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EOSDIS Core System Project

Release 5B Segment/Design Specification for the ECS Project

April 2000

Final

Raytheon Systems Company
Upper Marlboro, Maryland

Release 5B
Segment/Design Specification
for the ECS Project

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Preface€

This document is a contract deliverable with an approval code 2. As such, it does not require formal Government acceptance. Contractor approved changes to this document are handled in accordance with change control requirements described in the EOS Configuration Management Plan. Changes to this document will be made by document change notice (DCN) or by complete revision. The ECS Science configuration control board has reviewed it, and this final version is being delivered for Government review and comment.

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Abstract

The Release 5B Segment/Design Specification is an overview description of the ECS Project. The functionality of the ECS software is described at the Subsystem, Computer Software Configuration Item (CSCI), Computer Software Component (CSC), and Process levels. Architecture and context diagrams illustrate the process interconnections within the ECS CSCIs and the external connections to other CSCIs, subsystems, and specified segment interfaces. Interface events description tables describe the data, messages, notifications, or status information that occurs at each level of functionality within the ECS. A basic description of the Commercial Off The Shelf (COTS) software and hardware used in ECS is included. Also, a more detailed class level of documentation is offered from the output of the on-line tool ABC++.

Detailed design in this document is the level of information derived from requirement sources, and used by the development team to complete the ECS design implementation for a software system at a 5B state of maturity.

Keywords: Release 5B, Overview, SDPS, CSMS, Design, Detailed Design, Subsystem, Architecture, Software, Hardware, Object Oriented, Security, Gateway, System Management, Reports, User Interface, GUI.

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1. Introduction

1.1 Purpose and Scope

The purpose of the Segment/Design Specification for the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS) is to provide an overview of the hardware and software subsystems of the project. This document describes the detailed design of each ECS software subsystem implemented to satisfy the allocated and derived functional and performance requirements. This document also provides basic descriptions of the Commercial Off The Shelf (COTS) hardware and software used in the ECS. This document contains:

- Functional overviews of each Computer Software Configuration Item (CSCI)
- Context diagrams of each CSCI
- Interface event descriptions based on the context diagrams
- Process architecture diagrams
- Interface event description tables based on the process architecture diagrams
- CSCI data stores (databases as they relate to the process architecture diagrams)
- CSCI functions allocated to processes. For data servers, this includes descriptions of the functionality offered to clients via the server interfaces. For Graphical User Interface (GUI) applications, it describes the functionality provided to the GUI users.
- Specific limitations of the capabilities provided
- Summary of object classes listed by CSCI
- Summary of class libraries listed by CSCI
- Abbreviations and Acronyms

Hyper-linked on-line documentation generated by ABC++ is provided to accompany this document. The various subsystems, sub-directories, processes, libraries, and classes can be browsed down to the code level. This documentation can be accessed through the Universal Resource Locator (URL) http://ecsdocs.east.hitc.com:88 for those who have access to the ECS internally at the Landover Facility. For anyone not having access to the ECS internally at the Landover facility, the Data Management Office of the ECS Project must be contacted for access.

Under every process or library documented in Appendix A or B, there is a directory string. This string indicates the location of the Makefile and sources for the library.

This same directory string can be used to locate on-line documentation. This is accomplished by replacing the "/ecs/formal" part of the directory string with the URL for the on-line documentation associated with the page on which the classes are listed along with the names of processes and libraries which share those classes.

1.2 Document Organization

The remainder of this document is organized as follows:

- Section 2: Related Documentation
- Section 3: System Description
- Section 4: Subsystem Descriptions
- Section 5: Limitations of Current Implementation
- Appendix A: Software Processes
- Appendix B: Software Libraries
- Abbreviations and Acronyms

2. Related Documentation

2.1 Parent Documents

The parent documents are the documents from which the scope and content of this Design Specification are derived. These documents are listed below.

194-207-SEI	System Design Specification for the ECS Project
305/DV2 (F)	Segment/Design Specifications for the ECS Project
212-WP-002	Game Plan for the ECS Project
334-CD-510	5B Science System Release Plan for the ECS Project

2.2 Applicable Documents

Documents referenced in this document are listed below.

920-series General documents

920-TDE-001	EDC Hardware Diagram (Design)
920-TDG-001	GSFC Hardware Diagram (Design)
920-TDL-001	LaRC Hardware Diagram (Design)
920-TDN-001	NSIDC Hardware Diagram (Design)
920-TDS-001	SMC Hardware Diagram (Design)
920-TDV-001	VATC Hardware Diagram (Design)
920-TDP-001	PVC Hardware Diagram (Design)
920-TDV-101	VATC-SMC Hardware Diagram (Design)

920-TDE-002	EDC Hdwe/Sfwe Mapping (COTS)
920-TDG-002	GSFC Hdwe/Sfwe Mapping (COTS)
920-TDL-002	LaRC Hdwe/Sfwe Mapping (COTS)
920-TDN-002	NSIDC Hdwe/Sfwe Mapping (COTS)
920-TDS-002	SMC Hdwe/Sfwe Mapping (COTS)
920-TDV-002	VATC Hdwe/Sfwe Mapping (COTS)

920-TDE-003	EDC System Infrastructure Assignments (DCE/ DNS/DTS Infra.)
920-TDG-003	GSFC System Infrastructure Assignments (DCE/ DNS/DTS Infra.)
920-TDL-003	LaRC System Infrastructure Assignments (DCE/ DNS/DTS Infra.)
920-TDE-004	EDC Floor Plan
920-TDG-004	GSFC Floor Plan
920-TDL-004	LaRC Floor Plan
920-TDN-004	NSIDC Floor Plan
920-TDS-004	SMC Floor Plan
920-TDV-004	VATC Floor Plan
920-TDP-004	PVC Floor Plan
920-TDE-005	EDC Cable Management Plan
920-TDG-005	GSFC Cable Management Plan
920-TDL-005	LaRC Cable Management Plan
920-TDN-005	NSIDC Cable Management Plan
920-TDS-005	SMC Cable Management Plan
920-TDV-005	VATC Cable Management Plan
920-TDP-005	PVC Cable Management Plan
920-TDE-007	EDC Vendor Documentation List
920-TDG-007	GSFC Vendor Documentation List
920-TDL-007	LaRC Vendor Documentation List
920-TDN-007	NSIDC Vendor Documentation List
920-TDE-008	EDC Mount Points
920-TDG-008	GSFC Mount Points
920-TDL-008	LaRC Mount Points
920-TDN-008	NSIDC Mount Points

920-TDV-008	VATC Mount Points
920-TDP-008	PVC Mount Points
920-TDV-108	VATC-SMC Mount Points
920-TDE-009	EDC DAAC Baseline Hardware / Database Mapping
920-TDG-009	GSFC DAAC Baseline Hardware / Database Mapping
920-TDL-009	LaRC DAAC Baseline Hardware / Database Mapping
920-TDN-009	NSIDC DAAC Baseline Hardware / Database Mapping
920-TDS-009	SMC DAAC Baseline Hardware / Database Mapping
920-TDN-009	VATC DAAC Baseline Hardware / Database Mapping
920-TDP-009	PVC DAAC Baseline Hardware / Database Mapping
920-TDV-109	VATC-SMC DAAC Baseline Hardware / Database Mapping
920-TDE-010	EDC DAAC Baseline Database Configuration Listing
920-TDG-010	GSFC DAAC Baseline Database Configuration Listing
920-TDL-010	LaRC DAAC Baseline Database Configuration Listing
920-TDN-010	NSIDC DAAC Baseline Database Configuration Listing
920-TDV-010	VATC DAAC Baseline Database Configuration Listing
920-TDE-012	EDC DAAC SCSI Cable Management Plan
920-TDG-012	GSFC DAAC SCSI Cable Management Plan
920-TDL-012	LaRC DAAC SCSI Cable Management Plan
920-TDN-012	NSIDC DAAC SCSI Cable Management Plan
920-TDP-012	PVC DAAC SCSI Cable Management Plan

921-series Network Infrastructure documents

921-TDG-001	GSFC Network Overview Diagram (LAN Topology)
921-TDL-001	LaRC Network Overview Diagram (LAN Topology)

921-TDE-002	EDC Hardware / Network Diagram
921-TDG-002	GSFC Hardware / Network Diagram
921-TDL-002	LaRC Hardware / Network Diagram
921-TDN-002	NSIDC Hardware / Network Diagram
921-TDS-002	SMC Hardware / Network Diagram
921-TDV-002	VATC Hardware / Network Diagram
921-TDP-002	PVC Hardware / Network Diagram
921-TDV-102	VATC-SMC Hardware / Network Diagram
921-TDE-003	EDC IP Address Assignments (DAAC Hosts)
921-TDG-003	GSFC IP Address Assignments (DAAC Hosts)
921-TDL-003	LaRC IP Address Assignments (DAAC Hosts)
921-TDN-003	NSIDC IP Address Assignments (DAAC Hosts)
921-TDS-003	SMC IP Address Assignments (DAAC Hosts)
921-TDV-003	VATC IP Address Assignments (DAAC Hosts)
921-TDP-003	PVC IP Address Assignments (DAAC Hosts)
921-TDV-103	VATC-SMC IP Address Assignments (DAAC Hosts)
921-TDE-004	EDC IP Address Assignments (DAAC Network Hardware)
921-TDG-004	GSFC IP Address Assignments (DAAC Network Hardware)
921-TDL-004	LaRC IP Address Assignments (DAAC Network Hardware)
921-TDN-004	NSIDC IP Address Assignments (DAAC Network Hardware)
921-TDS-004	SMC IP Address Assignments (DAAC Network Hardware)
921-TDV-004	VATC IP Address Assignments (DAAC Network Hardware)
921-TDP-004	PVC IP Address Assignments (DAAC Network Hardware)
921-TDV-104	VATC-SMC IP Address Assignments (DAAC Network Hardware)
921-TDE-005	EDC Dual-Homed Host Static Routes
921-TDG-005	GSFC Dual-Homed Host Static Routes

921-TDL-005	LaRC Dual-Homed Host Static Routes
921-TDN-005	NSIDC Dual-Homed Host Static Routes
921-TDV-005	VATC Dual-Homed Host Static Routes
921-TDP-005	PVC Dual-Homed Host Static Routes

921-TDE-006	EDC Ingest Host Static Routes
921-TDG-006	GSFC Ingest Host Static Routes
921-TDL-006	LaRC Ingest Host Static Routes

922-series Disk Partitions documents

922-TDE-001	EDC APC Server
922-TDG-001	GSFC APC Server
922-TDL-001	LaRC APC Server
922-TDN-001	NSIDC APC Server
922-TDP-001	PVC APC Server

922-TDE-002	EDC Application Server
922-TDG-002	GSFC Application Server
922-TDL-002	LaRC Application Server
922-TDN-002	NSIDC Application Server
922-TDV-002	VATC Application Server
922-TDP-002	PVC Application Server

922-TDG-003	GSFC AQA Host
922-TDL-003	LaRC AQA Host
922-TDE-005	EDC CSS Server
922-TDG-005	GSFC CSS Server
922-TDL-005	LaRC CSS Server
922-TDN-005	NSIDC CSS Server

922-TDP-005	PVC CSS Server
922-TDE-006	EDC Distribution Server
922-TDG-006	GSFC Distribution Server
922-TDL-006	LaRC Distribution Server
922-TDS-006	SMC Distribution Server
922-TDP-006	PVC Distribution Server
922-TDE-007	EDC FSMS Server
922-TDG-007	GSFC FSMS Server
922-TDL-007	LaRC FSMS Server
922-TDN-007	NSIDC FSMS Server
922-TDV-007	VATC FSMS Server
922-TDP-007	PVC FSMS Server
922-TDE-008	EDC Ingest Server
922-TDG-008	GSFC Ingest Server
922-TDL-008	LaRC Ingest Server
922-TDV-008	VATC Ingest Server
922-TDP-008	PVC Ingest Server
922-TDE-009	EDC Interface Server
922-TDG-009	GSFC Interface Server
922-TDL-009	LaRC Interface Server
922-TDN-009	NSIDC Interface Server
922-TDP-009	PVC Interface Server
922-TDE-010	EDC MSS Server
922-TDG-010	GSFC MSS Server

922-TDL-010	LaRC MSS Server
922-TDN-010	NSIDC MSS Server
922-TDS-010	SMC MSS Server
922-TDV-010	VATC MSS Server
922-TDP-010	PVC MSS Server
922-TDE-011	EDC MSS File Server / CM Server
922-TDG-011	GSFC MSS File Server / CM Server
922-TDL-011	LaRC MSS File Server / CM Server
922-TDN-011	NSIDC MSS File Server / CM Server
922-TDS-011	SMC MSS File Server / CM Server
922-TDV-011	VATC MSS File Server / CM Server
922-TDP-011	PVC MSS File Server / CM Server
922-TDE-012	EDC OPS Workstation
922-TDG-012	GSFC OPS Workstation
922-TDL-012	LaRC OPS Workstation
922-TDN-012	NSIDC OPS Workstation
922-TDP-012	PVC OPS Workstation
922-TDE-013	EDC PDPS DBMS Server
922-TDG-013	GSFC PDPS DBMS Server
922-TDL-013	LaRC PDPS DBMS Server
922-TDN-013	NSIDC PDPS DBMS Server
922-TDP-013	PVC PDPS DBMS Server
922-TDE-014	EDC Queuing Server
922-TDG-014	GSFC Queuing Server
922-TDL-014	LaRC Queuing Server
922-TDN-014	NSIDC Queuing Server

922-TDP-014	PVC Queuing Server
922-TDE-015	EDC Science Processor
922-TDG-015	GSFC Science Processor
922-TDL-015	LaRC Science Processor
922-TDN-015	NSIDC Science Processor
922-TDV-015	VATC Science Processor
922-TDP-015	PVC Science Processor
922-TDE-016	EDC SDSRV Server
922-TDG-016	GSFC SDSRV Server
922-TDL-016	LaRC SDSRV Server
922-TDN-016	NSIDC SDSRV Server
922-TDP-016	PVC SDSRV Server
922-TDE-017	EDC Sybase Staging Server
922-TDG-017	GSFC Sybase Staging Server
922-TDL-017	LaRC Sybase Staging Server
922-TDN-017	NSIDC Sybase Staging Server
922-TDV-017	VATC Sybase Staging Server
922-TDE-018	EDC Working Storage Server
922-TDP-018	PVC Working Storage Server
922-TDE-019	EDC Distribution (DIP) Server #2
922-TDG-019	GSFC Distribution (DIP) Server #2
922-TDL-019	LaRC Distribution (DIP) Server #2
922-TDL-020	LaRC Science Processor # 2

