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EOSDIS Maintenance and Development Project

Training Material for the EMD Project
Volume 7: Resource Planning

Revision 02

July 2006

Raytheon Company
Upper Marlboro, Maryland

Training Material for the EMD Project
Volume 7: Resource Planning

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Preface

This document is a formal contract deliverable. It requires Government review and approval within 45 business days. Changes to this document will be made by document change notice (DCN) or by complete revision.

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Abstract

This is Volume 7 of a series of lessons containing the training material for the Earth Observing System Data and Information System (EOSDIS) Maintenance and Development (EMD) Project. This lesson provides a detailed description of the process required for integrating resource requests into a resource plan for a site, scheduling resources on a daily, weekly and monthly basis and reviewing the process for implementing plans.

***Keywords**:* training, instructional design, course objective, planning, resource planning, Release 7.

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Introduction

Identification

Training Material Volume 7 is part of Contract Data Requirements List (CDRL) Item 23, which is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Maintenance and Development (EMD) Contract (NAS5-03098).

Scope

Training Material Volume 7 describes the procedures by which maintenance and operations personnel prepare resource reservation requests and resource planners prepare resource plans. This lesson is designed to provide the operations staff with sufficient knowledge and information to satisfy all lesson objectives.

Purpose

The purpose of this Student Guide is to provide a detailed course of instruction that forms the basis for understanding resource planning. Lesson objectives are developed and will be used to guide the flow of instruction for this lesson. The lesson objectives will serve as the basis for verifying that all lesson topics are contained within this Student Guide and slide presentation material.

Status and Schedule

This lesson module provides detailed information about training for the current baseline of the system. Revisions are submitted as needed.

Organization

This document is organized as follows:

Introduction:	The Introduction presents the document identification, scope, purpose, and organization.
Related Documentation:	Related Documentation identifies parent, applicable and information documents associated with this document.
Student Guide:	The Student Guide identifies the core elements of this lesson. All Lesson Objectives and associated topics are included.
Slide Presentation:	Slide Presentation is reserved for all slides used by the instructor during the presentation of this lesson.

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Related Documentation

Parent Documents

The parent documents are the documents from which the EMD Training Material's scope and content are derived.

423-41-01	Goddard Space Flight Center, EOSDIS Core System (ECS) Statement of Work
423-46-03	EMD Task 101 Statement of Work For ECS SDPS Maintenance
423-46-02	Contract Data Requirements Document for EMD Task 101 ECS SDPS Maintenance

Applicable Documents

The following documents are referenced within this EMD Training Material, or are directly applicable, or contain policies or other directive matters that are binding upon the content of this document:

420-05-03	Goddard Space Flight Center, Earth Observing System (EOS) Performance Assurance Requirements for the EOSDIS Core System (ECS)
423-41-02	Goddard Space Flight Center, Functional and Performance Requirements Specification for the Earth Observing System Data and Information System (EOSDIS) Core System (ECS) (ECS F&PRS)
423-46-01	Goddard Space Flight Center, Functional and Performance Requirements Specification for the Earth Observing System Data and Information System (EOSDIS) Core System (ECS) Science Data Processing System (EMD F&PRS)

Information Documents

Information Documents Referenced

The following documents are referenced herein and amplify or clarify the information presented in this document. These documents are not binding on the content of the EMD Training Material.

609-EMD-001	Release 7.11 Operations Tools Manual for the EMD Project
611-EMD-001	Release 7.11 Mission Operation Procedures for the EMD Project
910-TDA-022	Custom Code Configuration Parameters for ECS

Information Documents Not Referenced

The following documents, although not referenced herein and/or not directly applicable, do amplify or clarify the information presented in this document. These documents are not binding on the content of the EMD Training Material.

305-EMD-001	Release 7.11 Segment/Design Specification for the EMD Project
311-EMD-001	Release 7.11 Data Management Subsystem (DMS) Database Design and Database Schema Specifications for the EMD Project
311-EMD-002	Release 7.11 INGEST (INS) Database Design and Schema Specifications for the EMD Project
311-EMD-003	Release 7.11 Planning and Data Processing Subsystem Database Design and Schema Specifications for the EMD Project
311-EMD-004	Release 7.11 Science Data Server Database Design and Schema Specifications for the EMD Project
311-EMD-005	Release 7.11 Storage Management and Data Distribution Subsystems Database Design and Database Schema Specifications for the EMD Project
311-EMD-006	Release 7.11 Subscription Server Database Design and Schema Specifications for the EMD Project
311-EMD-007	Release 7.11 Systems Management Subsystem Database Design and Schema Specifications for the EMD Project
311-EMD-008	Release 7.11 Registry Database Design and Schema Specifications for the EMD Project
311-EMD-009	Release 7.11 Product Distribution Subsystem (PDS) Database Design and Database Schema Specifications for the EMD Project
311-EMD-010	Release 7.11 NameServer Database Design and Schema Specifications for the EMD Project
311-EMD-011	Release 7.11 Order Manager Database Design and Database Schema Specifications for the EMD Project
311-EMD-012	Release 7.11 Spatial Subscription Server (SSS) Database Design and Schema Specifications for the EMD Project
311-EMD-013	Release 7.11 Data Pool Database Design and Schema Specifications for the EMD Project
313-EMD-001	Release 7.11 Internal Interface Control Document for the EMD Project
508-EMD-001	ACRONYMS for the EOSDIS Maintenance and Development (EMD) Project
152-TP-003	Glossary of Terms for the EOSDIS Core System (ECS) Project

Resource Planning Overview

Lesson Overview

This lesson will provide you with the complete process by which system personnel prepare resource reservation requests and resource planners prepare resource plans. The processes described in the lesson apply to resource planners and other maintenance and operations personnel who manage hardware resources for data processing. The procedures involved in resource planning include such tasks as preparing, validating, approving, and committing resource reservation requests, reviewing resource timelines, and defining resources.

Lesson Objectives

Overall Objective - The overall objective of the Resource Planning lesson is for maintenance and operations personnel to develop proficiency in the procedures that apply to resource planning operations for the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS).

Condition - The student will be given oral or written information and requirements for performing resource planning activities, access to the Planning Subsystem, a copy of 609-EMD-001, *Release 7.11 Operations Tools Manual for the EMD Project*, and a copy of 611-EMD-001, *Release 7.11 Mission Operation Procedures for the EMD Project*.

Standard - The student will perform resource planning activities in accordance with the prescribed procedures without error.

Specific Objective 1 - The student will describe the general steps in the resource planning process.

Condition - The student will be given written or oral questions concerning the general steps in the resource planning process.

Standard - The student will state without error the general steps involved in the resource planning process, including the definition of resources and scheduling of resource reservations.

Specific Objective 2 - The student will perform the steps involved in logging in to system hosts.

Condition - The student will be given a statement of the requirements for logging in to system hosts, access to the Planning Subsystem (through a workstation or X terminal), a copy of 609-EMD-001, *Release 7.11 Operations Tools Manual for the EMD Project*, and a copy of 611-EMD-001, *Release 7.11 Mission Operation Procedures for the EMD Project*.

Standard - In accordance with the lesson content, the applicable procedure, and the statement of requirements the student will access the command shell, set the DISPLAY environmental variable, and log in to the specified host using secure shell and the specified user ID.

Specific Objective 3 - The student will perform the steps involved in launching resource planning graphical user interfaces (GUIs) and other essential resource planning applications.

Condition - The student will be given a statement of the requirements for launching resource planning applications, access to the Planning Subsystem (through a workstation or X terminal), a copy of 609-EMD-001, *Release 7.11 Operations Tools Manual for the EMD Project*, and a copy of 611-EMD-001, *Release 7.11 Mission Operation Procedures for the EMD Project*.

Standard - In accordance with the lesson content, the applicable procedure, and the statement of requirements the student will log in to the appropriate host using secure shell and start the Message Handler, Resource Model, System Name Server, Resource Editor, and Resource Scheduler in the specified mode.

Specific Objective 4 - The student will perform the steps involved in shutting down resource planning applications.

Condition - The student will be given a statement of the requirements for shutting down resource planning applications, access to the Planning Subsystem (through a workstation or X terminal), a copy of 609-EMD-001, *Release 7.11 Operations Tools Manual for the EMD Project*, and a copy of 611-EMD-001, *Release 7.11 Mission Operation Procedures for the EMD Project*.

Standard - In accordance with the lesson content, the applicable procedure, and the statement of requirements the student will shut down the Resource Scheduler, Resource Editor, Message Handler, Resource Model, and System Name Server.

Specific Objective 5 - The student will perform the steps involved in determining the actual processing resources to be added to the resource planning list.

Condition - The student will be given a statement of the requirements for determining the actual processing resources to be added to the resource planning list, access to the Planning Subsystem (through a workstation or X terminal), a copy of 609-EMD-001, *Release 7.11 Operations Tools Manual for the EMD Project*, and a copy of 611-EMD-001, *Release 7.11 Mission Operation Procedures for the EMD Project*.

Standard - In accordance with the lesson content, the applicable procedure, and the statement of requirements the student will identify disk name and size, number of processors, amount of random-access memory, operating system, and applicable AutoSys instance.

Specific Objective 6 - The student will perform the steps involved in adding resources to the resource planning list.

Condition - The student will be given a statement of the requirements for adding resources to the resource planning list, access to the previously launched Resource Editor in the Planning Subsystem (through a workstation or X terminal), a copy of 609-EMD-001, *Release 7.11 Operations Tools Manual for the EMD Project*, and a copy of 611-EMD-001, *Release 7.11 Mission Operation Procedures for the EMD Project*.

Standard - In accordance with the lesson content, the applicable procedure, and the statement of requirements the student will access the Resource Editor, access the appropriate detail GUI(s) for

the type(s) of resource(s) to be added, define the type(s) of resource(s) to be added, and save the added resource(s) in the resource planning list.

Specific Objective 7 - The student will perform the steps involved in modifying resources on the resource planning list.

Condition - The student will be given a statement of the requirements for modifying resources on the resource planning list, access to the previously launched Resource Editor in the Planning Subsystem (through a workstation or X terminal), a copy of 609-EMD-001, *Release 7.11 Operations Tools Manual for the EMD Project*, and a copy of 611-EMD-001, *Release 7.11 Mission Operation Procedures for the EMD Project*.

Standard - In accordance with the lesson content, the applicable procedure, and the statement of requirements the student will access the Resource Editor, access the appropriate detail GUI(s) for the type(s) of resource(s) to be added, modify the definition of the resource(s), and save the added resource(s) in the resource planning list.

Specific Objective 8 - The student will perform the steps involved in deleting resources from the resource planning list.

Condition - The student will be given a statement of the requirements for deleting resources from the resource planning list, access to the previously launched Resource Editor in the Planning Subsystem (through a workstation or X terminal), a copy of 609-EMD-001, *Release 7.11 Operations Tools Manual for the EMD Project*, and a copy of 611-EMD-001, *Release 7.11 Mission Operation Procedures for the EMD Project*.

Standard - In accordance with the lesson content, the applicable procedure, and the statement of requirements the student will perform without error the steps involved in deleting resources from the resource planning list in accordance with the applicable procedure, including accessing the Resource Editor, highlighting the resource(s) to be deleted, and deleting the resource(s).

Specific Objective 9 - The student will perform the steps involved in creating a resource reservation request.

Condition - The student will be given a statement of the requirements for creating a resource reservation request, access to the previously launched Resource Scheduler in the Planning Subsystem (through a workstation or X terminal), a copy of 609-EMD-001, *Release 7.11 Operations Tools Manual for the EMD Project*, and a copy of 611-EMD-001, *Release 7.11 Mission Operation Procedures for the EMD Project*.

Standard - In accordance with the lesson content, the applicable procedure, and the statement of requirements the student will access the Resource Scheduler, prepare a resource reservation request, and save the resource reservation request.

Specific Objective 10 - The student will perform the steps involved in editing/modifying a resource reservation request.

Condition - The student will be given a statement of the requirements for editing/modifying a resource reservation request, access to the previously launched Resource Scheduler in the

Planning Subsystem (through a workstation or X terminal), a copy of 609-EMD-001, *Release 7.11 Operations Tools Manual for the EMD Project*, and a copy of 611-EMD-001, *Release 7.11 Mission Operation Procedures for the EMD Project*.

Standard - In accordance with the lesson content, the applicable procedure, and the statement of requirements the student will access the Resource Scheduler, select the resource reservation request to be modified, make resource reservation request modifications, and save the modified resource reservation request.

Specific Objective 11 - The student will perform the steps involved in validating or rejecting a resource reservation request.

Condition - The student will be given a statement of the requirements for validating or rejecting a resource reservation request, access to the previously launched Resource Scheduler in the Planning Subsystem (through a workstation or X terminal), a copy of 609-EMD-001, *Release 7.11 Operations Tools Manual for the EMD Project*, and a copy of 611-EMD-001, *Release 7.11 Mission Operation Procedures for the EMD Project*.

Standard - In accordance with the lesson content, the applicable procedure, and the statement of requirements the student will access the Resource Scheduler, access the specified resource reservation request, evaluate the entries in the resource reservation request fields, validate or reject the resource reservation request, and save the modified resource reservation request.

Specific Objective 12 - The student will perform the steps involved in approving resource reservation requests.

Condition - The student will be given a statement of the requirements for approving resource reservation requests, access to the previously launched Resource Scheduler in the Planning Subsystem (through a workstation or X terminal), a copy of 609-EMD-001, *Release 7.11 Operations Tools Manual for the EMD Project*, and a copy of 611-EMD-001, *Release 7.11 Mission Operation Procedures for the EMD Project*.

Standard - In accordance with the lesson content, the applicable procedure, and the statement of requirements the student will access the Resource Scheduler, access the specified resource reservation request, approve the resource reservation request, and save the modified resource reservation request.

Specific Objective 13 - The student will perform the steps involved in committing resource reservation requests.

Condition - The student will be given a statement of the requirements for committing resource reservation requests, access to the previously launched Resource Scheduler in the Planning Subsystem (through a workstation or X terminal), a copy of 609-EMD-001, *Release 7.11 Operations Tools Manual for the EMD Project*, and a copy of 611-EMD-001, *Release 7.11 Mission Operation Procedures for the EMD Project*.

Standard - In accordance with the lesson content, the applicable procedure, and the statement of requirements the student will access the Resource Scheduler, access the resource reservation requests, and commit the resource reservation requests.

Specific Objective 14 - The student will perform the steps involved in deleting a resource reservation request.

Condition - The student will be given a statement of the requirements for deleting a resource reservation request, access to the previously launched Resource Scheduler in the Planning Subsystem (through a workstation or X terminal), a copy of 609-EMD-001, *Release 7.11 Operations Tools Manual for the EMD Project*, and a copy of 611-EMD-001, *Release 7.11 Mission Operation Procedures for the EMD Project*.

Standard - In accordance with the lesson content, the applicable procedure, and the statement of requirements the student will access the Resource Scheduler, access the specified resource reservation request, and delete the resource reservation request.

Specific Objective 15 - The student will perform the steps involved in reviewing a resource timeline.

Condition - The student will be given a statement of the requirements for reviewing a resource timeline, access to the previously launched Resource Scheduler in the Planning Subsystem (through a workstation or X terminal), a copy of 609-EMD-001, *Release 7.11 Operations Tools Manual for the EMD Project*, and a copy of 611-EMD-001, *Release 7.11 Mission Operation Procedures for the EMD Project*.

Standard - In accordance with the lesson content, the applicable procedure, and the statement of requirements the student will access the Resource Scheduler, access the Resource Reservation Planning Master Timeline GUI, adjust the resource timeline display as necessary to view the resource reservation requests, review the resource timeline, and respond to questions concerning the resource timeline.

Specific Objective 16 - The student will perform the steps involved in troubleshooting resource-planning problems.

Condition - The student will be given a statement of resource planning trouble symptoms, access to the Planning Subsystem (through a workstation or X terminal), a copy of 609-EMD-001, *Release 7.11 Operations Tools Manual for the EMD Project*, and a copy of 611-EMD-001, *Release 7.11 Mission Operation Procedures for the EMD Project*.

Standard - In accordance with the lesson content, the applicable procedure, and the statement of requirements the student will review the trouble symptoms, check Resource Planning log files (as necessary), take appropriate action to correct the problem(s), and respond to questions concerning the possible cause(s) of the trouble symptoms.

Importance

This lesson applies to students who will be resource planners or who will manage hardware resources for data processing. The lesson will provide them with the knowledge and skills needed when performing their assigned tasks. Among those tasks are the following activities:

- Defining processing resources.
- Preparing resource reservation requests.
- Validating resource reservation requests.
- Approving resource reservation requests.
- Committing resource reservation requests.
- Reviewing resource timelines.
- Troubleshooting resource planning problems.

The lesson describes why and how the activities are performed. Consequently, the students will become aware of what tasks they will be performing on the job and how to accomplish those tasks.

Resource Planning Concepts

System Context

The resource planning process is accomplished at the Distributed Active Archive Centers (DAACs). The people involved in resource planning activities are the Resource Planner, Resource Manager, and personnel requesting the use of DAAC production resources for non-production-related purposes.

- The Resource Planner defines resources in the Planning and Data Processing Subsystems' (PDPS) database and develops proposed resource plans based on resource reservation requests for non-production-related activities.
- The Resource Manager puts a resource plan into effect.
- Personnel who have a need for Planning Subsystem or Data Processing Subsystem resources submit requests for time on specified resources to accomplish the non-routine activities that they plan to undertake.

The Context Diagram (Figure 1) shows the relationships among the Planning Subsystem, Data Processing Subsystem, Data Server Subsystem, and the other subsystems within the Science Data Processing component of the system. Of course, the context diagram shows a generalized (high-level) view of the system. The Planning Subsystem Architecture diagram (Figure 2) focuses on the resource and production planning processes and their relationships with each other and with other subsystems.

The Planning Subsystem (Figure 2) provides a mechanism for accomplishing the following general functions:

- Defining DAAC production resources.
- Scheduling production resources for non-production-related activities.
- Defining data processing jobs to be performed at the DAAC.
- Generating efficient plans for scheduling defined data processing jobs.
- Coordinating production with the Data Server Subsystem and Data Processing Subsystem to achieve a highly automated production system.

The Data Processing Subsystem PRONG computer software configuration item (CSCI) shown in Figure 3 is involved in the following general functions:

- Managing the allocation of data processing jobs to the site's data processing resources.
- Managing, queuing, and executing data processing jobs to produce data products.
- Supporting preliminary processing of ancillary data sets.

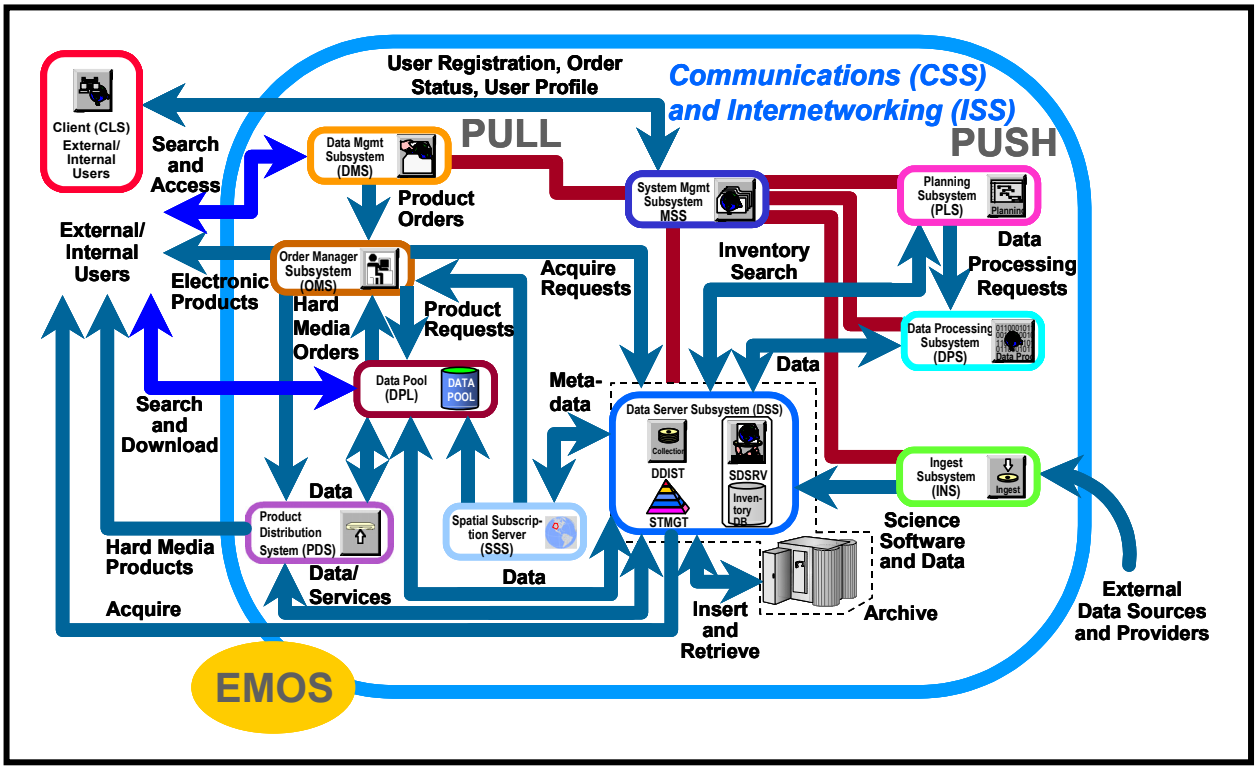

Figure 1. Context Diagram

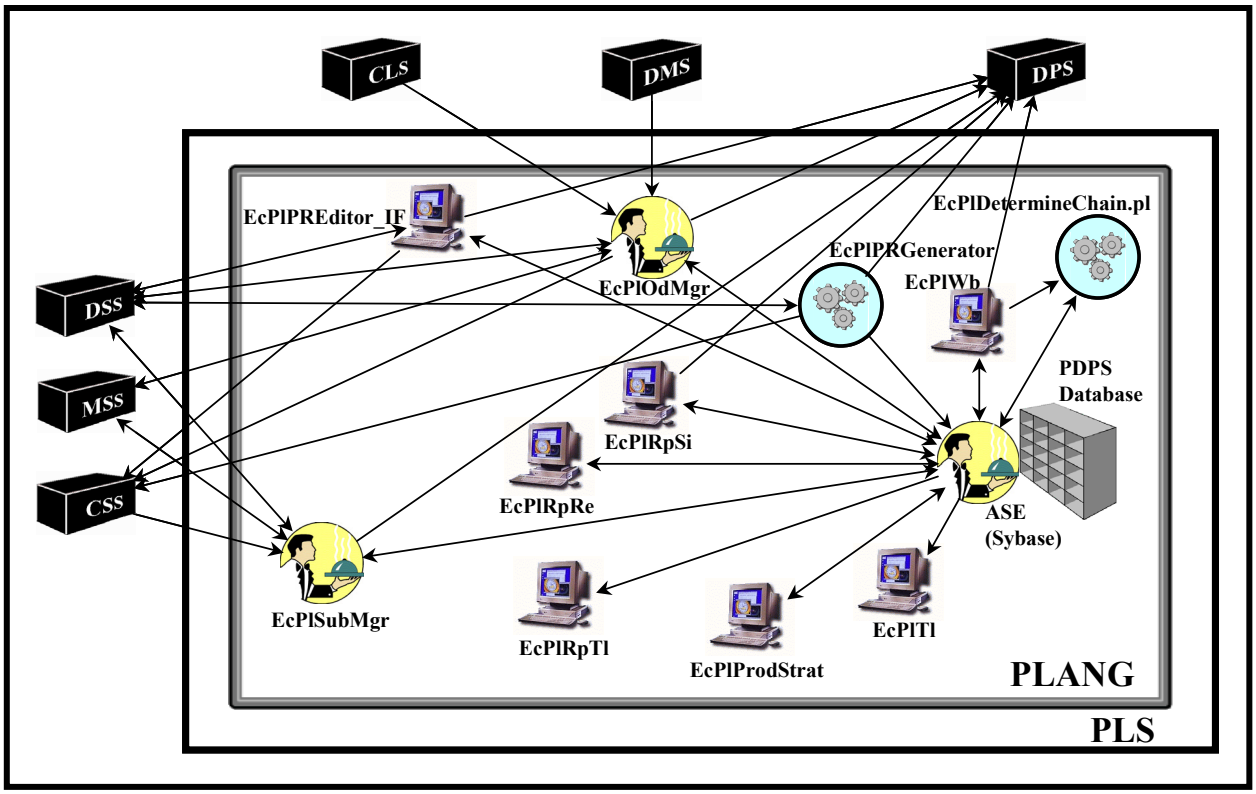

Figure 2. Planning Subsystem (PLANG CSCI) Architecture

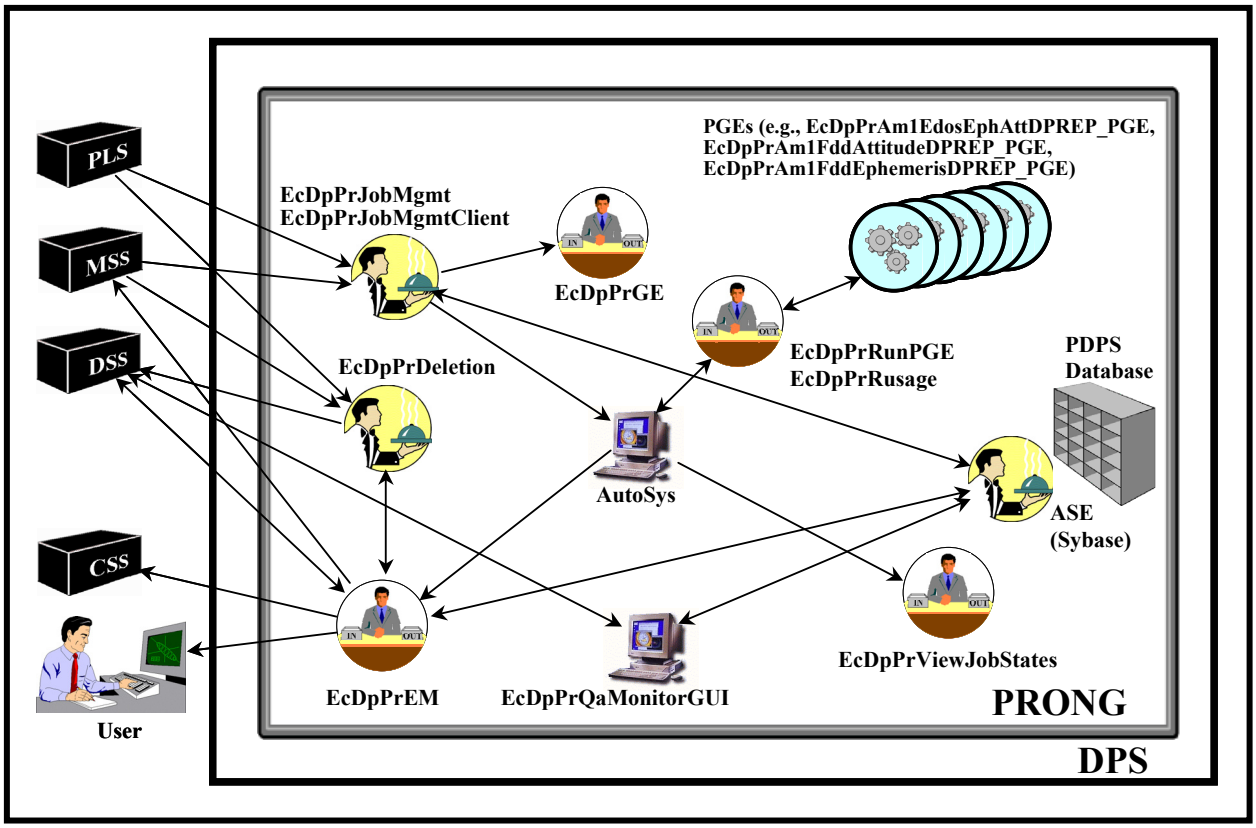

Figure 3. Data Processing Subsystem (PRONG CSCI) Architecture

Planning Subsystem

The Planning Subsystem (Figure 2) is the Science Data Processing subsystem that is used when defining resources and developing resource plans. DAAC personnel have access to the resource planning functions of the Planning Subsystem primarily through the Resource Scheduler and the Resource Editor GUIs, which are components of the Resource Planning Workbench in the Planning Subsystem.

