the scientific algorithms used to produce the data products distributed to the atmospheric sciences community. The CERES DMT is responsible for the development and maintenance of the software that implements the science team's algorithms in the production environment to produce CERES data products. The Langley ASDC is responsible for the production environment, data ingest, and the processing, archival, and distribution of the CERES data products.

1.1 Document Overview

This document, [CATALYST Test Plan](#), is part of the CATALYST delivery package provided to the Langley Distributed Active Archive Center (DAAC). It provides procedures for installing and testing the CATALYST software. A list of acronyms and abbreviations is provided in [Appendix A](#), a directory structure diagram is contained in [Appendix B](#) and a description of the software and data files is contained in [Appendix C](#).

This document is organized as follows:

- [Section 1.0](#) - Introduction
- [Section 2.0](#) - Software Installation Procedures
- [Section 3.0](#) - Test and Evaluation Procedures
- [Appendix A](#) - Acronyms and Abbreviations
- [Appendix B](#) - Directory Structure Diagram
- [Appendix C](#) - File Description Tables

1.2 CATALYST Overview

The CATALYST service contains no PGEs. Rather it is a framework for coordinating the execution of CERES PGEs in the ASDC production environment. This build of CATALYST contains the functionality necessary for running the Clouds and Inversion Edition 4 processing chain as well as the login interface required for the PR Web Tool.

1.2.1 Perl Library Modules

CATALYST is written primarily in Perl. Many of the routines required by CATALYST are located in CERES's Perl_Lib. The **\$PERL5LIB** environment variable must be defined before attempting to run the CATALYST server. **\$PERL5LIB** can be set using **\$CERESENV**.

1.2.2 Architecture/Location Dependent Code

There is only one location that CATALYST is to be installed: the *AMI-P* X86_64 cluster head node. This requirement exists because CATALYST must be able to communicate both internally, within the *AMI-P* cluster for job coordination, and externally to the PR Web Application, CATALYST Operator's Console, and sub-programs built using the CATALYST XML-RPC API for operator interaction and control.

2.0 Software Installation Procedures

This section describes how to install the CATALYST software in preparation for making the necessary test runs at the Langley DAAC. The installation procedures include an executable installation script which unpacks CATALYST software, configures run time environments, and adjusts the logging database as necessary.

2.1 Installation

1. The scripts and makefiles in the CATALYST delivery package expect the CERES environment variable, **\$CERESENV**, to point to a file which sets the following environment variables:
 - CERESHOME** - Top directory for CERES software
 - CERESLIB** - Top directory for CERESlib software (this location will be different for the different CERESlib versions)
 - PERL5LIB** - Directory containing CERES Perl module
2. CATALYST Installation Steps:
 - a) Shut down existing CATALYST v1.0.x process.
 - b) Log in to *AMI-p (ab01)* as the CATALYST administrator user (for PPE this is 'vobadm' and production this is 'catalyst') and execute the following commands:

```
cd $CERESHOME  
mv $CERESHOME/catalyst $CERESHOME/catalyst_v1_old
```
 - c) Log out of *AMI-p (ab01)*
 - d) Log in to *catalyst.larc.nasa.gov* (the dedicated CATALYST blade) as the CATALYST administrator user (for PPE this is 'vobadm' and production this is 'catalyst') and execute the following commands depending if your role is CM, PPE, or Production:
 - CM (as AUID of CERES CM):

```
cd $CERESHOME  
ln -s /data_loc/catalyst-cm $CERESHOME/catalyst
```
 - PPE (as 'vobadm'):

```
cd $CERESHOME  
ln -s /data_loc/catalyst-ppe $CERESHOME/catalyst
```
 - Production (as 'catalyst'):

```
cd $CERESHOME  
ln -s /data_loc/catalyst-prd $CERESHOME/catalyst
```

- e) Unpackage the CATALYST server code:

```
tar xf /SPG_ops/delivery/CERES/incoming/catalyst_server_1065.tar.gz -  
C $CERESHOME
```

- f) Confirm that \$CERESHOME/catalyst contains the following directories:

```
bin  
data  
exec  
handlers  
lib  
logs  
sockets
```

- g) Unpackage the CATALYST server update files:

```
tar xf  
/SPG_ops/delivery/CERES/incoming/catalyst_server_update01_1065.t  
ar.gz -C $CERESHOME  
tar xf  
/SPG_ops/delivery/CERES/incoming/catalyst_server_update02_1065.t  
ar.gz -C $CERESHOME
```

- h) Unpackage the CATALYST server lib files:

```
tar xf  
/SPG_ops/delivery/CERES/incoming/catalyst_server_libs_1065.tar.gz  
-C $CERESHOME
```

- i) Confirm that \$CERESHOME/catalyst now contains this additional directory:

```
local
```

- j) Unpackage the CATALYST server configuration files for your environment (CM, PPE, or Production):