922-TDE-021	EDC Workstation/DBMS (AIT) Server
922-TDG-021	GSFC Workstation/DBMS (AIT) Server
922-TDL-021	LaRC Workstation/DBMS (AIT) Server
922-TDP-021	PVC Workstation/DBMS (AIT) Server
922-TDE-022	EDC AIT Workstation
922-TDG-022	GSFC AIT Workstation
922-TDL-022	LaRC AIT Workstation
922-TDP-022	PVC AIT Workstation
922-TDE-023	EDC Planning Management Workstation
922-TDG-023	GSFC Planning Management Workstation
922-TDL-023	LaRC Planning Management Workstation
922-TDN-023	NSIDC Planning Management Workstation
922-TDE-024	LUT Sybase Server
922-TDE-025	DEM Science Server
922-TDE-027	EDC Data Spec Workstation
922-TDG-027	GSFC Data Spec Workstation
922-TDL-027	LaRC Data Spec Workstation
922-TDN-027	NSIDC Data Spec Workstation
922-TDP-027	PVC Data Spec Workstation
922-TDE-028	EDC ACSLS Workstation
922-TDG-028	GSFC ACSLS Workstation
922-TDL-028	LaRC ACSLS Workstation
922-TDP-028	PVC ACSLS Workstation

922-TDE-029	EDC Ingest Workstation
922-TDG-029	GSFC Ingest Workstation
922-TDL-029	LaRC Ingest Workstation
922-TDP-029	PVC Ingest Workstation
922-TDE-031	EDC Tape System Backup Server
922-TDG-031	GSFC Tape System Backup Server
922-TDL-031	LaRC Tape System Backup Server
922-TDN-031	NSIDC Tape System Backup Server
922-TDP-031	PVC Tape System Backup Server
922-TDE-032	EDC QA Workstation
922-TDG-032	GSFC QA Workstation
922-TDL-032	LaRC QA Workstation
922-TDN-032	NSIDC QA Workstation
922-TDP-032	PVC QA Workstation
922-TDE-033	EDC Planning Management Workstation
922-TDP-033	PVC Planning Management Workstation
922-TDE-034	EDC AIT Server
922-TDE-035	EDC DISK/RAID Driver
922-TDG-035	GSFC DISK/RAID Driver
922-TDL-035	LaRC DISK/RAID Driver
922-TDN-035	NSIDC DISK/RAID Driver
922-TDP-035	PVC DISK/RAID Driver
922-TDG-036	GSFC FSMS Workstation

922-TDE-037	EDC Xterm Server
922-TDL-037	LaRC Xterm Server
922-TDE-038	EDC Landsat 7 Simulator Disk RAID
922-TDG-039	GSFC MODAPS Server Disk
922-TDP-039	PVC MODAPS Server Disk
922-TDP-040	PVC EDOS/LPS Workstation Disk
922-TDP-041	PVC Push Area Workstation Disk

2.2.1 Other Related Documents and Documentation

205-CD-004	Science User's Guide and Operations Procedures Handbook (Release B.0) for the ECS Project
311-CD-506	Subscription Server Database Design and Schema Specifications for the ECS Project
313-CD-510	ECS Internal Interface Control Document for the ECS Project
333-CD-510	Release 5B SDP Toolkit User’s Guide for the ECS Project
193-801-SD4	PGS Toolkit Requirements Specification for the ECS Project (a.k.a. GSFC 423-06-02)
193-WP-118	Algorithm Integration and Test Issues, White Paper for the ECS Project
194-WP-925	Science Software Integration and Test White Paper for the ECS Project
423-16-01	Data Production Software and Science Computing Facility (SCF) Standards and Guidelines
IMSV0-PD-SD-002	Messages and Development Data Dictionary for v5.0 IMS Client v1.0.14 950928
COTS	XRP-II Manual
RFC	793 Transmission Control Protocol
RFC	768 User Datagram Protocol
RFC	791 Internet Protocol

RFC	1597 Address Allocation for Private Internets
	WWW page http://cmdm.east.hitc.com/baseline

2.3 Information Documents Not Referenced

The documents listed below, while not directly applicable, help in the maintenance of the delivered software.

423-41-02	Goddard Space Flight Center, Functional and Performance Requirements Specification for the Earth Observing System Data and Information System Core System
540-022	Goddard Space Flight Center, Earth Observing System Communications System Interface Requirements Document
560-EDOS-0211.0001	Goddard Space Flight Center, Interface Requirements Document between EDOS and the EOS Ground System

2.4 ECS Tool Descriptions

2.4.1 Discover

Discover is an information system for software engineering that transforms a code base into a tangible asset by enabling a software engineer's code comprehension, analysis of impact to code, and automated support of metrics collection. Discover starts with the creation of an Information Model, a highly associative database. The Information Model stores and tracks every entity, attribute and relationship between software objects. The Discover products do leverage off the Information Model to provide a variety of graphical and narrative development, engineering analysis, and quality assessment tools. The use of Discover on the ECS Program has been customized to take advantage of a selected set of Discover tools. However, the broad spectrum of tools is available for the more experienced user to use. The major activities provided for use by the user are:

1. Basic Navigation and Query – How to navigate in the Discover environment, taking advantage of the query mechanisms provided by the Discover Browser.
2. Results Collection – How to make query results logical groupings (groups) to assist in better understanding and management of system components.
3. Graphical Representations – How to use the graphical views to understand the relationships of code, which include:

   Call Trees – Header file or function calling relationships

   Outline – Representation of the code Structure

   Flowchart – Overview of the program flow which also depicts complexity

   Class Inheritance Diagrams – Shows class hierarchy according to a particular class

Entity Relationship Diagram (ERD) – A methodology independent representation of the relationships between C++ classes similar to object diagrams

Graphs – Shows the possible paths between two functions.

4. Impact Analysis – How to use the ECS customized "Modified Entities Report" which is a single push button action to determine what has been changed, the extent of the change, and the quality of the change made by a software engineer.

Detailed instructions for the use of the Discover tool are provided in the Discover User Training Version 5.1 slide presentation.

2.4.2 ABC++

ABC++ is a C++ program that creates on-line and hard copy documentation output for C and C++ programs by analyzing the header and source code (compiled using the same switches as for a C/C++ compiler) and by extracting comments from it. ABC++ uses a top-down recursive parser with multi level look-ahead. It implements its own version of the ANSI C/C++ preprocessor in order to obtain maximum ability to associate comments with declarations and to correlate its parse tree with the original code. It uses ANSI standard C++ libraries, with provision for minor variations between Unix and other operating systems and has been built on a variety of computer platforms including Linux, Sun, SGI, HP, DEC, AIX, OS/2, and Windows 95/NT. For each header file encountered in compilation, the declarations of classes, functions, variables, constants, templates, and macros are catalogued, forming a reference manual by which the various components can be located easily. Comments are associated with their declarations and included in this reference manual. The same is done for each source file that does not have a header (such as a "main" module). Hyperlinks allow you to jump from class names used as object types, return types, and parameter types in a declaration to the documentation generated for those classes. The user documentation for ABC++ can be accessed through the Universal Resource Locator (URL) http://ecsdocs.east.hitc.com:88/abc and a user manual can be found within this documentation.

2.4.3 Rational Rose

The Rational Rose tool provides support for object-oriented analysis and design. In particular, the Rose tool provides support for controlled-iterative or component-based development. The Rose tool is used on the ECS Project to document the object-oriented elements of the design using class diagrams, use-case diagrams, interaction diagrams, component diagrams, and object diagrams. The Unified Modeling Language (UML) is the methodology used on the ECS Project for all design activities (although the Rose tool also supports the Booch '93 Methodology or the Object Modeling Technique (OMT) as well).

The Rose tool can also be used to reverse engineer code developed that lacks supporting documentation to get as-built object diagrams.

Before using the Rational Rose tool, see "Rational Rose 98, Using Rose" for important tool usage and reference information. In addition, the following references can be obtained and used:

(1) “Unified Method for Object-Oriented Development,” by Grady Booch and Jim Rumbaugh (version 1.1, Rational Software Corporation) for an introduction to the respective method’s notation, semantics, and process for object-oriented analysis and design.

(2) the second edition of “Object-Oriented Analysis and Design with Applications” by Grady Booch, (Benjamin/Cummings, 1994)

(3) “Object-Oriented Modeling and Design” by James Rumbaugh, Michael Blaha, William Premerlani, Frederick Eddy and William Lorensen, (Prentice-Hall, 1991)

3. System Description

3.1 Release 5B Objectives

3.1.1 Release 5B Capabilities

The ECS capabilities are developed in increments called formal releases. Release 5B, which is controlled by Configuration Management, provides capabilities to support the Ingest and archival of raw data obtained from the EOS AM Mission spacecraft 1, morning equator crossing spacecraft series (Terra (AM-1)), and the Land Remote-Sensing Satellite (Landsat 7). Other capabilities provided by Release 5B include processing the data obtained, distributing raw or processed data as requested, quality assurance of processed data, supporting communication networks, and systems monitoring via interfaces with the ECS operations staff.

Release 5B capabilities include:

- ingest and archival of Terra (AM-1) and other science and engineering data from the EOS Data and Operations System (EDOS) and Landsat 7 Level 0 Reformatted (L0R) data from the Landsat 7 Processing System (LPS)
- ingest of Product Generation Executive (PGE) software from a Science Computing Facility (SCF) either electronically or via media tape
- archival, production, and Quality Assurance (QA) processing of Terra (AM-1) science data products, science software integration and test, and the associated communications network interfaces with the SCF
- operator interfaces for production and resource planning
- directory and inventory search, including a user browse capability via the Version Zero (V0) System user interface
- receiving requests for science data products and distributing science data products via FTP and 8mm tape
- interfacing with the Advanced Space-borne Thermal Emission and Reflection Radiometer (ASTER) Ground Data System (GDS) for the submission of Data Acquisition Requests (DARs) for data collection by the ASTER instrument aboard the Terra (AM-1) spacecraft
- ingest of ASTER Level 1A/1B data from the ASTER GDS
- managing the startup and shutdown of system network components, user registration and profile administration, database and archive administration, system data and file back-up and restores, system performance tuning and resource usage monitoring, and other routine operator duties

- support of DAR submittals and DAR query status between the ECS Java DAR Tool and the ASTER GDS via the MOJO Gateway
- support the display of browse data as a result of a single user request from the search results screen
- support to submit on-demand requests to the ASTER GDS for the generation of Level 1B products
- support the searching and ordering of ECS data products by the ASTER GDS
- support the searching and ordering of ASTER GDS products by ECS users
- V0 Gateway support for client requests for searches based on full ECS core metadata and product specific attributes, Landsat7 floating scenes, and band subsetting, and Landsat 7 data billing information
- SDP Toolkit support for thread safe concurrent processing by the science software
- user authorization checks to restrict data set access at the granule level based on data quality information
- support for five new production rules required for PM-1
- automated support for on-demand requests for ASTER processing
- operations support to update certain ESDT attributes without requiring the deletion of the data collection
- ESDTs to support MODIS, AIRS, and AMSR on PM-1
- support for data retrieval and distribution of a subset of a Landsat 7 granule as selected by floating scenes and/or individual bands
- delivery of Terra's (AM-1) ancillary data files for use at other DAAC sites
- spatial container changes for ASTER L1A/L1B from bounded rectangle to gpolygon
- ingest of FDS (formerly FDD) orbit data via polling without DR
- ingest of SAGE III MOC granules into the Science Data Server via SIPS interface
- ingest of SAGE III SCF granules into the Science Data Server via the SIPS interface
- ingest of DAS HDF EOS data via standard polling with DR
- ingest standard ECS products, including MODAPS and MOPITT SCF via the SIPS interface
- ingest data resident in the SDPS across a mode in the same DAAC or across DAACs
- ingest of ASTER 14 DEM granules into the Science Data Server via the SIPS interface
- ingest of ACRIM L0 and higher level data from the ACRIM SCF via the SIPS interface
- SSI&T support for PM-1 (AIRS and MODIS)

- mapping of data collection to information manager
- editing of ECS core attribute values
- consolidation of trouble tickets using the Remedy Tool
- fault recovery for mode management
- startup and shutdown of an entire mode
- encryption of the subscription server FTP password in the Science Data Server database
- support of production rules to allow multiple L0 granules as input into a single PGE
- support of production rules for most recent granule and optional DPRs
- tracking Landsat 7 order processing via MSS
- deletion of science data from the archive without deleting the corresponding metadata
- Configurable parameters to control the number of granules returned from a single search request
- handling of variations on search areas and product-specific spatial representations
- installation of ESDTs to insert and acquire archived data without the archive storage directory names
- processing of orbit, attitude, and ephemeris data into toolkit native format and HDF
- persistence of asynchronous acquire requests, which do not have callback functions
- storage of event information into the SDSRV database instead of flat files
- monitoring of the usage of memory by the Science Data Server
- provides COTS packages to allow operations to generate customized reports from ECS databases
- production rules for the closest granule, the spatial pad, and orbit processing of run time parameters
- provide a single configuration registry database to replace the numerous ECS application configuration files
- capability to associate the ASTER browse granule for the L1A product with the ASTER L1B and DEM products

ECS Release 5B has been distributed to five site locations including:

1. the System Management Center (SMC), located at the Goddard Space Flight Center (GSFC),
2. the DAAC at GSFC,
3. the DAAC at the Langley Research Center (LaRC),

4. the DAAC at the Earth Resource Observation System (EROS) Data Center (EDC)
5. the DAAC at the National Snow and Ice Center (NSIDC)

The ECS Release 5B communications network includes the National Aeronautics and Space Administration (NASA) Science Internet (NSI) and the EOSDIS Backbone Network (EBnet). These portions of the network are physically located at the SMC and at the DAAC sites. The communications network connects ECS to data providers at the EDOS, the Landsat 7 Processing System (LPS), NOAA Affiliated Data Center (ADC), and the EOSDIS Version 0 system.

The data users for Release 5B are the science user community connected to the four DAACs, the SCFs, and the ASTER GDS.

3.1.2 Release 5B Instrument and DAAC Support

ECS Release 5B supports the following instrument data operations and DAACs.

- Terra (AM-1) Support:

  ECS Release 5B supports archiving, processing, and distributing instrument data from a complement of four Terra (AM-1) instruments. These instruments are ASTER, Multi-Imaging SpectroRadiometer (MISR), Moderate-Resolution Imaging SpectroRadiometer (MODIS), and Measurements Of Pollution In The Troposphere (MOPITT).