The Planning Subsystem is composed of just one computer software configuration item (CSCI); i.e., PLANG. (The designation "PLANG" is derived from PLANNING.) The subsystem has the following major components as shown in Figure 2:

- Resource Planning Workbench.
  - Resource Editor (EcPlRpRe) - Graphical user interface (GUI) for defining/editing the resources at the site.
  - Resource Scheduler (EcPlRpSi) - GUI for creating/approving/committing resource reservations for non-production-related events and preparing a site resource schedule.
  - Resource Reservation Planning Master Timeline GUI (EcPlRpTl) - Graphical interface for displaying the resource schedule.

- Production Request Editor (EcPlPREditor).
  - GUI for submitting production requests that describe the data products to be produced; uses product generation executive (PGE) descriptions to generate the data processing requests (DPRs) necessary to fulfill the production requests.
- Production Planning Workbench.
  - Planning Workbench GUI (EcPlWb) - GUI for preparing and activating a site production schedule.
  - Production Strategies GUI (EcPlProdStrat) - GUI for defining production strategies (assign priorities for DPRs based on such characteristics as the type of production request, who is requesting processing, and the type of PGE to be run).
  - Planning Master Timeline GUI (EcPlTl) - Graphical interface for displaying production schedules, including resource reservations.
- On-Demand Manager (EcPlOdMgr).
  - Also known as the On-Demand Product Request Manager or ODPRM.
  - Server that receives on-demand product requests [from the EOS Data Gateway (EDG) web client via the V0 Gateway] from users.
  - Generates Production Requests needed to fill on-demand product requests and submits the PRs to the Data Processing Subsystem for processing.
- On-Demand Manager Client (EcPlOdMgrClient).
  - A utility program that manually provides some client functionality for EcPlOdMgr.
- Subscription Manager (EcPlSubMgr).
  - Server that manages receipt of subscription notifications (e.g., availability of input data needed for DPRs).
- Sybase Adaptive Server Enterprise (ASE) Server.
  - Commercial off-the-shelf (COTS) software application that handles interfaces with the Planning and Data Processing Subsystems' (PDPS) shared database for planning and processing activities.
  - Performs the functions of a Structured Query Language (SQL) server for the PDPS database.

In addition to the preceding major components the Planning Subsystem includes the following components associated with both the resource planning applications and the production planning workbench:

- Message Handler (EcPlMsh).
  - GUI that displays various types of messages including warning messages and information messages.
- System Name Server (EcPlSns).
  - Handles interprocess communication.
- Resource Model (EcPlRpRm, EcPlRm).
  - Underlying resource data coordinators for the planning software.

The Message Handler, System Name Server, and Resource Model are associated with both the resource planning workbench and the production planning workbench applications.

Planning/production personnel use the following start-up and shutdown scripts (which are available in the /usr/ecs/*MODE*/CUSTOM/utilities directory on the Planning/Management Workstation) to either start or shut down many of the preceding applications:

- EcPlSomeStart.
  - Launches the System Name Server, Message Handler, and Resource Model needed by the Planning Workbench GUI.
  - Does not launch the Planning Workbench GUI.
- EcPlAllStart.
  - Launches the Planning Workbench and Planning Master Timeline as well as the Message Handler, System Name Server, and Resource Model.
- EcPlPRE_IFStart.
  - Launches the Production Request Editor.
- EcPlPRE_ReadOnlyStart.
  - Launches a read-only instance of the Production Request Editor.
- EcPlPRGeneratorStart.
  - Launches the Production Request Generator (command-line interface for creating production requests).
- EcPlProdStratStart.
  - Launches the Production Strategies GUI.

- EcPlRpAllStart.
  - Launches the Message Handler, System Name Server, and Resource Planning Resource Model needed by the Resource Editor and Resource Scheduler GUIs.
- EcPlRpReStart.
  - Launches the Resource Editor after the Message Handler, System Name Server, and Resource Planning Resource Model have been started (using EcPlRpAllStart).
- EcPlRpSiStart.
  - Launches the Resource Scheduler after the Message Handler, System Name Server, and Resource Planning Resource Model have been started (using EcPlRpAllStart).
- EcPlSubsEditStart.
  - Starts the Subscription Editor.
- EcPlTlStart.
  - Launches the Production Planning Master Timeline (assuming that the Message Handler, System Name Server, and Resource Model have been started).
- EcPlWbStart.
  - Launches the Planning Workbench if the Message Handler, System Name Server, and Resource Model have already been started.
- EcPlSlay.
  - Shuts down a Planning Subsystem executable that must be specified by name and application ID (message-service ID).
- EcPlSlayAll.
  - Shuts down the Planning Master Timeline, Message Handler, System Name Server, and Resource Model (and the Planning Workbench if it has not already been shut down).
- EcPlRpSlayAll.
  - Shuts down the Resource Planning Master Timeline, Message Handler, System Name Server, and Resource Model (and the Resource Scheduler and Resource Editor GUIs if they have not already been shut down).

The following start-up scripts are in the /usr/ecs/*MODE*/CUSTOM/utilities directory on the Queuing Server:

- EcPlOdMgrClientStart.
  - Starts the EcPlOdMgrClient.
- EcPlOdMgrStart.
  - Starts the PLS server EcPlOdMgr.
- EcPlPlanningAppStart.
  - Starts Planning Subsystem server group (i.e., Subscription Manager, On-Demand Manager).
- EcPlStart.
  - Starts Planning Subsystem server (i.e., Subscription Manager).
- EcPlSubMgrStart.
  - Starts the Subscription Manager.

The following start-up scripts in the /usr/ecs/*MODE*/CUSTOM/utilities directory on the Planning/Management Workstation are typically called by other applications and are not normally invoked directly by planning/production personnel:

- EcPlMshStart.
  - Starts the Message Handler individually.
- EcPlRmStart.
  - Starts the Resource Model individually.
- EcPlRpRmStart.
  - Starts the Resource Model individually.
- EcPlSnsStart.
  - Starts the System Name Server individually.
- EcPlStart.
  - Starts Planning Subsystem server (i.e., Subscription Manager).
- SweeperStart.
  - Starts the sweeper; called by EcCsIdPingServers.

In addition to the preceding start-up scripts the following scripts are available in the /usr/ecs/*MODE*/CUSTOM/utilities directory:

- EcLgLogCtrlStart.
  - Not applicable to log files for any Planning Subsystem or Data Processing Subsystem server. [Script for setting the Debug Log or ALOG Level to any value between 0 and 3 "on the fly" (without having to re-start the applicable server).]
- EcPlCdsPingServers.
  - Not currently functional due to the implementation of sockets and the retirement of the Distributed Computing Environment (DCE). [Uses DCE Cell Directory Service (CDS)].
- EcPlDbClean.
  - Cleans up some PDPS database tables by deleting records that meet specified criteria. [Calls a stored procedure]
- EcPlDbCleanArchive.
  - Cleans Earth Science Data and Information System (ESDIS) Data Gathering and Reporting System (EDGRS) archive tables of granules older than seven days. [Calls a stored procedure]
  - Intended to be run on a daily basis.
- EcPlDbBuild.
  - Supports installation of the PDPS database. Creates new database schema (builds tables and other database objects for the current release). Drops any previously existing objects, including any data in the tables. (The script automatically invokes additional scripts; such as EcPlDbDrop.) Designed to be run from ECS Assistant. The user must be Database Operator (DBO) with sso_role (Site Security Officer).
- EcPlDbDrop.
  - Drops all tables and related objects in the database. Designed to be run from ECS Assistant. Parameters are the same as for EcPlDbBuild. The user must be DBO.
  - EcPlDbDrop is called automatically by EcPlDbBuild. Due to complaints from some sites that obsolete tables were still present in their databases, EcPlDbDrop automatically drops all obsolete tables that still exist.

- EcPlDbDump.
  - Dumps the transaction log, the database, and the master database to a flat file that can be used for database recovery. Designed to be run from ECS Assistant. Creates files in the directory /usr/ecs/{MODE}/COTS/sybase/sybase_dumps with filenames pdps_tran_dmp.<timestamp>, pdps_dmp.<timestamp>, and master_dmp.<timestamp> respectively. Parameters are the same as for EcPlDbBuild. The user must be a System Administrator (SA) or at least DBO with OPER role.
- EcPlDbMigrate.
  - Migrates data from one version of the PDPS database to another.
- EcPlDbPatch.
  - Used in upgrading an existing PDPS database schema to the next valid database version level. Patches any modified or new database structures to the database without having to re-install the entire database. Allows for existing data to be maintained. Invoked through ECS Assistant.
  - Changes only those objects that have been modified since the last release, preserving existing data in the tables. Parameters are the same as for EcPlDbBuild. The user must be DBO.
- EcPlRpFetchBaseline.
  - [not used].
- EcPlDbReset.
  - Clears the data in the database tables and loads the values in the specified "saved database" file.
- EcPlDbList.
  - Provides a listing of saved databases.
- EcPlDbSave.
  - Saves the current database.
- fos_services.
  - Script used by the Sweeper executable (not normally invoked directly by planning/production personnel).

The following Planning Subsystem script is available in the /usr/ecs/*MODE*/CUSTOM/bin/PLS directory on the Planning/Management Workstation:

- EcPlDetermineChain.pl.
  - Called by the Planning Workbench GUI when a plan is activated.
  - The chainFlag values (in the PDPS database PlProductionRequest and PlDataProcessingRequest tables) for previously unflagged chain heads are set and a chainId (PlDataProcessingRequest table) is assigned to each DPR.

The following Communications Subsystem scripts (among others) are available in the /usr/ecs/*MODE*/CUSTOM/utilities directory on the Planning/Management Workstation:

- EcCsIdPingServers.
  - Pings servers using Hubble Space Telescope (HST) sockets middleware.
  - Replacement for EcPlCdsPingServers, which does not work due to the implementation of sockets and the retirement of DCE.
- EcCsPerfLogProcessor.pl
  - Extracts performance information from log files.

The following Client Subsystem application is available in the /usr/ecs/*MODE*/CUSTOM/eosview directory on the Planning/Management Workstation:

- EOSView.
  - EOSView is an HDF-EOS viewer for visualizing science data. EOSView can take any HDF-EOS data file and perform visualization functions; however, it does not provide sophisticated data analysis functions.

Data Processing Subsystem

The Data Processing Subsystem is the Science Data Processing subsystem that the Production Monitor uses when monitoring data processing. The Production Monitor has access to the Data Processing Subsystem primarily through AutoSys and the Quality Assurance Monitor (QA Monitor). AutoSys is used for monitoring the processing of DPRs. The QA Monitor is used primarily for updating QA metadata flags.

The Data Processing Subsystem is composed of the following three computer software configuration items (CSCIs):

- PRONG (derived from **PRO**CESSI**NG**).
  - Provides the services required to manage and monitor the Science Data Processing environment, which executes Science Software items (PGEs) and produces data products.

- Algorithm Integration & Test Tools (AITTL).
  - Set of tools used for test and integration of new science software, new versions of science software, and user methods into the Science Data Processing operational environment.
- Science Data Processing (SDP) Toolkit.
  - Provides a set of software libraries, which are used to integrate Science Software into the system environment.

The PRONG CSCI is the focus of this section. PRONG (shown in Figure 3) has the following major components:

- Job Management (EcDpPrJobMgmt).
  - Uses the AutoSys COTS product to create and initiate execution of PRONG administrative jobs for managing science processor hardware assets and for PGE execution.
  - Responsible for efficient AutoSys management so the maximum number of jobs possible can be continuously run using the product. (Controls the flow of jobs through AutoSys by only allowing jobs ready to run into the product and by removing jobs as they complete.)
  - Creates and starts execution of Ground Event jobs in AutoSys.
- Ground Event process (EcDpPrGE).
  - Initiated by the Job Management Server when the server gets a ground event request.
  - The ground event process starts at a specified time and runs a specified duration.
  - During the time the ground event process runs, it sets a computer resource [central processing unit (CPU), random-access memory (RAM), etc.] off-line and the computer resource is not available for running PGEs.
- Job Management Client (EcDpPrJobMgmtClient).
  - Used by programs that need access to the Job Management Server services to modify jobs in AutoSys.
    - Can be used to create, cancel, release, or change the priority of jobs (among other functions).
  - Used as a tool for testing the operation of the Job Management Server.

- AutoSys.
  - Event Processor (AutoSys daemon).
    - COTS job scheduling software application used to accomplish the execution of jobs that support PGE execution in an automated fashion.
  - Event Server.
    - Sybase database server for the AutoSys database.
  - AutoSys GUIs.
    - Allow human intervention in the AutoSys job stream.
    - Provide various mechanisms for monitoring and altering the job stream.
  - AutoSys Job Management GUIs.
    - Provide graphical depictions of scheduled jobs, completed jobs, and jobs being processed.
    - Provide graphical depictions of the status of hosts in the Planning Subsystem and Data Processing Subsystem.
    - Allow human intervention in the AutoSys job stream.
    - Provide various mechanisms for monitoring and altering the job stream.
- Execution Management (EcDpPrEM).
  - Initiates PGE execution (via AutoSys).
  - Supports the preparation activities prior to the execution of each PGE and activities subsequent to the execution of each PGE.
  - Provides status on On-Demand Processing Requests and sends e-mail to the originator in the event of a failure.
  - The Data Management library portion of EcDpPrEM (DpPrDM) manages the flow of science data to and from science processing resources including communication mechanisms to interface with the EcDsScienceDataServer.
    - Data Management manages data retention on science processing resources to support PGE executions.
- PGE Execution Manager (EcDpPrRunPGE).
  - Controls and monitors the execution of a PGE, including the creation of a Process Control File (PCF) and the growth of the output products.

  - Provides a buffer between AutoSys and the PGE. It serves as a wrapper to the PGE process, initiates the PGE execution and captures the PGE's exit status.
  - Monitors the PGE's computer resources. If the PGE's computer resources exceed its expected usage an alarm is sent to AutoSys.
- Resource Usage (EcDpPrRusage).
  - Measures the actual resources used by a PGE.
  - Reports unexpected resource usage to AutoSys.
- View Job States (EcDpPrViewJobStates).
  - Called by the EcDpPrDisplayJobStates script to generate reports that show which jobs have completed, the jobs that are executing, and the jobs awaiting execution.
- Data Preprocessing (DPREP).
  - Set of PGEs that use a statistical approach to convert Level 0 (L0) attitude and ephemeris ancillary data for a particular satellite (e.g., Terra, Aqua, or Aura) into SDP Toolkit native binary format without altering or modifying the scientific content of the granules.
  - Terra DPREP consists of the following PGEs:
    - EcDpPrAm1EdosEphAttDPREP_PGE.
    - EcDpPrAm1FddAttitudeDPREP_PGE.
    - EcDpPrAm1FddEphemerisDPREP_PGE.
    - EcDpPrDumpAttitudeDPREP.
    - EcDpPrDumpEphemerisDPREP.
  - Aqua DPREP consists of the following PGEs:
    - EcDpPrPm1FddEphemerisDPREP_PGE.
    - EcDpPrPm1AttitudeDPREP_PGE.
  - Aura DPREP consists of the following PGEs:
    - EcDpPrAuraEphemerisDPREP_PGE.
    - EcDpPrAuraAttitudeDPREP_PGE.
- Deletion Server (EcDpPrDeletion).
  - Notifies Science Data Server to remove interim granules via the execution management process once they are no longer needed.

  - Interim product is removed after the last PGE in the chain has used the interim product or a pre set time has expired after its last use.
  - Used by PLS to delete granules associated with a cancelled DPR.
- Deletion Client (EcDpPrDeletionClient).
  - Used by programs that need access to Deletion Server services to delete granules.
- Sybase ASE Server.
  - COTS product that acts as a SQL (database) server for the PDPS database.
- Quality Assurance Monitor (EcDpPrQaMonitorGUI).
  - Simple interface that allows DAAC operators to transfer science data from the archives, browse data images, and examine and update science metadata.
- EcDpPrLoadTable.pl.
  - Script that is run from the Job Management Client Tool to load the DpPrPgeLimits table.
  - If there were no record in the DpPrPge table for a particular PGE ID/computer combination that was scheduled, the DPR would not be prevented from running and there would be no limits placed on how many of those DPRs could run on the same virtual machine.
- EcDpPrAutocons.
  - A resource (configuration) parameter file that assigns labels to the user-defined (i.e., EMD project-defined) buttons on the AutoSys Job Activity Console and specifies the command associated with each button.
    - For example, Button 3 is labeled "Client Tool" and calls the command "/usr/ecs/TS2/CUSTOM/utilities/EcDpPrJobMgmtClientStart TS2 $JOB" that launches the Job Management Client.
- EcDpPrEMGetAncHeaders.
  - Extracts the header record of the Toolkit ancillary file to which the Logical Unit Number is pointing.
  - Results are written to the standard output.
- EcDpPrPREPQCConverterPGE.
  - Shell script for converting National Centers for Environmental Control (NCEP) PREPQC (Quality Controlled Observation Data) data products from the BUFR format to the HDF-EOS point format.

  - Calls EcDpPrReadPREPQCData and EcDpPrWritePREPQCDataToHDFEOS in performing the conversion.

- EcDpPrReadPREPQCData.
  - PREPQC read program called by EcDpPrPREPQCConverterPGE when converting NCEP PREPQC data products from the BUFR format to the HDF-EOS point format.

- EcDpPrWritePREPQCDataToHDFEOS.
  - PREPQC write program called by EcDpPrPREPQCConverterPGE when converting NCEP PREPQC data products from the BUFR format to the HDF-EOS point format.

- EcDpPrSMFCopy.
  - Shell script that copies Status Message Facility (SMF) files from the toolkit message directory to a PGE directory.
    - SMF files are used by the SDP Toolkit to facilitate a status and error message handling mechanism for use in the science software and to provide a means of sending log files, informational messages, and output data files to DAAC personnel or to remote users.

Production personnel use the following start-up scripts (which are available in the /usr/ecs/*MODE*/CUSTOM/utilities directory on the Queuing Server):

- EcDpPrAutosysStart.
  - Launches the AutoSys GUI Control Panel.

- EcDpPrDeletionClientStart.
  - Starts the Deletion Client.

- EcDpPrGarbageCollectorStart.
  - Starts the Deletion Client.
  - Differs from the EcDpPrDeletionClientStart script in the following three ways:
    - Does not open a separate xterm window.
    - Requires specification of a MACHINE_TO_COLLECT variable.
    - Includes retry logic in case of database deadlock.

The following start-up scripts in the /usr/ecs/*MODE*/CUSTOM/utilities directory on the Queuing Server are typically called by other applications and are not normally invoked directly by production personnel:

- EcDpPrDeletionStart.
  - Starts the Deletion Server.
- EcDpPrDisplayJobStates.
  - Invoked by AutoSys Job Activity Console buttons to generate either a "Jobs Waiting" or a "Jobs Completed" report.
  - Executes EcDpPrViewJobStates to generate the specified report.
- EcDpPrJobMgmtClientStart.
  - Starts the Job Management Client.
- EcDpPrJobMgmtStart.
  - Starts the Job Management Server.
- EcDpPrStart.
  - Starts the Data Processing Subsystem server group (i.e., Job Management Server and Deletion Server).
- EcDpProcessingAppStart.
  - Starts the Data Processing Subsystem server group (i.e., Job Management Server and Deletion Server).

The following start-up script is available in the /usr/ecs/*MODE*/CUSTOM/utilities directory on the Planning/Management Workstation:

- EcDpPrQaMonitorGUIStart.
  - Launches the Quality Assurance (QA) Monitor GUI.
  - The QA Monitor GUI is a Data Processing System GUI but it is installed on the Planning/Management Workstation with many of the Planning applications.

In addition to the preceding start-up scripts the following scripts are available in the /usr/ecs/*MODE*/CUSTOM/utilities directory on the Queuing Server:

- EcDpBusySystemClean.pl.
  - Performs a rough clean-up of some of the PDPS database tables based on information in the PlDataGranuleShort table.

  - Removes from the run-time directory all files for which it is removing the file names from the DpPrFile database table.

- EcDpPrRestartFailedJobs.
  - Restarts all restartable jobs (i.e., not failed PGE jobs) for a specified mode/autosys instance.

- EcDpPrCleanMaintMachineFiles.pl.
  - Cleans out entries in various tables in the PDPS database for specified science processor(s) [deallocates resources on the specified processor(s)].

- EcDpPrRmFilesWOGranules.pl.
  - Ensures consistency between the file references in various tables in the PDPS database and the files actually staged on the data processing disks (removes files from the disks or references in the database tables as necessary).

Resource Definition and Resource Scheduling Processes

One of the principles of operation underlying resource planning is that production processing resources are routinely allocated to specific system services. For example, the central processing units (CPUs) that are used for production processing are normally dedicated to that purpose on a full-time basis. It is on an exception basis that they are allocated to other activities.

Any activity that requires the use of production resources for non-production-related purposes is considered a "ground event." Ground events include the following types of activities (among others):

- Testing.
- Corrective maintenance.
- Preventive maintenance.
- System upgrades.

The resource planning process is the mechanism by which reservations for ground events are defined and controlled. Resource planning affects the resources that are scheduled during the production planning process; consequently, resource planning and production planning are interdependent.

- In general, both resource planning and production planning involve planning for the next day, week and month.
- Resource Planning activities occur on a biweekly basis for 30-day plans, on a weekly basis for 10-day plans, and on a daily basis.
- However, requests to support ground events may be entered at any time.

- The important point is that it is necessary to be aware of the anticipated processing load and upcoming maintenance events for about the next month.

Resource Definition Process

The Resource Planner uses the Resource Editor GUI to define system resources used in production processing in the following terms:

- "Disks."
- "Virtual computers" (sets of CPUs and associated memory and disks).
- "Strings" (sets of virtual computers).
- "Real computers" (hosts that are composed of one or more virtual computers).
- "AutoSys" ("strings" associated with the production processing software).
- Generic "hardware."

The following general process is used for defining production resources:

- Determine what production resources are available.
- Determine the distribution of resources among operating modes.
- Define resources for each mode using the Resource Editor GUI.

Resource Scheduling Process

The Resource Planner and Resource Manager are both involved in resource scheduling using the Resource Scheduler. The Production Planner and Production Monitor are involved in the implementation of ground events.

- Resource Planner processes resource reservation requests for ground events.
- Resource Manager commits resource reservations.
- Production Planner sends committed resource reservations (ground events) to Data Processing via the Planning Workbench.
- Production Monitor monitors execution of ground events in processing.

The following process is used for generating and implementing resource reservations (ground events):

- Personnel who have a need for Planning Subsystem or Data Processing Subsystem resources submit requests for time on specified resources to accomplish the non-routine activities that they plan to undertake.
  - Depending on DAAC policy, many personnel may have access to the resource planning applications for creating resource reservation requests.

  - Alternatively, personnel may have to contact the Resource Planner to have resource reservation requests entered for them.

- The Resource Planner reviews requests for resource reservations to determine if the requests are valid.
  - Requests include the following types of information:
    - Activity description.
    - Resource(s) required.
    - Time period(s) for using the requested resource(s).
    - Comments (e.g., explanation of variance from normal use).
  - Resource Planner may decide to forward the request to a “sponsor” for validation.
    - A sponsor is someone who evaluates a resource reservation request based on expertise that is particularly relevant to the resource reservation request.
- If the Resource Planner or sponsor determines that the request to reserve the resource is valid, the Resource Planner “approves” it along with all other requests that have been validated.
  - The set of all validated resource reservation requests is considered a draft Resource Plan.
- The scheduling software identifies conflicts (if any) in the draft Resource Plan and alerts the Resource Planner to the problem(s).
- If possible, the Resource Planner resolves all conflicts before presenting the proposed plan to the Resource Manager to have the resources committed.
  - However, during the conflict-resolution process the Resource Planner may have to consult with resource requesters and the Resource Manager to ensure that the reserved resources will not have adverse effects on the DAAC’s high-priority events.
- When the Resource Planner has achieved a conflict-free plan, it is presented to the Resource Manager to be implemented.
- The Resource Manager "commits" the resource plan, which signals the Planning Subsystem that the plan can be implemented.
  - Committing a plan actually involves committing all of the individual approved resource reservation requests that collectively make up the plan.

- All committed resource reservations are automatically included in the next production plan to be activated through the Planning Workbench and are subsequently sent to Data Processing.
  - Resource reservations/ground events cannot take effect until they have been sent to Data Processing as part of an activated production plan.
- In Data Processing a ground event job for each resource reservation is sent to the specified resource(s) at the indicated start time.
  - If a data processing job is already using the specified resource(s) at the ground event's scheduled start time, the data processing job runs to completion before releasing the resource(s) to the ground event job.

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Logging in to System Hosts

Logging in to System Hosts

Logging in to system hosts is accomplished from a UNIX command line prompt. It is an initial set of steps that is performed when accomplishing many other Resource Planning tasks.

Logging in to system hosts starts with the assumption that the applicable hosts are operational and the operator has logged in to a workstation or X-term that has access to the applicable network in the system.

Logging in to system Hosts

NOTE: Commands in Steps 1 and 2 are typed at a UNIX system prompt.

1 At the UNIX command line prompt type **setenv DISPLAY *clientname*:0.0** then press the **Return/Enter** key.

- Use either the X terminal/workstation IP address or the machine-name for the client name.
- When using secure shell, the DISPLAY variable is set just once, before logging in to remote hosts. If it were to be reset after logging in to a remote host, the security features would be compromised.

2 In the terminal window (at the command line prompt) start the log-in to the appropriate host by typing **/tools/bin/ssh *hostname*** then press **Return/Enter**.

- The **-l** option can be used with the ssh command to allow logging in to the remote host (or the local host for that matter) with a different user ID. For example, to log in to x0pls02 as user cmops enter:

  /tools/bin/ssh -l cmops x0pls02

- Depending on the set-up it may or may not be necessary to include the path (i.e., /tools/bin/) with the ssh command. Using ssh alone is often adequate. For example:

  ssh x0pls02

  - or -

  ssh -l cmops x0pls02

- Examples of Planning/Management Workstation host names include **e0pls03**, **g0pls01,** and **l0pls02.**

- Examples of Science Processor host names include **e0spg11**, **g0spg11,** and **l0spg11**.
- Examples of Queuing Server host names include **e0sps04**, **g0sps06**, and **l0sps03**.
- If you receive the message, **"Host key not found from the list of known hosts. Are you sure you want to continue connecting (yes/no)?"** enter **yes** ("y" alone will not work).
- If you have previously set up a secure shell passphrase and executed **sshremote**, a prompt to **Enter *passphrase* for RSA key '<*user@localhost*>'** appears; continue with Step 3.
- If you have not previously set up a secure shell passphrase, go to Step 4.

3 If a prompt to **Enter passphrase for RSA key '<*user@localhost*>'** appears, type your ***passphrase*** then press **Return/Enter**.