CM:

```
tar xf  
/SPG_ops/delivery/CERES/incoming/catalyst_conf_cm_1065.tar.g  
z -C $CERESHOME
```

PPE:

```
tar xf  
/SPG_ops/delivery/CERES/incoming/catalyst_conf_ppe_1065.tar.g  
z -C $CERESHOME
```

Production:

tar xf

/SPG_ops/delivery/CERES/incoming/catalyst_conf_prod_1065.tar.gz -C \$CERESHOME

k) Confirm that \$CERESHOME/catalyst now contains this additional directory:

conf

l) Copy the CATALYST Log Database configuration files from the old CATALYST directory to the new location:

cp \$CERESHOME/catalyst_v1_old/conf/auth \$CERESHOME/catalyst/conf

m) Unpacking the CATALYST PGE handler modules would normally be done now but for this delivery this step is deferred until the testing of JIRA Ticket CER-238 (Provide Plug-in Method for Installing New PGEs in CATALYST) in Section 3.2.3.

n) CATALYST is now installed. You can now proceed to the next section.

3. Download the latest version of the CATALYST Operator’s Console from CATALYST Home Page (http://ceres.larc.nasa.gov/Internal/intern_docs_catalyst.php) to your desktop.
4. Before proceeding beyond this point, you will want to verify that PR Tool SCCR 1073 has been installed in PPE.
5. CATALYST 2.0 Test PR Database Installation Steps:

For testing this version of CATALYST, a test database for the PR Tool needs to be installed in PPE. This will provide the CAT2-Beta2-Ed4 PRs that will be used for testing CATALYST. **This database ONLY needs to be installed in the PPE.** A list of instructions, provided by Carla Grune, on performing this database installation follows.

2015-09-09

CERES PRDB **Test Database** for CATALYST 2.0 (PPE Environment) - SCCR 1065

For questions contact

Carla Grune at 757-951-1942 or at carla.o.grune@nasa.gov

or Lisa Coleman at 757-951-1631 or at lisa.h.coleman@nasa.gov

The following delivered files are located on *AMI-P* in */SPG_ops/delivery/CERES/incoming*.

PR_database_VCAT2.PPE.Test-1065.tar.gz

PR_database_VCAT2.PPE.Test-1065.list

Purpose (**PPE only**):

To verify CATALYST 2.0 processes the Stream ID for CAT2-Beta2-Ed4 PRs in the PPE Environment.

This CERES PRDB is a **Test Database** to be used by **CATALYST 2.0** PPE Testing.

Extract files from: **PR_database_VCAT2.PPE.Test-1065.tar.gz**

PR_database_VCAT2.PPE.Test-1065.tar file contents:

- **PR_database_CAT2-PPE-Test_1065_082715.backup,**
- **CAT2-Beta2-Ed4_Stream_4_CAT2-PPE-Test_1065.sql.**

Instructions to extract files:

Create a directory, e.g., **SCCR1065_VCAT2-PPE-Test**

From the directory:

1. Obtain the **tar.gz** file, **PR_database_VCAT2.PPE.Test-1065.tar.gz** file from the *AMI-P* location
2. Run **gunzip PR_database_VCAT2.PPE.Test-1065.tar.gz.**
3. Run **tar -xvf PR_database_VCAT2.PPE.Test-1065.tar.**

Installation Instructions:

Make a full backup of the PPE PRDB (**ceres_pr_opt_ppe** on *dsrvr205*).

Restore the backup file to **ceres_pr_opt_ppe** on *dsrvr205*.

- **PR_database_CAT2-PPE-Test_1065_082715.backup**

Apply the database SQL script to **ceres_pr_opt_ppe** on *dsrvr205*.

- **CAT2-Beta2-Ed4_Stream_4_CAT2-PPE-Test_1065.sql.**

Postgres command line instructions:

Connect to the **ceres_pr_opt_ppe** database on *dsrvr205*.

psql -d ceres_pr_opt_ppe -f PR_database_CAT2-PPE-Test_1065_082715.backup

psql -d ceres_pr_opt_ppe -f CAT2-Beta2-Ed4_Stream_4_CAT2-PPE-Test_1065.sql

PgAdmin3 Database Instructions (ceres_pr_opt_ppe):

Open PgAdmin3 application.

Connect to the postgresQL DB Server, **dsrvr205.larc.nasa.gov -p 3060** as a DBA administrator, by double clicking on that server.

Click on the arrow adjacent to "**dsrvr205.larc.nasa.gov**" to expand the view.

Click on the arrow adjacent to "Databases" to expand the view.

Restore the backup file, **PR_database_CAT2-PPE-Test_1065_082715.backup**

Select the database, **ceres_pr_opt_ppe**

Right mouse click on, **ceres_pr_opt_ppe**

Select "Restore...."