  ECS Release 5B provides a communications network and data/information management support for:

  – ASTER instrument data including the receipt of ASTER level 1 data on magnetic tape at EDC from Japan, and the production and distribution of higher level ASTER products by EDC.

  – MISR instrument data including the receipt of MISR level 0 data and the LaRC archive, production, and distribution of levels 1, 2 and 3 data and data products.

  – MODIS instrument data including level 0 data: archive, production, and distribution of levels 1A and 1B including distribution of the 1A and 1B data to the MODIS Data Processing System (MODAPS) for higher level processing. The receiving of higher level MODIS products from MODAPS via the SIPS interface is also supported.

  – MOPITT instrument data including the receipt of MOPITT level 0 data, and the LaRC archive, production, and distribution of levels 1, 2 and 3 data. During the initial period after launch, the MOPITT higher level products are generated at the SCF and provided to the ECS via the SIPS interface.

- Landsat 7 Support:

  – ECS Release 5B provides a repository for Landsat 7 L0R (L0 reformatted) data. The ECS communications network includes interfaces with the Landsat 7 system elements, the Mission Management Office (MMO), and the Ground Data Processing System (GDPS). The GDPS is composed of the Landsat 7 Processing System and the Image Assessment System (IAS).

  - The ECS network interfaces are needed to receive product cost information, exchange of registration services, and system management status from the MMO. The ECS receives and stores Landsat 7 level 0R data, metadata, and browse data from the LPS. The ECS also receives calibration data and metadata from the IAS. ECS network interfaces for data search, data order, and data distribution services to Landsat 7 users are also provided in Release 5B.

- SAGE III Support
  - The ECS Release 5B supports receiving SAGE III Level 0 data from the SAGE III MOC, provides the Level 0 data to the SAGE III SCF, and receives higher level products from the SCF via the SIPS interface.

- ACRIM Support
  - The ECS Release 5B supports receiving ACRIM L0 data and higher level products from the SCF via the SIPS interface.

- PM-1 Support
  - The ECS Release 5B supports Science Software Integration and Test (SSI&T) for the PM-1 mission.

3.2 Release 5B Architecture Overview

The ECS Release 5B architecture comprises the logical items listed here. Commercial Off The Shelf (COTS) software and hardware are used, to the extent possible, to implement the ECS functionality of these logical items.

- System
- Segments
- Subsystems
- Computer software configuration items (CSCIs)
- Computer software components (CSCs)
- Processes

ECS Release 5B was built of the following two segments.

- CSMS – Communications and Systems Management Segment
- SDPS – Science Data Processing Segment

Each segment was in turn built of the following subsystems.

- CSMS: CSS - Communications Subsystem
  ISS - Internetworking Subsystem
  MSS - System Management Subsystem
- SDPS: CLS - Client Subsystem
  DMS - Data Management Subsystem
  IOS - Interoperability Subsystem
  DSS - Data Server Subsystem
  PLS - Planning Subsystem
  DPS - Data Processing Subsystem
  INS - Ingest Subsystem

System: A stand-alone composite of hardware, facilities, material, software, services, and personnel required for operation based upon a defined set of system level requirements and designed as a related set of capabilities and procedures.

Segment: A logical and functional subset of related capabilities, implemented with COTS hardware and COTS and custom developed software to satisfy a defined subset of the system level requirements.

Subsystem: A logical subset of Segment related capabilities, implemented with COTS hardware and COTS and custom developed software to satisfy a defined subset of segment level requirements.

CSCI: A logical subset of Subsystem related capabilities, implemented with COTS and custom developed software to satisfy a defined subset of the subsystem level software requirements.

CSC: A logical subset of CSCI related capabilities, implemented with COTS and custom developed software to satisfy a defined subset of the CSCI level software requirements.

Process: A logical and functional set of software, written in a specific order and in a defined manageable size to manipulate data as part of a product-generating algorithm. A process can be separately compiled but can also use infrastructure library calls, system service calls, COTS service calls, and application programming interfaces to manipulate data to generate products.

Figure 3.2-1 is a hierarchical software diagram. The hierarchical software diagram depicts an example of the decomposition levels used in the ECS design and described in this document. The diagram is also a graphical representation of the terms just described.

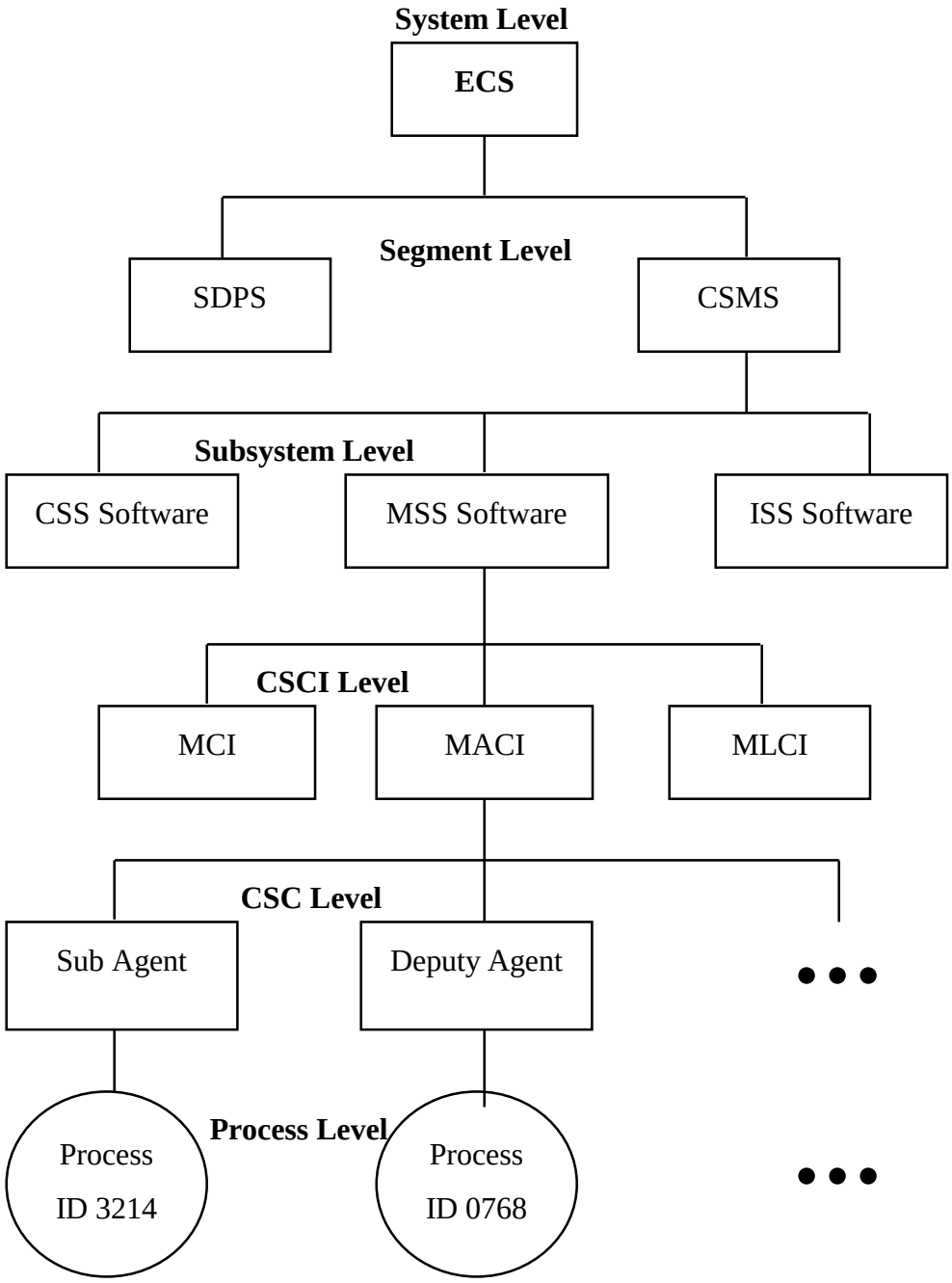

Figure 3.2-1. Example Hierarchical Software Diagram

3.2.1 Release 5B Context Description

ECS Release 5B provides the capability to collect and process satellite science data as depicted in Figure 3.2.1-1.

The Science Data Processing and Communications and Systems Management are the two segments of the ECS Release 5B described in this document. The Science Data Processing Segment (SDPS) provides science data ingest and production, search and access functions, data archive, and system management capabilities. The SDPS receives Terra (AM-1) Level 0 science data from EDOS and L0R Data from the Landsat 7 Processing System. The SDPS exchanges data with the ASTER GDS and other affiliated data centers to obtain science and other data (i.e., engineering and ancillary) required for data production. It also connects with the ASTER GDS to submit ASTER Data Acquisition Requests (DARs) for the collection of science data by the ASTER instrument. Science algorithms, provided by the Science Computing Facilities (SCFs), are used in data production to transform data into higher level products (Level 1 to Level 4 products) for research. The ECS project uses SCF expertise to support the Quality Assurance activities of using the results of the Science Software Integration and Test (SSIT) activities to process data and verify the data production science algorithms prior to actual data production. The Communications and Systems Management Segment (CSMS) provides the communications infrastructure for the ECS and systems management for all of the ECS hardware and software components. The CSMS provides the interconnection between users and service providers within the ECS, transfer of information between subsystems, CSCIs, CSCs, and processes of the ECS.

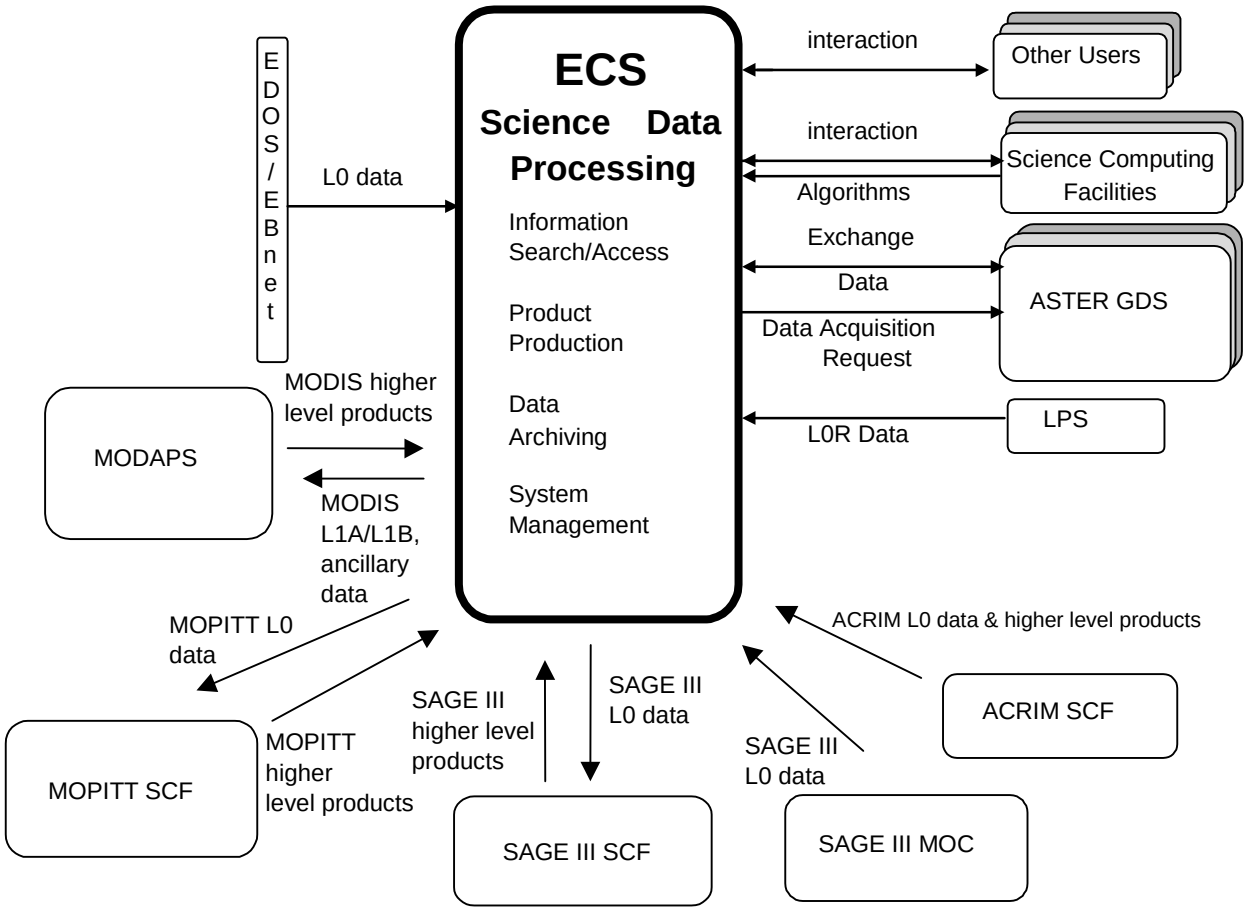

Figure 3.2.1-1. Release 5B Context Diagram

The remaining sections of this document provide an overview of the ECS Release 5B design and as such do not deal specifically with the configuration of components at each EOSDIS site. For more information on the site unique configurations, refer to the 920-series of General documents. Each of the segments consists of subsystems as specified in Section 3.2.

3.2.2 Release 5B Architecture

3.2.2.1 Subsystem Architecture

The ECS SDPS subsystems are depicted in Figure 3.2.2.1-1. A subsystem consists of the Commercial Off The Shelf (COTS) and/or ECS developed software and the COTS hardware needed for its execution. The SDPS subsystems can be grouped into a ‘Push’ or ‘Pull’ category of functionality with the exception of DSS. The information search and data retrieval makes up the ‘Pull’ side of the ECS architecture/design and consists of the CLS, DMS, IOS and also uses the DSS functionality described on the ‘Push’ side of the ECS architecture. Data capture (ingest of data), storage management, planning and data processing of satellite or previously archived

data from other sites make up the 'Push' side of the ECS architecture/design and consists of the DSS, INS, PLS, and DPS. This document describes the software and hardware components of each subsystem. However, since the hardware configurations differ between the sites, the hardware descriptions in this document are at a generic level. Specific hardware and network configurations for each site are documented in the 921-series Network Infrastructure documents.