- If a command line prompt is displayed, log-in is complete.
- If the passphrase is unknown, press **Return/Enter**, which should cause a **<user@remotehost>'s password:** prompt to appear (after the second or third try if not after the first one), then go to Step 4.
- If the passphrase is entered improperly, a **<user@remotehost>'s password:** prompt should appear (after the second or third try if not after the first one); go to Step 4.

4 If a prompt for **<*user@remotehost*>'s password:** appears, type your ***password*** then press **Return/Enter**.

- A command line prompt is displayed.
- Log-in is complete.

Launching and Shutting Down Resource Planning Applications

Launching Resource Planning Applications

As previously mentioned the following two (2) software applications are the principal operator tools associated with Resource Planning:

- Resource Scheduler GUI (Scheduling Interface).
- Resource Editor GUI.

Other applications associated with resource planning include the following items:

- Message Handler (which displays various types of messages).
- System Name Server (which handles interprocess communication).
- Resource Planning System Resource Model (which is an underlying resource data coordinator for the resource planning software).
- Resource Reservation Planning Master Timeline GUI (which provides a graphic display of resource allocations).

Depending on DAAC policy, all personnel who may need to use system resources could be granted access to the Resource Planning tool for the purpose of submitting resource reservation requests. Personnel who may be appointed "sponsors" for the purpose of validating resource reservation requests should have authorization to validate those requests. Other functions of Resource Planning and the Resource Definition features should be reserved for the Resource Planner and Resource Manager.

Access to the resource planning applications is gained through the use of UNIX commands. Launching resource planning applications starts with the assumption that the applicable host is active and the operator (resource requester, Resource Planner, sponsor, or Resource Manager) has logged in to the system.

Launching Resource Planning Applications

1 Access a terminal window logged in to the Planning/Management Workstation host.

- Examples of Planning/Management Workstation host names include **e0pls03**, **g0pls01,** and **l0pls02.**
- For detailed instructions refer to the procedure for **Logging in to System Hosts** (preceding section of this lesson).

2 If necessary, type **setenv ECS_HOME /usr/ecs/** then press the **Return/Enter** key.

- When logging in as a system user (e.g., cmshared), the ECS_HOME variable may be set automatically so it may not be necessary to perform this step.

3 Type **cd /usr/ecs/*MODE*/CUSTOM/utilities** then press **Return/Enter**.

- Change directory to the directory containing the resource planning start-up scripts (e.g., EcPlRpAllStart).
- The ***MODE*** will most likely be one of the following operating modes:
  - OPS (for normal operation).
  - TS1 (for SSI&T).
  - TS2 (new version checkout).
- Note that the separate subdirectories under /usr/ecs apply to (describe) different operating modes.

4 Type **EcPlRpAllStart *MODE ApplicationID*** then press **Return/Enter** to launch the Message Handler, System Name Server, and the Resource Model.

- The **Message Handler** graphical user interface (GUI) (Figure 4) is displayed.

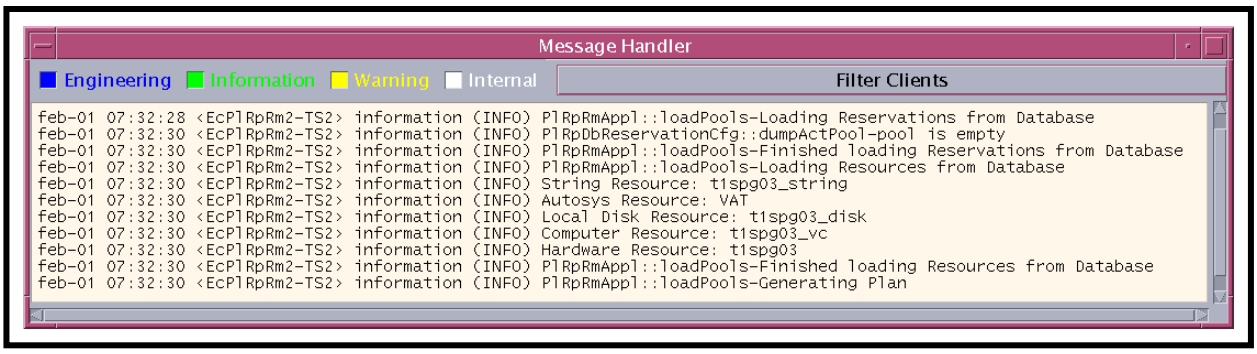

Figure 4. Message Handler GUI

- When the **Message Handler** GUI displays a message that concludes with "…Finished loading all records from the database", it is time to get a UNIX prompt and continue with the next step.
- The **Message Handler** GUI displays messages of the following types:
  - Engineering.
  - Information.
  - Warning.

– Internal.

- The **System Name Server** (SNS) handles interprocess communication.
- The **Resource Model** is an underlying resource data coordinator for the resource planning software.
- The ***ApplicationID*** (also called MSGSRV_ID) is any number from 1 to 5. It identifies the message service in use so messages can be directed to the proper message handler GUI. Consequently, it is a good idea to use the same ApplicationID consistently during a resource planning session.

5 If the Resource Editor is to be launched, type **EcPlRpReStart** ***MODE ApplicationID*** then press **Return/Enter**.

- The **Resource Editor** (Figure 5) is displayed.

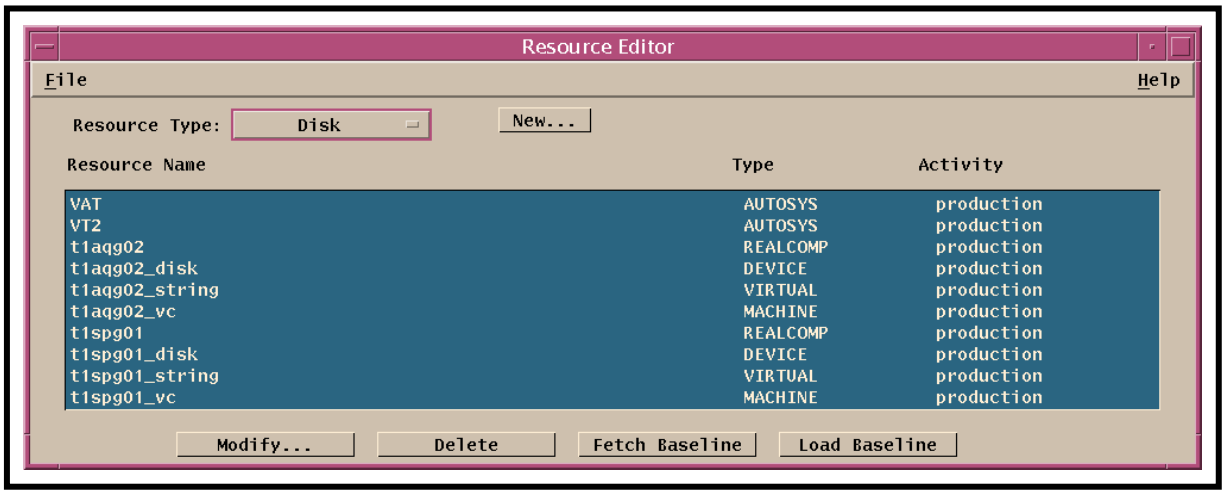

Figure 5. Resource Editor

- The **Resource Editor** provides the following data on each resource (as indicated by the column headers for the resource list):
  - **Resource Name.**
  - **Type** [of resource].
  - **Activity.**

- A set of buttons enables the following operations:
  - **New... -** Define a new resource in the resource list in the PDPS database.
  - **Modify... -** Edit or review the details of an existing resource.
  - **Delete -** Delete an existing resource from the resource list in the PDPS database.
  - **Fetch Baseline -** [not used].
  - **Load Baseline -** [not used].
- Alternatively, the preceding operations can be enabled by selecting the corresponding entry in the GUI's **File** pull-down menu.

6 If the Resource Scheduler (Scheduling Interface) is to be launched, type **EcPlRpSiStart** ***MODE ApplicationID*** then press **Return/Enter**.

- The **Resource Scheduler** (Figure 6) is displayed.

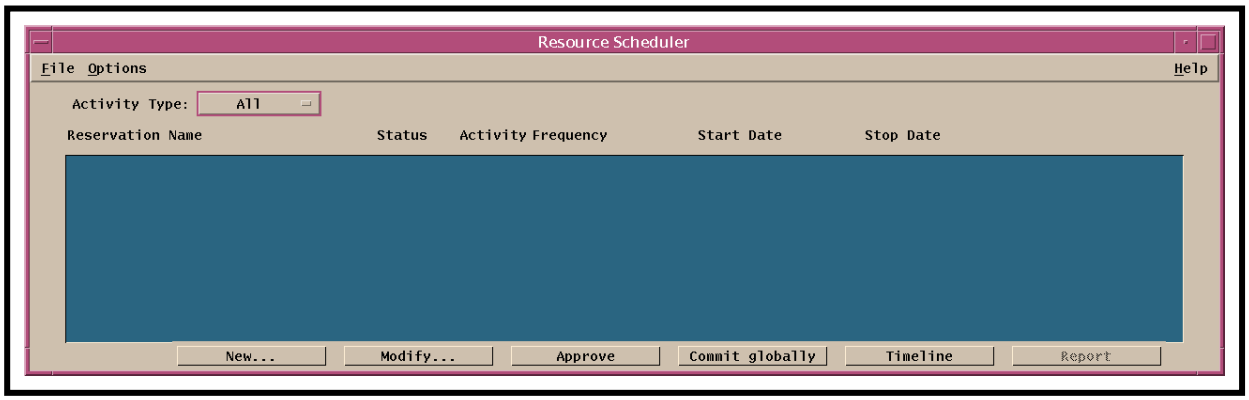

Figure 6. Resource Scheduler

- It may be worthwhile to launch the **Resource Scheduler** from a separate terminal/X-term window because the window from which it is launched is continuously refreshed and is unavailable for entering any additional commands.
- The **Resource Scheduler** shows the **Resource Reservation List**, which provides the following data on each resource reservation request (as indicated by the column headers for the list):
  - **Reservation Name.**
  - **Status** [of each reservation]**.**
  - **Activity** [type of activity]**.**
  - **Frequency.**

- **Start Date** [and time].
- **Stop Date** [and time]**.**

- In addition, a set of buttons enables the following operations:
  - **New... -** Create a resource reservation request (brings up the **Resource Reservation Request Edit/Definition** GUI described in a subsequent section of the lesson).
  - **Modify... -** Edit or review the details of an existing resource reservation request (brings up the **Resource Reservation Request Edit/Definition** GUI).
  - **Approve -** Used to indicate that the selected resource reservation request(s) has (have) been validated and a draft resource plan can be created. Clicking on this button causes the Planning Subsystem to determine whether there are conflicts among resource reservations. The Planning Subsystem detects conflicts and reports them to the operator.
  - **Commit globally** - Commit all "approved" resource reservations. (Commit to a plan.)
  - **Time Line** - Display a timeline-oriented view of the resource plan in the **Resource Reservation Planning Master Timeline** GUI.
  - **Report** - The **Report** option is disabled. The reports have been deleted from the system requirements.
- The following operations can be enabled by selecting the corresponding entry in the GUI's **File** pull-down menu:
  - **New -** Create a resource reservation request (brings up the **Resource Reservation Request Edit/Definition** GUI).
  - **Open -** Edit or review the details of an existing resource reservation request (brings up the **Resource Reservation Request Edit/Definition** GUI).
  - **Delete –** Delete an existing resource reservation request.
  - **Exit –** Exit from the **Resource Scheduler** GUI.
- The following operation can be enabled by selecting the corresponding entry in the GUI's **Options** pull-down menu:
  - **Timeline** - Display a timeline-oriented view of the resource plan in the **Resource Reservation Planning Master Timeline** GUI.

Shutting Down Resource Planning Applications

When resource planning activities have been completed, the Message Handler, System Name Server, and Resource Model should be shut down to eliminate unneeded processes and allow other operators to gain access to the resource planning applications. If any of the three processes remains active, it is likely to interfere with subsequent attempts to launch resource planning applications.

Shutting down resource planning applications starts with the assumption that the **Resource Editor** (Figure 5) and the **Resource Scheduler** (Figure 6) have been launched and the GUIs are currently being displayed.

Shutting Down Resource Planning Applications

---

1 To quit the **Resource Editor** when resource planning activities have been completed select **File → Exit** from the GUI's pull-down menu.

- The **Resource Editor** (Figure 5) disappears.

2 To quit the **Resource Scheduler** when resource planning activities have been completed select **File → Exit** from the GUI's pull-down menu.

- The **Resource Scheduler** (Figure 6) disappears unless there are resource reservation requests with a status of "approved".
- If there are any resource reservation requests with a status of "approved" listed on the **Resource Scheduler**, a **Close Application** pop-up dialogue box (Figure 7) is displayed with a message "Status of the listed reservations" and a list of the resource reservation requests with "approved" status.

3 If the **Close Application** pop-up dialogue box is displayed, click on the appropriate button from the following selections:

- **Ok** - to quit the **Resource Scheduler** and dismiss the dialogue box.
  - Selecting **Ok** effectively commits all "approved" Resource Reservations.
- **Cancel** - to dismiss the dialogue box and return to the **Resource Scheduler**.

4 After quitting the **Resource Editor**/**Resource Scheduler** GUI(s) click in the UNIX window used to start the resource planning applications.

5 Type **EcPlRpSlayAll** ***MODE ApplicationID*** then press **Return/Enter** to shut down the Message Handler, System Name Server, and Resource Model.

- The **Message Handler** GUI (Figure 4) disappears.

6 Type **ps -ef | grep *MODE*** then press **Return/Enter** to obtain a list of active processes in the specified mode.

- A list of active processes in the specified mode is displayed.
- If an error message is received when **ps -ef | grep *MODE*** is entered, type **ps -auxwww | grep *MODE*** then press **Return/Enter**.

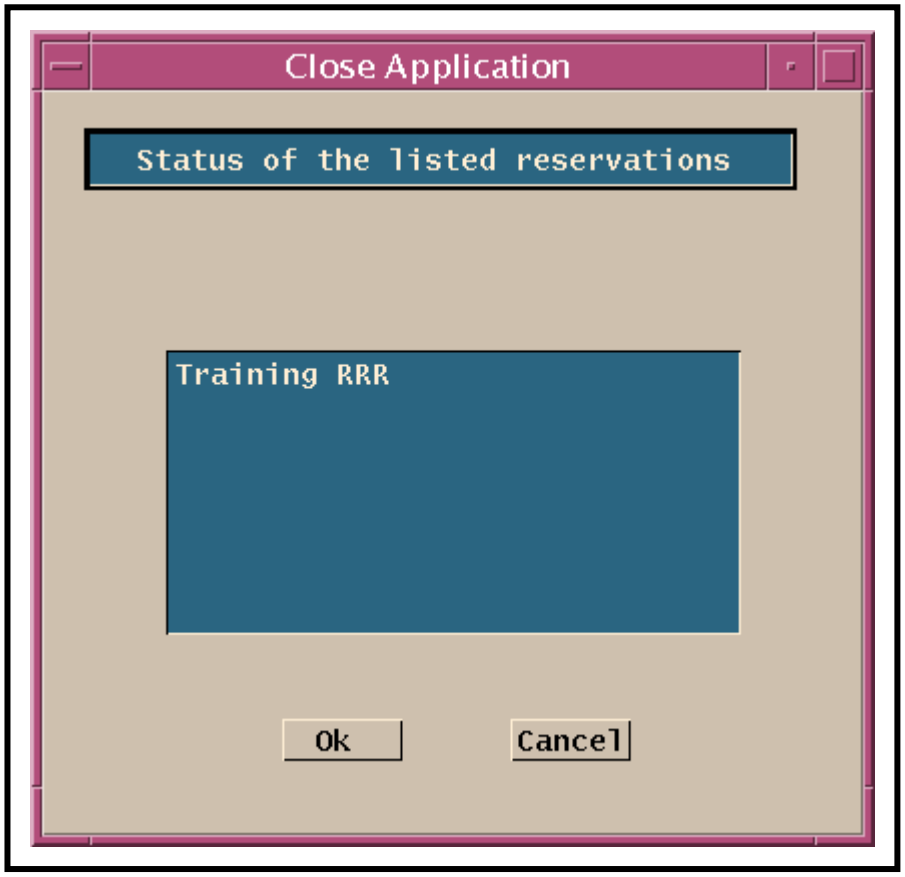

Figure 7. Close Application Pop-Up Dialogue Box

7 Examine the list of processes running in the specified mode to determine whether the Message Handler, System Name Server, and Resource Model processes have actually been shut down.

- None of the following processes should be active:
  - EcPlRpRe
  - EcPlRpSi

- EcPlRpTl
- EcPlMsh
- EcPlSns
- EcPlRpRm

8 If any of the specified processes [especially the Message Handler, System Name Server, and/or Resource Model process(es)] is/are still active, type **kill -15** ***process_id1 [process_id2] [process_id3] […]*** to terminate the active process(es).

9 Repeat Steps 6 through 8 as necessary.

Defining Resources

The Resource Editor allows the authorized operator to perform the following functions:

- Add or delete resources.
- Modify the characteristics of resources.

Modifications to the resource planning list are recorded in the PDPS database.

The hardware resources for which resource planning can be supported include host computers and storage devices, as well as “strings” that are sets of “real” computers.

Adding or Modifying Resources

The Resource Editor allows the authorized operator to define resources in the following categories:

- Disks.
  - Disk partitions that are associated with and provide temporary data storage for the input and output files used in processing.
- Virtual Computers.
  - Virtual computers composed of CPUs, random-access memory (RAM), and associated-disk(s).
  - The CPUs and RAM specified for a virtual computer are components of the real computer from which the virtual computer is derived.
- Real Computers.
  - Physical computing devices (hosts), each of which contains one or more CPUs.
  - Each real computer is divided into one or more virtual computers by allocating CPUs and RAM from the real computer to the virtual computer(s).
- Strings.
  - Sets of one or more virtual computers.
  - Strings are associated with the processing software (AutoSys).
  - A dual science processor configuration can be defined by specifying strings containing virtual computers derived from different real computers.

- AutoSys.
  - Identifies the string(s) of virtual computers used by the production processing software.
- Hardware.
  - Any type of equipment that is not defined as a computer or disk may be defined as "hardware."

Resources at the DAACs need to be allocated among the operating modes. For example, disk partitions at a DAAC could be split among the operating modes as follows:

- OPS – 60%.
- TS1 20%.
- TS-2 20%.

Actual percentages would be determined at each DAAC and it would be advantageous to reserve some nominal percentage of the disk space (e.g., two to five percent) as a safety buffer. In any case, it is critical to ensure that the sum of the disk space assigned to the various modes is no more than the total disk space available.

CPUs and RAM need to be allocated among modes in the same manner. However, it is not necessary to be exact with the CPU count or RAM amount.

- There is no one-to-one mapping of CPU allocation with actual CPUs on the science processor.
- Actual CPU usage during processing is limited by the operating system (OS).
  - If ten CPUs have been specified for a particular mode, only ten Data Processing Requests (DPRs) can be running the Execute job at a given time.
  - What is really being defined is the maximum number of DPRs that will execute at a given time.
- It is important to monitor the load on each science processor.
  - CPUs can be over-allocated or under-allocated as necessary to get the most out of the CPUs on each science processor.
  - If monitoring indicates that the processor is underused when OPS mode is at full processing capacity, the number of CPUs allocated to OPS mode could probably be increased.
  - If the science processor is at full capacity when OPS mode is at full processing capacity and it is suspected that the processor may be overworked, the number of CPUs allocated to OPS mode should be reduced.

- Random-access memory (RAM) is subject to the same considerations as CPUs.
  - RAM can be over-allocated or under-allocated as necessary to get the most out of the memory on each science processor.
- The OS takes care of true CPU and RAM allocation.

Determining Actual Processing Resources

Before data processing resources can be defined, it is necessary to know what resources are actually available at the DAAC. Some resources are defined in terms of other resources; for example, a string is defined as one or more virtual computers. However, it is generally necessary to have the following types of information available in order to define processing resources:

- Host names [“real computers”].
- Number of processors [CPUs] available on each host.
- Operating System (OS) for each host.
- Memory [RAM] on each host.
- Total disk space.
- AutoSys instance(s) at the DAAC.

The procedure for determining the actual processing resources to be defined starts with the assumption that the Resource Planner has logged in to the system.

Determining Actual Processing Resources

---

1 Access a terminal window logged in to the applicable Science Processor.

- Examples of Science Processor host names include **e0spg11**, **g0spg11,** and **l0spg11**.
- For detailed instructions refer to the procedure for **Logging in to System Hosts** (preceding section of this lesson).

2 Type **cd /usr/ecs/*MODE*/CUSTOM/pdps/*processor*/data/DpPrRm/*processor*_disk** then press **Return/Enter**.

- Change directory to the disk mount point (e.g., /usr/ecs/OPS/CUSTOM/pdps/e0spg11/data/DpPrRm/e0spg11_disk).

3 Type **df -k .** (being sure to include the dot) then press **Return/Enter**.

- Information concerning disk size and use is displayed; for example:

```
Filesystem          Type  kbytes     use     avail  %use Mounted on
/dev/dsk/xlv/vgo1     xfs 413394688 164646048 248748640  40  /vol1
```

- In the preceding example the total disk space is 413,394,688 kilobytes or 413,394.69 megabytes (413 gigabytes).

4 Type **hinv** then press **Return/Enter**.

- The hinv command is available on Silicon Graphics, Inc. (SGI) hosts only.
- Information concerning CPUs and RAM (memory) is displayed; for example (not all rows are shown):

Processor 0: 194 MHZ IP25
CPU: MIPS R10000 Processor Chip Revision: 2.6
FPU: MIPS R10010 Floating Point Chip Revision: 0.0
Processor 1: 194 MHZ IP25
CPU: MIPS R10000 Processor Chip Revision: 2.6
FPU: MIPS R10010 Floating Point Chip Revision: 0.0
Processor 2: 194 MHZ IP25
CPU: MIPS R10000 Processor Chip Revision: 2.6
FPU: MIPS R10010 Floating Point Chip Revision: 0.0
Processor 3: 194 MHZ IP25
CPU: MIPS R10000 Processor Chip Revision: 2.6
FPU: MIPS R10010 Floating Point Chip Revision: 0.0
Processor 4: 194 MHZ IP25
CPU: MIPS R10000 Processor Chip Revision: 2.5
FPU: MIPS R10010 Floating Point Chip Revision: 0.0
Processor 5: 194 MHZ IP25
CPU: MIPS R10000 Processor Chip Revision: 2.5
FPU: MIPS R10010 Floating Point Chip Revision: 0.0
Processor 6: 194 MHZ IP25
CPU: MIPS R10000 Processor Chip Revision: 2.5
FPU: MIPS R10010 Floating Point Chip Revision: 0.0
Processor 7: 194 MHZ IP25
CPU: MIPS R10000 Processor Chip Revision: 2.5
FPU: MIPS R10010 Floating Point Chip Revision: 0.0
Processor 8: 194 MHZ IP25
CPU: MIPS R10000 Processor Chip Revision: 2.5
FPU: MIPS R10010 Floating Point Chip Revision: 0.0
Processor 9: 194 MHZ IP25
CPU: MIPS R10000 Processor Chip Revision: 2.5
FPU: MIPS R10010 Floating Point Chip Revision: 0.0
Processor 10: 194 MHZ IP25
CPU: MIPS R10000 Processor Chip Revision: 2.5
FPU: MIPS R10010 Floating Point Chip Revision: 0.0

Processor 11: 194 MHZ IP25
CPU: MIPS R10000 Processor Chip Revision: 2.5
FPU: MIPS R10010 Floating Point Chip Revision: 0.0
Processor 12: 194 MHZ IP25
CPU: MIPS R10000 Processor Chip Revision: 2.5
FPU: MIPS R10010 Floating Point Chip Revision: 0.0
Processor 13: 194 MHZ IP25
CPU: MIPS R10000 Processor Chip Revision: 2.5
FPU: MIPS R10010 Floating Point Chip Revision: 0.0
Processor 14: 194 MHZ IP25
CPU: MIPS R10000 Processor Chip Revision: 2.5
FPU: MIPS R10010 Floating Point Chip Revision: 0.0
Processor 15: 194 MHZ IP25
CPU: MIPS R10000 Processor Chip Revision: 2.5
FPU: MIPS R10010 Floating Point Chip Revision: 0.0
Secondary unified instruction/data cache size: 1 Mbyte
Data cache size: 32 Kbytes
Instruction cache size: 32 Kbytes
Main memory size: 2048 Mbytes, 8-way interleaved
[…]

- In the example the science processor has 16 CPUs (0-15) and 2048 megabytes of RAM.

5 Repeat Steps 1 through 4 for all other science processors (if any).

NOTE: Steps 6 through 12 describe the use of the Netscape browser to determine certain types of information concerning computer resources (including the number of CPUs and amount of RAM), which can be determined using the **hinv** command as described in Step 4. However, the "as-built" file accessed using the Netscape browser lists the necessary operating system information in addition to CPU and RAM data. The advantage of the **hinv** command is that it provides real-time data and is reliably up to date. The advantage of the "as-built" file accessed using the Netscape browser is that it provides operating system data that is not available using the **hinv** command.

6 Type **netscape &** then press **Return/Enter**.

- It may be necessary to change directories before launching the Netscape web browser (e.g., cd /tools/bin/netscape3.01).
- The Netscape web browser (Figure 8) is displayed.

7 Type **http://cmdm-ldo.raytheon.com/baseline/** in the browser's **Location (Go To)** field then press **Return/Enter**.

- The **EMD Baseline Information System** web page (Figure 9) is displayed.

8 Select (click on) the **EMD Configuration** link.

- A table of files is displayed.

9 Select (click on) the **Asbuilts** link for the relevant DAAC.

- A list of files is displayed.

10 Select (click on) the file name corresponding to the desired host (e.g., x0spg11.asbuilt.html).

- A report containing the following types of information (among other items) is displayed:
  - Host Name ["real computer"].
  - Processors [CPUs].
  - Operating System.
  - Memory [RAM].
  - Interrogation Date (useful in determining how up-to-date the information is).

11 Select (click on) the browser **Back** button.

- The list of "as-built" files is displayed.

12 Repeat Steps 10 and 11 for all other science processors (if any).

13 To quit the Netscape browser when the necessary information has been acquired select **File → Exit** from the browser's pull-down menu.

- The Netscape browser disappears.

14 Access a terminal window logged in to the Queuing Server host.

- Examples of Queuing Server host names include **e0sps04**, **g0sps06**, and **l0sps03**.
- For detailed instructions refer to the procedure for **Logging in to System Hosts** (preceding section of this lesson).

15 Type **cd /usr/ecs/*MODE*/COTS/autotree/autouser** then press **Return/Enter**.

- Change directory to the directory (e.g., /usr/ecs/*MODE*/COTS/autotreeb/autouser, /usr/ecs/*MODE*/COTS/autotree/autouser, /data1/SHARED/COTS/autotree/autouser) containing the set-up files (e.g., FMR.autosys.csh.g0sps06) and the AutoSys configuration files (e.g., config.FMR).