File Options Tab

- o Format = "Custom or tar"
- o Filename = Browse to and select the backup file above

Restore Options #2 Tab

- o Select "Clean before restore"

Select "Restore" button

Select "Done" button when the restore is completed.

Apply the update **CAT2-Beta2-Ed4_Stream_4_CAT2-PPE-Test_1065.sql**

Select the database, **ceres_pr_opt_ppe**

Select the SQL icon from the Main Tool Bar

Click on the File Open icon

Browse to the **CAT2-Beta2-Ed4_Stream_4_CAT2-PPE-Test_1065.sql file**

Select this file.

Click on the Open button in the right corner.

Select the Execute query (green arrow) icon, on the Main toolbar.

The "Query returned successfully" message is received.

Close the .sql file and PgAdmin3 application.

3.0 Test and Evaluation Procedures

This section provides instructions for executing the CATALYST test suite. (See Section 2.1 for an explanation of the **CERESENV** environment variable.)

Please note: The test suite must be executed on *catalyst.larc.nasa.gov*, on which CATALYST has been installed. If problems are encountered in any of the tests, immediately contact one of the CATALYST developers.

3.1 Executing the CATALYST Test Suite

3.1.1 Starting the CATALYST server

Initialize the server by running the following commands (PPE: 'vobadm').

```
source $CERESENV  
$CERESHOME/catalyst/bin/start_catalyst.sh
```

If any error messages are written to the screen please contact the CATALYST development team.

Now the CATALYST server's master process has started. Start the individual CATALYST processes using the CATALYST manager utility on the command line. Start the CATALYST manager utility using the following command:

```
$CERESHOME/catalyst/bin/catalyst_manager.sh
```

Upon doing so, you will be presented with a dialog listing several commands that you can type. Executing this command within the CATALYST manager utility will start all of the CATALYST processes:

start all

When the CATALYST manager's prompt returns, you can check the status of the processes you have just started using this command:

status

At this point the status command should show that all of the CATALYST processes are running. If that is not the case please contact the CATALYST development team.

When you are finished with the CATALYST manager and want to return to the shell, this command will exit the CATALYST manager (NOTE: all processes you have started from the manager will remain running in the background):

exit

3.2 Preliminary Test Cases

3.2.1 JIRA Ticket CER-241

3.2.1.1 Ticket Description

CER-241: Enable SSL for XML-RPC Interface to CATALYST

3.2.1.2 Test Procedures

This test will verify that the PR Tool can connect to the CATALYST server running on catalyst.larc.nasa.gov. If you can successfully log into PR Tool 2.1 using your *AMI* username and password, this confirms the PR Tool can reach the CATALYST server via a secure SSL connection.

3.2.2 JIRA Ticket CER-234

3.2.2.1 Ticket Description

CER-234: Isolate CATALYST Services to Improve Uptime to Support PR Tool Authentication

3.2.2.2 Test Procedures

If you haven't already done so start the CATALYST Operator's Console now and follow the login instructions in Section 1.6 of the CATALYST Operator's Console Operator's Manual. In the console select Server Status from the CATALYST Server menu to view the Server Status dialog box. Stop the following services if they are running: ange, cluster, kernel, and logdb. Confirm that the status arrows are pointing down and are red (it may take a moment for the arrows to change from green to yellow to red). Confirm that the PR Tool still accepts logins.

Start the ange, cluster, kernel, and logdb services. Confirm that the status arrows are pointing up and are green. The Server Status window can now be closed. In order to proceed with processing PRs, as the CATALYST administrator user (PPE: 'vobadm'), select "Start Processing" from the "CATALYST Server" menu in the Operator's Console. Confirm that the wording in the console's title bar changed from "Connected – Server Not Ready to Process" to "Connected – Server Ready to Process".

Note: Every time that the CATALYST kernel process is stopped and then restarted, this requires you to select the "CATALYST Server -> Start Processing" menu item from the Operator's Console. The intent of this is to provide the opportunity to examine the state of the system prior to when it last stopped and before any further actions can take place.

3.2.3 JIRA Ticket CER-238

3.2.3.1 Ticket Description

CER-238: Provide Plug-in Method for Installing New PGEs in CATALYST

3.2.3.2 Test Procedures

Before installing the CATALYST PGEs provided by SCCR 1067, confirm that CATALYST contains zero PGEs. You can confirm this viewing the PGE Settings dialog in the CATALYST Operator's Console (select "CATALYST Server" -> "PGE Settings"). You will find that zero subsystems and zero PGEs are listed.

Next, you will install the 8 PGE Handlers provided by SCCR 1067 by following the directions below.