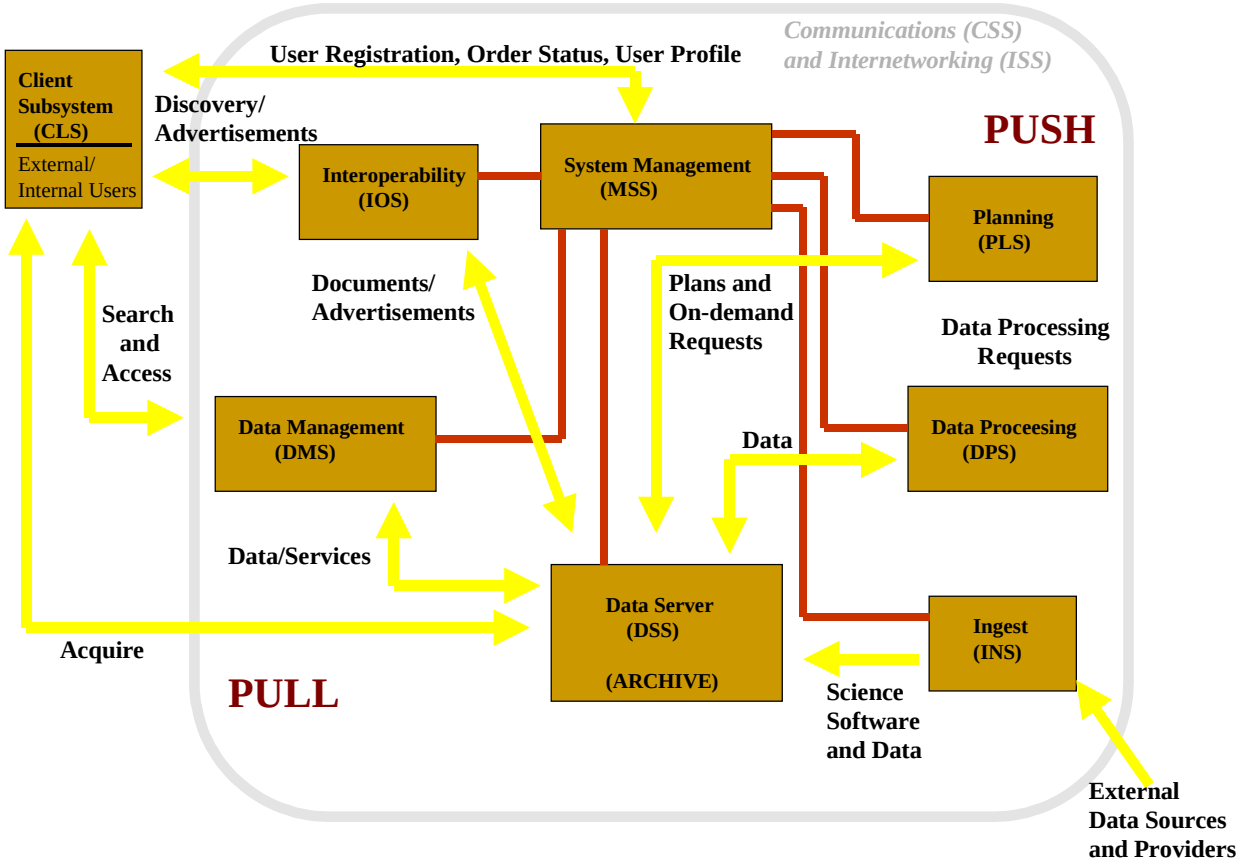

Figure 3.2.2.1-1. Subsystem Architecture Diagram

As shown in the subsystem architecture diagram, SDPS Release 5B subsystems can be grouped into a 'Push' or 'Pull' category of functionality with the exception of DSS. The DMS and the IOS on the 'Pull' side of ECS also use the DSS functionality described on the 'Push' side of the ECS architecture. Data capture (ingest of data), storage management, planning and data processing of satellite or previously archived data from other sites make up the 'Push' side of the ECS architecture/design and consists of:

1. The DSS with the functions needed to
    - archive (insert) science data
    - search for and retrieve archived data
    - manage (create and delete items from) the archives
    - stage (store on physical media temporarily) data resources needed as input to data processing or resulting as output from their processing execution
2. The INS with interfaces to external suppliers (such as EDOS and LPS) to:
    - transfer data into SDPS and temporarily store the data
    - provide staging capabilities for data waiting to be archived
    - provide operator interfaces for managing ingest operations
3. The DPS and PLS with:
    - DPS dispatching and monitoring the execution of the science software, and interfaces to DSS to stage the input data needed and archive the generated data
    - PLS providing long and short term planning of science data processing of the production environment and production resources

Information search and data retrieval makes up the 'Pull' side of the ECS architecture/design and consists of:

1. The CLS, DMS, and IOS with:
    - CLS providing user interfaces for data search and retrieval to science users and operators
    - DMS providing support for data search and retrieval across all ECS sites in conjunction with the DSS at each site. The DMS also provides a gateway as the interface to the Version 0 (V0) Information Management System (IMS) using the V0 IMS protocol
    - IOS managing advertisements of data and services it receives from the DSS or non-ECS users via the operations staff. IOS makes the advertisements available via a World Wide Web (WWW) interface for searching and browsing. Other SDPS subsystems (i.e., CLS, PLS, DPS, DMS, and INS) use IOS to determine the location of data and the services, offered by the DSS, for a particular type of data or distributed data that has been processed

CSMS – The following subsystems are the CSMS subsystems, which interact with and support the SDPS to complete the ECS architecture.

2. The MSS with:
    - hardware and software baseline and configuration management
    - trouble ticketing and nonconformance report (NCR) tracking
    - system start-up and shut-down
    - fault and performance monitoring for networks, platforms, and software applications
    - user account management and user order tracking
3. The CSS with:
    - Distributed Computing Environment (DCE) using Transmission Control Protocol/Internet Protocol (TCP/IP) for the network communications stack.
    - Libraries with common software mechanisms for application error handling, aspects of recovering client/server communications; Universal References to distributed objects and interfaces to e-mail, file transfer and network file copy capabilities.
    - External gateways to translate from the CSMS internal protocols, based on DCE, to protocols acceptable by external systems such as ASTER GDS and Landsat 7 LPS and vice versa.
4. The ISS with:
    - Networking hardware devices (e.g., routers, switches, hubs, cabling, etc.) and their respective embedded software. For more information on site unique configurations, refer to the 920-series of General documents.

3.2.2.2 Multi-Site Architecture

ECS Release 5B is distributed to five sites specified in Section 3.1.1. Each site is identified and its operational capabilities follow.

1. EDC DAAC capabilities include:
    - ingest of ASTER Level 1A / 1B and Landsat 7 Level 0R data, with ancillary data needed for production
    - production, archival and distribution of ASTER products
    - archival and distribution of Landsat 7 0R data
    - Receipt of higher level MODIS land products from MODAPS, via the SIPS interface, for archival and distribution
2. GSFC DAAC capabilities include:
    - ingest of MODIS Level 0 data and related ancillary data

- production, archival and distribution of the level 1A and 1B including the distribution of the level 1A, 1B and ancillary data to MODAPS for higher level processing
- Receipt of higher level MODIS atmospheric and ocean products from MODAPS, via the SIPS interface, for archival and distribution
- SSI&T support for PM-1 (AIRS and MODIS)

3. LaRC DAAC capabilities include:
   - ingest of CERES, MISR and MOPITT Level 0 and related ancillary data
   - production, archival, and distribution of the higher level products for MISR
   - data forwarding support for CERES through LaTIS and MOPITT to the SCF
   - Receipt of higher level CERES products from LaTIS, via the SIPS interface, for archival and distribution
   - Receipt of higher level MOPITT products from the MOPITT SCF, via the SIPS interface, for archival and distribution
   - Receipt of SAGE III Level 0 from the SAGE III MOC and the distribution of this data to the SAGE III SCF for processing
   - Receipt of higher level SAGE III products from the SCF, via the SIPS interface, for archival and distribution
4. NSIDC DAAC capabilities include:
   - Receipt of higher level MODIS snow and ice products from MODAPS, via the SIPS interface, for archival and distribution
5. SMC capabilities include:
   - Overall ECS system performance monitoring, coordinating, and setting system-wide policies and priorities.

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4. Subsystem Description

Design Description Organization and Approach

This section presents a subsystem-by-subsystem overview description of the "as-built" ECS. The current detailed design information is provided for the Hardware Configuration Items (HWCI), Computer Software Component Items (CSCI), and Computer Software Components (CSC) for each subsystem and is being delivered to the DAACs in drop increments.

The SDPS and CSMS subsystem descriptions include:

- Subsystem functional overviews with a subsystem context diagram and a table of interface event descriptions
- CSCI descriptions with a context diagram and a table with interface event descriptions
- Architecture Diagrams, Process Descriptions, and Process Interface Event Tables. The Architecture Diagrams show the processes of the CSCI/CSC and how these processes connect with other CSCIs and CSCs of the same subsystem and the interfaces with other subsystems and external entities such as Operations, External Data Providers and Users. These Processes and the supporting libraries are listed in Appendices A (Software Process) and B (Software Libraries).
- Data Store descriptions for each CSCI in each SDPS/CSMS subsystem. The Data Stores are identified with the software name and shown in the architecture diagrams either as single data stores or as a group of data stores with a generic name such as "Data Stores" or "database."
- Hardware descriptions of the subsystem hardware items and the fail-over strategy.

The convention used for Context and Architecture diagrams includes using circular shapes to show the subject subsystems, CSCIs, CSCs, or processes (with name in bold), elliptical shapes to show associated CSCIs, CSCs, or processes within a given subsystem and squares or rectangles to show external subsystems, CSCIs, CSCs, and processes. Data stores are shown using the data store or database name with horizontal lines, one above and one below the name. An interface event is data, a message (which includes a notification or status), command/request or status code passed between subsystems, CSCIs, CSCs, or processes. The convention used to identify events is a straight line between two objects labeled with a phrase beginning with an action-oriented word to best describe the event. The arrow on the event line indicates an origination point and to where the event is directed. The response to this action is not shown in the diagram, in most cases, for simplification. However, the response is described in the description column of the interface event tables. Interface events are identified in the interface event or process interface tables starting with the interface event at the top and middle of the diagram and going clock-wise around the diagram. These conventions are consistent with other ECS documentation. The convention for naming the ECS processes is Ec <subsystem abbreviation> meaningful name. The *Ec* identifies the process as an ECS developed process versus a Commercial Off The Shelf (COTS) product. The *subsystem abbreviations* are listed subsystem-by-subsystem.

- Cl for CLS
- Cs for CSS
- Dm for DMS
- Dp for DPS
- Ds for DSS
- In for INS
- Io for IOS
- Ms for MSS
- Pl for PLS

The *meaningful name* identifies the process and its functionality within the subsystem, CSCI, or CSC. An example is EcIoAdServer, which identifies an ECS-developed IOS process called the Advertisement Server. Any names within an architecture diagram that do not follow this convention are COTS products. All COTS product names are kept for simplicity and to adhere to licensing and trademark agreements.

4.1 Data Server Subsystem Overview

The Data Server Subsystem (DSS) provides capabilities to store, search, retrieve, and distribute earth science and related data. The DSS provides data repositories and management capabilities to safely store data on a permanent basis. The DSS stages data needed for data processing by the Data Processing Subsystem (DPS) or for retrieval by users at external locations. The DSS organizes and stores its data by data types, and provides advanced search capabilities and processing services on those data types in support of earth science data users. The DSS distributes data to users either electronically or on physical media. It also includes administrative capabilities to operate and manage its hardware and software.

DSS functionality includes:

- The DSS provides advertisements, for data types and corresponding data type services, to the Interoperability Subsystem (IOS)
- The DSS stores (archives) the Ingest Subsystem (INS) ingested data and products created via the DPS
- The DSS receives service requests for data and data type services from external service requesters including the Client Subsystem (CLS), the Data Management Subsystem (DMS), the Planning Subsystem (PLS), and the DPS
- The DSS provides (distributes) data in response to service requests, to the request originator, by means of either electronic transfer or physical media. Alternatively, the subsystem can provide references to data as a Universal Reference (UR)

Data Server Subsystem Context

Figure 4.1-1 is the context diagram for the DSS. The diagram shows the events DSS sends to other SDPS or CSMS subsystems and the events sent to DSS.

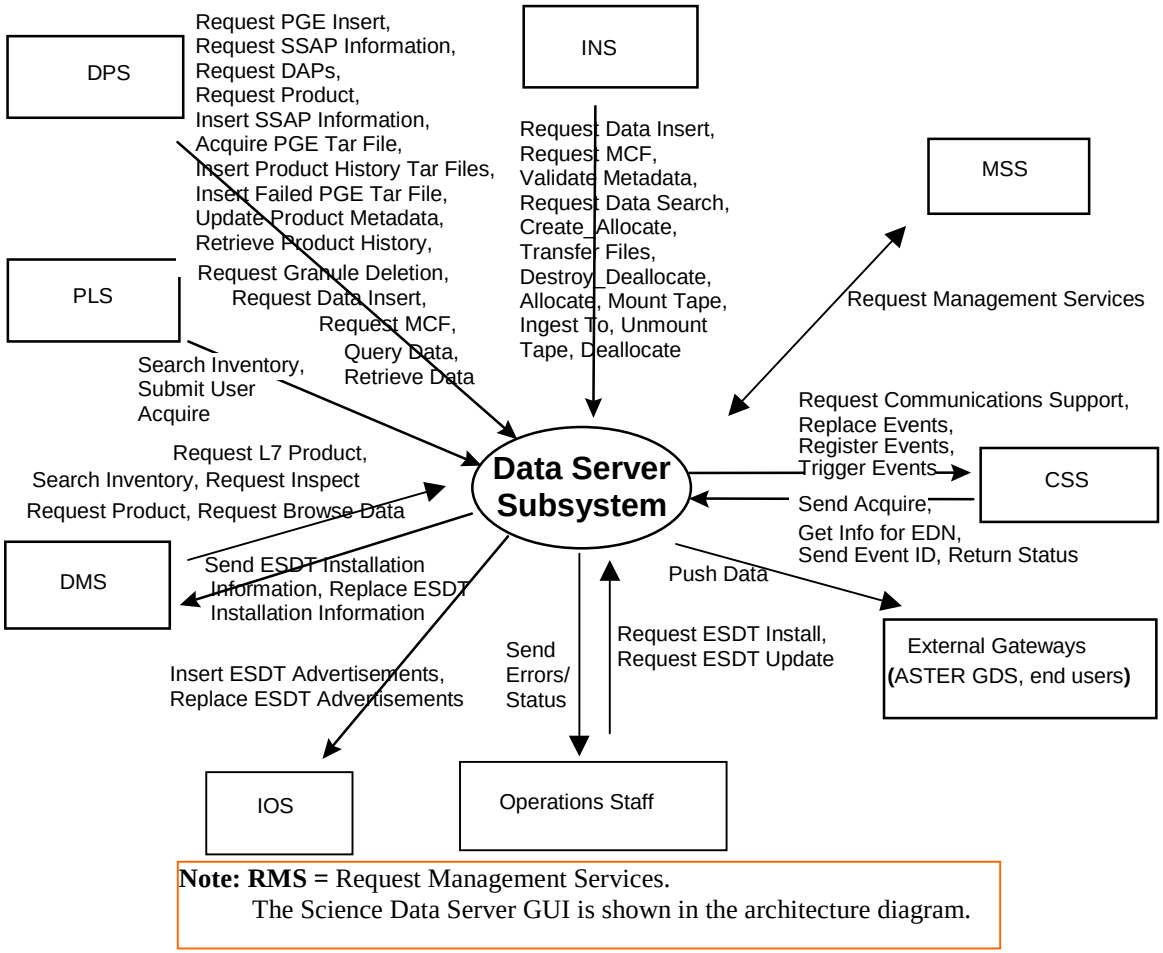


Figure 4.1-1. Data Server Subsystem Context Diagram

Table 4.1-1 provides a description of the interface events shown in the Data Server Subsystem context diagram.