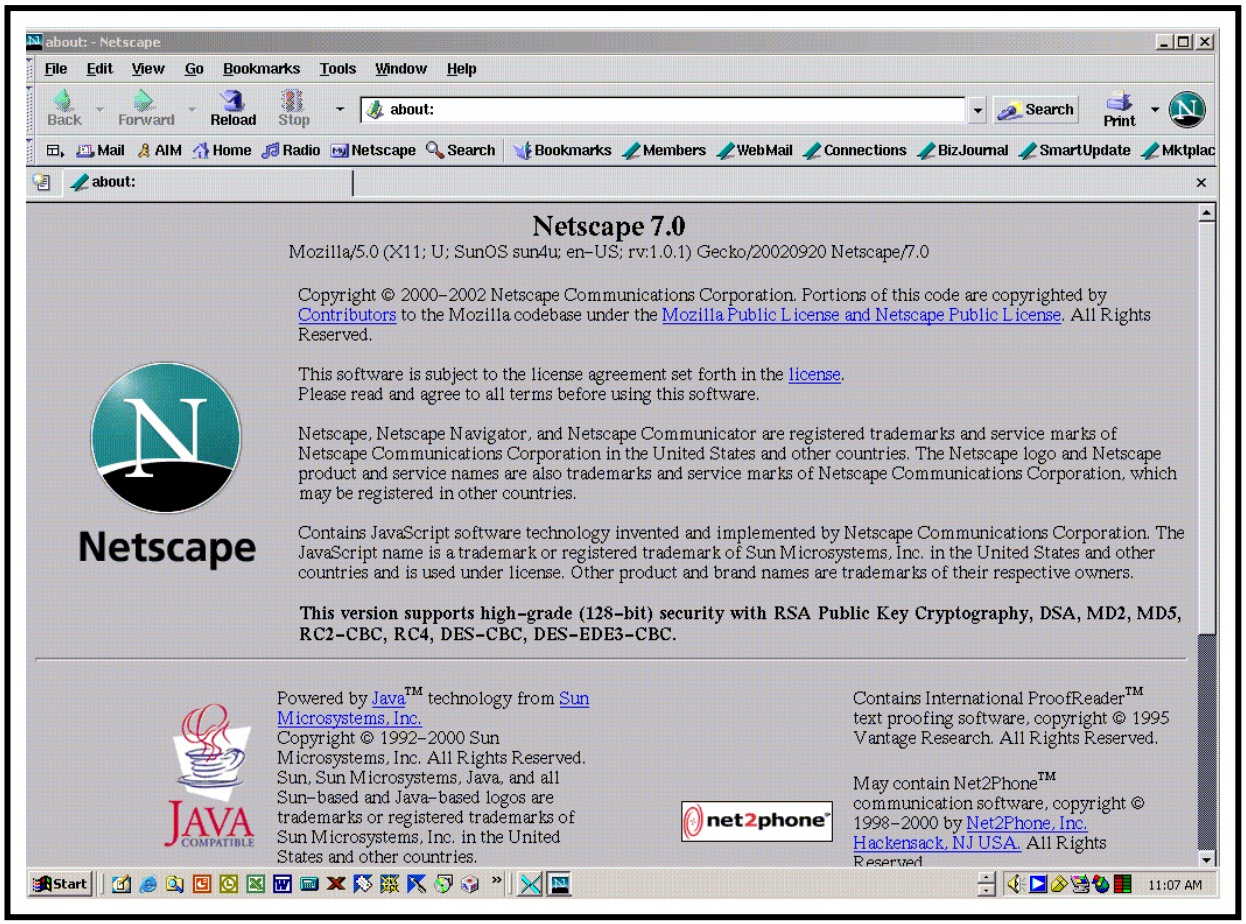

Figure 8. Netscape Web Browser

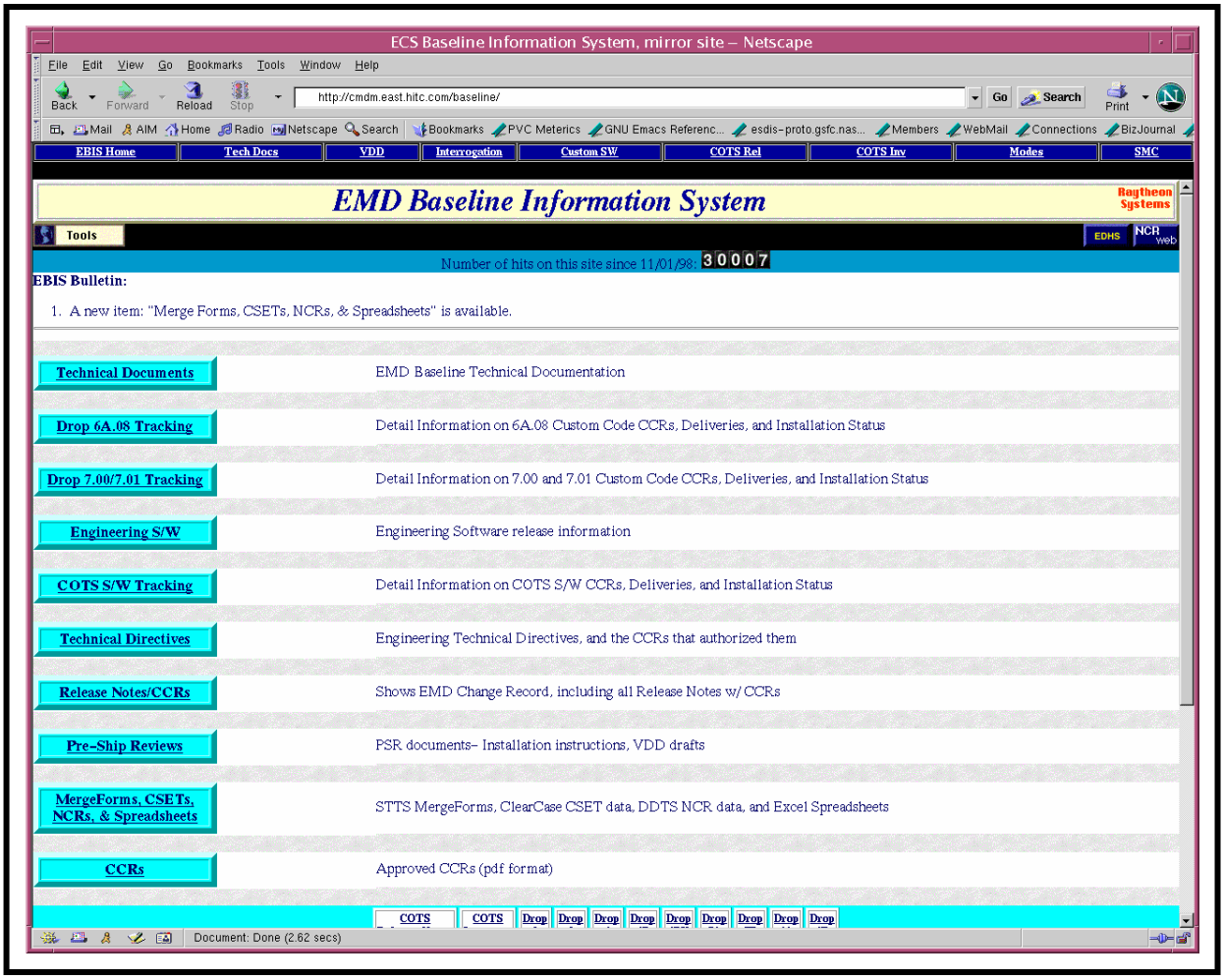

Figure 9. EMD Baseline Information System Web Page

- The particular path to be typed may vary from site to site.
- The AutoSys instance at the DAAC is identified by three capital letters appended to the beginning of the set-up files and the end of the configuration file.
  - Typically, AutoSys instances at the DAACs are identified as FMR.
- It is possible to have multiple AutoSys instances installed at a DAAC.

Example: Definition of Resources at DAAC X

At DAAC X there are two science processors; i.e., x0spg01 and x0spg02. In both cases disk space is 413,394,688 kilobytes or 413,394.688 megabytes. If it were decided to reserve 3% of each disk as a safety buffer, each disk would have a total of 400,992.847 megabytes functionally available for operational use.

In this example the resources for OPS mode are split among x0spg01 and x0spg02 but all resources for TS1 mode come from x0spg01. Likewise, all resources for TS2 mode come from x0spg02. Accordingly, the disk space is allocated among modes as follows:

- x0spg01
  - 240595.708 megabytes for OPS mode (60% of 400,992.847 megabytes rounded down).
  - 160397.138 megabytes for TS1 mode [40% of 400,992.847 megabytes (20% of 801,985.694 megabytes total for x0spg01 and x0spg02) rounded down].
- x0spg02
  - 240595.708 megabytes for OPS mode.
  - 160397.138 megabytes for TS2 mode [40% of 400,992.847 megabytes (20% of 801,985.694 megabytes total for x0spg01 and x0spg02) rounded down].

When allocating CPUs between modes, it would probably be a good idea to reserve one CPU of each science processor for use by the operating system and allocate the remainder to the various operating modes. At DAAC X the total number of CPUs in both x0spg01 and x0spg02 is 16 each. The CPUs might be allocated among modes as follows:

- x0spg01
  - 1 CPU for operating system use.
  - 9 CPUs for OPS mode.
  - 6 CPUs for TS1 mode.

- x0spg02
  - 1 CPU for operating system use.
  - 9 CPUs for OPS mode.
  - 6 CPUs for TS2 mode.

Total RAM for x0spg01 is 2048 megabytes. The same is true for x0spg02. RAM might be allocated among modes as follows:

- x0spg01
  - 1228 megabytes for OPS mode.
  - 819 megabytes for TS1 mode [40% of 2048 megabytes (20% of 4096 megabytes total for x0spg01 and x0spg02) rounded down to the nearest megabyte].
- x0spg02
  - 1228 megabytes for OPS mode.
  - 819 megabytes for TS2 mode [40% of 2048 megabytes (20% of 4096 megabytes total for x0spg01 and x0spg02) rounded down to the nearest megabyte].

The resources for the OPS, TS1, and TS2 modes might be defined as shown in Table 1, Example of Resource Definitions – DAAC X.

Adding a Resource

As previously mentioned the procedures for adding a resource to the resource planning list may involve any of the following types of resources:

- “Disks.”
- “Virtual Computers.”
- “Real Computers.”
- "Strings.”
- “AutoSys.”
- Generic “Hardware.”

The procedure for adding a resource starts with the assumption that the Resource Planner has launched the **Resource Editor** (Figure 5) in the appropriate mode and the GUI is currently being displayed.

Table 1. Example of Resource Definitions – DAAC X

Resource Type	Resource Name	Activity	Partition Size [mega-bytes]	Block Size [bytes]	CPUs	RAM [mega-bytes]	Oper Sys	Associated Disks/ Computers/ Strings
OPS Mode								
Disk	x0spg01_disk_OPS	Production	240595.708	1024				
Disk	x0spg02_disk_OPS	Production	240595.708	1024				
Computer	x0spg01_vc_OPS	Production			9	1228	IRIX 6.5.17	x0spg01_disk_OPS
Computer	x0spg02_vc_OPS	Production			9	1228	IRIX 6.5.17	x0spg02_disk_OPS
Real Computer	x0spg01	Production						x0spg01_vc_OPS
Real Computer	x0spg02	Production						x0spg02_vc_OPS
String	string_OPS	Production						x0spg01_vc_OPS x0spg02_vc_OPS
Autosys	FMR	Production						string_OPS
TS1 Mode								
Disk	x0spg01_disk_TS1	Production	160397.138	1024				
Computer	x0spg01_vc_TS1	Production			6	819	IRIX 6.5.17	x0spg01_disk_TS1
Real Computer	x0spg01	Production						x0spg01_vc_TS1
String	string_TS1	Production						x0spg01_vc_TS1
Autosys	FMR	Production						string_TS1
TS2 Mode								
Disk	x0spg02_disk_TS2	Production	160397.138	1024				
Computer	x0spg02_vc_TS2	Production			6	819	IRIX 6.5.17	x0spg02_disk_TS2
Real Computer	x0spg02	Production						x0spg02_vc_TS2
String	string_TS2	Production						x0spg02_vc_TS1
Autosys	FMR	Production						string_TS2

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Adding a Resource

1 Observe the resource type listed currently listed on the **Resource Editor** GUI **Resource Type** option button. If a different resource type is to be added, click and hold on the **Resource Type** option button and select (highlight then release the mouse button) the applicable resource type from the option menu that is displayed.

- Resources should generally be defined in the following order due to dependencies among resource definitions (disks are essential to the definition of a virtual computer; virtual computers are essential to the definition of a real computer; etc.):
  - **Disk.**
  - **Virtual Computer.**
  - **Real Computer.**
  - **String.**
  - **Autosys.**
  - **Hardware.**

2 Click on the **New…** button.

- The selection of the **Resource Type** determines which GUI appears when the **New…** button is activated. The following selections are available and require performance of the specified procedure to complete the addition of the resource:
  - **Disk** - The **Disk Details** GUI is displayed. Perform the procedure for **Defining Disk Resources** (subsequent section of this lesson).
  - **Virtual Computer** - The **Virtual Computer Details** GUI is displayed. Perform the procedure for **Defining Virtual Computer Resources** (subsequent section of this lesson).
  - **Real Computer** - The **Real Computer Details** GUI is displayed. Perform the procedure for **Defining Real Computer Resources** (subsequent section of this lesson).
  - **String** - The **String Details** GUI is displayed. Perform the procedure for **Defining String Resources** (subsequent section of this lesson).
  - **Autosys** - The **Autosys Details** GUI is displayed. Perform the procedure for **Defining AutoSys Resources** (subsequent section of this lesson).

- **Hardware** - The **Hardware Resource Details** GUI is displayed. Perform the procedure for **Defining Hardware Resources** (subsequent section of this lesson).

Defining Disk Resources

As previously mentioned initially some nominal percentage (e.g., two to five percent) of each DAAC processing disk may be reserved as a safety buffer and the remaining disk space is split among the operating modes as follows:

- OPS – 60%.
- TS1 - 20%.
- TS-2 - 20%.

The procedure for defining disk resources is subordinate to the procedures for adding a resource and modifying a resource. The disk resources definition procedure starts with the assumption that the Resource Planner has launched the **Resource Editor** (Figure 5) and the GUI is currently being displayed.

Defining Disk Resources

---

1 On the **Resource Editor** click and hold the **Resource Type** option button, then select **Disk** from the option menu that is displayed.

2 Click on the **New…** button.

- The **Disk Details** GUI is displayed.
- The **Disk Details** GUI displayed when the **New…** button on the **Resource Editor** GUI is clicked is similar to the **Disk Partition Details** GUI (Figure 10) that is displayed when the **Modify…** button on the **Resource Editor** GUI is clicked.
  - The difference is that the data entry fields are blank on the **Disk Details** GUI accessed from the **New…** button and there is data in the data entry fields on the **Disk Details** GUI accessed from the **Modify…** button.

3 Type the name of the disk resource to be added to the list of available resources in the Disk Details GUI Resource Name field.

- For example, one of the disk resources for the OPS mode at the Land Processes (LP) DAAC might be identified as **e0spg11_disk_OPS**.

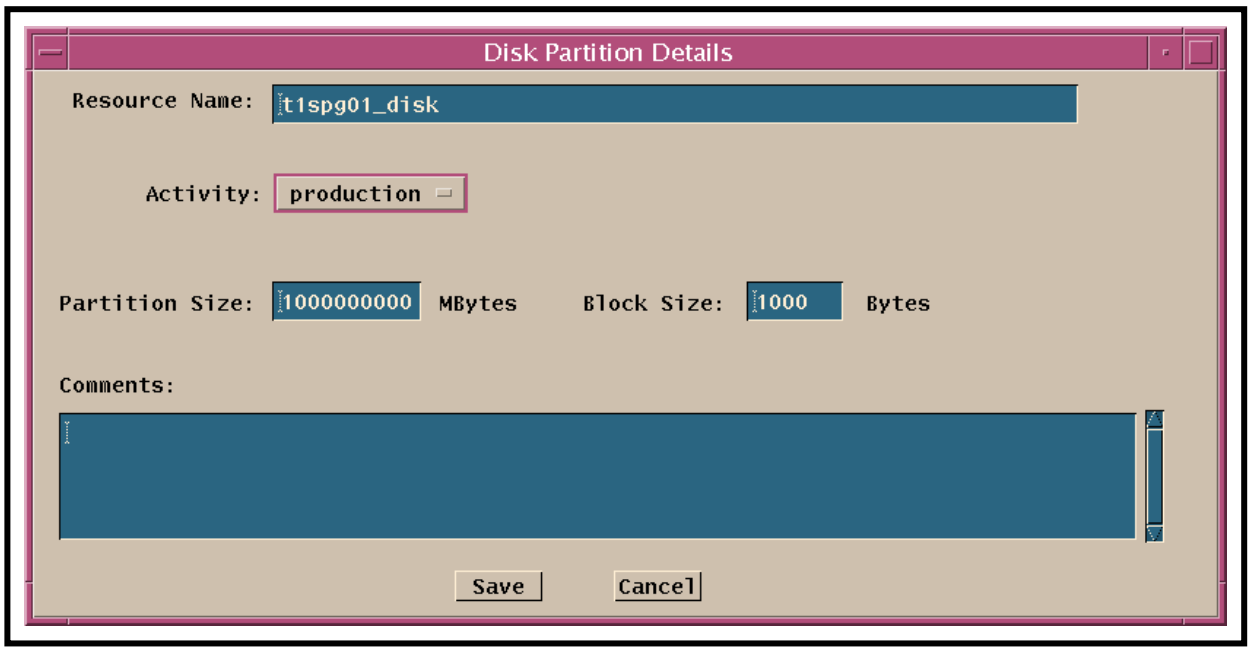

Figure 10. Disk Partition Details GUI

4 If the system-generated default activity (indicated on the **Activity** option button) needs to be changed, click and hold on the **Activity** button and select (highlight then release the mouse button) the appropriate category of activity from the option menu that is displayed.

- Currently the following activities are available:
  - **production.**
  - **test.**
  - **groundevent.**

5 Type the specified data concerning the disk resource in the following fields:

- **Partition Size** - size of the disk partition, in **megabytes** (mandatory entry).
  - The partition size represents the amount of the total disk space to be allocated to the mode in which the Resource Planning GUIs were launched.
  - For example, if the resources for OPS mode are being defined (the Resource Planning GUIs were launched in OPS mode) and 240,595.708 megabytes were to be allocated to OPS mode, the number 240595.708 would be entered in the **Partition Size** field.

- **Block Size** - block size (in bytes) used for the disk; enter **1024** (mandatory entry).
- **Comments** - relevant comments on the resource (e.g., total disk space, amount reserved as a safety buffer, and percentage allocated to the applicable mode).

6 When all data concerning the disk resource to be added have been entered in the correct fields, click on the appropriate button from the following selections:

- **Save** - to save the disk resource data and return to the **Resource Editor**.
- **Cancel** - to return to the **Resource Editor** without saving the disk resource data.

Defining Virtual Computer Resources

The procedure for defining virtual computer resources is subordinate to the procedures for adding a resource and modifying a resource. The virtual computer resources definition procedure starts with the assumption that the Resource Planner has launched the **Resource Editor** (Figure 5) and the GUI is currently being displayed.

Defining Virtual Computer Resources

---

1 On the **Resource Editor** click and hold the **Resource Type** option button, then select **Virtual Computer** from the option menu that is displayed.

2 Click on the **New…** button.

- The **Virtual Computer Details** GUI is displayed.
- The **Virtual Computer Details** GUI displayed when the **New…** button on the **Resource Editor** GUI is clicked is similar to the **Virtual Computer Details** GUI (Figure 11) that is displayed when the **Modify…** button on the **Resource Editor** GUI is clicked.
  - The difference is that most of the data entry fields are blank on the **Virtual Computer Details** GUI accessed from the **New…** button and there is data in the data entry fields on the **Virtual Computer Details** GUI accessed from the **Modify…** button.
- The **Virtual Computer Details** GUI shows several fields, including the following pair of lists:
  - **Disks** - A list of the disks previously defined for the site.
  - **Associated Disks -** List of disks that are associated with the computer.

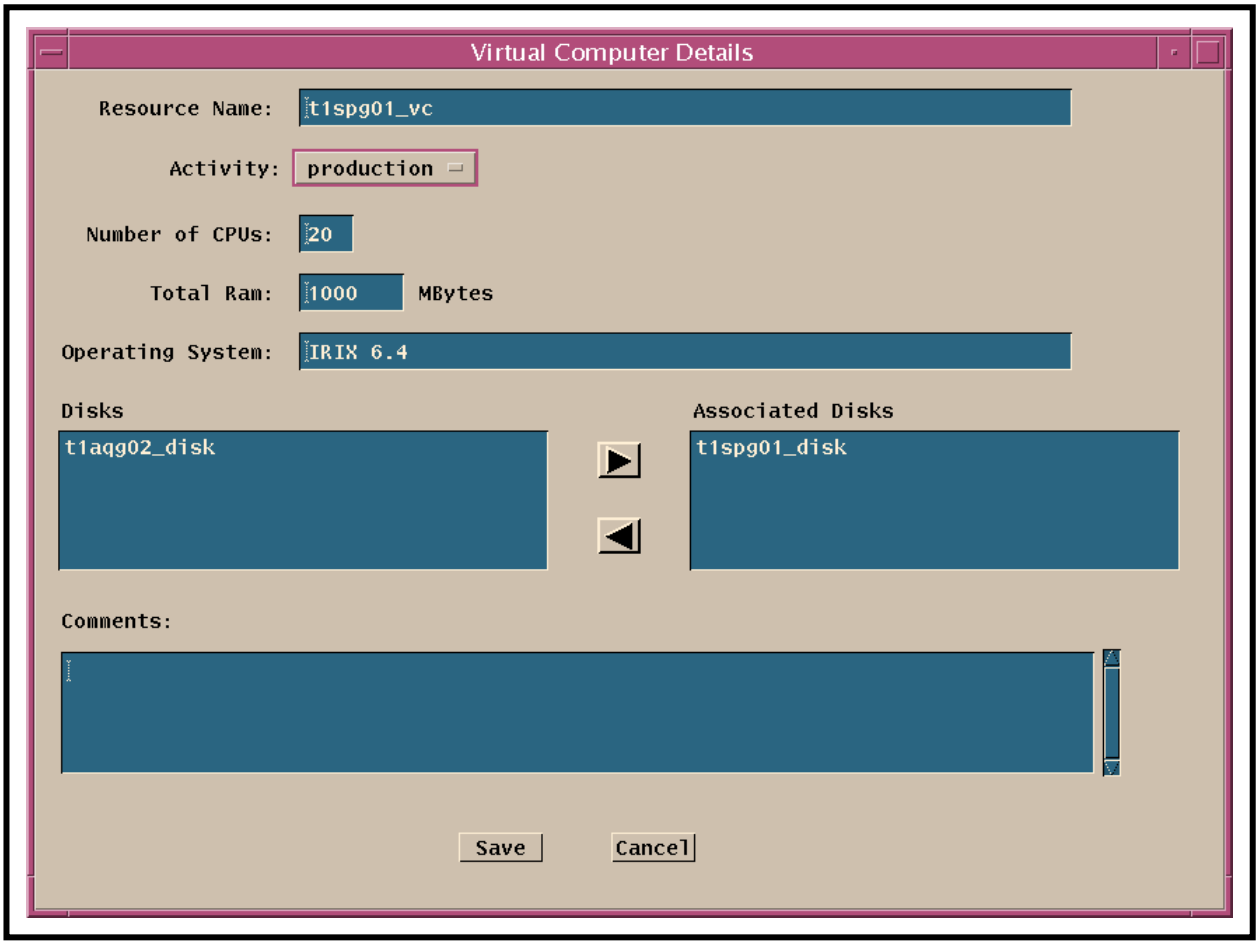

Figure 11. Virtual Computer Details GUI

3 Type the name of the computer resource to be added to the list of available resources in the **Computer Details** GUI **Resource Name** field.

- For example, a virtual computer at the LP DAAC might be identified as **e0spg11_vc_OPS**.

4 If the system-generated default activity (indicated on the **Activity** option button) needs to be changed, click and hold on the **Activity** button and select (highlight then release the mouse button) the appropriate category of activity from the option menu that is displayed.

5 Type the specified data concerning the virtual computer resource in the following fields:

- **Number of CPUs** - Number of central processing units (CPUs) in the virtual computer (e.g., 9) (mandatory entry).
- **Total RAM** - Virtual computer's total RAM in megabytes (e.g., 1228) (mandatory entry).

- **Operating System** - Name and version of the computer's operating system (e.g., IRIX 6.5.17) (mandatory entry).

6 Move disk resources between the **Disks** and **Associated Disks** lists as necessary by selecting (highlighting) the disk to be moved, then clicking on the right or left arrow button (as applicable) to move the disk to the other list.

- Highlighted disk disappears from one list and appears on the other.

7 Type any relevant comments in the **Comments** field (e.g., allocation of CPUs and RAM among modes).

8 When all data concerning the virtual computer resource to be added have been entered in the correct fields, click on the appropriate button from the following selections:

- **Save** - to save the virtual computer resource data and return to the **Resource Editor**.
- **Cancel** - to return to the **Resource Editor** without saving the virtual computer resource data.

9 Repeat Steps 1 through 8 for each additional virtual computer (if any) to be defined for the mode.

Defining Real Computer Resources

As previously mentioned each "real" computer is divided into "virtual" computers. The virtual computers are allocated among the operational modes. A real computer is defined in terms of virtual computers.

The procedure for defining real computer resources is subordinate to the procedures for adding a resource and modifying a resource. The real computer resources definition procedure starts with the assumption that the Resource Planner has launched the **Resource Editor** (Figure 5) and the GUI is currently being displayed.

Defining Real Computer Resources

---

1 Click and hold on the **Resource Editor** GUI **Resource Type** option button, then select **Real Computer** from the option menu that is displayed.

2 Click on the **New…** button.

- The **Real Computer Details** GUI is displayed.

- The **Real Computer Details** GUI displayed when the **New…** button on the **Resource Editor** GUI is clicked is similar to the **Real Computer Details** GUI (Figure 12) that is displayed when the **Modify…** button on the **Resource Editor** GUI is clicked.
  - The difference is that most of the data entry fields are blank on the **Real Computer Details** GUI accessed from the **New…** button and there is data in the data entry fields on the **Real Computer Details** GUI accessed from the **Modify…** button.
- The **Real Computer Details** GUI shows several fields, including the following pair of lists:
  - **Computers** - A list of virtual computers previously defined for the site.
  - **Associated Computers -** List of virtual computers that are associated with the real computer.

3 Type the name of the real computer resource to be added to the list of available resources in the **Real Computer Details** GUI **Resource Name** field.

- For example, one of the real computers at the LP DAAC might be identified as **e0spg11**.

4 If the system-generated default activity (indicated on the **Activity** option button) needs to be changed, click and hold on the **Activity** button and select (highlight then release the mouse button) the appropriate category of activity from the option menu that is displayed**.**

5 Move computer resources between the **Computers** and **Associated Computers** lists as necessary by selecting (highlighting) the computer to be moved, then clicking on the right or left arrow button (as applicable) to move the computer to the other list.

- Highlighted computer disappears from one list and appears on the other.

6 Type any relevant comments in the **Comments** field.

7 When all data concerning the real computer resource to be added have been entered in the correct fields, click on the appropriate button from the following selections:

- **Save** - to save the real computer resource data and return to the **Resource Editor**.
- **Cancel** - to return to the **Resource Editor** without saving the real computer resource data.