- a) Unpackage the CATALYST PGE handler modules:

```
tar xf /SPG_ops/delivery/CERES/incoming/catalyst_pge_1067.tar.gz -C  
$CERESHOME
```

- b) Confirm that **\$CERESHOME/catalyst/handlers** contains the following PGE handlers:

```
CER4_1_4_1P6.pm  
CER4_1_4_2P4.pm  
CER4_1_4_2P5.pm  
CER4_1_4_3P3.pm  
CER4_5_6_1P4.pm  
CER4_5_6_1P5.pm  
CER4_5_6_2P3.pm  
CER4_5_6_4P2.pm
```

Note: Files in the handlers directory that do not end with “.pm” will not be loaded by the CATALYST server.

- a) Stop the kernel process. You can stop the kernel process using the Server Status dialog in the Operator’s Console (“CATALYST Server” -> “Server Status”). Press the “Stop” button on the kernel line.
- b) Once the kernel has registered that it has stopped, press the “Start” button. When the kernel starts, it will find and load the new PGE handlers that were installed in the “handlers/” directory.
- c) Return to the “PGE Settings” dialog in the Operator’s Console. You will now see the Clouds and Inversion subsystems. There will be four PGEs listed under Clouds and four PGEs listed under Inversion. Seeing these PGEs listed here means the PGE handlers for SCCR 1067 were installed and have loaded successfully. Note that the subsystems and their associated PGEs are disabled. This is the default mode when PGE handlers are first added to the CATALYST server.

3.2.4 JIRA Ticket CER-231

3.2.4.1 Ticket Description

CER-231: Improved Command Line Management Tools

3.2.4.2 Test Procedures

The command line management tools that CATALYST provides can be run at any time by the CATALYST administrator user (PPE: ‘vobadm’). The manager interface can be started by running the following command on the command line:

```
$CERESHOME/catalyst/bin/catalyst_manager.sh
```

This will bring up a prompt containing a menu that lists the commands that you can type as well as what the command performs. Type “help” or “?” at any time to redisplay the help menu. Type “status” to see which CATALYST processes are running. Typing “exit” when you are done will return you to the shell.

DISCLAIMER: It is suggested that while using the CATALYST manager tool that you not stop CATALYST services during this test. Doing so will not harm the system, but may either slow down testing the tickets following this or cut off components necessary for testing the remaining tickets.

3.2.5 JIRA Tickets CER-151 and CER-229

3.2.5.1 Ticket Description

CER-151: Unexplained memory growth on CATALYST Production Server

CER- 229: Improved CATALYST Component Status in the Operator's Console

3.2.5.2 Test Procedures

Using the CATALYST Operator’s Console, display the Server Status window by selecting “Server Status” under the “CATALYST Server” menu. This will show you which CATALYST services are running and how much memory the services are using. It also allows you to see the log file associated with that service. If you are an administrator for CATALYST (PPE: ‘vobadm’) you will be able to start/stop some of the CATALYST processes. The only CATALYST processes that you can start and stop from here are the following: ange, cluster, logdb, and kernel.

DISCLAIMER: It is suggested that while using the Server Status window in the Operator’s Console that you not stop CATALYST services during this test. Doing so will not harm the system, but may either slow down testing the tickets following this or cut off components necessary for testing the remaining tickets.

Note: Stopping the xmlrpc, user, and master process is not permitted in this dialog because doing so will result in an immediate Operator’s Console disconnect from the CATALYST server. These services can be stopped via the command-line CATALYST manager tool (catalyst_manager.sh) found in the \$CERESHOME/catalyst/bin directory.

Use this dialog window throughout your testing to periodically check CATALYST server memory usage. You should not see the Total Memory increase substantially, i.e., double or triple the original size when all the processes are running. Please contact a member of the CATALYST development team if you think the total memory has increased significantly.

3.2.6 JIRA Ticket CER-228

3.2.6.1 Ticket Description

CER-228: Improved CATALYST Email Notification System

3.2.6.2 Test Procedures

After you have enabled the CATALYST monitor emails (mentioned in both the release notes and the CATALYST Server Operator’s Manual), confirm that you are receiving the emails at the

specified intervals. Confirm that the emails that you are receiving accurately reflect the current state of the CATALYST system. The emails should provide information similar to what is seen in the CATALYST Operator's Console's Server Status window (accessible through the "CATALYST Server" menu).

3.2.7 JIRA Ticket CER-239

3.2.7.1 Ticket Description

CER-239: Add Better Signal Handlers in CATALYST Server

Test Procedures

This test will simulate kill signals sent from the operating system to all running processes when the host is shutdown.