Table 4.1-1. Data Server Subsystem Interface Events (1 of 5)

Event	Interface Event Description
Request Data Insert	The INS and DPS send insert requests to the DSS for a particular file or files (into the SDPS inventory and archives). Inserted data is accompanied by metadata. The metadata is catalogued in the SDSRV inventory as a granule of a particular ESDT short name and version.
Request MCF	The INS and DPS request the Metadata Configuration File (MCF) from the DSS prior to a data insert request. The DSS provides the MCF information as part of the GetMCF service call.

Table 4.1-1. Data Server Subsystem Interface Events (2 of 5)

Event	Interface Event Description
Validate Metadata	The DSS validates the metadata files the INS has populated.
Request Data Search	The INS sends a search request to the DSS for a granule corresponding to a particular ESDT short name and version, which has a particular local granule id.
Create_Allocate	The INS sends requests to the DSS to allocate areas on the local staging disk to store ingested data.
Transfer Files	The INS sends requests to the DSS to transfer (copy) data files to a staging disk.
Destroy_Deallocate	The INS sends requests to the DSS to deallocate a staging disk area (to remove an existing staging disk area from usage).
Allocate	The INS sends requests to the DSS to allocate peripheral devices for data ingesting.
Mount Tape	The INS sends requests to the DSS to load tapes to hardware peripherals for reading the tapes.
Ingest To	The INS sends requests to the DSS to copy files from peripheral resources to staging disk areas.
Unmount Tape	The INS sends requests to the DSS to unload and detach tapes from hardware peripherals after reading or writing to the tapes.
Deallocate	The INS sends requests to the DSS to deallocate the previously allocated media resource.
Request Management Services	The MSS provides a basic management library of services to the subsystems, implemented as client or server applications, using the CSS Process Framework. The basic management library of services include: • **Lifecycle Commands -** The HPOV Network Node Manager forwards (via DCE RPCs), to the MSS Sub Agent running on each managed host, requests to start and stop ECS applications. A start request has mode and temperature parameters that the MSS Sub Agent uses in constructing its command line startup request. Stop requests precipitate a PF shutdown RPC call to the target ECS application from the MSS Sub Agent. Managed applications use the application interface PFGETMODE to obtain their operational mode (e.g., Ops, test, or training). • **User Profile Request** - The MSS provides requesting subsystems with User Profile parameters such as e-mail address and shipping address upon request by authorized users to support their processing activities.
Request Communications Support	The CSS provides a library of services available to each SDPS/CSMS subsystem. The services required to perform the specific subsystem assignments are requested by the subsystem from the CSS. These services include: Distributed Computing Environment (DCE) support, file transfer services, Network & Distributed File Services, Bulk Data transfer services, file copying services, name/address services, password services, Server Request Framework (SRF), Universal Reference (UR), Error/Event logging, message passing, Fault Handling services, User Authentication services, Mode information, and retrieving the requested configuration attribute-value pairs from the Configuration Registry for ECS applications that request them.

Table 4.1-1. Data Server Subsystem Interface Events (3 of 5)

Event	Interface Event Description
Replace Events	The DSS sends the updated subscription events with updated qualifiers for an Earth Science Data Type (ESDT) to the CSS Subscription Server when an ESDT is updated. This event replaces the original event in the CSS Subscription Server.
Register Events	The DSS sends the subscription events for an Earth Science Data Type (ESDT) to the CSS Subscription Server when an ESDT is installed into the system or when an ESDT is updated by adding additional events.
Trigger Events	The DSS notifies the CSS (via an event trigger) when a subscription event occurs on an ESDT Service.
Send Acquire	An “acquire” (instruction to obtain data) is created by the CSS and sent to the DSS via remote procedure call. This is similar to the “Request Product” interface event, except it applies to EDOS expedited data.
Get Info for EDN	Expedited Data Set Notification (EDN) information is obtained from the DSS, by request, and used by the CSS to send messages to users at the ASTER GDS.
Send Event ID	The CSS sends Event Ids to the DSS when ESDTs are installed or when ESDTs are updated by adding additional events.
Return Status	Status returned by the CSS to the DSS to simply indicate that the request was received, not that the action succeeded.
Push Data	The DSS assembles instructions to send data to the ASTER GDS or other external users via the CSS. The DSS pushes data, via the FTP service and followed by a signal file, to the destination specified in an acquire instruction (by particular ESDTs that function this way).
Request ESDT Install	The Operations staff sends ESDT installation information to the DSS for adding descriptor, dynamic link library (dll), version id, and archive configuration information for a new Earth Science Data Type.
Request ESDT Update	The Operations Staff sends updated ESDT information to the DSS for adding updated descriptor and Dynamic Link Library (DLL) information for an existing ESDT.
Send Errors/Status	The DSS sends error conditions and status of data distributions to the Operations Staff or users.
Insert ESDT Advertisements	The Interoperability Subsystem (IOS) receives requests to insert advertisements for data types (ESDTs) from the DSS including both data product and signature service advertisements.
Replace ESDT Advertisements	The Interoperability Subsystem (IOS) receives requests to update advertisements for data types (ESDTs) from the DSS including both data product and signature service advertisements. These updated advertisements replace the previous advertisement associated with this ESDT.
Send ESDT Installation Information	The DSS sends ESDT installation information, to the DMS Data Dictionary, whenever a new ESDT is installed. This data consists of Inventory and Collection level metadata.
Replace ESDT Installation Information	The DSS sends updated ESDT information to the DMS Data Dictionary whenever an ESDT is updated. This data consists of updated Inventory and Collection level metadata.

Table 4.1-1. Data Server Subsystem Interface Events (4 of 5)

Event	Interface Event Description
Request L7 Product	The EOS Data Gateway within the V0 IMS requests Landsat 7 Products from the SDPS (via the DMS to the DSS) through the EDC Dorran Billing and Accounting System.
Search Inventory	The PLS and DMS send Inventory Search Requests to the DSS to search the SDPS Inventory (metadata). In response, Earth Science Data Type (ESDT) Universal References (URs) for the granules are returned from the DSS.
Request Inspect	The DMS sends a request for an inspection of granule metadata to the DSS in support of a price estimate request.
Request Product	The DPS sends requests, to the DSS, for particular data granules to be pushed, via the FTP service, onto the DPS science processor as input for data processing or for SSIT work. The DMS forwards product requests (to the DSS) to acquire data products for an external user.
Request Browse Data	The DMS submits requests for Browse data to the DSS to acquire reduced resolution products to support a product request.
Submit User Acquire	The PLS submits an acquire command to the DSS on behalf of the user. The user gets a response via the DSS upon data distribution.
Request PGE Insert	The DPS sends requests to the DSS to insert data that defines a PGE and allows it to be scheduled and executed.
Request SSAP Information	The DPS sends requests to the DSS for SSAP information, including names of existing SSAPs and the information associated with a specific SSAP. In response, the DSS sends lists of SSAPs and related information.
Request DAPs	The DPS requests DAPs based on URs from the DSS. The DAPs are placed on a local DPS disk.
Insert SSAP Information	The Operations Staff sends requests to the DSS to insert SSAP information, via the DPS SSAP GUI, including SSAP name, SSAP version number, PGE name, PGE version number, and SSAP Acceptance Date.
Acquire PGE Tar File	The DPS acquires a tar file for any PGE not currently local to the science processor from the DSS. The executable is extracted from the tar file and used during PGE execution.
Insert Product History Tar Files	The DPS sends a request to the DSS to insert the PGE Production History Tar File resulting outputs for permanent archive after the PGE has successfully completed executing.
Insert Failed PGE Tar File	After an unsuccessful execution of a PGE, the DPS obtains the Tar file containing the PGE log files, core dump (if any), PCF and other files, and requests the files be inserted into the DSS for permanent archive.
Update Product metadata	The Operations Staff uses the QA Monitor GUI in the DPS to send requests to update product metadata in the DSS.
Retrieve Product History	The Operations Staff uses the QA Monitor GUI to submit requests to the DSS to transfer the Production History tar file from the Science Data archives to the user's host machine.

Table 4.1-1. Data Server Subsystem Interface Events (5 of 5)

Event	Interface Event Description
Request Granule Deletion	The DPS sends delete requests to the DSS for particular granules (interim data) in the metadata (the SDPS inventory).
Query Data	The DPS submits requests of this type to the DSS. It searches the archive for granules that match the user-supplied selection criteria: data type and begin/end date. Results are displayed to the user.
Retrieve Data	The DPS sends retrieval requests, to the DSS, for a particular data granuleId. The product is transferred (pushed), via the File Transfer Protocol (FTP) service, onto the DPS science processor and used as input for Product Generation Executive (PGE) processing or for Science Software Integration and Test (SSIT) work.

Data Server Subsystem Structure

The DSS is three CSCIs:

- The Science Data Server (SDSRV) CSCI manages and provides user access to collections of non-document (non hard copy) earth science data, extracts and modifies data by request, accepts browse, search, and retrieval requests from users, and catalogs data insert requests from other SDPS or CSMS CSCIs, CSCs, and processes. The SDSRV CSCI manages earth science data as logical collections of related data, via interfaces independent of data formats and hardware configurations inherent in underlying storage technologies. The SDSRV manages interactive sessions with service requesters and informs the service requester of the availability of data and services via the IOS.

- The Data Distribution (DDIST) CSCI formats and distributes data to users electronically or via physical media. The formatting process includes the layout of a sequence of files, assembling a packing list and using Tape Archive (TAR) formats for tapes. The DDIST CSCI accepts requests from the SDSRV CSCI. The DDIST CSCI distributes staged data (data prepared for distribution), directs the Storage Management (STMGT) CSCI to transfer data either electronically or by 8mm tape, and provides a Graphical User Interface (GUI) for operations management to view, cancel, suspend/resume and change the priorities of distribution requests. Electronic distribution can be requested via an FTP push or pull. With push, the DDIST CSCI uses network resources managed by the STMGT CSCI to transfer the data to a remote destination specified by the requester. For pull, the data is placed in an area managed by the STMGT CSCI, from which the requester can retrieve the data.

- The Storage Management (STMGT) CSCI stores and manages data, and retrieves data files from the archives for other science data processing software. The STMGT CSCI provides an interface to make implemented changes in new data storage technologies transparent to users and without interfering with ECS systems outside the STMGT CSCI. The STMGT CSCI performs quality assurance processing and files recovery services. The STMGT CSCI also provides management of storage resources and prepares data for distribution.

The Data Server Subsystem hardware consists of the following four Hardware Configuration Items (HWCIs):

- Access Control and Management

  The Access Control and Management HWCI (ACMHW) is hardware to support the Ingest and Data Server Subsystems' software to directly interact with users. The ACMHW provides a level of security by isolating other hardware items from external software access.

- Working Storage

  The Working Storage HWCI (WKSHW) is hardware to provide high-performance storage of large volumes of data on a temporary basis.

- Data Repository

  The Data Repository HWCI (DRPHW) is hardware to provide high-capacity storage for long-term storage of data files.

- Distribution and Ingest Peripherals

  The Distribution and Ingest Peripherals HWCI (DIPHW) is hardware to provide support to ingest and distribution via physical media.

Detailed information on hardware/software mapping, hardware diagrams, disk partitioning, etc., can be found in 920-TDx-00x, the 921-TDx-00x, and the 922-TDx-00x series of baseline documents.

Use of COTS in the Data Server Subsystem

- RogueWave's Tools.h++

  The Tools.h++ class libraries provide libraries of object strings and collections. These libraries must be installed for the DSS processes to run.

- RogueWave's DBTools.h++

  The DBTools.h++ C++ class libraries interact with the Sybase database Structured Query Language (SQL) server and buffer the processes from the relational database used. These libraries must be installed for the Server to run.

- Rogue Wave's Net.h++

  This is a C++ class library to provide an object-oriented interface to Inter-Process Communication (IPC) and network communication services. The Net.h++ framework enables developed code to be portable to multiple operating systems and network services. These libraries must be installed with the STMGT software to support interaction with other subsystems.

- Integrated Computer Solutions (ICS) Builder Xcessory

  The Builder Xcessory GUI builder tool modifies the displays. The Builder Xcessory generates the C++ code to produce the Mtool display at run time. There is no operational part of the Builder Xcessory needed at run-time.

- Sybase SQL Server

  The Sybase SQL server provides the capabilities to insert, update and delete database contents. The Sybase SQL Server must be operational to execute search and insert requests for metadata. The terms Sybase Server and Sybase SQL Server are used interchangeably in this section.

- Autometric's Spatial Query Server

  The Spatial Query Server (SQS) provides the capability to store and search spatial metadata. SQS has spatial indexing to search on spatial metadata for the SDSRV.

- Sybase Open Client / CT_LIB

  The Sybase Open Client provides access between DSS custom code and the Sybase SQL Server DBMS.

- University of Illinois' Hierarchical Data Format (HDF)

  HDF provides EOS extended capabilities for sub-setting services with the SDSRV CSCI.

- University of Colorado's Object Description Language (ODL)

  ODL provides a general architecture, independent means of passing metadata files between subsystems.