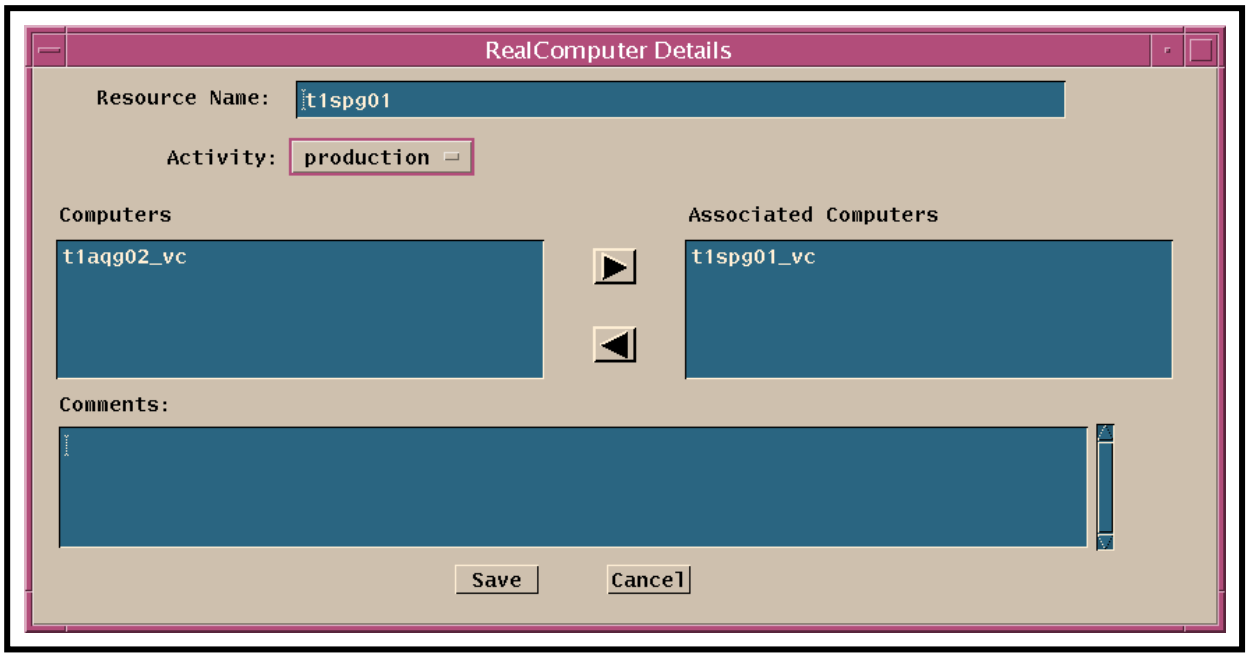

Figure 12. Real Computer Details GUI

Defining String Resources

The procedure for defining string resources is subordinate to the procedures for adding a resource and modifying a resource. The string resources definition procedure starts with the assumption that the Resource Planner has launched the **Resource Editor** (Figure 5) and the GUI is currently being displayed.

Defining String Resources

---

1 Click and hold on the **Resource Editor** GUI **Resource Type** option button, then select **String** from the option menu that is displayed.

2 Click on the **New…** button.

- The **String Details** GUI is displayed.
- The **String Details** GUI displayed when the **New…** button on the **Resource Editor** GUI is clicked is similar to the **String Details** GUI (Figure 13) that is displayed when the **Modify…** button on the **Resource Editor** GUI is clicked.
  - The difference is that most of the data entry fields are blank on the **String Details** GUI accessed from the **New…** button and there is data in the data entry fields on the **String Details** GUI accessed from the **Modify…** button.

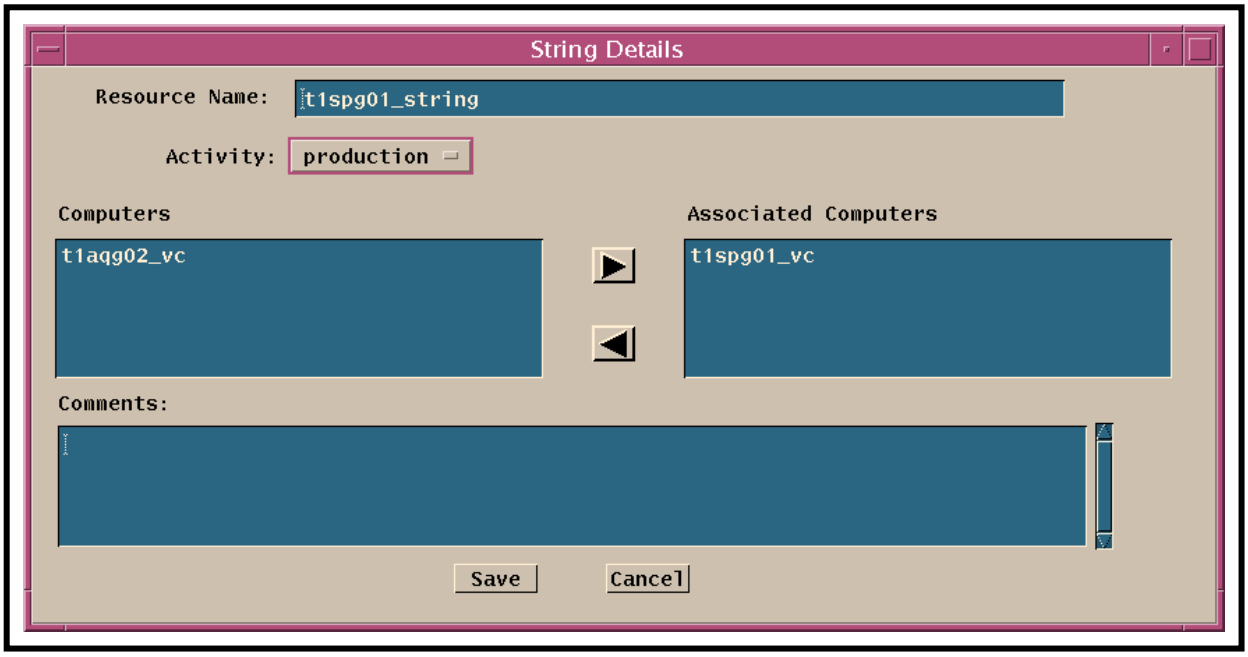

Figure 13. String Details GUI

- The **String Details** GUI shows several fields, including the following pair of lists:
  - **Associated Computers -** List of computers that are associated with the string.
  - **Computers -** A list of computers previously defined for the site.

3 Type the name of the string resource to be added to the list of available resources in the String Details GUI Resource Name field.

- For example, a string at the LP DAAC might be identified as **e0spg11_string_OPS**.

4 If the system-generated default activity (indicated on the **Activity** option button) needs to be changed, click and hold on the **Activity** button and select (highlight then release the mouse button) the appropriate category of activity from the option menu that is displayed.

5 Move computer resources between the **Computers** and **Associated Computers** lists as necessary by selecting (highlighting) the computer to be moved, then clicking on the right or left arrow button (as applicable) to move the computer to the other list.

- Highlighted computer disappears from one list and appears on the other.
- If a dual science processor configuration is being defined, multiple virtual computers are associated with the string resource.
  - For example, e0spg11_string_OPS at the LP DAAC might have the associated computers e0spg11_vc_OPS and e0spg11_vc_OPS.

6 Type any relevant comments in the **Comments** field.

7 When all data concerning the string resource to be added have been entered in the correct fields, click on the appropriate button from the following selections**:**

- **Save** - to save the string resource data and return to the **Resource Editor**.
- **Cancel** - to return to the **Resource Editor** without saving the string resource data.

Defining AutoSys Resources

The procedure for defining AutoSys resources is subordinate to the procedures for adding a resource and modifying a resource. The AutoSys resources definition procedure starts with the assumption that the Resource Planner has launched the **Resource Editor** (Figure 5) and the GUI is currently being displayed.

Defining AutoSys Resources

---

1 Click and hold on the **Resource Editor** GUI **Resource Type** option button, then select **Autosys** from the option menu that is displayed.

2 Click on the **New…** button.

- The **Autosys Details** GUI is displayed.
- The **Autosys Details** GUI displayed when the **New…** button on the **Resource Editor** GUI is clicked is similar to the **Autosys Details** GUI (Figure 14) that is displayed when the **Modify…** button on the **Resource Editor** GUI is clicked.
  - The difference is that most of the data entry fields are blank on the **Autosys Details** GUI accessed from the **New…** button and there is data in the data entry fields on the **Autosys Details** GUI accessed from the **Modify…** button.
- The **Autosys Details** GUI shows several fields, including the following pair of lists:
  - **Strings** - A list of previously defined strings (sets of computers).
  - **Associated Strings -** List of sets of computers that are associated with the AutoSys resource.

3 Type the name of the AutoSys resource to be added to the list of available resources in the **Autosys Details** GUI **Resource Name** field.

- For example, an AutoSys resource at the LP DAAC might be identified as **FMR**.
  - AutoSys resources are identified by three capital letters that specify an AutoSys instance installed as part of the Data Processing Subsystem.

Figure 14. Autosys Details GUI

4 If the system-generated default activity (indicated on the **Activity** option button) needs to be changed, click and hold on the **Activity** button and select (highlight then release the mouse button) the appropriate category of activity from the option menu that is displayed.

5 Move string resources between the **Strings** and **Associated Strings** lists as necessary by selecting (highlighting) the string to be moved, then clicking on the right or left arrow button (as applicable) to move the string to the other list.

- Highlighted string disappears from one list and appears on the other.

6 Type any relevant comments in the **Comments** field.

7 When all data concerning the AutoSys resource being defined have been entered in the correct fields, click on the appropriate button from the following selections:

- **Save** - to save the AutoSys resource data and return to the **Resource Editor**.
- **Cancel** - to return to the **Resource Editor** without saving the AutoSys resource data.

Defining Hardware Resources

The procedure for defining hardware resources is subordinate to the procedures for adding a resource and modifying a resource. The hardware resources definition procedure starts with the assumption that the Resource Planner has launched the **Resource Editor** (Figure 5) and the GUI is currently being displayed.

Defining Hardware Resources

---

1 Click and hold on the **Resource Editor** GUI **Resource Type** option button, then select **Hardware** from the option menu that is displayed.

2 Click on the **New…** button.

- The **Hardware Details** GUI (Figure 15) is displayed.

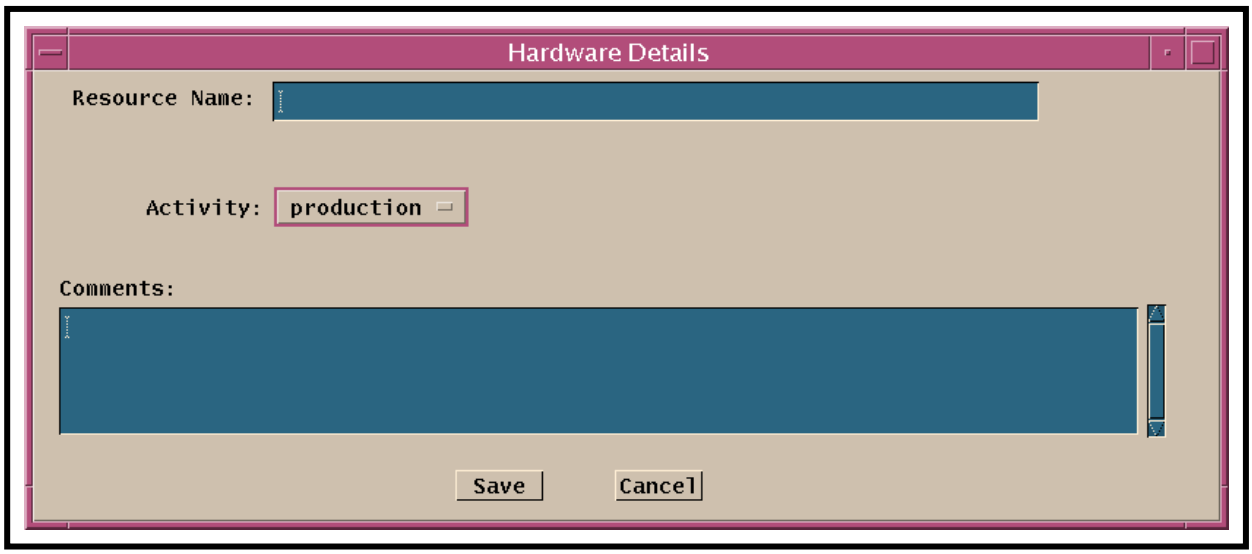

Figure 15. Hardware Details GUI

3 Type the name of the hardware resource to be added to the list of available resources in the **Hardware Details** GUI **Resource Name** field.

- For example, a compact disk read-only memory (CD-ROM) drive associated with computer e0spg11 at the LP DAAC might be identified as **e0spg11_cdrom_OPS**.

4 If the system-generated default activity (indicated on the **Activity** option button) needs to be changed, click and hold on the **Activity** button and select (highlight then release the mouse button) the appropriate category of activity from the option menu that is displayed.

5 Type any relevant comments concerning the resource in the **Comments** field.

6 When all data concerning the hardware resource to be added have been entered in the correct fields, click on the appropriate button from the following selections:

- **Save** - to save the hardware resource data and return to the **Resource Editor**.
- **Cancel** - to return to the **Resource Editor** without saving the hardware resource data.

Modifying a Resource

The procedures for modifying a resource involve making changes to any of the various types of resources (e.g., computers, disks, strings) on the resource planning list using the same GUIs that are used for adding resources. The procedure for modifying a resource starts with the assumption that the Resource Planner has launched the **Resource Editor** (Figure 5) and the GUI is currently being displayed.

Modifying a Resource

---

1 Select (highlight) the resource to be modified in the **Resource Name** list displayed on the **Resource Editor**, then click on the **Modify…** button to gain access to the appropriate resource details GUI.

- The type of resource selected determines which of the following GUIs appears when the **Modify…** button is activated:
  - **Disk.**
  - **Virtual Computer.**
  - **String.**
  - **Real Computer.**
  - **Autosys.**
  - **Hardware.**

2 Make desired changes to the fields of the GUI as necessary in accordance with the applicable steps of the appropriate procedure from the following list:

- **Defining Disk Resources**.
- **Defining Virtual Computer Resources**.

- **Defining Real Computer Resources**.
- **Defining String Resources**.
- **Defining AutoSys Resources**.
- **Defining Hardware Resources**.

Deleting a Resource

The procedure for deleting a resource starts with the assumption that the Resource Planner has launched the **Resource Editor** (Figure 5) and the GUI is currently being displayed.

Deleting a Resource

1 Select (highlight) the resource to be deleted in the **Resource Name** list displayed on the **Resource Editor**, then click on the **Delete** button.

- A pop-up dialogue box (Figure 16) appears with the message, "**Confirm deleting selected resource?**"

Figure 16. Delete Confirmation Dialogue Box

2 Click on the appropriate button from the following selections:

- **Ok** - to delete the resource and dismiss the dialogue box.
- **Cancel** - to leave the **Resource Definition** list unchanged and dismiss the dialogue box.

Creating a Resource Reservation Request

Creating a Resource Reservation Request

The person who needs to use resources for non-routine activities makes a resource reservation request that includes the following information:

- Activity for which the reservation request is being made.
- Resources to be dedicated to the activity.
- When/how often the activity will occur.

When the requester has submitted a resource reservation request, it is reviewed by the Resource Planner and may be evaluated by a "sponsor" who either validates (determines that the specified resources are appropriate for the proposed activity) or rejects the request.

The procedure for creating a resource reservation request starts with the assumption that the person who will be generating the request has launched the **Resource Scheduler** (Figure 6**)** and the GUI is currently being displayed.

Creating a Resource Reservation Request

1 From the Resource Scheduler, click on the **New...** button to gain access to the **Resource Reservation Request Edit/Definition** GUI.

- The **Resource Reservation Request Edit/Definition** GUI (Figure 17) is displayed.

2 Type a name for the resource request in the **Request Name** field (**Resource Reservation Request Edit/Definition** GUI).

- **Request Name** is a mandatory entry.
- Spaces are allowed in entries made in this field.
- Naming conventions (if any) for resource reservation requests depend on DAAC policy.

NOTE: The Planning Subsystem automatically fills in the **Edited Date (**date of request entry) field (you do not have to make an entry in the field).

3 Type the identification of the person making the resource reservation request in the **Originator** field.

- **Originator** is a mandatory entry.
- Spaces are allowed in entries made in this field.

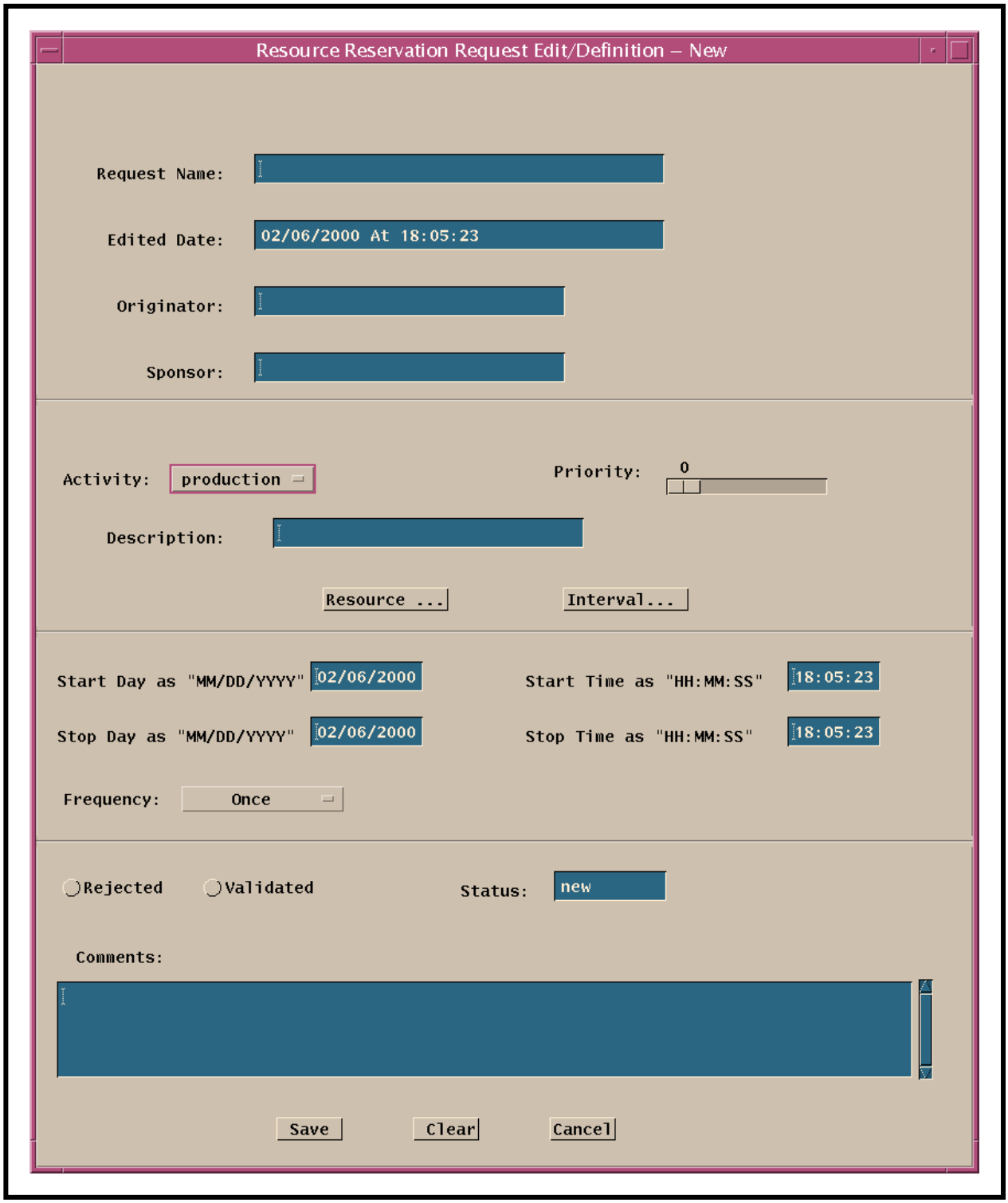

Figure 17. Resource Reservation Request Edit/Definition GUI

- Either UserID or actual name of a person may be used, depending on DAAC policy (if applicable).

4 Type the identification of the person sponsoring the resource reservation request in the **Sponsor** field.

- **Sponsor** is a mandatory entry.
- Spaces are allowed in entries made in this field.
- If appropriate, the same individual may be listed as both **Originator** and **Sponsor** (at least initially).

5 If the type of activity currently displayed on the **Activity** option button is not accurate, click and hold on the **Activity** option button and select (highlight then release the mouse button) the proper activity from the option menu that is displayed.

- The following activities are currently available:
  - **production.**
  - **test.**
  - **groundevent.**

6 Slide the **Priority** slide to the right to select the appropriate priority for the resource reservation request.

- The **Priority** scale is numbered from 0 to 100.
- The higher the number selected, the lower the priority.
  - 1 denotes the highest priority.
  - 100 designates the lowest priority.

7 Type a description of the specific activity for which the resource is required in the **Description** field.

- For example, if **Test** was selected as the **Activity**, "Version 2.0 Test TS0420" might be entered in the **Description** field to describe the particular test to be performed using the requested resources.
- **Description** is a mandatory entry.
- The entry in this field is displayed on the Resource Reservation Planning Master Timeline GUI if the resource reservation is eventually approved and committed as part of the resource plan.
- No more than 31 characters can be entered in the **Description** field; if more space is needed, use the **Comments** field.

8 Perform the procedure for **Selecting Resources** (subsequent section of this lesson).

- Resource selection is mandatory.

NOTE: The **Interval…** button is used for deselecting periods of time (if any) when the requested resources are **not** needed during the period(s) of time defined by the duration and frequency specified on the resource reservation request. The resource reservation request has to be saved before intervals can be adjusted. Consequently, the procedure for Deselecting Intervals is subordinate to the procedure for **Editing a Resource Reservation Request** and is discussed in a subsequent section of this lesson.

9 Type duration information in the following fields (to define the period over which the resource is required), pressing the **Tab** key on the keyboard after completing each entry to move to the next field:

- **Start Day** - start date of the resource request period (in ***MM/DD/YYYY*** format - mandatory entry).
- **Start Time** - start time of the resource request period (in ***hh:mm:ss*** format - mandatory entry).
- The **Start Time** must be later than the time when the resource reservation request will be saved; otherwise, it will not be possible to save the request.
- **Stop Day** - stop date of the resource request period (in ***MM/DD/YYYY*** format - mandatory entry).
- **Stop Time** - stop time of the resource request period (in ***hh:mm:ss*** format - mandatory entry).
- If a reservation is to be repeated at intervals (with some frequency), the **Stop Day** specifies the end date in the date range of the reservation request.

10 Perform the procedure for **Selecting Frequency** (subsequent section of this lesson).

- The **frequency** selection involves identifying those periods of time when the requested resources are needed for the specified activity.
- The default frequency is **Once**.

NOTE: Leave the selections **Validated** and **Rejected** for the sponsor's evaluation (to be discussed in a subsequent section of this lesson).

NOTE: The **Status** field indicates **new** when a new resource reservation request is being prepared. No entry is required in this field.

11 Type comments concerning the resource reservation request in the **Comments** field.

12 After the appropriate data have been entered in the resource reservation request fields, click on the appropriate button:

- **Save** - to save the resource reservation request.
- **Clear** - to clear entries for starting over. Once cleared, the entries are deleted from the system.
- **Cancel** - to exit the **Resource Reservation Request Edit/Definition** GUI without saving the request.

Selecting Resources

The **Resource…** button on the **Resource Reservation Request Edit/Definition** GUI provides the person submitting the request with a means of specifying the resources to be assigned to the particular resource reservation request. Upon clicking on the **Resource…** button a **Resources Selection** GUI with the following pair of lists is displayed:

- **Resources** - identifies the available resources.
- **Selected Resources** - identifies the resources that have been selected for incorporation in the resource reservation request.

The person submitting the request selects resources by moving resources from one list to the other until the **Selected Resources** list contains the desired set of resources. The requester highlights each resource to be moved and clicks on the appropriate arrow button to make the transfer.

The procedure for selecting resources starts with the assumption that the person submitting the request has launched the **Resource Scheduler** and the **Resource Reservation Request Edit/Definition** GUI (Figure 17) is currently being displayed.

Selecting Resources

---

1 Click on the **Resource…** button to gain access to the **Resources Selection** GUI.

- The **Resources Selection** GUI (Figure 18) is displayed.
- The **Request Name** field is blank and is to remain empty.
- The **Resources Selection** GUI shows a pair of lists.
  - **Resources** - itemizes the available resources.
  - **Selected Resources** - itemizes the resources that have been selected for incorporation into the resource reservation.

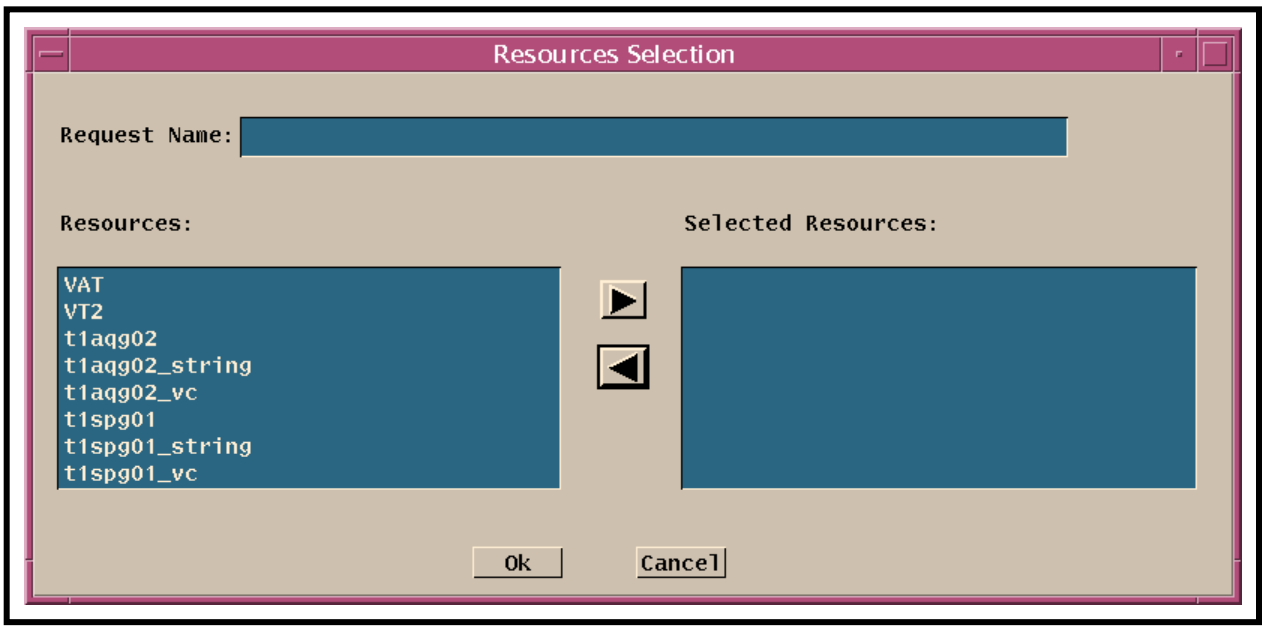

Figure 18. Resources Selection GUI

2 Move resources (as necessary) between the **Resources** and **Selected Resources** lists on the **Resources Selection** GUI by selecting (highlighting) the resource to be moved (click on the resource in the list from which it is to be moved) then clicking on the right or left arrow button (as applicable) to move the resource to the other list.

- Highlighted resource disappears from one list and appears on the other.

3 When the appropriate data have been entered in the resource fields, click on the appropriate button from the following selections:

- **Ok** - to save the selections, exit the **Resources Selection** GUI and return to the **Resource Reservation Request Edit/Definition** GUI.
- **Cancel** - to exit the **Resources Selection** GUI and return to the **Resource Reservation Request Edit/Definition** GUI without saving the selected resources.

4 Return to the procedure for **Creating a Resource Reservation Request** or the procedure for **Editing a Resource Reservation Request** (as applicable) and go to the next step in the process of defining the resource reservation request.