This test involves the CATALYST administrator user (PPE: 'vobadm') completely shutting down the CATALYST server and all of its associated services. While CATALYST is running, go to the command line and identify the CATALYST master process's Process ID (PID). This can be found using the following command:

```
cat $CERESHOME/catalyst/data/catalyst.pid
```

You will see the PID that is associated with the CATALYST master process. Using this PID we will send the TERM signal to the CATALYST master process; this is performed as follows (replaced "<pid>" with the PID you found above):

```
kill -TERM <pid>
```

Once the command has finished, you will want to examine the CATALYST master log file to see that the shutdown was requested and all of the CATALYST components were stopped. You can view the end of the CATALYST master log file using this command:

```
tail -n 15 $CERESHOME/catalyst/logs/master.log
```

You should see output similar to the following screenshot:

```

thillye1@zb27<x86_64-linux> (Thu 2015-09-10 4:39:40pm) {||E=0|SL=1|}
323:[~]> tail -n 15 /SSIT/CERES/CATALYST_Testing/catalyst/logs/master.log
2015/09/10 11:15:13 [INFO]> [tayers] started kernel process
2015/09/10 16:35:19 [INFO]> shutting down master process
2015/09/10 16:35:19 [INFO]> stopping user process
2015/09/10 16:35:19 [INFO]> stopping kernel process
2015/09/10 16:35:19 [INFO]> stopping ange process
2015/09/10 16:35:19 [INFO]> stopping logdb process
2015/09/10 16:35:19 [INFO]> stopping cluster process
2015/09/10 16:35:19 [INFO]> stopping xmlrpc process
2015/09/10 16:35:20 [INFO]> user process has stopped
2015/09/10 16:35:20 [INFO]> kernel process has stopped
2015/09/10 16:35:20 [INFO]> ange process has stopped
2015/09/10 16:35:20 [INFO]> logdb process has stopped
2015/09/10 16:35:20 [INFO]> xmlrpc process has stopped
2015/09/10 16:35:30 [INFO]> cluster process has stopped
2015/09/10 16:35:30 [INFO]> master process has shut down

thillye1@zb27<x86_64-linux> (Thu 2015-09-10 4:39:41pm) {||E=0|SL=1|}
324:[~]> 

```

Figure 3-1. Screenshot of Master Log File after Shutdown

If you happened to have an Operator’s Console running while you issued the kill command above, you will also notice that the Operator’s Console has disconnected from the server. To reconnect restart CATALYST by following the commands in Section 3.1.1 and select “Connect” from the “CATALYST Server” menu to login to the console again. Select “Start Processing” from the “CATALYST Server” menu to ensure that CATALYST can accept PRs when they are submitted.

3.2.8 JIRA Ticket CER-240

3.2.8.1 Ticket Description

CER-240: Add Timestamps and Severity Levels to All CATALYST Log Files

3.2.8.2 Test Procedures

First, confirm that all of the CATALYST server log files can be viewed from the “Server Status” dialog box found in the “CATALYST Server” menu. You should find individual log files for the following processes: ange, cluster, kernel, logdb, master, user, and xmlrpc.

For each line listed in every log file, confirm that each line is prefixed by both a timestamp and a severity level. Severity levels with “ERROR” indicate messages that have been sent to STDERR. Lines that show “INFO” are non-error information printed by the process.

3.3 Submitting Test Production Requests to the Server

Before submitting the test PRs to CATALYST, both the Clouds and Inversion subsystems need to be enabled. This is done using the PGE Settings dialog in the Operator's Console; selecting "PGE Settings" under the "CATALYST Server" menu in the Operator's Console will display this dialog. Select enable for Subsystem Mode and Subsystem Epilog Mode for both subsystems. Remember to apply the changes before moving to the next subsystem. While still in this dialog, you will want to enable the PGE Mode and PGE Epilog Mode for each of the PGEs in these subsystems. Remember to apply changes before moving to the next PGE.

You will now use to PPE PR Tool to submit the test PRs to CATALYST.

You can more easily find the CAT2-Beta2-Ed4 PRs by searching the PR Tool using these two parameters as your filters:

Output Production Strategy: CAT2-Beta2-Ed4
Stream: CAT2-Beta2-Ed4 | SSF

You will find 15 PRs with CAT2-Beta2-Ed4 as the Production Strategy. One of these PRs, 1604-15 for PGE CER4.1-4.1P6, is to be used in a later test in this Test Plan; do not attempt to submit 1604-15 at this time!

Using the PR Tool, submit the following 14 PRs to CATALYST:

1. 1605-15
2. 1618-15
3. 1606-15
4. 1607-15
5. 1609-15
6. 1608-15
7. 1611-15
8. 1610-15
9. 1612-15
10. 1613-15
11. 1614-15
12. 1615-15
13. 1616-15
14. 1617-15

Note: PRs 1605-15 and 1618-15 are for PGE CER4.1-4.1P6. With CATALYST v1.0.x, that PGE required you to run a CopyECS macro action in the Operator's Console which was used to run the Clouds CopyECS script and start the PR processing. With CATALYST v2.0.0 onward this manual action is no longer necessary; the CopyECS script is run automatically when the PR is submitted.