- DCE Client

  DCE Client provides DSS with communications between other subsystems. DCE can reside on one or both sides of the interface. An instance must be installed on the platform where DSS resides. Although the DCE Client is part of CSS, this COTS item must be installed for DSS to run in the SDPS operational and test environment.

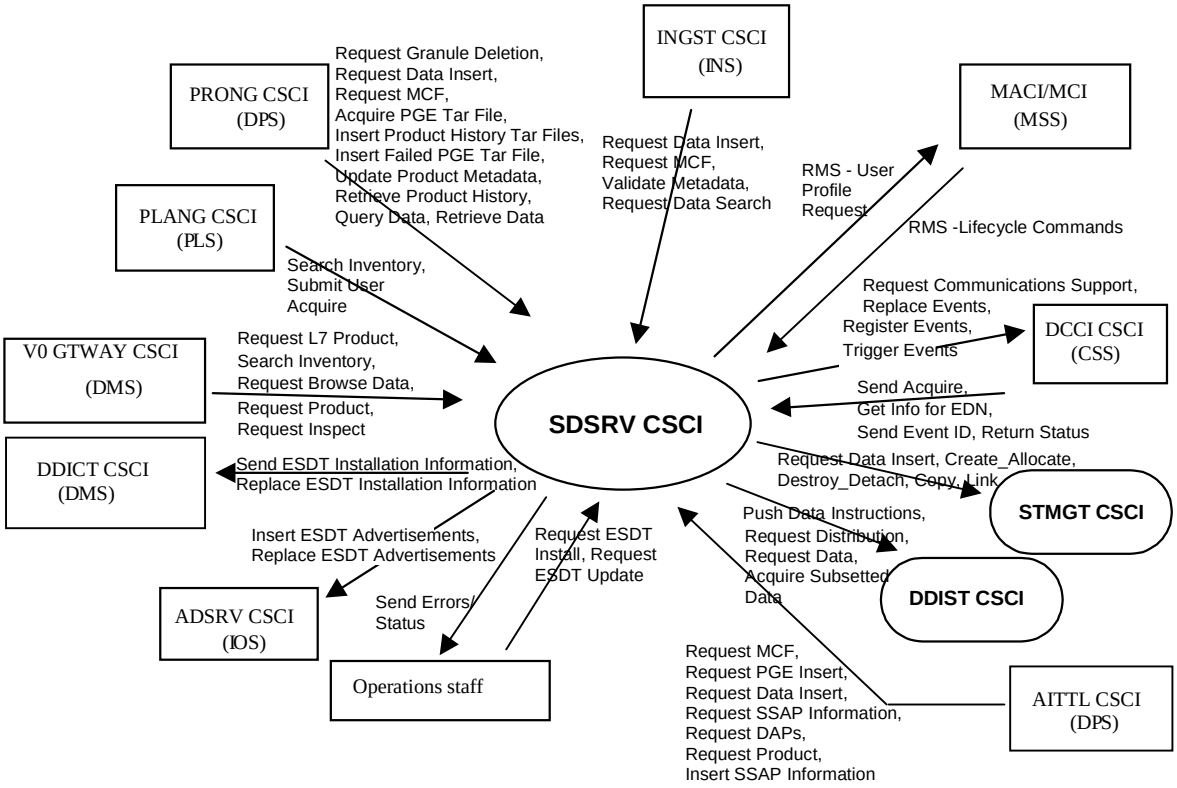
4.1.1 Science Data Server Software Description

4.1.1.1 Science Data Server Functional Overview

The SDSRV CSCI provides the SDPS with a catalog of Earth Science Data holdings, and the Earth Science Data Type services that operate on the data. The SDSRV CSCI provides a catalog of metadata describing the archived data holdings of the SDPS and provides mechanisms to acquire the data from the archive. The SDSRV CSCI also provides data type services on the catalog and a data reduction or sub-setting and reformatting services.

4.1.1.2 Science Data Server Context

Figure 4.1.1.2-1 is the SDSRV CSCI context diagram. The diagram shows the events sent to the SDSRV CSCI and the events the SDSRV CSCI sends to other CSCIs. The events have been grouped by CSCI including the Storage Management and Data Distribution functions of the DSS.



Note: RMS = Request Management Services.
The Science Data Server GUI is shown in the architecture diagram.

Figure 4.1.1.2-1. SDSRV CSCI Context Diagram

Table 4.1.1.2-1 provides descriptions of the interface events shown in the SDSRV CSCI context diagram.

Table 4.1.1.2-1. SDSRV CSCI Interface Events (1 of 4)

Event	Interface Event Description
Request Data Insert	The INGST, PRONG, and AITTL CSCIs send requests to the SDSRV CSCI to insert a particular file or files into the inventory and archive. Inserted data is accompanied by metadata. The metadata is catalogued in the SDSRV inventory as a granule of a particular ESDT short name and version. For INGST CSCI, this data can be algorithms, Level 0 (L0) data, standard products, ancillary data, correlative data or calibration data. For the PRONG AND AITTL CSCIs, these files can be processing output, static files received with PGEs, PGE Tape Archive (TAR) files, Algorithm Packages (APs), Science Software Archive Packages (SSAPs), or Delivered Algorithm Packages (DAPs), failed PGE tar files, or production history files. All data insert requests are sent to the STMGT CSCI from the SDSRV CSCI.
Request MCF	The INGST, PRONG, and AITTL CSCIs request the Metadata Configuration File (MCF) template, from the SDSRV CSCI, for each input or output data type, respectively, prior to a data insert request. The SDSRV CSCI provides the MCF information as part of the GetMCF service call. Also, the PRONG CSCI can request from the SDSRV CSCI the MCF for a particular ESDT short name prior to a data insert request.
Validate Metadata	The SDSRV CSCI validates the metadata files, which the INGST CSCI has populated.
Request Data Search	The INGST CSCI sends a search request to the SDSRV CSCI for a granule corresponding to a particular ESDT short name and version, which has a particular local granule id.
Request Management Services	The MACI and MCI provide a basic management library of services to the CSCIs, implemented as client or server applications, using the DCCI CSCI Process Framework. The basic management library of services include: • **Lifecycle Commands -** The HPOV Network Node Manager forwards (via DCE RPCs), to the MSS Sub Agent running on each managed host, requests to start and stop ECS applications. A start request has mode and temperature parameters that the MSS Sub Agent uses in constructing its command line startup request. Stop requests precipitate a PF shutdown RPC call to the target ECS application from the MSS Sub Agent. Managed applications use the application interface PFGETMODE to obtain their operational mode (e.g., Ops, test, or training). • **Request User Profile** - The MCI provides requesting CSCIs with User Profile parameters such as e-mail address and shipping address upon request by authorized users to support their processing activities.
Request Communications Support	The DCCI CSCI provides a library of services available to each SDPS or CSMS CSCI. The services required to perform the specific CSCI assignments are requested by the CSCI from the DCCI CSCI. These services include: Distributed Computing Environment (DCE) support, file transfer services, Network & Distributed File Services, Bulk Data transfer services, file copying services, name/address services, password services, Server Request Framework (SRF), Universal Reference (UR), Error/Event logging, message passing, Fault Handling services, User Authentication services, Mode information, and retrieving the requested configuration attribute-value pairs from the Configuration Registry for ECS applications that request them.

Table 4.1.1.2-1. SDSRV CSCI Interface Events (2 of 4)

Event	Interface Event Description
Replace Events	The SDSRV CSCI sends the updated subscription events with modified qualifiers for an Earth Science Data Type (ESDT) to the DCCI CSCI (Subscription Server) when an ESDT is updated. This event replaces the original event in the DCCI CSCI.
Register Events	The SDSRV CSCI sends the subscription events for an Earth Science Data Type to the DCCI CSCI (Subscription Server) when an ESDT is installed into the system or when an ESDT is updated by adding additional events.
Trigger Events	The SDSRV CSCI notifies the DCCI CSCI (via an event trigger) when a subscription event occurs on an Earth Science Data Type Service.
Send Acquire	An “acquire” (instruction to obtain data) is created by the DCCI CSCI and sent to the SDSRV CSCI. This is similar to the “Request Product” interface event, except it applies to EDOS expedited data.
Get Info for EDN	Expedited Data Set Notification (EDN) information is obtained from the SDSRV CSCI, by request, and used by the DCCI CSCI to send messages to users at the ASTER GDS.
Send Event ID	The DCCI CSCI sends Event Ids to the SDSRV CSCI when ESDTs are installed or when ESDTs are updated by adding additional events.
Return Status	Status returned by the DCCI CSCI to the SDSRV CSCI to simply indicate that the request was received, not that the action succeeded
Create_Allocate	The SDSRV CSCI sends requests to the STMGT CSCI to allocate areas on the local staging disk to store ingested data or output files from routine data processing or SSIT work.
Destroy_Detach	The SDSRV CSCI sends requests to the STMGT CSCI to detach from a staging disk area (lose access to an existing staging disk area owned by another process).
Copy	The SDSRV and DDIST CSCIs send requests to the STMGT CSCI to copy data within staging disks and between staging disks.
Link	The SDSRV and DDIST CSCIs send requests to the STMGT CSCI to link files from read-only cache to a staging disk specified in the request.
Push Data Instructions	The SDSRV CSCI assembles instructions to send data and sends the instructions to the DDIST CSCI. The DDIST CSCI sends a request to the STMGT CSCI to push the data, via the FTP service, followed by a signal file (to the destination specified in an acquire instruction by particular ESDTs that function this way.
Request Distribution	The SDSRV CSCI sends distribution requests to the DDIST CSCI for various categories of data. The distribution services on those data are essentially identical for all data categories.
Request Data	The PRONG CSCI sends data retrieval requests to the SDSRV CSCI. The SDSRV CSCI sends the data retrieval request to the DDIST CSCI. The DDIST CSCI queues the request in a queue with the appropriate priority. When the request is taken from the queue, the STMGT CSCI is passed the data retrieval request from the DDIST CSCI for a particular data granule to be pushed onto the DPS science processor, via the FTP service. The data granule is to be used as input for PGE processing or for SSIT work.

Table 4.1.1.2-1. SDSRV CSCI Interface Events (3 of 4)

Event	Interface Event Description
Acquire Subsetted Data	The SDSRV CSCI sends requests to the DDIST CSCI to retrieve subsetted data files for distribution.
Request PGE Insert	The AITTL CSCI sends requests to the SDSRV CSCI to insert data that defines a PGE and allows it to be scheduled and executed.
Request SSAP Information	The SDSRV CSCI receives requests from the AITTL CSCI for SSAP information, including names of existing SSAPs and the information associated with a specific SSAP. In response, the SDSRV CSCI sends lists of SSAPs and related information.
Request DAPs	The AITTL CSCI requests DAPs based on URs from the SDSRV CSCI. The DAPs are placed on a local AITTL disk.
Request Product	The SDSRV CSCI receives requests from the V0 GTWAY CSCI for a product order from an external user to be distributed by the DDIST CSCI upon receipt of the data from the STMGT CSCI. The SDSRV CSCI receives requests from the AITTL CSCI to push data granules, via the FTP service, onto the DPS science processor as input for data processing or SSIT work.
Insert SSAP Information	The Operations Staff sends requests to the SDSRV CSCI to insert SSAP information, via the SSAP GUI in the AITTL CSCI, including SSAP name, SSAP version number, PGE name, PGE version number, and SSAP Acceptance Date.
Request ESDT Install	The Operations Staff sends ESDT installation information to the SDSRV CSCI for adding the descriptor, dynamic link library (dll), version id, and archive configuration information for a new Earth Science Data Type.
Request ESDT Update	The Operations Staff sends updated ESDT information to the SDSRV CSCI for adding updated descriptor and dynamic link library (dll) information for an existing ESDT.
Send Errors/Status	Error conditions and status of data distribution are sent from the SDSRV CSCI (for acquires that are synchronous) or the DDIST CSCI (if the acquire is asynchronous and the DDIST CSCI gets the request) to the Operations Staff.
Insert ESDT Advertisements	The ADSRV CSCI receives requests to insert advertisements for data types (ESDTs) from the SDSRV CSCI including both data product and signature service advertisements.
Replace ESDT Advertisements	The ADSRV CSCI receives requests to insert updated advertisements for data types (ESDTs) from the SDSRV CSCI including both data product and signature service advertisements. This information replaces the original information.
Send ESDT Installation Information	The SDSRV CSCI sends ESDT installation information, to the DDICT CSCI, whenever a new ESDT is installed. This data consists of Inventory and Collection level metadata.
Replace ESDT Installation Information	The SDSRV CSCI sends updated ESDT information to the DDICT CSCI whenever an ESDT is updated. This data consists of Inventory and Collection level metadata. The updated information replaces the ESDT information in the DDICT CSCI.
Request L7 Product	The EOS Data Gateway within the V0 IMS requests Landsat 7 Products from the SDPS (via the V0 GTWAY CSCI to the SDSRV CSCI) through the EDC Dorran Billing and Accounting System.

Table 4.1.1.2-1. SDSRV CSCI Interface Events (4 of 4)

Event	Interface Event Description
Search Inventory	The PLANG AND V0 GTWAY CSCIs send requests to the SDSRV CSCI to search the SDPS Inventory (archives). In response, the ESDT Universal References (URs) for the granules are returned from the SDSRV CSCI.
Request Browse Data	The V0 GTWAY CSCI submits requests for browse data to the SDSRV CSCI to acquire reduced resolution products to support a product request.
Request Inspect	The V0 GTWAY CSCI sends a request for an inspection of granule metadata to the SDSRV CSCI in support of a price estimate request.
Submit User Acquire	The PLANG CSCI submits an acquire command to the SDSRV CSCI on behalf of the user. The user gets a response via the DDIST CSCI upon data distribution.
Request Granule Deletion	The PRONG CSCI sends delete requests to the SDSRV CSCI for particular granules (interim data) in the SDSRV metadata.
Acquire PGE Tar File	The PRONG CSCI acquires a tar file for any PGE not currently local to the science processor from the SDSRV CSCI. The executable is extracted from the tar file and used during PGE execution.
Insert Product History Tar Files	The PRONG CSCI sends a request to the SDSRV CSCI to insert the PGE Production History Tar File resulting outputs for permanent archive after the PGE has successfully completed executing.
Insert Failed PGE Tar File	After an unsuccessful execution of a PGE, the PRONG CSCI obtains the Tar file containing the PGE log files, core dump (if any), PCF and other files, and requests the files be inserted into the SDSRV CSCI for permanent archive.
Update Product Metadata	The Operations Staff uses the QA Monitor GUI in the PRONG CSCI to send requests to update product metadata in the SDSRV CSCI.
Retrieve Product History	The Operations Staff uses the QA Monitor GUI in the PRONG CSCI to submit requests to the SDSRV CSCI to transfer the Production History tar file from the Science Data archives to the user's host machine.
Query Data	The PRONG CCSI submits requests of this type to the SDSRV CSCI. It searches the archive for granules that match the user-supplied selection criteria: data type and begin/end date. Results are displayed to the user.
Retrieve Data	The PRONG CSCI sends retrieval requests, to the SDSRV CSCI, for a particular data granuleId. The product is transferred (pushed), via the FTP service, onto the DPS science processor and used as input for PGE processing or for SSIT work.