Selecting Frequency

The **Frequency** option button on the **Resource Reservation Request Edit/Definition** GUI (Figure 17) allows the user to specify whether the resource reservation request describes a one-time event or a recurring event. Furthermore, the **Frequency** button provides options for

periodic resource requests; i.e., to specify how often a repeating resource need will occur. Several options for specifying the frequency are available in the **Frequency** option menu and there is a text field in which the person making the request enters a qualifier for certain frequencies. The default frequency is **Once**, which indicates that the resource need covers the entire time period between the 'Start Time' and 'Stop Time' (if the request is for one day only, a single Start Date is required for the **Once** option only). Other options are identified in Table 2, Frequency List and Qualifiers. The frequency data are applied to the resources specified in the **Selected Resources** list box (described in the preceding section).

Table 2. Frequency List and Qualifiers

Frequency	Text Qualifier	Result
Once		The default. Resource reservation covering the period between the start time and stop time for the start/stop date specified.
Daily		Resource reservation for every day, between the start date and end date, for the start time and end time specified.
Weekly		Resource reservation for every week on the start day of the week between the start time and end time specified, repeated every week until the specified end date.
Every_2_weeks		Resource reservation for every two weeks on the start day of the week between the start time and end time specified, repeated every two weeks until the specified end date.
Monthly		Resource reservation for every month on the start day of the month, repeated until the end date as specified.
Mon_thru_Fri		Resource reservation for every Monday through Friday, between the start date and end date, for the start time and end time specified.
Mon_Wed_Fri		Resource reservation for every Monday, Wednesday, and Friday, between the start date and end date, for the start time and end time specified.
Tues_Thurs		Resource reservation for every Tuesday and Thursday, between the start date and end date, for the start time and end time specified.
Every_?_Days	*n*	Resource reservation for every *n* days, between the start date and end date, for the start time and end time specified.
Weekend		Resource reservation for every Saturday and Sunday, between the start date and end date, for the start time and end time specified.

The procedure for selecting resources starts with the assumption that the person submitting the resource reservation request has launched the **Resource Scheduler** and the **Resource Reservation Request Edit/Definition** GUI (Figure 17) is currently being displayed.

Selecting Frequency

---

1 Click and hold on the **Frequency** option button on the **Reservation Request Edit/Definition** GUI and select (from the option menu that is displayed) the appropriate frequency to be applied to the resource reservation request.

- The frequency options on the menu are shown in Table 2, Frequency List and Qualifiers.

2 If **Every_?_Days** was selected as the frequency, type the number of days between actions in the field to the right of the **Frequency** button.

3 Return to the procedure for **Creating a Resource Reservation Request** or the procedure for **Editing a Resource Reservation Request** (as applicable) and go to the next step in the process of defining the resource reservation request.

Editing a Resource Reservation Request

Editing a Resource Reservation Request

During the process of evaluating resource reservation requests to validate and approve them and achieve a conflict-free resource plan, it may be necessary to edit some of the resource reservation requests. For example, any of the following factors may lead to the modification of a resource reservation request:

- Activities related to evaluation of the resource reservation request for validation purposes.
- Change in the activity/event for which a resource reservation request was prepared.
- Addition or deletion of resources.
- Modification of intervals for recurring ground events.
- Resource conflicts.

Before editing a resource reservation request, the person editing the request must be able to provide the same types of information that were required for making the initial request (including the appropriate changes to be made). In addition, the person editing the request must know which request is to be edited.

The procedure for editing a resource reservation request starts with the assumption that the person editing the request has launched the **Resource Scheduler** (Figure 6), which is currently being displayed.

Editing a Resource Reservation Request

1 If the resource reservation request to be edited is not included in the list displayed on the **Resource Scheduler**, click and hold on the **Activity Type** option button and select the appropriate category of activity (or select **All**) from the option menu that is displayed.

2 From the **Resource Scheduler**, highlight (click on) the resource reservation request you want to modify then click on the **Modify…** button to access the **Resource Reservation Request Edit/Definition** GUI.

- The **Resource Reservation Request Edit/Definition** GUI (Figure 17) containing the data for the selected resource reservation request is displayed.

3 Observe the **Resource Reservation Request Edit/Definition** GUI **Status** field, which indicates the current status of the reservation request.

- **Status** is a Planning Subsystem-generated entry based on user input in other fields.
- **Status** field may indicate "new," "validated," "rejected," "approved," "committed," etc.

4 If assigning a sponsor to evaluate (validate) the resource reservation request, type the sponsor's User ID in the Sponsor field.

5 If changing the selection of resource(s), perform the procedure for **Selecting Resources** (previous section of this lesson).

6 If making an interval adjustment, perform the procedure for **Deselecting Interval** (subsequent section of this lesson).

- The **interval** selection involves identifying those periods of time (if any) when the requested resources are **not** needed during the period(s) of time defined by the duration and frequency specified on the resource reservation request.

7 If making a frequency adjustment, perform the procedure for **Selecting Frequency** (previous section of this lesson).

8 Make modifications by completing Steps 5 through 11 (as necessary) of the procedure for **Creating a Resource Reservation Request**.

- Make changes in the following fields as necessary:
  - **Activity.**
  - [Activity] **Description.**
  - **Start Day.**
  - **Stop Day.**
  - **Start Time.**
  - **Stop Time.**
  - **Comments.**
- **Status** will revert to **new** when the edited resource reservation request is saved if certain types of modifications have been made (e.g., changes in the selected resources or start/stop date/time).

9 If appropriate at this time, click on either the **Validated** button or the **Rejected** button.

- If evaluating the request as a sponsor.

- Refer to the procedure for **Validating or Rejecting a Resource Reservation Request** (a subsequent section of this lesson).

10 After the appropriate data have been entered in the resource reservation request fields, click on the appropriate button(s) from the following selections:

- **Save** - to save the modified resource reservation request and dismiss the **Resource Reservation Request Edit/Definition** GUI.
- **Clear** - to clear entries for starting over without dismissing the **Resource Reservation Request Edit/Definition** GUI. Once cleared, the entries are deleted from the system.
- **Cancel** - to exit the **Resource Reservation Request Edit/Definition** GUI without saving the modified request.

Deselecting Interval

The **Interval…** button on the **Resource Reservation Request Edit/Definition** GUI (Figure 17) allows the person editing the resource reservation request to tailor a **frequency-based** request by overriding selected intervals. When the requester clicks on the **Interval…** button, a **Resource Reservation Intervals Selection** GUI (Figure 19) with the following pair of lists is displayed:

- **Selected Intervals** – initially identifies the dates applicable to the resource reservation request as automatically generated by the Planning Subsystem, based upon the duration and frequency information entered (as described in preceding sections).
- **Unselected Intervals** - the person modifying the resource reservation request selects the date(s), if any, from among the automatically generated intervals to identify when the requested resources will **not** be needed for the activity for which the resource reservation request was prepared.

The procedure for deselecting intervals starts with the assumption that the person modifying the resource reservation request has launched the **Resource Scheduler** and the **Resource Reservation Request Edit/Definition** GUI (Figure 17) containing the data for the selected resource reservation request is currently being displayed.

Deselecting Intervals

---

1 Click on the **Interval…** button on the **Resource Reservation Request Edit/Definition** GUI to gain access to the **Intervals Selection** GUI.

- The **Intervals Selection** GUI (Figure 19) is displayed.

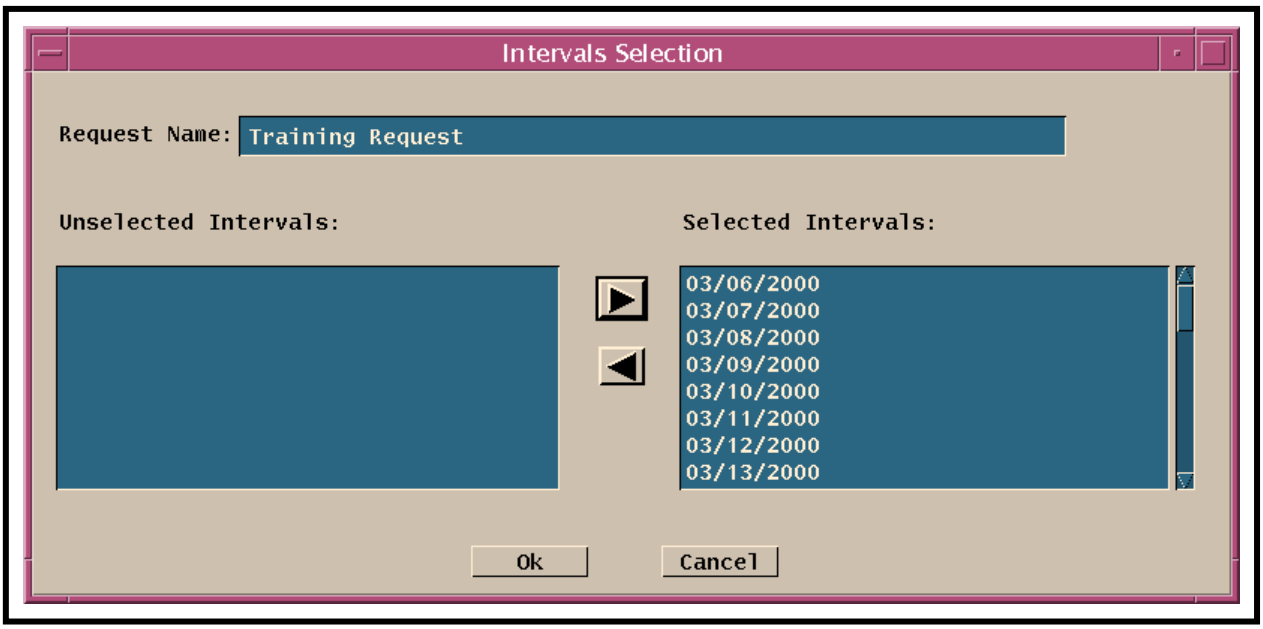

Figure 19. Resource Reservation Intervals Selection GUI

- The **Intervals Selection** GUI shows the following pair of lists:
  - **Unselected Intervals** - lists dates (if any) that do **not** need to be reserved for the resource reservation request.
  - **Selected Intervals** - identifies the applicable dates for the resource reservation request (initially automatically generated by the system based upon the duration and frequency information entered).

2 Move dates (as necessary) between the **Unselected Intervals** and **Selected Intervals** lists on the **Intervals Selection** GUI by selecting (highlighting) the date to be moved (click on the date in the list from which it is to be moved) then clicking on the right or left arrow button (as applicable) to move the date to the other list.

- Highlighted date disappears from one list and appears on the other.

3 When the appropriate data have been entered in the interval fields, click on the appropriate button from the following selections:

- **OK** - to save the selections, exit the **Intervals Selection** GUI and return to the **Resource Reservation Request Edit/Definition** GUI.
- **Cancel** - to exit the **Intervals Selection** GUI and return to the **Resource Reservation Request Edit/Definition** GUI without saving the selections.

4 Return to the procedure for **Editing a Resource Reservation Request** and go to the next step in the process of modifying the resource reservation request.

Validating or Rejecting a Resource Reservation Request

All resource reservation requests must be validated and approved before scheduling. Validation is the process by which a request is checked to ensure that it is complete and reasonable (requested resources are appropriate for the stated activity).

After reviewing a resource reservation request, the Resource Planner may choose to consult with appropriate DAAC staff or assign a staff member ("sponsor") to validate the request. When a resource reservation request has been evaluated by a sponsor and either validated or rejected, the status of the request, as viewed on the **Resource Scheduler** (Figure 6), changes to the newly assigned status.

Before evaluating a resource reservation request for the purpose of validating or rejecting it, the evaluator (sponsor) must know which request is to be evaluated.

The procedure for validating or rejecting a resource reservation request starts with the assumption that the sponsor has launched the **Resource Scheduler** and the **Resource Scheduler** (Figure 6) is currently being displayed.

Validating or Rejecting a Resource Reservation Request

---

1 If the desired resource reservation request is not included in the list displayed on the **Resource Scheduler**, click and hold on the **Activity Type** option button and select the appropriate category of activity (or select **All**) from the option menu that is displayed.

2 From the **Resource Scheduler**, highlight (click on) the resource reservation request to be validated.

3 Click on the **Modify…** button to gain access to the **Resource Reservation Request Edit/Definition** GUI.

- The **Resource Reservation Request Edit/Definition** GUI (Figure 17) containing the data for the selected resource reservation request is displayed.

4 Evaluate the entries in the **Resource Reservation Request Edit/Definition** GUI fields, especially the following fields:

- **Activity.**
- **Description.**
- **Priority.**

- **Start Day.**
- **Stop Day.**
- **Start Time.**
- **Stop Time.**
- **Frequency.**
- **Status.**
- **Comments.**

5 Click on the **Resource…** button.

- The **Resources Selection** GUI (Figure 18) is displayed.

6 Evaluate the entries in the **Resources** and **Selected Resources** fields.

7 Click on the **Cancel** button.

8 Click on the **Interval…** button.

- The **Interval Selection** GUI (Figure 19) is displayed.

9 Evaluate the entries in the **Unselected Intervals** and **Selected Intervals** fields.

10 Click on the **Cancel** button.

11 Click on either the **Validated** button or the **Rejected** button as appropriate.

- **Validated** indicates that the resource reservation request is complete and "makes sense;" i.e., the request includes the appropriate resources consistent with the type of activity that is being proposed.
- **Rejected** indicates that the resource reservation request is not acceptable as submitted.

12 If appropriate, update the **Comments** field by typing relevant comments concerning the resource reservation request, especially reasons for rejection.

13 After the appropriate data have been entered in the resource reservation request fields, click on the appropriate button(s):

- **Save** - to save the modified resource reservation request and dismiss the **Resource Reservation Request Edit/Definition** GUI.
- **Clear** - to clear entries without dismissing the **Resource Reservation Request Edit/Definition** GUI. Once cleared, the entries are deleted from the system.

- **Cancel** - to exit the **Resource Reservation Request Edit/Definition** GUI without saving the modified request.

Approving a Resource Reservation Request

As previously mentioned all resource reservation requests must be validated and approved before scheduling. The resource reservation request approval process has the following general steps:

- The sponsor has validated the resource reservation request (request status is "validated").
- The Resource Planner changes the status of the resource reservation request to "approved" (enters the approval into the Planning Subsystem).
- The Planning Subsystem checks for conflicts between the resource reservation and other reservations.
- If conflicts are detected…
  - A dialogue box pops up indicating that there are conflicts that must be resolved.
  - The Resource Planner resolves the conflicts (in consultation with the Resource Manager and resource requesters, if necessary), making appropriate modifications to resource reservation requests.
- The Planning Subsystem allows the approval of a resource reservation request only if there are no scheduling conflicts.
- The Resource Manager reviews the set of "approved" resource reservation requests and changes the status of resource reservation requests to "committed" (refer to the next section of the lesson, "Committing a Resource Reservation Request"), which has the effect of activating the resource plan.
  - However, committed resource reservations/ground events cannot take effect until they have been sent to Data Processing as part of an activated production plan.

When preparing a resource plan for approval and eventual activation, the Resource Planner should consult with the Resource Manager concerning what effects resource reservation requests would have on high-priority activities.

The procedure for approving one or more resource reservation requests starts with the assumption that the Resource Planner has launched the **Resource Scheduler** (Figure 6), which is currently being displayed. Furthermore, it is assumed that the Resource Planner knows which resource reservation request(s) should be approved (from among those that have been validated).

1 If the desired resource reservation request is not included in the list displayed on the **Resource Scheduler**, click and hold on the **Activity Type** option button and select the appropriate category of activity (or select **All**) from the option menu that is displayed.

2 Highlight (click on) the resource reservation request to be approved.

3 Click on the **Approve** button to request approval from the Planning Subsystem.

- If there are resource conflicts resulting from the attempt to approve the resource reservation request, a pop-up dialogue box (Figure 20) appears indicating that the approval failed and making reference to the **Message Handler** GUI (Figure 4) for further information.

Figure 20. PlRpSiMsgBox_popup (Approval Failed) Dialogue Box

4 Click on the **OK** button to collapse the pop-up dialogue box.

- If there are **no** resource conflicts to be resolved, the entry in the **Status** column of the **Resource Scheduler** indicates that the request is "Approved" (changes from “Validated”). [End of procedure.]
- If there are resource conflicts to be resolved, the entry in the **Status** column of the **Resource Scheduler** indicates that the request has "Conflicts" (changes from “Validated”). [Continue with Step 5.]

5 If there are resource conflicts to be resolved, examine the information displayed on the **Resource Scheduler**.

- Although the pop-up dialogue box makes reference to the **Message Handler** GUI for further information, no relevant data seems to be displayed there. Therefore, it is more appropriate to check for conflicts in the duration and frequency information for the resource reservation requests displayed on the **Resource Scheduler**. When more than one resource reservation request is scheduled for the same date and time, there may be a conflict (if the same resource is specified in the requests).
- It may be necessary to examine individual resource reservation requests in detail. If so, use the procedure for **Editing a Resource Reservation Request**.

6 If necessary, consult with the resource requester(s), Resource Manager and other personnel to determine which resource reservation request(s) to modify or delete in order to create a conflict-free resource plan.

7 If applicable, go to the procedure for **Deleting a Resource Reservation Request** and delete resource reservation request(s) as necessary to resolve the conflicts.

8 If applicable, go to the procedure for **Editing a Resource Reservation Request** and modify/validate resource reservation request(s) as necessary to resolve the conflicts.

9 If applicable, return to Step 1 to approve a modified resource reservation request.

- The modified procedure must have been "validated." If necessary, refer to the procedure for **Validating or Rejecting a Resource Reservation Request**.

Committing Resource Reservation Requests

After resource reservation requests have been validated and approved, and conflicts have been resolved, the following actions are taken:

- Resource Manager determines the effects of the "approved" resource reservation requests on high-priority activities.
- Resource Manager commits the resource reservation requests if reserving the resources will **not** have adverse effects on high-priority activities.
- Planning Subsystem updates the status of "approved" resource reservation requests to "committed" in the PDPS database.

- All committed resource reservations are automatically included in the next production plan to be activated through the Planning Workbench and are subsequently sent to Data Processing.
  - Resource reservations/ground events cannot take effect until they have been sent to Data Processing as part of an activated production plan.
- In Data Processing a “ground event” job for each resource reservation is sent to the specified resource(s) at the indicated start time.
  - If a data processing job is already using the specified resource(s) at the ground event’s scheduled start time, the data processing job runs to completion before releasing the resource(s) to the ground event job.

The procedure for committing resource reservation requests starts with the assumption that the Resource Manager has launched the **Resource Scheduler** (Figure 6), which is currently being displayed. All resource reservation requests with a status of “Approved” have their status changed to “Committed” at the same time.

Committing Resource Reservation Requests

1 If all approved resource reservation requests are not included in the list displayed on the **Resource Scheduler**, click and hold on the **Activity Type** option button and select **All** from the option menu that is displayed.

2 Click on the **Commit globally** button.

- The entries in the **Status** column for all “Approved” requests change to "Committed."

3 To view a graphical representation of the resource plan go to the procedure for **Reviewing a Resource Timeline** (subsequent section of this lesson).

NOTE: Resource reservations/ground events are not sent to data processing and cannot be implemented until they have been included in a production plan. Refer to procedure on creating production plans in the lesson on Production Planning and Processing.

Deleting a Resource Reservation Request

If a resource reservation request is to be deleted (e.g., having been rejected and incapable of being satisfactorily modified), the request can be deleted. The resource reservation request is dropped from the resource reservation request list but is not removed immediately from the PDPS database (although it is assigned a status of “deleted”). Eventually “deleted” resource reservations are removed from the PDPS database through routine database maintenance activities.

The procedure for deleting one or more resource reservation requests starts with the assumption that the Resource Planner or Resource Manager has launched the **Resource Scheduler** (Figure 6), which is currently being displayed. Furthermore, it is assumed that the Resource Planner knows which resource reservation request(s) should be deleted (among those listed).

Deleting a Resource Reservation Request

1 If the desired resource reservation request is not included in the list displayed on the **Resource Scheduler**, click and hold on the **Activity Type** option button and select the appropriate category of activity (or select **All**) from the option menu that is displayed.

2 Highlight (click on) the resource reservation request to be deleted.

3 Select **File → Delete** from the **Resource Scheduler** pull-down menu.

- The entry for the resource reservation request is deleted from the GUI.

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Reviewing Resource Timelines

Reviewing a Resource Timeline

The Resource Planning software has provisions that allow the operator to view the Resource Plan as a timeline. The timeline display represents a set of resources, arranged along the left side of the screen, and some period of time indicated across the top edge of the screen.

The use of a resource over a period of time is represented by one or more "resource reservation" bars across the screen.

- A bar represents a time period during which a resource reservation has been planned.
- Each bar bears the name of the resource reservation. Given the selection of a light enough color for the bar and a time span that allows a long enough bar, the name of the resource reservation can be seen on the bar.
  - Placing the cursor on a resource reservation bar causes the name of the resource reservation, its description, and its start and end dates/times to appear near the bottom of the timeline GUI.
- At those times when there is no reservation affecting a particular resource, the resource plan makes it available for its default activity.
  - Example: By default all science processors will be used for science processing unless a reservation for some other activity (e.g., maintenance or testing) has been made for a specific science processor.

The procedure for reviewing a resource timeline starts with the assumption that the person who will be reviewing the timeline has launched the **Resource Scheduler** (Figure 6) and the GUI is currently being displayed.

Reviewing a Resource Timeline

1 From the **Resource Scheduler** click on the **Timeline** button.

- The **Resource Reservation Planning Master Timeline** GUI (Figure 21) is displayed.

2 Adjust the **Resource Reservation Planning Master Timeline** GUI window size and the view of the timeline as necessary using the mouse.

- Grab a corner of the timeline window with the cursor and resize the window as desired.
- Scroll up or down through the full list of resources.

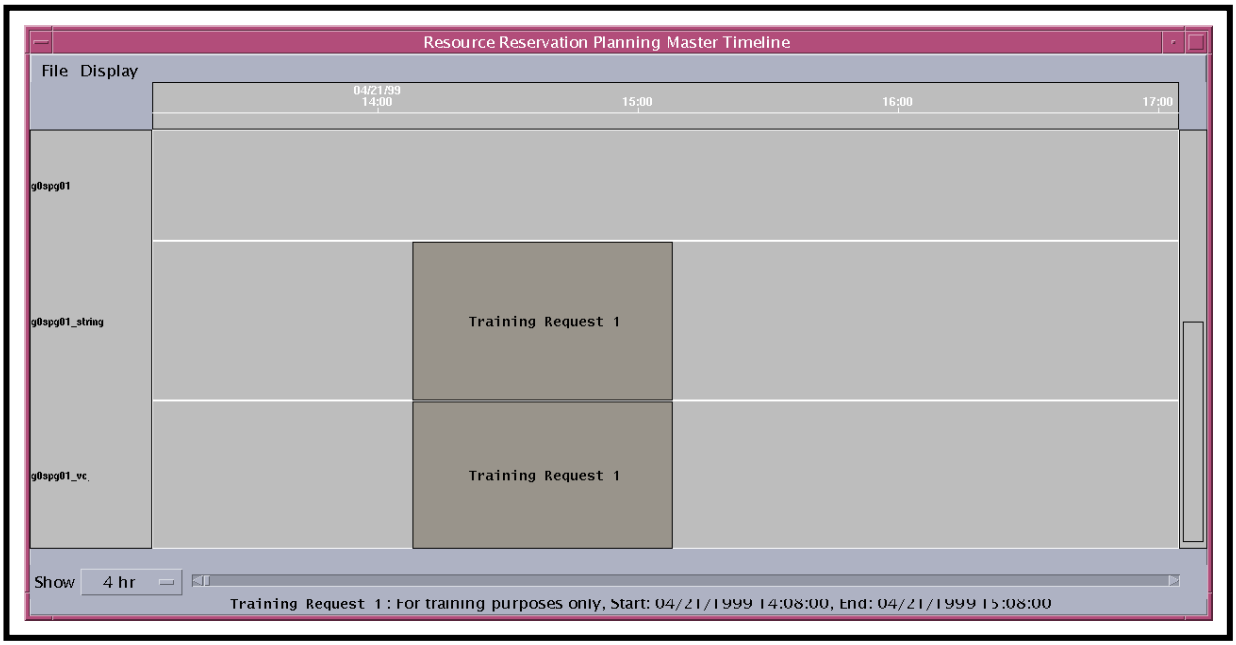

Figure 21. Resource Reservation Planning Master Timeline GUI

- Scroll left or right to go backward or forward in time.

3 If a different time scale (start and end dates and times) is desired, perform Steps 4 through 6; otherwise, go to Step 7.

4 Select **Display** → **Change Time Scale** from the pull-down menu:

- The **plan window edit** window (Figure 22) is displayed.

5 Type date and time for the desired start and end times (in ***DD MMM YYYY hh:mm:ss*** format) in the **Plan Win Start** and **Plan Win End** fields of the **plan window edit** window.

6 When the appropriate date and time have been entered, click on the appropriate button from the following selections:

- **OK** - to accept the changes and dismiss the **plan window edit** window.
- **Apply** - to accept the changes without dismissing the **plan window edit** window.
- **Cancel** - to cancel the changes and dismiss the **plan window edit** window.

Figure 22. Plan Window Edit Window

7 If a different time span is desired, click and hold on the **Show** option button and select (highlight then release the mouse button) the desired time span from the option menu that is displayed:

- **1 hr**
- **4 hr**
- **8 hr**
- **12 hr**
- **24 hr**
- **48 hr**
- **4 day**
- **1 week**
- **2 week**
- **1 month**
- **full scale**

8 If no resources are displayed on the GUI or if different resources should be displayed, perform Steps 9 through 13; otherwise, go to Step 14.

9 Select **Display** → **Change resources** from the pull-down menu:

- The **Resource edit** window (Figure 23) is displayed.

10 If adding resource(s) from the **Available Resources** list to the **Viewed Resources** list, select (highlight) the resource(s) to be added, then click on the **Add** button to move the resource(s) to the **Viewed Resources** list.

- Highlighted resource(s) appear(s) on the **Viewed Resources** list.