3.4 Post PR Submission JIRA Test Cases

3.4.1 JIRA Tickets CER-119 and CER-128

3.4.1.1 Ticket Description

CER-119: Prevent 2 PRs with the same SS, CC, PS and data date from being submitted

CER-128: Prevent CATALYST from receiving Bad PRs

3.4.1.2 Test Procedures

Using the PPE PR Tool, submit PR 1604-15, which was explicitly omitted from the initial PR submissions above. This PR duplicates what is in 1618-15, meaning 1604-15 is to be rejected by CATALYST. Confirm that the PR Tool reports:

The submission request for the PR was rejected by the CATALYST server

which means CATALYST has not accepted this PR and will perform no further action upon it.

3.4.2 JIRA Ticket CER-44, CER-98

3.4.2.1 Ticket Description

CER-44: CATALYST does not provide capability in current build to start/stop individual PGE handlers.

CER-98: Modify the epilogue configurations (auto, manual, off) to be based on PGE.

3.4.2.2 Test Procedures

In the CATALYST Operator's Console, select "PGE Settings" from the "CATALYST Server" menu. Inside the PGE Settings dialog, disable PGE CER4.1-4.1P6, and click the "Apply Settings" button. The PRs associated with CER4.1-4.1P6 are now disabled, meaning no further activity can be performed on those PRs. Verify that the PR panel shows the PRs for CER4.1-4.1P6 as being "PGE Disabled & User Locked".

After the PRs have been verified disabled, the PGE can now be re-enabled using the "PGE Settings" dialog. The PRs that had been disabled should now be flagged only as "User Locked". Select one of the "User Locked" PRs in the PR Panel and unlock it by either clicking the "Unlock" button near the bottom of the PR panel or by right clicking and selecting "Unlock" from the menu that appears, thereby restoring it to a runnable state. Repeat this process for each "User Locked" PR for that PGE.

3.4.3 JIRA Ticket CER-182

3.4.3.1 Ticket Description

CER-182: CATALYST Processing Steps

3.4.3.2 Test Procedures

In the CATALYST Operator's Console, select "PGE Settings" from the "CATALYST Server" menu. Inside the PGE Settings dialog, disable the epilogs for Clouds PGE CER4.1-4.1P6 and select "Apply Changes". Confirm that no epilogs run for this PGE or any of the others although science processing continues. Note: You will have to wait until the science processing is

completed for a job associated with this PGE (approximately 1.5 hours) to ensure that the epilog does not run and science processing continues. Once this has been verified enable the epilogs for Clouds PGE CER4.1-4.1P6 via the PGE Setting dialog window. Note that epilogs run as expected now.

3.4.4 JIRA Tickets CER-34, CER-35 and CER-106

3.4.4.1 Ticket Description

CER-34: Determine all failed job instances

CER-35: Report all failed job instances to granularity of a given PR

CER-106: Search by date and exit codes

3.4.4.2 Test Procedures

Throughout testing, use the CATALYST Operator's Console's PR job search window to locate jobs in various CATALYST job states "running", "ready_to_launch", "failed_science", etc. and various Science Status codes "SUCCESS", "SUCCESS_WQ", "PGE_ERROR", etc. For more information on searching with this tool, refer to the CATALYST Operator's Console Operator's Manual. Note: No failures are expected for the test PRs so failed states will not be seen unless science or epilog job failures can be "rigged" in the PPE environment.

3.4.5 JIRA Ticket CER-235

3.4.5.1 Ticket Description

CER-235: Progress Bars and Summary for Multiple Job Actions in Operator's Console

3.4.5.2 Test Procedures

Using the Operator's Console, select several jobs that are in the waiting state. Apply the "Pause" action to the jobs you have selected. While the pause action is being applied to those jobs, you will see a progress bar indicating the number of jobs to be paused versus the number of jobs that have been paused. You will be presented with a summary of all the pause actions that were requested, and any errors in pausing that may have occurred.

Remember to resume the jobs that you have paused above. This can be done by selecting the same jobs that you have paused and then applying the "Resume" action to those jobs.

3.4.6 JIRA Ticket CER-225

3.4.6.1 Ticket Description

CER-225: ANGe Ingest Notification System

3.4.6.2 Test Procedures

Confirm that the CATALYST user is receiving ANGe emails to the CATALYST blade on *AMI-P* (zb27.cluster.net) by verifying there are no errors in the CATALYST ange log file. This log file can be viewed by selecting "CATALYST Server" → "Server Status" → "View Log" for the ange process.

3.4.7 JIRA Ticket CER-237

3.4.7.1 Ticket Description

CER-237: Provide Method for Inspecting State of CATALYST Jobs Prior to Activation

3.4.7.2 Test Procedures

This test requires stopping and starting the CATALYST kernel process and can only be performed by the CATALYST administrator user (PPE: 'vobadm'). Use the CATALYST Operator's Console's Server Status window to stop the CATALYST kernel process. The Server Status window is accessible via "Server Status" found under the "CATALYST Server" menu in the Operator's Console. When the process indicates that it has stopped, restart the kernel process.