4.1.1.3 Science Data Server Architecture

Figures 4.1.1.3-1, 4.1.1.3-2 and 4.1.1.3.3 are the SDSRV CSCI architecture diagrams. The diagrams show the events sent to the SDSRV CSCI processes and the events the SDSRV CSCI processes send to other processes.

The Science Data Server (SDSRV) CSCI is five processes: three SDPS custom developed processes and two COTS processes. The three SDPS custom developed processes are the Science Data Server (EcDsScienceDataServer), the Hierarchical Data Format (HDF) EOS Server (EcDsHdfEosServer) [Note: multiple HDF Server processes can be defined.], and the Science

Data Server GUI (EcDsSdSrvGui). The COTS processes are the Sybase SQL Server and the Spatial Query Server (SQS). The SDSRV CSCI uses the Sybase SQL Server Database Management System (DBMS) for SDPS Inventory and Configuration data storage. The server holds Earth Science Data Type configuration information and the data catalog for all the archived products found at a DAAC.

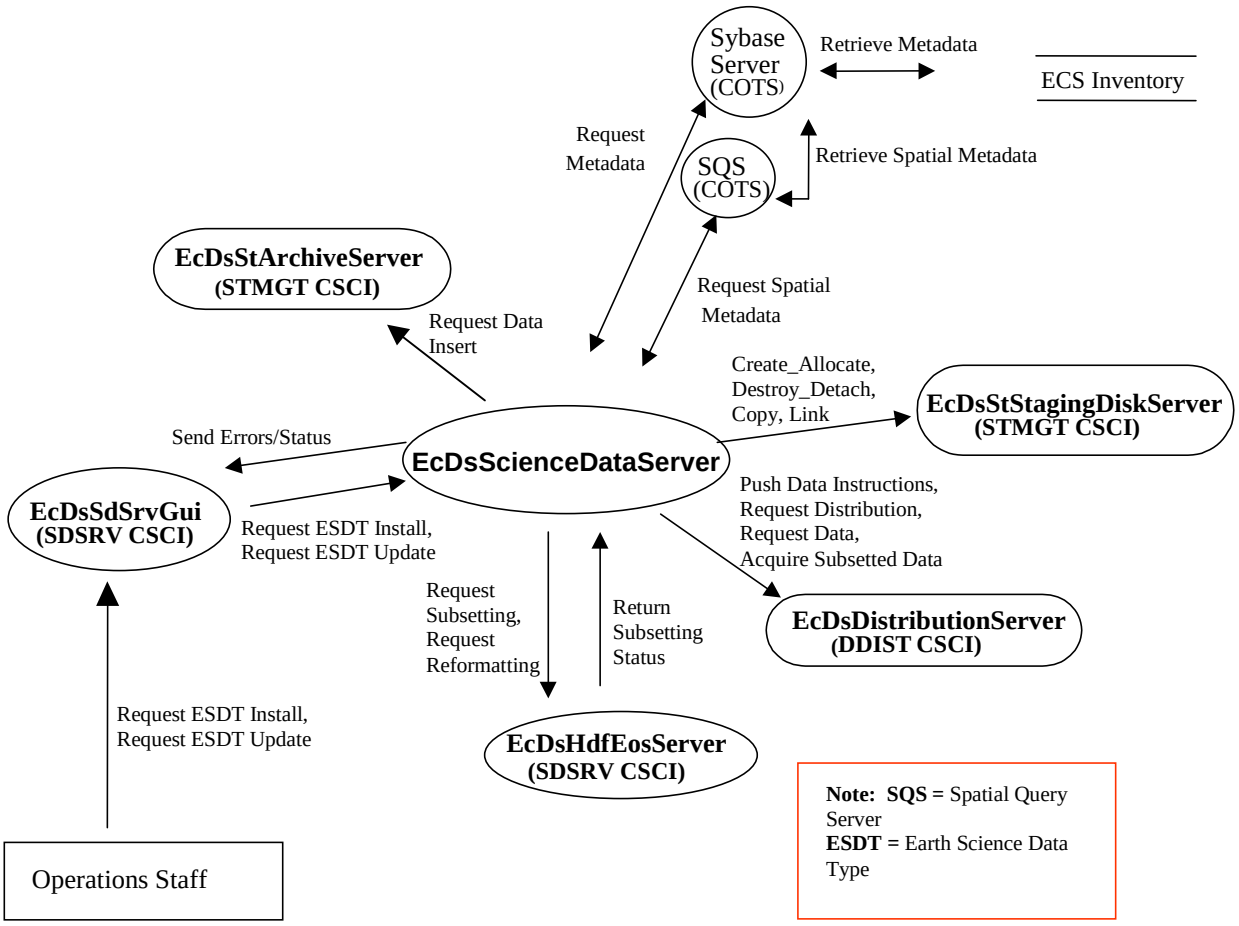


Figure 4.1.1.3-1. SDSRV CSCI Architecture Diagram

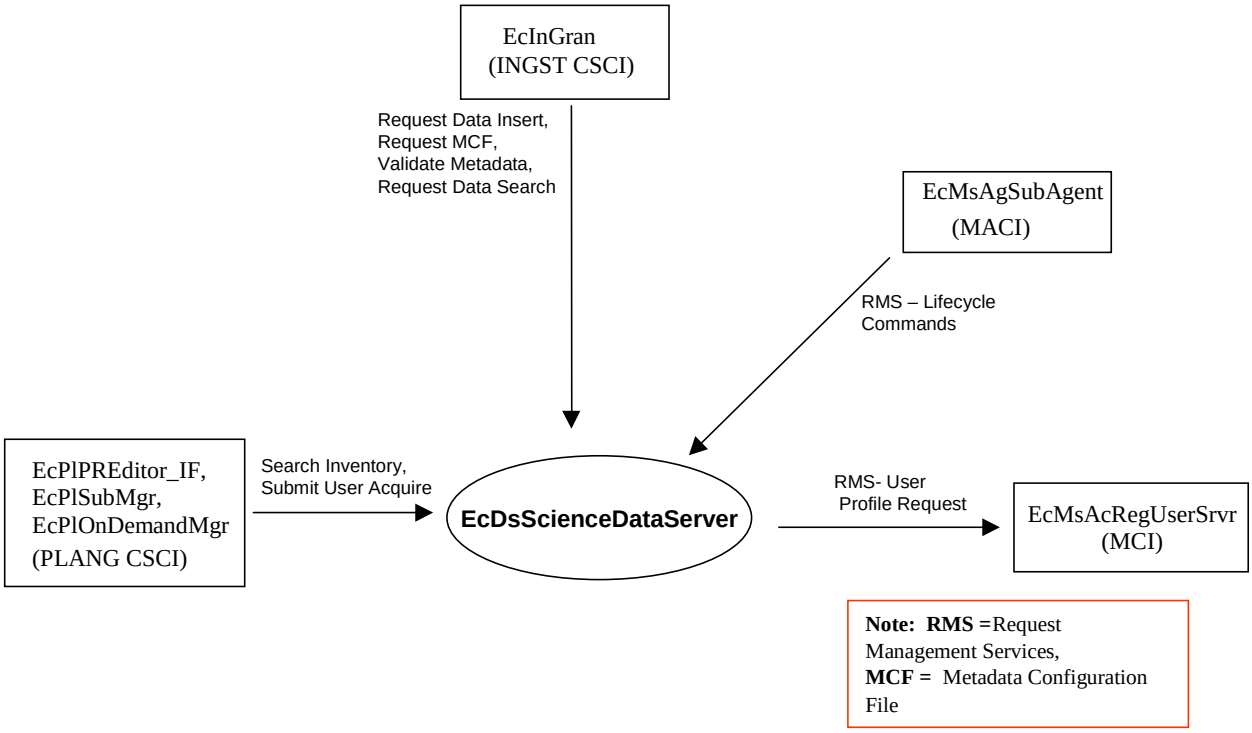


Figure 4.1.1.3-2. SDSRV CSCI Architecture Diagram (cont.)

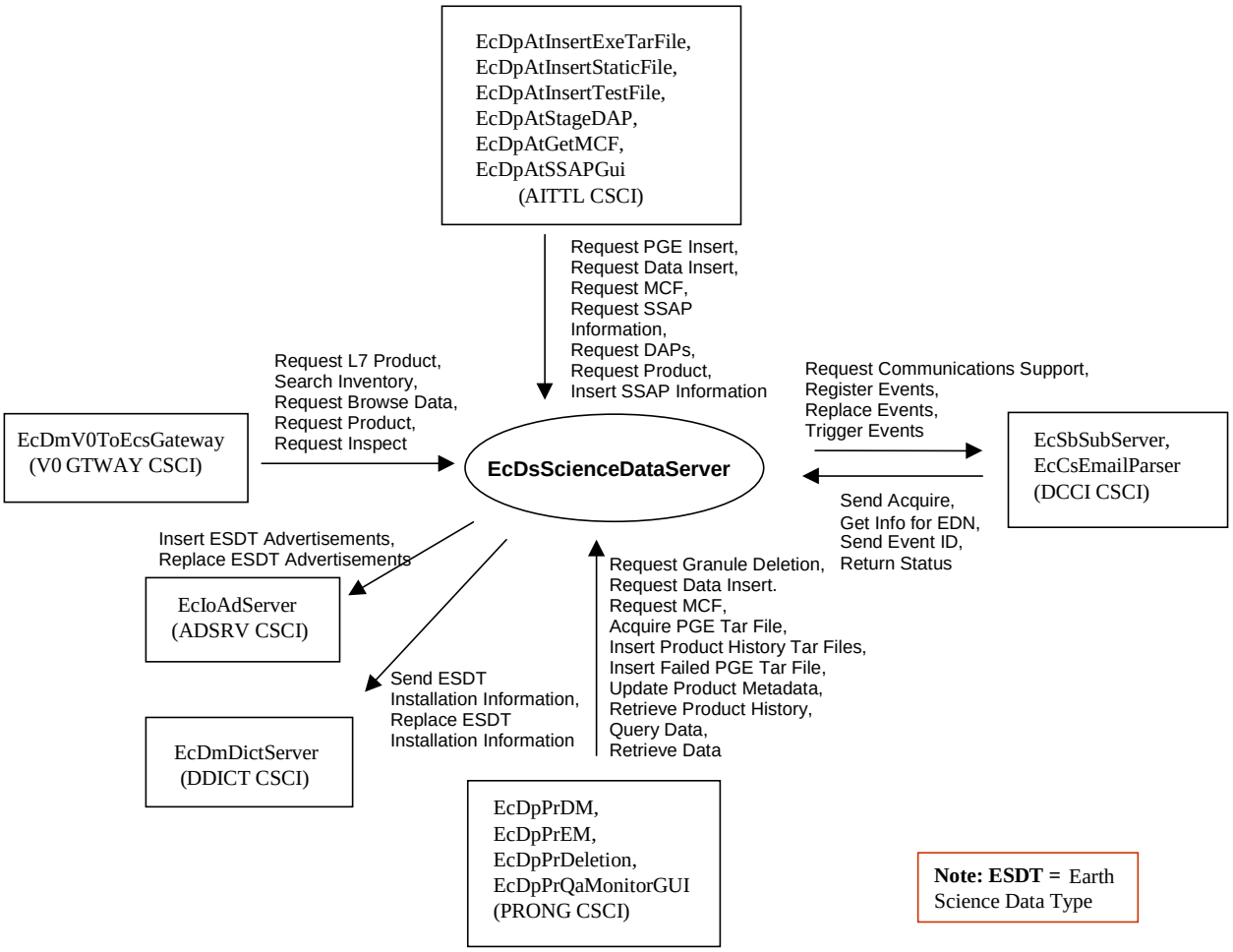


Figure 4.1.1.3-3. SDSRV CSCI Architecture Diagram (cont.)

4.1.1.4 Science Data Server Process Descriptions

Table 4.1.1.4-1 provides descriptions of the processes shown in the SDSRV CSCI architecture diagram.

Table 4.1.1.4-1. SDSRV CSCI Processes (1 of 2)

Process	Type	COTS / Developed	Functionality
EcDsScienceDataServer	Server	Developed	The EcDsScienceDataServer server manages collections of earth science and related data, and service requests for the storage, search, retrieval, and manipulation of data within those collections. The science data server performs the following functions: • manages earth science data as logical collections of related data, using interfaces independent of any data formats and hardware configurations provided by underlying storage technologies, • manages interactive sessions with users, • manages the processing of service requests from the DMS (V0 Gateway), providing a variety of services on earth science and related data, • issues requests to the STMGT and DDIST CSCIs to perform storage and distribution services in support of processing service requests, • provides advertisements to the IOS to announce the availability of data and services to users, • issues commands to the EcIoAdServer to replace advertisement information including the metadata and services • manages the processing of service requests from the INS and DPS to "insert" data for long-term storage and access, • manages the processing of service requests from the DPS to provide data to be used as input for data processing, • provides subscription events and event triggers to the CSS subscription server • issues commands to the CSS EcSbSubServer to replace subscription events • provides sub-setting requests to the EcDsHdfEosServer for scene sub-setting • provides sub-setting requests to the EcDsHdfEosServer for compound sub-setting • provides reformatting request to the EcDsHdfEosServer for conversion from HDFEOS to HDF The EcDsScienceDataServer supports: • Single requests, one at a time • Multiple concurrent requests • Asynchronous request processing • Request processing buffered from Remote Procedure Call (RPC) threads • Multiple threads within a single user session

Table 4.1.1.4-1. SDSRV CSCI Processes (2 of 2)

Process	Type	COTS / Developed	Functionality
EcDsHdfEosServer	Server	Developed	The EcDsHdfEosServer provides science data sub-setting capabilities for earth science data configured with a sub-setting service. EcDsHdfEosServer supports: • Single requests, one at a time • Asynchronous request processing • Request processing buffered from RPC threads • Sub-setting requests of spatial (floating scene or fixed scene)/band/temporal sub-setting • Reformatting requests from HDFEOS to HDF
EcDsSdSrvGui	GUI	Developed	The EcDsSdSrvGui provides an operator interface for : • receiving descriptor files and dynamic link libraries (dll) for configuring ESDTs into the EcDsScienceDataServer • monitoring active EcDsScienceDataServer requests • updating ESDT information in the EcDsScienceDataServer The EcDsSdSrvGui supports: • Single requests, one at a time
Sybase	Server	COTS	Provides the management of spatial data types of an earth science catalog of metadata for the SDPS. Includes capabilities for searching and storing the catalog.
Spatial Query Server (SQS)	Server	COTS	Provides the capability to manage spatial data types of earth science catalog metadata for the SDPS (including specialized spatial searches).