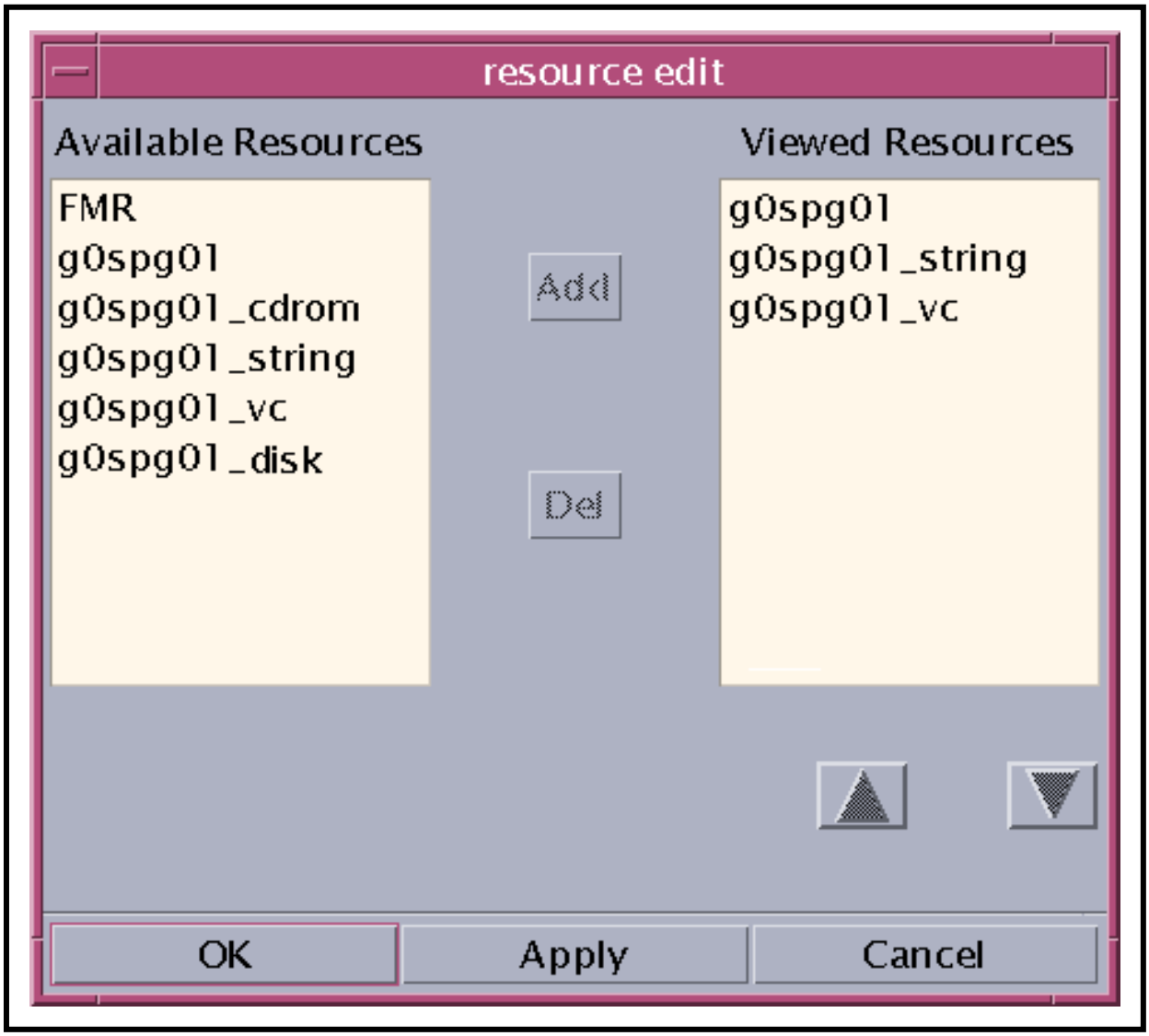

Figure 23. Resource Edit Window

11 If deleting resource(s) from the **Viewed Resources** list, select (highlight) the resource(s) to be removed, then click on the **Del** button to remove the resource(s) from the **Viewed Resources** list.

- Highlighted resource(s) disappear(s) from the **Viewed Resources** list.

12 If changing the order in which resources are listed in the **Viewed Resources** list, select (highlight) the resource to be moved, then click on the up or down arrow as necessary to reposition the selected resource.

- Highlighted resource changes position in the **Viewed Resources** list.

13 When the **Viewed Resources** list contains the desired set of resources, click on the appropriate button from the following selections:

- **OK** - to accept the changes and dismiss the **Resource edit** window.
- **Apply** - to accept the changes without dismissing the **Resource edit** window.
- **Cancel** - to cancel the changes and dismiss the **Resource edit** window.

14 If different color-coding of the timeline is desired, perform Steps 15 through 19; otherwise, go to Step 20.

15 Select **Display → Change colors** from the pull-down menu:

- The **Color Selections** window (Figure 24) is displayed.

16 Click on the name of one of the resource reservations to be recolored.

- The resource reservation is highlighted.

17 Click on the desired color (in the color palette) to be applied to the highlighted resource reservation.

18 Repeat Steps 16 and 17 as necessary.

19 When the appropriate color changes have been made, click on the appropriate button from the following selections:

- **OK** - to accept the changes and dismiss the **Color Selections** window.
- **Apply** - to accept the changes without dismissing the **Color Selections** window.
- **Cancel** - to cancel the changes and dismiss the **Color Selections** window.

20 Observe the resource reservation information displayed on the **Resource Reservation Planning Master Timeline** GUI.

21 Repeat the previous steps as necessary.

22 If it becomes necessary to exit from the timeline GUI, select **File → Quit** from the pull-down menu.

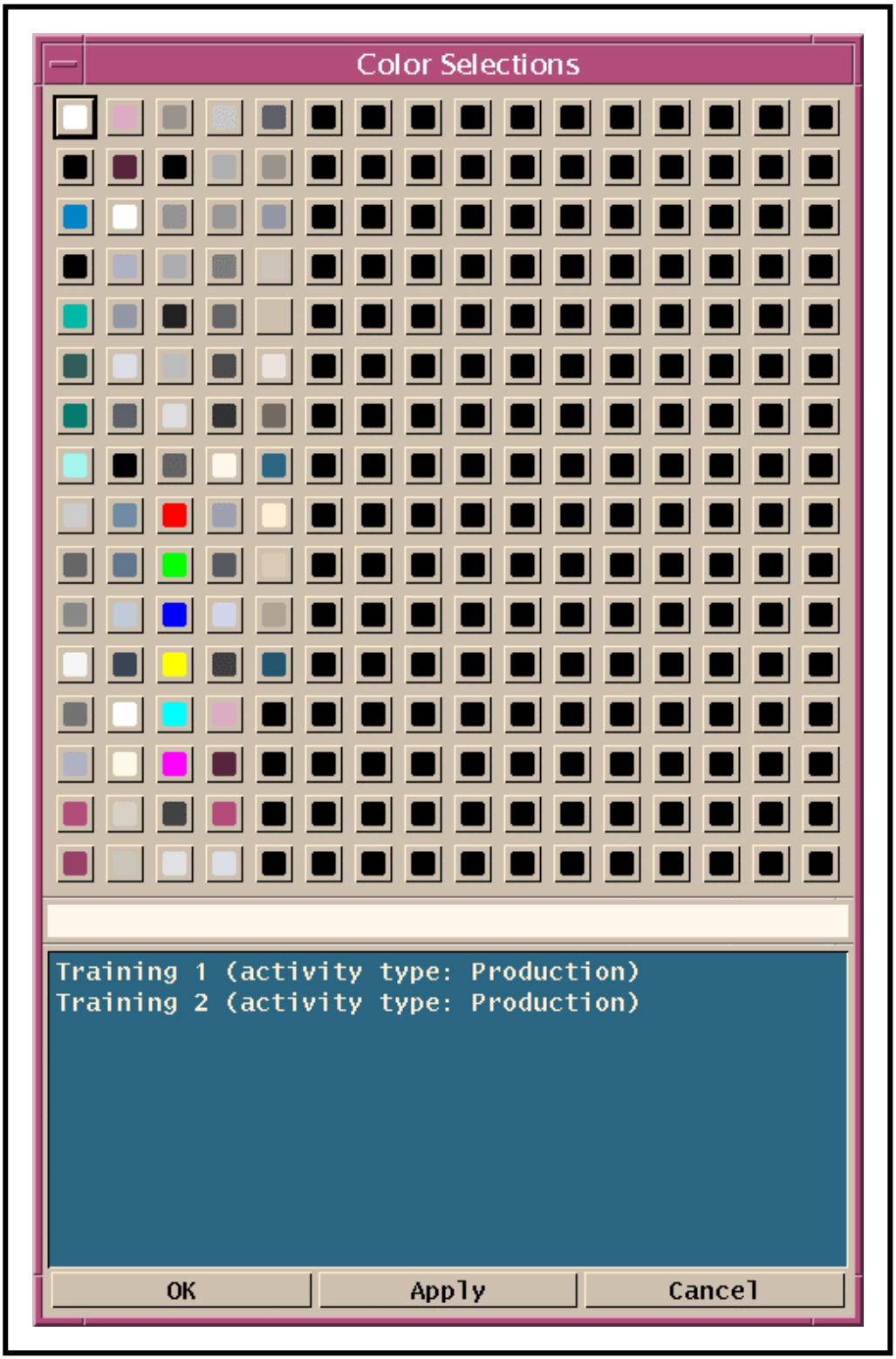

Figure 24. Color Selections Window

Tuning System Parameters

Tuning System Configuration Parameters

The values assigned to system parameters affect the functioning and performance of the system. When certain parameters are modified, the system operates differently. Changes to some other parameters may not appear to affect the system although there may in fact be subtle effects. In any case before system parameters are modified it is essential to understand what will happen to system functioning and performance.

Many system parameters may be subject to control by Configuration Management (CM). When making or requesting a change to system parameters, the CM process at the particular site must be followed (if applicable).

Values are assigned to Data Processing Subsystem and Planning Subsystem parameters in the following databases:

- PDPS database.
- Configuration Registry database.

The Configuration Registry Server provides a single interface (via a Sybase server) for retrieving configuration attribute-value pairs for system servers from the Configuration Registry database. When system servers are started, they access the Configuration Registry Database to obtain needed configuration parameters.

The Database Administrator has access to a Configuration Registry GUI for viewing and editing configuration data in the database. Therefore, it is necessary to coordinate with the Database Administrator when changes to configuration parameters are needed. Also, as previously mentioned, changes to configuration-controlled parameters are subject to approval through the site CM process.

Default and adjusted values assigned to system parameters vary from site to site. For guidance concerning the assignment of values to parameters included in the Configuration Registry refer to document 910-TDA-022, *Custom Code Configuration Parameters for ECS*. The document is available at http://cmdm-ldo.raytheon.com/baseline/ under "Technical Documents."

The following parameters are examples of parameters whose values may be modified to enhance system functioning or performance:

- AppLogSize [parameter applies to all servers].
  - Maximum size of the application log (ALOG) file for a particular application.
  - Recommended size varies considerably depending the nature of the application for which the file is being written.

- AppLogLevel [parameter applies to all servers].
  - Level of detail provided in the ALOG file for a particular application.
  - Acceptable values are 0, 1, 2, or 3.
  - A setting of “0” provides the most data.
- DebugLevel [parameter applies to all servers].
  - Level of detail provided in the debug log file for a particular application.
  - Normally acceptable values are 0, 1, 2, or 3.
  - A setting of "0" turns off logging; a setting of “3” provides a significant amount of data.
- DpPr_MAX_RETRIES [EcDpPrEM and EcDpPrDeletion parameter (also EcDpPrQaMonitorGUI and several Science Software Integration and Test programs)].
  - Number of retries (e.g., 30) to the Science Data Server for acquires/inserts before giving up.
- DpPr_WAIT_PERIOD [EcDpPrEM and EcDpPrDeletion parameter (also EcDpPrQaMonitorGUI and several Science Software Integration and Test programs)].
  - Time in seconds (e.g., 120) to wait between retries to the Science Data Server.
- DpPrRM_MAX_RETRIES [EcDpPrEM, EcDpPrGE, EcDpPrJobMgmt, EcDpPrDeletion parameter].
  - Maximum number (e.g., 100) of attempts to allocate a computer resource.
- DpPrRM_RETRY_PERIOD [EcDpPrEM, EcDpPrGE, EcDpPrJobMgmt, EcDpPrDeletion parameter].
  - Number of seconds (e.g., 120) between retries when trying to allocate a resource.
- DpPrMaxConcurrentDPRs [EcDpPrJobMgmt parameter].
  - Maximum allowed jobs.
  - Three integer values (e.g., 100 100 100) are assigned to DpPrMaxConcurrentDPRs; the first for routine processing; the second for on-demand processing; and the third for reprocessing jobs.
- DpPrMinConcurrentDPRs [EcDpPrJobMgmt parameter].
  - Minimum allowed jobs.

  - Three integer values (e.g., 0 0 0) are assigned to DpPrMaxConcurrentDPRs; the first for routine processing; the second for on-demand processing; and the third for reprocessing jobs.
  - Minimum number of concurrent DPRs for each job class (i.e., routine, on demand, reprocessing) NOT CURRENTLY USED.
- DpPrAutoSysMaxDPRs [EcDpPrJobMgmt parameter].
  - Total number of jobs (e.g., 100) allowed in AutoSys.
- DpPrDeleteFailedPGEJobs [EcDpPrJobMgmt parameter].
  - If TRUE, failed PGE Jobs are removed by Job Management, as necessary, when space is needed for another job that is ready to run. This is recommended to keep job management straightforward. However, this may be confusing for the operator, since they may not get a chance to see the failure if the system is busy.
  - If FALSE (the usual value), failed PGE Jobs are left in AutoSys. They must not be removed manually from AutoSys, however, since they will be removed by the Production Request Editor when a Production Request or DPR is cancelled.
- DBConnections [EcPoConnections (includes EcPlSubMgr, EcPlOdMgr, EcDpPrDeletion, EcDpPrJobMgmt and EcDpPrJobMgmtClient) parameter].
  - Number of connections needed by a particular application (e.g., 10 for EcPlOdMgr).
  - Optional parameter that specifies the number of connections to maintain in the connection pool.
  - The parameter is a list of positive integers. There must be one entry for each DbHandle in the DbHandleList.
  - Generally it should be set to the maximum number of connections that are expected to be used simultaneously in a process. If one connection per thread is used, this will be the same as the number of concurrent threads expected to execute. When the pool is used up there is a performance penalty to allocate and deallocate connections on the fly.
  - If this parameter is not specified or is given as “NONE”, it defaults to 1.
- SleepDelayForFailures [EcPlSubMgr parameter].
  - Amount of time in seconds (e.g., 60) to wait before reprocessing failed notifications. If the specified value were less than 60, a default value of 60 seconds would be assumed.
  - Duration of the sleep delay used by the failed notification thread in seconds.

  - Less frequent checking can increase speed for the other threads.
- SleepDelayForTimers [EcPlSubMgr parameter].
  - Amount of time in seconds (e.g., 60) the Subscription Manager should sleep between checking for expired timers. It should be set to the minimum amount of time a timer will be set for at this DAAC. The minimum it can be set to is 60 seconds.
  - Duration of sleep delay used by the timer checking thread in seconds.
  - Less frequent checking can increase speed for the other threads.
- SleepDelayForExp [EcPlOdMgr parameter].
  - Sleep delay for expiration thread in seconds (e.g., 86400).
  - Should be considerably greater than the sleep delay for completion threads (SleepDelayForCmp).
- SleepDelayForCmp [EcPlOdMgr parameter].
  - Sleep delay for completion threads in seconds (e.g., 300).
  - Should be considerably less than the sleep delay for expiration threads (SleepDelayForExp).
- SocketLimit [EcDpPrDeletion, EcDpPrJobMgmt, EcPlOdMgr, EcPlSubMgr parameter].
  - Number of connections (e.g., 200) to a server through the Hubble Space Telescope (HST) sockets middleware.
  - Too low a number misses connections.
  - Too high a number may adversely affect the memory of the server's host.

When the value assigned to a parameter has been changed and saved in the Configuration Registry, the modified value does not take effect until the affected server has been restarted. For example, if the debug level for the Subscription Manager log has been changed from “2” to “3” in the Configuration Registry, the modification does not affect the recording of data in the log until after a warm restart of the Subscription Manager (at which time the server would read the parameters in the Configuration Registry).

Monitoring the Load on Processing Resources

The Production Planner and Production Monitor should work with the Resource Planner to make optimum use of processing resources. The Resource Planner allocates the disk partitions, CPUs, and RAM available for processing among the active modes (e.g., OPS, TS1, TS2). The Production Planner and Production Monitor monitor the load on the processing resources.

The Resource Planner assigns the bulk (typically 60% - 80%) of the processing resources to the OPS mode. The remainder of the processing assets are divided among the modes used for SSI&T and new version software checkout.

The Production Planner and Production Monitor monitor the load on the processing resources to identify whether the actual load is appropriately distributed among modes. They inform the Resource Planner of under- or over-use of resources as allocated.

When monitoring the load on the processing resources, the Production Planner and Production Monitor should take the following considerations into account:

- Disk space allocated to OPS mode is likely to be used to capacity.
- Disk space assigned to the other two modes may not fill up.
- There is no one-to-one mapping of CPU allocation with actual CPUs on the science processor.
- The operating system (OS) takes care of true CPU and RAM allocation.
  - Actual CPU usage during processing is limited by the OS.
  - If ten CPUs have been specified for a particular mode, only ten Data Processing Requests (DPRs) can be running the Execute job at a given time.
  - What is really being defined is the maximum number of DPRs that will execute at a given time.
- CPUs can be over-allocated or under-allocated as necessary to get the most out of the CPUs on each science processor.
- If monitoring indicates that the processor is underused when OPS mode is at full processing capacity, the number of CPUs allocated to OPS mode could probably be increased.
- If the science processor is at full capacity when OPS mode is at full processing capacity (and the processor may be overworked) the number of CPUs allocated to OPS mode should be reduced.
- Random-access memory (RAM) is subject to the same considerations as CPUs.
  - RAM can be over-allocated or under-allocated as necessary to get the most out of the memory on each science processor.

Strategies for Tuning

A scenario that demonstrates how DPRs might be processed under a particular set of conditions and some strategies for tuning the system are presented in the paragraphs that follow. The processing conditions include the following types of items:

- The total number of jobs allowed into AutoSys.
- The number of CPUs available for processing.
- Characteristics of the PGEs to be processed.

The total number of jobs allowed into AutoSys is controlled by the DpPrPgeLimits table in the PDPS database. An example of some of the types of data maintained in the DpPrPgeLimits table is shown in Table 3.

Table 3. Example of PDPS Database DpPrPgeLimits Table Contents (Selected Columns)

computerName [Virtual Computer]	pgeId	maxConcurrent [DPRs]
A	1	20
B	1	20
A	2	20
B	2	20

The scenario assumes that each of the virtual computers (i.e., A and B) listed in Table 3 has 16 CPUs. (There are 32 CPUs total.)

Relevant PGE characteristics are shown in Table 4.

Table 4. PGE Characteristics

PGE	# CPUs Used	Average Execution Time	Average Stage Time	Destage Time
1	1	5 minutes	5 minutes	5 minutes
2	1	60 minutes	5 minutes	5 minutes

Assuming that 100 DPRs of each type (i.e., PGE 1 and PGE 2 - 200 DPRs total) are ready to run and are released at once into AutoSys, the following actions occur:

- Eighty (80) DPRs enter AutoSys. The remaining 120 are queued, with their assignments already made:
  - Machine (Virtual Computer) A.
    - 20 PGE 1s start staging.
    - 30 PGE 1s are queued on Machine A.
    - 20 PGE 2s start staging.
    - 30 PGE 2s are queued on Machine A.
  - Machine (Virtual Computer) B.
    - 20 PGE 1s start staging.
    - 30 PGE 1s are queued on Machine B.
    - 20 PGE 2s start staging.
    - 30 PGE 2s are queued on Machine B.
- After about five (5) minutes, all 80 DPRs that were staging have finished staging and are ready for execution. However, only 32 CPUs are available.
  - The first 32 DPRs that ask for CPUs get them and start running [sixteen (16) on Machine A and sixteen (16) on Machine B]. Forty-eight (48) DPRs are waiting.
  - Assuming that parameters in the Registry database are set as follows:
    - DpPrRM_RETRY_PERIOD = 120 seconds.
    - DpPrRM_MAX_RETRIES = 100.

    the waiting DPRs keep trying every two minutes for up to 100 times each before timing out (after 200 minutes).
  - Note that in this example timing out is a real possibility.
- The quick jobs complete processing after five (5) minutes, freeing up sixteen (16) CPUs. In the current example, the sixteen (16) CPUs are subsequently occupied with about eight (8) five-minute PGEs and eight (8) 60-minute PGEs because CPUs are given randomly to whichever DPR gets back first to asking for them after waiting for the retry period (i.e., 120 seconds). Priorities are not used.
  - At first, there was a 50:50 ratio of fast:slow DPRs, now there is a 25:75 ratio of fast:slow. After another five (5) minutes, the ratio becomes 12.5:87.5 fast:slow, so 87.5 % of the CPUs are occupied by 60-minute DPRs.

- Apparently, the 60-minute DPRs tend to dominate the CPUs. After one (1) hour the first batch of sixteen (16) 60-minute PGEs vacates the CPUs to be replaced by eight (8) five-minute PGEs and eight (8) 60-minute PGEs, but the five-minute PGEs become extinguished again by the slow ones.
    - If the staging and destaging times were not the same (so the DPRs didn't have the same opportunity to hit the execution stage at the same time) the scenario would proceed differently.

Various strategies can be employed to tune the system:

- Limit the number of DPRs through the use of the DpPrPgeLimitsTable.
    - In the preceding example if the number of slow DPRs allowed into AutoSys is less than the number of CPUs, there is always a channel for the fast jobs to squeeze through.
    - The big disadvantage to this approach is that the slow jobs are also being prevented from staging.
- Increase the declared number of CPUs for the processors to more than the actual number (overallocate CPUs).
    - This approach allows more of each type of PGE into the science processors.
    - The disadvantage is that it could overwhelm the science computers. However, they are kept busy.
- Create new virtual computers (assigning CPUs on the processors to them) and assign (via the DpPrPgeLimits table) PGEs to run on the new virtual computers.
    - This approach is another way to guarantee bandwidth (CPUs) to PGEs.
    - The disadvantage of this approach is that some CPUs could remain idle, not being seen by one of the virtual computers.
    - In the past, there may have also been some code problems with supporting this, but those difficulties should have been resolved.

Probably some combination of the first two of the preceding strategies is best; i.e., increase the number of declared CPUs to be more than the total number of slow jobs allowed into AutoSys, always leaving some CPUs for a channel of fast jobs. The total number of faster-moving jobs should be increased to make sure that there is always be a queue of them available to get their channel occupied.

The staging and destaging times have to be accounted for and this could change things in terms of using the DpPrPgeLimits table and the number of CPUs per processor to tune the job flow.

Also, it is important to perform regular garbage collection on all of the virtual computers. Procedures for cleaning the PDPS database and DPS disks (i.e., “garbage collection”) are provided in the **Production Planning and Processing** lesson.

Troubleshooting Resource Planning Problems

Trouble Symptoms

Troubleshooting is a process of identifying the source of problems on the basis of observed trouble symptoms. One common source of problems involves the reliance on messages or data from other subsystems. However, unlike many other operational areas in the system, Resource Planning does not have interfaces with many other subsystems. Consequently, problems with Resource Planning can usually be traced to either some part of the Planning Subsystem or the system infrastructure.

Fault Recovery

Each request that crosses a client/server boundary is assigned a system-unique identifier referred to as an RPC ID. (RPC refers to Remote Procedure Call, the mechanism by which requests are submitted from client to server.) The RPC ID facilitates the automatic fault recovery events that occur whenever there is a client or server failure.

- As a request propagates through the system, each associated client/server exchange is assigned a unique RPC ID.
  - The RPC ID for each interaction is derived from the previous RPC ID received by the client for the request.
    - Consequently, all RPC IDs associated with a given request have a common portion that relates the various client/server calls to one another.
  - Given the previous RPC ID, clients consistently reproduce the same RPC ID that was submitted to the server on the subsequent event.
- The concept of reproducible RPC IDs is central to the system fault recovery capability.
  - When requests are retried from client to server, they are always submitted with the same RPC ID that was used in the original submission of the request, even if either the client or server has crashed between retries.
- The RPC ID is also central to the check-pointing aspect of fault recovery.
  - As requests arrive at fault recovery-enabled servers, they are recorded in a persistent store (typically a database), tagged with the RPC ID, which identifies the request.
  - As the request is serviced, check-pointing state information may be updated in the persistent store, up to and including the completion status of the request.

- This allows the servers to resume servicing from the last check-pointed state, particularly upon resubmission from a client.

Fault Handling

Failure events are classified according to the following three severity levels:

- Fatal error.
  - Returned when a request cannot be serviced, even with operator intervention.
  - For example, if a request is made to distribute data via ftp to a non-existent host, the request is failed with a fatal error.
- Retry error.
  - Potentially recoverable error.
  - Normally, a retry error would be returned to the client only when the server cannot recover from the error automatically.
  - A retry error may require operator assistance during recovery.
    - For example, when using the Resource Scheduler GUI, the Resource Planner would enter a new name for a resource reservation request after being notified that there was a previously existing resource reservation request with the name that had been entered.
- Warning.
  - Provided when operations can proceed without interruption, but an unexpected circumstance was detected.
  - For example, if a client requests a file to be removed but the file does not exist, there is no error per se; however, a warning is generated to caution the client that the file to be removed did not exist in the first place.

Transient errors (such as network errors) are always retry errors.

- In general, clients and servers that experience transient retry errors first attempt to recover by retrying the operation automatically.
- One special case of this is “rebinding,” which refers to the process by which a client automatically attempts to re-establish communication with a server in the event communication is disrupted.
  - The disruption may be caused by transient network failure, or by the server crashing or being brought down.
  - In any case, the client automatically attempts to reconnect to the server for a configurable period of time on a client-by-client basis.

System processes encountering an error or receiving an error from a server request can either pass the error back to a higher-level client or present it to the operator for operator intervention.

Client Crash and Restart

In general when a client crashes, the server continues to service the requests that were in process at the time of the client's crash. When a client restarts in the system, it sends a restart notification to each server with which it interacts.

- Clients notify servers that they have come up either "cold" or "warm."
- Generally, the notification temperature sent to the server matches the temperature at which the client process is restarted.

The default server behavior in response to startup notification from a client is as follows:

- Warm Notification.
  - Outstanding requests for the restarted clients remain available in the persistent store.
  - The outstanding requests may be resubmitted by the client, and are serviced to completion upon resubmission.
  - Associated resources are left allocated until the requests are completed.
- Cold Notification.
  - All outstanding requests for the restarted client are cancelled.
  - If the client resubmits any cancelled request using the same RPC ID (e.g., by pressing the Retry button from an operator GUI), it is failed with a fatal error due to the client cold startup notification.
  - Any resources associated with the cancelled requests are released and reclaimed by the system.

Server Crash and Restart

When a server crashes, clients cannot continue to submit requests for processing.

- Synchronous requests in progress result in a Distributed Computing Environment (DCE) exception being thrown back to the client process, which enters a rebinding failure recovery mode (as previously mentioned).
- Attempts to submit requests while the server is down result in the client blocking until a communication timeout has been reached.
- Although DCE has been replaced by socket-based library calls (i.e., CCS Middleware), the DCE exception code is handled by the CCS Middleware.

When a server restarts, it may perform various resynchronization activities in order to recover from an unexpected termination.

- In the event of a server cold start or cold restart, the server typically cancels all outstanding requests and reclaims all associated resources.
- In general, existing request queues are retained for warm restarts and cleared for cold starts or cold restarts.

Troubleshooting a Resource Planning Failure

Table 5 describes actions to be taken in response to some common Resource Planning problems. If the problem cannot be identified and fixed without help within a reasonable period of time, the appropriate response is to call the help desk and submit a trouble ticket in accordance with site Problem Management policy.

Table 5. Troubleshooting Resource Planning Problems

Symptom	Response
Unable to log in to the Planning Subsystem host (e.g., g0pls01).	Check with the Operations Controller/System Administrator to ensure that the host is “up."
GUI not displayed when the start-up script has been properly invoked.	Ensure that the DISPLAY variable was set properly. [For detailed instructions refer to the procedure for **Launching Resource Planning Applications Using UNIX Commands** (previous section of this lesson).]
Error message indicating that SNS (System Name Server) and/or Resource Model is/are in use using the selected Application ID.	1. Use another Application ID if working in a different mode from the person using the selected Application ID. 2. If working in the same mode as the other user, coordinate use of Planning applications with the other user and/or the System Administrator. [For detailed instructions refer to the procedure for **Launching Resource Planning Applications Using UNIX Commands** (previous section of this lesson).]
Error message associated with the Resource Editor.	Refer to Table 6, Resource Editor User Messages (adapted from the corresponding table in 609-EMD-001, *Release 7.11 Operations Tools Manual for the EMD Project*).
Error message associated with the Resource Scheduler.	Refer to Table 7, Resource Scheduler User Messages (adapted from the corresponding table in 609-EMD-001, *Release 7.11 Operations Tools Manual for the EMD Project*
Other problems.	Check the log files (e.g., EcPlRpRe.ALOG, EcPlRpSi.ALOG, EcPlRpRm.ALOG) in the /usr/ecs/*MODE*/CUSTOM/logs directory for error messages. [For detailed instructions refer to the procedure for **Checking Log Files** (subsequent section of this lesson).]