When the kernel process has started, the kernel is in a read-only mode. This means all jobs viewed in the Operator's Console should remain visible and allow you to see the details for the jobs. You will not be able to perform actions such as job pausing, resuming, rescanning, etc. Once this is confirmed, you will need to execute the "Start Processing" command found under the "CATALYST Server" menu in the Operator's Console. This will allow users to perform actions on CATALYST jobs once again. Note: Stopping the kernel also stops whatever jobs might have been running at the time. Once the "Start Processing" option is selected these jobs will be automatically resubmitted to SGE and processing will begin again.

3.4.8 JIRA Ticket CER-138

3.4.8.1 Ticket Description

CER-138: Organize PRs by Processing Stream in PR Listing in CATALYST

3.4.8.2 Test Procedures

Confirm that each of the test PRs that were submitted to CATALYST at the start of testing are listed in the PR panel of the Operator's Console first under the PR Stream, then by subsystem, then by PGE. The PR Stream name that is displayed here is assigned by the PR Tool. For these test cases, the PR Stream name should appear as "SSF (CAT2-Beta2-Ed4)".

3.4.9 JIRA Ticket CER-47

3.4.9.1 Ticket Description

CER-47: CLONE - Request: Operator's Console Options (maximize display screen and refresh job instances)

3.4.9.2 Test Procedures

At any time when the CATALYST Operator's Console is running, verify the main window for the Console can be resized in the horizontal or vertical, and can be maximized to fill the entire screen.

3.4.10 JIRA Ticket CER-233

3.4.10.1 Ticket Description

CER-233: Operator's Console User Group Privileges Handling

3.4.10.2 Test Procedures

This test will require multiple users. You will need to have one person designated as an **administrator**, one as a **manager**, one as an **operator**, and one additional person with no designation (meaning they have read-only privileges). You can set these designations in the CATALYST Access Control List (ACL) that is described in Section 1.4.6 of the CATALYST Server Operator's Manual. **Remember to run the "Reload ACL" action from the "CATALYST Server" menu in the Operator's Console after you have modified the users file.**

Note: To aid in verifying the user's permissions, you will find that button and menu items will be grayed out, indicating the user does not have sufficient permissions to perform that action.

Have each user log in to the Operator's Console. You should find:

- for the user with *no permissions* the following is true:
 - No buttons and/or menu items that involve changing the state of the server (including PRs and jobs) are allowed.
- for the user with *administrator* permissions, the following is true:
 - All buttons and/or menu items that involve changing the state of the server (including PRs and jobs) are allowed.
- for the user with *manager* permissions, the following is true:
 - All buttons and/or menu items that involve changing the state of PRs and Jobs are allowed.
 - The PGE and Subsystem settings in the "PGE Settings" menu of the Operator's Console are allowed to be modified.
- for the user with *operator* permissions, the following is true:
 - Only buttons that allow adjusting a job's state are allowed in the Operator's Console. This **does not** include changing the state of a PR.

3.4.11 JIRA Ticket CER-232

3.4.11.1 Ticket Description

CER-232: Hover Text Descriptions and Help Built Into the Operator's Console

3.4.11.2 Test Procedures

Confirm that help text appears when hovering the mouse cursor over buttons on the Operator's Console. The text that appears should provide relevant information regarding the item below the cursor.

3.4.12 JIRA Tickets CER-94, CER-100, CER-120, and CER-150

3.4.12.1 Ticket Description

CER-94: CATALYST displayed difficulty detecting job lost/killed via qdel

CER-100: Did not report blades were down with signal from Ganglia.

CER-120: CATALYST shutdown unexpectedly

CER-150: UGE connection loss caused server shutdown

3.4.12.2 Test Procedures

To verify the SGE qdel detection is working properly, identify a CATALYST SGE job on the command line (using the qstat command) and find its SGE job id. Once you have the SGE job id for the CATALYST job, run the following command, replacing “<job_number>” with the SGE job id you have found:

```
qdel <job_number>
```

Back in the Operator’s Console, locate the CATALYST job that you have qdel’d by searching the PRs associated with the PGE that was just gdel’d for the Science Status Code “SGE_QDEL”. You should find one job with this status. It should within a few moments time display its state as “failed_science” and have a science processing status of “SGE_QDEL”, indicating the job has been deleted externally to the CATALYST server. Resubmit this job by selecting it and then selecting the Resubmit Science icon.

To verify the blade list that CATALYST maintains is properly in sync with SGE, compare the blades and the blades availability as listed in the CATALYST Operator’s Console with the blade availability as reported by SGE using the “qstat -f “ command on the command line. Blades that are active (and available to CATALYST) are blades that show an empty entry in the “states” column.

To verify that CATALYST is properly using the blade list when launching SGE jobs, you would first take note of which blades are flagged as disabled in the blade list provided by the Operator’s Console. Using that list of blades, identify a CATALYST SGE job using the “qstat” command. Using that job’s SGE job id, run the following command:

```
qstat -j <job_number>
```

In the row labeled “hard_queue_list”, you will see a list of hosts that CATALYST says this job can run on. You should not find any of the CATALYST disabled hosts in this list. This means SGE will not schedule this job on one of the disabled hosts.

3.4.13 JIRA Ticket CER-51

3.4.13.1 Ticket Description

CER-51: Recommendation for CATALYST running CERES Wrapper (Epilogue) via Grid Engine on ab09 [related to JIRA ticket CER-39]

3.4.13.2 Test Procedures

Verify that epilogue scripts executed correctly when run by CATALYST on the catalyst.larc.nasa.gov host on AMI-P by checking the “Epilog Status” column for completed jobs and confirming that the status is “Success”. Anything other than “Success” appearing in this column indicates an epilog failure.

3.4.14 JIRA Ticket CER-145, CER-230

3.4.14.1 Ticket Description

CER-145: Add support for viewing epilog STD_OUT/STD_ERR from the operator's console

CER-230: Viewing a Job's Logs in the Operator's Console

3.4.14.2 Test Procedures

For any job in CATALYST that has started running, bring up the job details window by double-clicking on the job in the Operator's Console main window. At the bottom of this window, you will find buttons that allow you to see various log files the PGE produces: SGE log, PCF, PCF log, Toolkit logs, and the Epilog log files.

For any job in CATALYST where the epilogue has run, either successfully or unsuccessfully, confirm that the output you would ordinarily see when running the epilogue interactively is captured by the CATALYST server. You can perform this confirmation by selecting "Epilog Log" from the Job Details window. Another window will appear containing the epilogue wrapper's output.

Confirm that PCF and log files can be viewed along with others as listed at the bottom of a Job Details window.

3.4.15 JIRA Ticket CER-132, CER-164

3.4.15.1 Ticket Description

CER-132: Operator's Console GUI froze while attempting to mark PRs for deletion

CER-164: Server side order of operations timing bug for query PR information request

3.4.15.2 Test Procedures

Once you have completed processing all of the test PRs, you will want to delete those PRs. Deleting PRs gives you the opportunity to rerun these test PRs if you so choose. For each PR you choose to delete, this is the process to follow using the Operator's Console:

1. Select (left-click) the PR you want to delete.
2. Lock the PR you have selected. Locking is performed by pressing the lock icon below the PR list panel.
3. Delete the PR you have just locked. The trash can icon near the lock icon deletes the PR.

Confirm that you can have several PRs deleting at one time.

Note: Deletions for Clouds Beta2-Ed4 PGEs can take a very long time, as compared to Inversion Beta2-Ed4 PGEs.

Appendix A

Acronyms and Abbreviations

API	Application Programming Interface
ASDC	Atmospheric Science Data Center
CATALYST	CERES AuTomAteD job Loading sYStem
CERES	Clouds and the Earth's Radiant Energy System
CERESlib	CERES library
DAAC	Distributed Active Archive Center
LDAP	Lightweight Directory Access Protocol
NASA	National Aeronautics and Space Administration
Perl_Lib	CERES's Perl module library
PR	Processing Request
TRMM	Tropical Rainfall Measuring Mission
XML-RPC	Extensible Markup Language – Remote Procedure Call

Appendix B
CATALYST Directory Structure Diagram

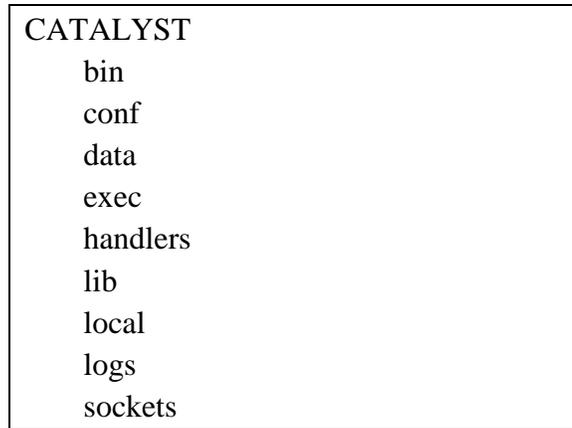


Figure B-1. CATALYST Directory Structure

Appendix C File Description Table

C.1 Executable Scripts

Table C-1. \$CATALYST/bin directory

File Name	Format	Description
catalyst_manager.sh	bash	Text user interface utility for managing CATALYST processes.
send_email.sh	bash	Sends a CATALYST status email to the group.
send_email_if_issue.sh	bash	Sends a CATALYST status email to the group only if there is a problem.
start_catalyst.sh	bash	Start the CATALYST master process.
stop_catalyst.sh	bash	Stops the CATALYST master process and other CATALYST subprocesses.