Table 6. Resource Editor User Messages (1 of 3)

Message Text	Impact	Cause and Corrective Action
A resource with this name already exists - re-enter name	Each resource name in the database must be unique.	1. Type a different name in the **Resource Name** field. 2. Click on the **Save** button.
Activity Type is Not initialized	Without this field initialized, the "Save" operation gets rejected.	1. Shut down all Resource Planning tasks. [For detailed instructions refer to the procedure for **Shutting Down Resource Planning Applications** (previous section of this lesson).] 2. Notify the Database Administrator to have the PDPS database initialized (run the EcPlDbBuild script in the /usr/ecs/*MODE*/CUSTOM/utilities directory). 3. Relaunch Resource Planning applications. [For detailed instructions refer to the procedure for **Launching Resource Planning Applications Using UNIX Commands** (previous section of this lesson).] 4. Resume the operation that elicited the error message.
Block Size must be an integer number – reenter	Integer only.	1. Type the appropriate integer (e.g., 1024) in the **Block Size** field. 2. Click on the **Save** button.
Block Size required	This is a required field.	1. Type the appropriate integer (e.g., 1024) in the **Block Size** field. 2. Click on the **Save** button.
Error modifying computer resource	Database interface error.	1. Check the database connections. [For detailed instructions refer to the procedure for **Checking Database Connections** (subsequent section of this lesson).] 2. If the problem recurs, call the help desk and submit a trouble ticket in accordance with site Problem Management policy.
Error modifying computer resource comments	Database interface error.	1. Check the database connections. [For detailed instructions refer to the procedure for **Checking Database Connections** (subsequent section of this lesson).] 2. If the problem recurs, call the help desk and submit a trouble ticket in accordance with site Problem Management policy.
Error saving computer resource	The operation failed due to an error in the database interface.	1. Check the database connections. [For detailed instructions refer to the procedure for **Checking Database Connections** (subsequent section of this lesson).] 2. If the problem recurs, call the help desk and submit a trouble ticket in accordance with site Problem Management policy.

Table 6. Resource Editor User Messages (2 of 3)

Message Text	Impact	Cause and Corrective Action
Error saving computer resource comments	Database interface error.	1. Check the database connections. [For detailed instructions refer to the procedure for **Checking Database Connections** (subsequent section of this lesson).] 2. If the problem recurs, call the help desk and submit a trouble ticket in accordance with site Problem Management policy.
Number of cpus must be an integer number	Non-numeric data are not valid.	1. Type the appropriate integer (e.g., 22) in the **Number of CPUs** field. 2. Click on the **Save** button.
Number of cpus required	This is a required field.	1. Type the appropriate integer (e.g., 22) in the **Number of CPUs** field. 2. Click on the **Save** button.
Operating system required	This is a required field.	1. Type the appropriate operating system data (e.g., IRIX 6.5.22) in the **Operating System** field. 2. Click on the **Save** button.
Partition Size must be a number – reenter	Integer only.	1. Type the appropriate integer (e.g., 400000) in the **Partition Size** field. 2. Click on the **Save** button.
Partition Size required	This is a required field.	1. Type the appropriate integer (e.g., 400000) in the **Partition Size** field. 2. Click on the **Save** button.
Resource is reserved - cannot modify	The Resource Scheduler GUI reserves the resource.	If possible, leave the resource alone. However, if the resource definition needs to be modified immediately, use the **Resource Scheduler** to change the status or delete the reservation. 1. If the resource definition needs to be modified immediately, first delete all resource reservations that specify the resource. [For detailed instructions refer to the procedure for **Deleting a Resource Reservation Request** (previous section of this lesson).] 2. Modify the resource definition. [For detailed instructions refer to the procedure for **Modifying a Resource** (previous section of this lesson).]
Resource name required	Each resource in the database must have a unique name.	1. Type an appropriate name in the **Resource Name** field. 2. Click on the **Save** button.
Resources loaded	The resources list has been loaded from the MSS baseline configuration.	For information only. No action is necessary.

Table 6. Resource Editor User Messages (3 of 3)

Message Text	Impact	Cause and Corrective Action
Resources not loaded - file not found	The MSS baseline configuration file is not found in the previously designated directory.	No Longer Applicable.
Select a resource to modify from the list	The selected resource should be one of the defined resources.	Select (highlight) the resource to be modified in the **Resource Name** list displayed on the **Resource Editor**.
Strings should be selected	AutoSys definition requires the association of a string name.	1. Move string resources between the **Strings** and **Associated Strings** lists as necessary by selecting (highlighting) the string to be moved, then clicking on the right or left arrow button (as applicable) to move the string to the other list. 2. Click on the **Save** button.
Total ram must be an integer number	Integer only.	1. Type the appropriate integer (e.g., 1000) representing the computer's total RAM (in megabytes) in the **Total RAM** field. 2. Click on the **Save** button.
Total ram required	This is a required field.	1. Type the appropriate integer (e.g., 1000) representing the computer's total RAM (in megabytes) in the **Total RAM** field. 2. Click on the **Save** button.
Unable to lock Resource tables - cannot delete resource	The processing software uses the resource or its member resource.	Do not delete the resource definition at this time. The resource definition cannot be deleted while the resource is in use. 1. Wait until the resource has been released by Data Processing. 2. Try again to delete the resource definition. [For detailed instructions refer to the procedure for **Deleting a Resource** (previous section of this lesson).]
Unable to lock Resource tables - cannot modify resource	The processing software uses the resource or its member resource.	Do not modify the resource definition at this time. The resource definition cannot be modified while the resource is in use. 1. Wait until the resource has been released by Data Processing. 2. Try again to modify the resource definition. [For detailed instructions refer to the procedure for **Modifying a Resource** (previous section of this lesson).]

Table 7. Resource Scheduler User Messages (1 of 4)

Message Text	Impact	Cause and Corrective Action
A Reservation must be selected to delete	User cannot proceed.	1. If the desired resource reservation request is not included in the list displayed on the **Resource Scheduler**, click and hold on the **Activity Type** option button and select the appropriate category of activity (or select **All**) from the option menu that is displayed. 2. Highlight (click on) the resource reservation request to be deleted. 3. Select **File** → **Delete** from the **Resource Scheduler** pull-down menu.
A Reservation must be selected to modify	User cannot proceed.	1. If the desired resource reservation request is not included in the list displayed on the **Resource Scheduler**, click and hold on the **Activity Type** option button and select the appropriate category of activity (or select **All**) from the option menu that is displayed. 2. From the **Resource Scheduler**, highlight (click on) the resource reservation request you want to modify then click on the **Modify…** button to access the **Resource Reservation Request Edit/Definition** GUI.
Can't insert new ResvName: <name> into database	The database cannot be updated.	1. Check the database connections. [For detailed instructions refer to the procedure for **Checking Database Connections** (subsequent section of this lesson).] 2. If the problem recurs, call the help desk and submit a trouble ticket in accordance with site Problem Management policy.
can't send requestActChg to resource model for resvName: <name>	The database cannot be updated.	1. Check the database connections. [For detailed instructions refer to the procedure for **Checking Database Connections** (subsequent section of this lesson).] 2. If the problem recurs, call the help desk and submit a trouble ticket in accordance with site Problem Management policy.
Delete ResvName: <name> from the list	The database cannot be updated.	Delete the resource reservation request. [For detailed instructions refer to the procedure for **Deleting a Resource Reservation Request** (previous section of this lesson).]
Error in creating a new object for row: <row>.	The database cannot be updated.	1. Check the database connections. [For detailed instructions refer to the procedure for **Checking Database Connections** (subsequent section of this lesson).] 2. If the problem recurs, call the help desk and submit a trouble ticket in accordance with site Problem Management policy.

Table 7. Resource Scheduler User Messages (2 of 4)

Message Text	Impact	Cause and Corrective Action
Fail to modify resvName: <name>	The database cannot be updated.	1. Check the database connections. [For detailed instructions refer to the procedure for **Checking Database Connections** (subsequent section of this lesson).] 2. If the problem recurs, call the help desk and submit a trouble ticket in accordance with site Problem Management policy.
I can't find <Plan Name>.	There is a problem with the resource pool.	Enter a valid Plan Name.
Must select reservation	User cannot proceed.	1. If the desired resource reservation request is not included in the list displayed on the **Resource Scheduler**, click and hold on the **Activity Type** option button and select the appropriate category of activity (or select **All**) from the option menu that is displayed. 2. From the **Resource Scheduler**, highlight (click on) the desired resource reservation request.
New Resvation can't leave resources list of ResvName: <name> empty	This required field must be filled.	Ensure that there is at least one entry in the **Selected Resources** list on the **Resources Selection** GUI. [For detailed instructions refer to the procedure for **Selecting Resources** (subsequent section of this lesson).]
Open one Reservation at a time, Please	Reservation cannot be opened.	1. Find and click on the **Resource Reservation Edit/Definition** GUI that is already open. 2. Click on either the **Save** or **Cancel** button (as appropriate). 3. Open the desired resource reservation request. [For detailed instructions refer to either the procedure for **Creating a Resource Reservation Request** or **Editing a Resource Reservation Request** (previous sections of this lesson).]
PlRpSiScheduler::modifyReservation – can't save new info for resvName: <name>.	The database cannot be updated.	1. Check the database connections. [For detailed instructions refer to the procedure for **Checking Database Connections** (subsequent section of this lesson).] 2. If the problem recurs, call the help desk and submit a trouble ticket in accordance with site Problem Management policy.
ResvName: <name> already has status <status>.	Action cannot be completed.	Choose a different action.

Table 7. Resource Scheduler User Messages (3 of 4)

Message Text	Impact	Cause and Corrective Action
ResvName: <name> can't replace new Interval List	The database cannot be updated.	1. Type a new (unique) name for the resource request in the **Request Name** field (**Resource Reservation Request Edit/Definition** GUI). 2. Click on the **Save** button. [For detailed instructions refer to the procedure for **Creating a Resource Reservation Request** (previous section of this lesson).]
ResvName: <name> Selected Intervals list can't be empty	This required field must be filled.	Ensure that there is at least one entry in the **Selected Intervals** list on the **Intervals Selection** GUI. [For detailed instructions refer to the procedure for **Deselecting Intervals** (subsequent section of this lesson).]
ResvName: <name> Selected Resources list can't be empty	This required field must be filled.	Ensure that there is at least one entry in the **Selected Resources** list on the **Resources Selection** GUI. [For detailed instructions refer to the procedure for **Selecting Resources** (subsequent section of this lesson).]
ResvName: <name> accepts new resources list	Informational message.	For information only. No action is necessary.
resvName: <name> can't replace new Resource List	The database cannot be updated.	1. Check the database connections. [For detailed instructions refer to the procedure for **Checking Database Connections** (subsequent section of this lesson).] 2. If the problem recurs, call the help desk and submit a trouble ticket in accordance with site Problem Management policy.
ResvName: <name> can't uncommitted < > RactAlls	The database cannot be updated.	1. Check the database connections. [For detailed instructions refer to the procedure for **Checking Database Connections** (subsequent section of this lesson).] 2. If the problem recurs, call the help desk and submit a trouble ticket in accordance with site Problem Management policy.
resvName: <name> fails to approve – status is changed to <status>.	The plan cannot be approved due to conflicts with other reservations.	Resolve the conflict(s). [For detailed instructions refer to the procedure for **Approving a Resource Reservation Request** (previous section of this lesson).]
resvName: <name> myTime: <time> resourceName: <name> conflicted Time: <time> conflictResvName: <name>	Informational message.	For information only. No action is necessary.

Table 7. Resource Scheduler User Messages (4 of 4)

Message Text	Impact	Cause and Corrective Action
ResvName: <name> resource list is less now	Informational message.	For information only. No action is necessary.
ResvName: <name> status is changed from approved to committed	Informational message.	For information only. No action is necessary.
ResvName: <name> status is changed to <status>	Informational message.	For information only. No action is necessary.
Success to approve reservation Name: <name>	Informational message.	For information only. No action is necessary.
Success to update resvName: <name> name	Informational message.	For information only. No action is necessary.
This Name: <name> with status: <status> has been used, Please pick another Name.	The resource reservation request name must be unique.	1. Type a different name in the **Request Name** field. 2. Click on the **Save** button.

Troubleshooting Procedures

The following procedures for correcting Resource Planning problems are provided in this section:

- Checking Log Files
- Checking Database Connections

Checking Log Files

Log files can provide indications of the following types of problems:

- Communication problems.
- Database problems.
- Lack of disk space.

The procedure for checking log files starts with the assumption that the operator has logged in to the system and the Planning Subsystem host.

Checking Log Files

---

1 Access a terminal window logged in to the appropriate host.

- Examples of Planning/Management Workstation host names include **e0pls03**, **g0pls01,** and **l0pls02.**
- For detailed instructions refer to the procedure for **Logging in to System Hosts** (preceding section of this lesson).

2 Type **cd /usr/ecs/*MODE*/CUSTOM/logs** then press **Return/Enter**.

- Change directory to the directory containing the resource planning log files (e.g., EcPlRpRe.ALOG, EcPlRpReDebug.log, EcPlRpSi.ALOG, or EcPlRpSiDebug.log).

3 Type **pg *filename*** then press **Return/Enter**.

- ***filename*** refers to the resource planning log file to be reviewed (e.g., EcPlRpRe.ALOG, EcPlRpReDebug.log, EcPlRpSi.ALOG, or EcPlRpSiDebug.log).
- The first page of the log file is displayed.
- Although this procedure has been written for the **pg** command, any UNIX editor or visualizing command (e.g., **more**, **vi, view**) can be used to review the log file.

4 Review the log file to identify problems that have occurred.

5 Respond to problems as follows:

- Resource Planning-related problems.
  - Perform the appropriate procedure(s) from the list near the beginning of the **Troubleshooting Procedures** section.

- Communication problems.
  - Notify the Operations Controller/System Administrator of suspected communication problems.
- Database problems.
  - Verify that relevant database servers are running.
  - Check for lack of (or corruption of) data in the database using either a database browser or interactive structured query language (isql) commands.
  - Notify the Database Administrator of suspected database problems.
- Lack of disk space.
  - Remove unnecessary files.
  - Notify the Operations Controller/System Administrator of recurring disk space problems.

Checking Database Connections

If applications (including the GUIs) are unable to connect to the database, data cannot be retrieved or (in the case of the GUIs) displayed. Consequently, if a GUI does not display data or if the display does not refresh, checking the database connections is a logical step in trying to isolate the problem.

The procedure for checking database connections starts with the assumption that the operator has logged in to the system and the Planning/Management Workstation (e.g., e0pls03, g0pls01, or l0pls02).

Checking Database Connections

---

1 Submit a request to the Database Administrator to identify the values for parameters associated with the appropriate application.

- The following parameters are should be requested:
  - **DBName.**
  - **DBServer.**
  - **DBMaxConnections.**
- The preceding parameters are associated with the following applications:
  - EcPlRpRe.

- EcPlRpRm.
- EcPlRpSi.
- EcPlRpTl.

2 Access a terminal window logged in to the Queuing Server host.

- Examples of Queuing Server host names include **e0sps04**, **g0sps06**, and **l0sps03**.
- For detailed instructions refer to the procedure for **Logging in to System Hosts** (preceding section of this lesson).

3 Type **isql –U *userID* -S *DBServer*** then press **Return/Enter**.

- For example:

  isql –U pdps_role –Sx0sps02_srvr

4 At the **Password:** prompt type ***dbpassword*** then press **Return/Enter**.

- The ***dbpassword*** is the password for logging in to the database using the specified ***userID***.

5 Type **sp_who** at the **1>** prompt then press **Return/Enter**.

6 Type **go** at the **2>** prompt then press **Return/Enter**.

- A listing similar to the following one is displayed (some lines have been deleted):

```
spid   status      loginame                    hostname   blk
       dbname                    cmd
------ ------------ ------------------------------ ---------- -----
       ------------------------------ ----------------
     1 recv sleep   EcDpPrDeletion                        0
       pdps_TS1                    AWAITING COMMAND
     2 sleeping     NULL                                  0
       master                      NETWORK HANDLER
     3 sleeping     NULL                                  0
       master                      DEADLOCK TUNE
     4 sleeping     NULL                                  0
       master                      MIRROR HANDLER
     5 sleeping     NULL                                  0
       master                      HOUSEKEEPER
     6 sleeping     NULL                                  0
       master                      CHECKPOINT SLEEP
     7 sleeping     NULL                                  0
       master                      AUDIT PROCESS
```

```
 8 recv sleep   EcPlSubMgr                    0
   pdps                 AWAITING COMMAND
 9 recv sleep   EcPlSubMgr                    0
   pdps                 AWAITING COMMAND
10 recv sleep   EcDpPrDeletion                0
   pdps                 AWAITING COMMAND
11 recv sleep   EcDpPrJobMgmt                 0
   pdps                 AWAITING COMMAND
12 recv sleep   pdpsUsers              x0ais03    0
   master                AWAITING COMMAND
13 recv sleep   EcDpPrJobMgmt                 0
   pdps                 AWAITING COMMAND
14 recv sleep   EcDpPrDeletion                0
   pdps                 AWAITING COMMAND
15 recv sleep   pdpsUsers              x0sps02    0
   master                AWAITING COMMAND
16 recv sleep   EcDpPrJobMgmt                 0
   pdps_TS1                AWAITING COMMAND
17 recv sleep   EcDpPrJobMgmt                 0
   pdps_TS1                AWAITING COMMAND
18 recv sleep   pdpsUsers              x0ais03    0
   tempdb                AWAITING COMMAND
19 recv sleep   EcDpPrDeletion                0
   pdps_TS1                AWAITING COMMAND
20 recv sleep   pdpsUsers              x0sps02    0
   tempdb                AWAITING COMMAND
21 recv sleep   pdpsUsers              x0pls01    0
   pdps_TS1                AWAITING COMMAND
22 recv sleep   EcPlRm                       0
   pdps_TS1                AWAITING COMMAND
23 recv sleep   EcPlWb                       0
   pdps_TS1                AWAITING COMMAND
24 recv sleep   EcPlSubMgr                   0
   pdps_TS1                AWAITING COMMAND
25 recv sleep   EcPlSubMgr                   0
   pdps_TS1                AWAITING COMMAND
26 recv sleep   EcPlSubMgr                   0
   pdps_TS1                AWAITING COMMAND
27 recv sleep   EcPlSubMgr                   0
   pdps_TS1                AWAITING COMMAND
28 running      pdps_role              x0pls01    0
```

```
pdps                    SELECT

(28 rows affected)
(return status = 0)
```

7 Type **sp_configure "user connections"** at the **1>** prompt then press **Return/Enter**.

8 Type **go** at the **2>** prompt then press **Return/Enter**.

- A listing similar to the following one is displayed:

```
Parameter Name              Default     Memory Used Config Value
     Run Value
----------------------------- ----------- ----------- ------------
    -----------
number of user connections          25       7503        100
          100

(1 row affected)
(return status = 0)
```

9 Type **quit** at the **1>** prompt then press **Return/Enter**.

10 Compare the number of actual connections (results of **sp_who**) with the number of connections for which the database has been configured (results of **sp_configure "user connections"**).

11 If the number of actual connections is very close to the number of connections for which the database has been configured, notify the Database Administrator of the fact.

12 If the number of actual connections is **not** very close to the number of connections for which the database has been configured, compare the number of actual connections with the value for DBMaxConnections that the Database Administrator specified (Step 1).

13 If the number of actual connections is very close to the value for DBMaxConnections, notify the Database Administrator of the fact.

- It may be advisable to increase the value assigned to the DBMaxConnections parameter in the Configuration Registry.

Practical Exercise

Introduction

This exercise is designed to give the students practice in resource planning activities.

Equipment and Materials

One workstation or X terminal per student.

Statement of the requirements for the exercise.

Release 7.11 Operations Tools Manual for the EMD Project, *609*-EMD-001, one copy per student.

Release 7.11 Mission Operation Procedures for the EMD Project, 611-EMD-001, one copy per student.

Logging in to System Hosts

The exercise involves logging in to system hosts. The exercise begins with a student receiving the necessary information/ requirements for logging in to a system host. The student logs in to a system host as specified in the requirements.

Perform the following steps:

1. Access the command shell.
2. Set the DISPLAY environmental variable.
3. Log in to the specified host using secure shell and the specified user ID.

Launching Resource Planning Applications

The exercise involves launching resource planning applications. The exercise begins with a student acting in the role of a resource user receiving the necessary information/requirements for launching resource reservation applications. The student launches the Resource Scheduler and Resource Editor consistent with the requirements.

Perform the following steps:

1. Access the command shell.
2. Log in to the Planning/Management Workstation.
3. Set the necessary environmental variables.

4. Start the Message Handler, Resource Model, and System Name Server in the appropriate mode.
5. Start the Resource Editor in the appropriate mode.
6. Start the Resource Scheduler in the appropriate mode.

Shutting Down Resource Planning Applications

The exercise involves shutting down resource planning applications. The exercise begins with a student acting in the role of a resource user receiving the necessary information/requirements for shutting down resource reservation applications. The student shuts down the Resource Scheduler and the Resource Editor, and cleans up background processes consistent with the requirements.

Perform the following steps:

1. Shut down the Resource Scheduler.
2. Shut down the Resource Editor.
3. Shut down the Message Handler, Resource Model, and System Name Server.

Determining Actual Processing Resources to be Added to the Resource Planning List

The exercise involves determining the actual processing resources to be added to the resource planning list. The exercise begins with a student acting in the role of Resource Planner receiving the necessary information/requirements for determining actual processing resources to be added to the resource planning list. The student determines the resources to be added to the resource planning list as specified in the requirements.

Perform the following steps:

1. Access a terminal window logged in to the applicable Science Processor.
2. Change to the disk mount point (subdirectory).
3. Identify the disk name and size by changing to the disk mount point and typing df -k . (including the dot).
4. Identify the number of processors (CPUs) and amount of RAM (type hinv).
5. Launch Netscape.
6. Identify the Operating System by selecting the as-built file name corresponding to the desired host at the relevant DAAC (e.g., x0spg11.asbuilt.html).
7. Access a terminal window logged in to the applicable Queuing Server host.
8. Identify the AutoSys instance (in the “autouser” directory).

Adding Resources to the Resource Planning List

The exercise involves adding resources to the resource planning list. The exercise begins with a student acting in the role of Resource Planner receiving the necessary information/requirements for adding resources to the resource planning list. The student adds resources to the resource planning list as specified in the requirements.

Perform the following steps:

1. Access the Resource Editor.
2. Access the appropriate detail GUI(s) for the type(s) of resource(s) to be added.
3. Define the type(s) of resource(s) to be added as specified in the requirements.
4. Save the added resource(s) in the resource planning list.

Modifying Resources on the Resource Planning List

The exercise involves modifying resources on the resource planning list. The exercise begins with a student acting in the role of Resource Planner receiving the necessary information/requirements for modifying resources on the resource planning list. The student modifies resources on the resource planning list as specified in the requirements.

Perform the following steps:

1. Access the Resource Editor.
2. Access the appropriate detail GUI(s) for the type(s) of resource(s) to be modified.
3. Modify the definition of the resource(s) as specified in the requirements.
4. Save the modifications to the resource planning list.

Deleting Resources from the Resource Planning List

The exercise involves deleting resources from the resource planning list. The exercise begins with a student acting in the role of Resource Planner receiving the necessary information/requirements for deleting resources from the resource planning list. The student deletes resources from the resource planning list as specified in the requirements.

Perform the following steps:

1. Access the Resource Editor.
2. Highlight the resource(s) to be deleted.
3. Delete the resource(s) as specified in the requirements.

Creating a Resource Reservation Request

The exercise involves the preparation of a resource reservation request. The exercise begins with a student acting in the role of a resource user receiving the necessary information/requirements for creating a resource reservation request. The student prepares a resource reservation request that is consistent with the requirements.

Perform the following steps:

1. Access the Resource Scheduler.
2. Prepare a resource reservation request that is consistent with the written or stated requirements.
3. Save the resource reservation request.

Editing/Modifying a Resource Reservation Request

The exercise requires the editing of a resource reservation request. The exercise begins with a student acting in the role of a resource user receiving the necessary information/requirements for editing an existing resource reservation request. The student modifies the resource reservation request consistent with the requirements.

Perform the following steps:

1. Access the Resource Scheduler.
2. Select the resource reservation request to be modified.
3. Make resource reservation request modifications consistent with the written or stated requirements.
4. Save the modified resource reservation request.

Validating or Rejecting a Resource Reservation Request

The exercise involves the validation or rejection of a resource reservation request. The exercise begins with a student acting in the role of "sponsor" receiving the necessary information/requirements for validating or rejecting a resource reservation request. The student validates or rejects a resource reservation request as specified in the requirements.

Perform the following steps:

1. Access the Resource Scheduler.
2. Access the specified resource reservation request.
3. Evaluate the entries in the resource reservation request fields.
4. Validate or reject the resource reservation request as specified in the requirements.

5. Save the modified resource reservation request.

Approving Resource Reservation Requests

The exercise involves approving resource reservation requests. The exercise begins with a student acting in the role of Resource Planner receiving the necessary information/requirements for approving a resource reservation request. The student approves a resource reservation request consistent with the requirements.

Perform the following steps:

1. Access the Resource Scheduler.
2. Access the specified resource reservation request.
3. Approve the resource reservation request as specified in the requirements.
4. Save the modified resource reservation request.

Committing Resource Reservation Requests

The exercise involves committing resource reservation requests. The exercise begins with a student acting in the role of Resource Manager receiving the necessary information/requirements for committing resource reservation requests. The student commits resource reservation requests consistent with the requirements.

Perform the following steps:

1. Access the Resource Scheduler.
2. Access the specified resource reservation request(s).
3. Commit the resource reservation request(s) as specified in the requirements.

Deleting a Resource Reservation Request

The exercise involves deleting a resource reservation request. The exercise begins with a student acting in the role of Resource Planner receiving the necessary information/requirements for deleting a resource reservation request. The student deletes the resource reservation request consistent with the requirements.

Perform the following steps:

1. Access the Resource Scheduler.
2. Access the specified resource reservation request.
3. Delete the resource reservation request as specified in the requirements.

Reviewing a Resource Timeline

The exercise involves reviewing a resource timeline. The exercise begins with a student acting in the role of Resource Planner receiving the necessary information/requirements for reviewing specified resource reservation requests on a resource timeline. The student reviews the specified resource timeline and responds to questions concerning timeline characteristics.

Perform the following steps:

1. Access the Resource Scheduler.
2. Access the Resource Reservation Planning Master Timeline GUI.
3. Adjust the resource timeline display as necessary to view the specified resource reservation requests.
4. Review the resource timeline.
5. Respond to questions concerning the resource timeline without error.

Troubleshooting Resource Planning Problems

The exercise involves troubleshooting Resource Planning problems. The exercise begins with a student acting in the role of Resource Planner receiving the necessary trouble symptom information and requirements for troubleshooting the problem(s). The student reviews the specified trouble symptoms, takes action to correct the problem(s), and responds to questions concerning the possible cause(s).

Perform the following steps:

1. Review the trouble symptoms.
2. Check Resource Planning log files as necessary.
3. Take action to correct the problem(s).
4. Respond to questions concerning the possible cause(s) without error.

Slide Presentation

Slide Presentation Description

The following slide presentation represents the slides used by the instructor during the conduct of this lesson.

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