4.1.1.5 Science Data Server Process Interface Descriptions

Table 4.1.1.5-1 provides descriptions of the interface events shown in the SDSRV CSCI architecture diagram.

Table 4.1.1.5-1. SDSRV CSCI Process Interface Events (1 of 5)

Event	Event Frequency	Interface	Initiated By	Event Description
Request Metadata	One per request to store, search, delete, update, Earth Science Metadata	Sybase Server (COTS)	*Processes:* EcDsScienceDataServer *Library:* DsDb *Class:* DsDbInterface via the Sybase Open Server, SQS, and Sybase Open Client COTS	The EcDsScienceDataServer sends requests to store, search, delete, or update Earth Science Metadata. The results are sent back to the EcDsScienceDataServer. The M&O Staff must manually change a configured parameter in order for the EcDsScienceDataServer to communicate directly with the Sybase Server.
Retrieve Spatial Metadata	One per request	*Process:* Spatial Query Server (SQS) [COTS]	*Processes:* EcDsScienceDataServer *Library:* DsDb *Class:* DsDbInterface via the Sybase Open Server, SQS, and Sybase Open Client COTS	The SQS sends requests to store, search, delete, or update Earth Science Metadata. The results are sent back to the SQS. The default configuration is for the EcDsScienceDataServer to communicate via the SQS to the ECS inventory.
Retrieve Metadata	One to many per metadata request	Data Tables within the ECS Inventory	*Process:* Sybase SQL Server *Libraries (Sybase):* Libtcl.so Libtli.so Libsybdb.so *Class:* Sybase Open Client /ct_lib	The Sybase SQL Server retrieves metadata from the SDSRV Inventory database and returns the metadata to the SQS or the EcDsScienceDataServer.

Table 4.1.1.5-1. SDSRV CSCI Process Interface Events (2 of 5)

Event	Event Frequency	Interface	Initiated By	Event Description
Request Spatial Metadata	One per request to store, search, delete, or update spatial Earth Science Metadata.	*Process:* SQS (COTS)	*Process:* EcDsScienceDataServer *Libraries:* DpPrDssIF, DsDb *Class:* DsDbInterface	The EcDsScienceDataServer sends requests to the SQS to store search, delete, or update spatial Earth Science metadata in the SDSRV database. Metadata Results are sent back to the EcDsScienceDataServer via the Sybase Server and the SQS. The results include the status of the SQL Server and SQS Server commands. The SQS handles the translation of spatial metadata data types (understood by the EcDsScienceDataServer and SQS) to relational data types (understood by SQS and the Sybase SQL Server) and vice versa.
Create_Allocate	One allocation per request	*Process:* EcDsStStagingDiskServer *Library:* DsStSt *Class:* DsStStagingDisk	*Process:* EcDsScienceDataServer *Library:* DsGe *Class:* DsGeESDT	The EcDsScienceDataServer sends requests to the EcDsStStagingDiskServer to allocate areas on the local staging disk to store data for distribution.
Destroy_Detach	One detach per request	*Process:* EcDsStStagingDiskServer *Library:* DsStSt *Class:* DsStStagingDisk	*Process:* EcDsScienceDataServer *Library:* DsGe *Class:* DsGeESDT	The EcDsScienceDataServer sends requests to the EcDsStStagingDiskServer to detach from a staging disk area (lose access to an existing staging disk area owned by another process).

Table 4.1.1.5-1. SDSRV CSCI Process Interface Events (3 of 5)

Event	Event Frequency	Interface	Initiated By	Event Description
Copy	One file copy per request	*Process:* EcDsStStagingDiskServer *Library:* DsStSt *Class:* DsStStagingDisk	*Process:* EcDsScienceDataServer *Library:* DsGe *Class:* DsGeESDT	The EcDsScienceDataServer sends requests to the EcDsStStagingDiskServer to copy data within staging disks and between staging disks.
Link	One link per file in a request	*Process:* EcDsStStagingDiskServer *Library:* DsStSt *Class:* DsStStagingDisk	*Process:* EcDsScienceDataServer *Library:* DsGe *Class:* DsGeESDT	The EcDsScienceDataServer sends requests to the EcDsStStagingDiskServer to link files from the read-only cache to a staging disk and from one staging disk to another.
Push Data Instructions	One per distribution request	*Process:* EcDsDistributionServer *Libraries:* DsDdB, DsDdC, DsDdl *Classes:* DsDdRequestMgrC, DsDdGranuleC	*Process:* EcDsScienceDataServer *Library:* DsSr *Class:* DsSrWorkingCollection	The EcDsScienceDataServer assembles instructions to send data and the instructions to the EcDsDistributionServer.
Request Distribution	One per distribution request	*Process:* EcDsDistributionServer *Library:* DsDdC *Class:* DsDdRequestMgrC	*Process:* EcDsScienceDataServer *Library:* DsSr *Class:* DsSrWorkingCollection	The EcDsScienceDataServer sends distribution requests to the EcDsDistributionServer for various categories of data. The distribution services are essentially identical for all data categories.
Request Data	One granule per retrieval request	*Process:* EcDsDistributionServer *Class:* DsDdGranuleS	*Process:* EcDsScienceDataServer *Class:* DsDbInterface	The EcDsScienceDataServer sends requests to the EcDsDistributionServer for a particular data granule(s) to be provided.
Acquire Subsetted Data	One file per request	*Process:* EcDsDistributionServer *Class:* DsDsgranuleS	*Process:* EcDsScienceDataServer *Class:* DsDbInterface	The EcDsScienceDataServer sends requests to the EcDsDistributionServer to retrieve subsetted data files for distribution.

Table 4.1.1.5-1. SDSRV CSCI Process Interface Events (4 of 5)

Event	Event Frequency	Interface	Initiated By	Event Description
Return Subsetting status	One per sub-setting request	*Process:* EcDsScienceDataServer *Library:* DsCsSh *Classes:* DsCsConformant DsCsNonConformant	*Process:* EcDsHdfEosServer *Classes:* DsESDTLsL70R DsESDTLsL70RWRS	The EcDsHdfEosServer sends the status of sub-setting requests to the EcDsScienceDataServer.
Request Subsetting	One per request to reduce resolution	*Process:* EcDsHdfEosServer *Library:* DsCsSh *Classes:* DsCsConformant DsCsNonConformant	*Process:* EcDsScienceDataServer *Classes:* DsESDTLsL70R DsESDTLsL70RWRS	The EcDsScienceDataServer sends requests to the EcDsHdfEosServer to reduce the resolution of an archived earth science data product using configured services for spatial (floating scene or fixed scene) / band/temporal reduction.
Request Reformatting	One per request to reformat the data	*Process:* EcDsHdfEosServer *Libraries:* DsDc, DsCsSh *Class:* DsCsNonConformantImp	*Process:* EcDsScienceDataServer *Classes:* DsESDTLsL70R DsESDTLsL70RWRS	The EcDsScienceDataServer sends requests to the EcDsHdfEosServer to convert HDFEOS format to HDF format.
Request ESDT Install	One per new ESDT installation	*Process:* EcDsScienceDataServer *Library:* DsAd *Class:* DsAdDataTypeCollector	Operations Staff *Process:* EcDsSdSrvGui *Class:* DsGuSdDataType	The Operations Staff sends ESDT installation information for adding the descriptor, dynamic link library (dll), version ID, and archive configuration information for a new ESDT to the EcDsScienceDataServer.
Request ESDT Update	One per new ESDT update	*Process:* EcDsScienceDataServer *Library:* DsAd *Class:* DsAdDataTypeCollector	Operations Staff *Process:* EcDsSdSrvGui *Class:* DsGuSdDataType	The Operations Staff or a user sends updated ESDT information, via the EcDsSdSrvGui to the EcDsScienceDataServer, for adding updated descriptor and dynamic link library (dll) information for an existing ESDT.

Table 4.1.1.5-1. SDSRV CSCI Process Interface Events (5 of 5)

Event	Event Frequency	Interface	Initiated By	Event Description
Request Data Insert	One per data insert request from EcDpPrDM or EcInGran	*Process:* EcDsStArchiveServer *Libraries:* DsStCmn, DsStSt *Classes:* DsStStagingDisk, DsStStagingDiskController	*Process:* EcDsScienceDataServer *Library:* DsCI *Classes:* DsClRequest, DsClCommand, DsGeESDT	The EcDsScienceDataServer sends data insert requests to the EcDsStArchiveServer for data to be stored in the SDPS inventory.
Send Errors/Status	Once per distribution request completion	Operations Staff *Process:* EcDsSdSrvGui *Class:* DsGuErrorDialog	*Process:* EcDsScienceDataServer *Library:* EcUt *Class:* EcLgErrorMsg	Error conditions and status of ESDT installs and updates are sent from the EcDsScienceDataServer (for acquires that are synchronous) to the Operations Staff via the EcDsSdSrvGui.

Table 4.1.1.5-2. SDSRV CSCI Process Interface Events (1 of 5)

Event	Event Frequency	Interface	Initiated By	Event Description
Request Data Insert	One per data insert request from EcInGran	*Process:* EcDsScienceDataServer *Library:* DsCI *Classes:* DsClRequest, DsClCommand, DsGeESDT	Process: EcInGran *Library:* InPreprocess *Class:* InDataServerInsertionTask	The EcInGran process sends requests to the EcDsScienceDataServer to insert a particular file or files into the archive. Inserted data is accompanied by metadata. The metadata is catalogued in the SDSRV inventory as a granule of a particular ESDT short name and version. This data can be algorithms, Level 0 (L0) data, standard products, ancillary data, correlative data or calibration data.

Table 4.1.1.5-2. SDSRV CSCI Process Interface Events (2 of 5)

Event	Event Frequency	Interface	Initiated By	Event Description
Request MCF	One per set of external data received by ECS	*Process:* EcDsScienceDataServer *Library:* DsCl *Class:* DsClDescriptor	*Process:* EcInGran *Library:* InPreprocess *Class:* InDataPreprocessTask	The EcInGran process requests the Metadata Configuration File (MCF) from the EcDsScienceDataServer, prior to a data insert request. The EcDsScienceDataServer provides the MCF information as part of the GetMCF service call.
Validate metadata	One per data insert request.	*Process:* EcDsScienceDataServer *Library:* DsCl *Class:* DsClDescriptor	*Process:* EcInGran *Library:* InPreprocess *Class:* InDataPreprocessTask	The EcDsScienceDataServer validates the metadata files that the EcInGran process has populated.
Request Data Search	One per input pointer in metadata or per granule pointer in linkage file	*Process:* EcDsScienceDataServer *Library:* DsCl *Class:* DsClQuery	*Process:* EcInGran *Library:* InPreprocess *Class:* InDataPreProcessTask	The EcInGran process sends a search request to the EcDsScienceDataServer for a granule corresponding to particular ESDT short name and version, which has a particular local granule id.

Table 4.1.1.5-2. SDSRV CSCI Process Interface Events (3 of 5)

Event	Event Frequency	Interface	Initiated By	Event Description
Search Inventory	One per query	*Process:* EcDsScienceDataServer *Library:* DsCl *Class:* DsClQuery	*Processes:* EcPlPREditor_IF, EcPlSubMgr, EcPlOdMgr *Library:* DpPrDssIF *Class:* DpPrDSSInterface	The EcPlPREditor_IF, EcPlSubMgr and EcPlOdMgr processes create two types of queries. One type only has the ESDT short name and data start and stop times and the other type also includes spatial coordinates. The EcPlPREditor_IF process queries when the predicted data is available. The EcPlPREditor_IF process creates an ESDT Reference from an UR after receiving an ESDT Reference from a query. The EcDsScienceDataServer returns ESDT References for granules to satisfy the query. The EcPlSubMgr process creates an ESDT Reference from an UR after receiving a subscription notification or receiving an ESDT reference from a query. The EcPlSubMgr process queries when predicted data is not available. The EcPlOdMgr process creates an ESDT Reference from an UR after receiving a subscription notification or receiving an ESDT reference from a query. The EcPlOdMgr process queries when predicted data is not available. The EcDsScienceDataServer returns metadata information about the granule being inspected.

Table 4.1.1.5-2. SDSRV CSCI Process Interface Events (4 of 5)

Event	Event Frequency	Interface	Initiated By	Event Description
Submit User Acquire	One per request	*Process:* EcDsScienceDataServer *Library:* DsCl *Classes:* DsCl Request, DsClCommand, DsClESDTReferenceCollector	*Process:* EcPlOdMgr *Library:* PlCore2 *Classes:* PlActivator, DpPrDSSInterface	The EcPlOdMgr submits an acquire command to the EcDsScienceDataServer on behalf of the user. The user gets a response via the EcDsDistributionServer upon data distribution.

Table 4.1.1.5-2. SDSRV CSCI Process Interface Events (5 of 5)

Event	Event Frequency	Interface	Initiated By	Event Description
Request Management Services	One service per request	*Process:* EcDsScienceDataServer	*Process:* EcMsAgSubAgent *Library:* EcAgInstrm *Class:* EcAgManager	The EcMsAgSubAgent and EcMsAcRegUserSrvr provide a basic management library of services to the processes, implmented as client or server applications, using the DCCI CSCI process Framework. The basic management library of services include: • **Lifecycle Commands -** The HPOV Network Node Manager forwards (via DCE RPCs), to the MSS Sub Agent running on each managed host, requests to start and stop ECS applications. A start request has mode and temperature parameters that the MSS Sub Agent uses in constructing its command line startup request. Stop requests precipitate a PF shutdown RPC call to the target ECS application from the MSS Sub Agent. Managed applications use the application interface PFGETMODE to obtain their operational mode (e.g., Ops, test, or training).
	One profile per request	*Process:* EcMsAcRegUserSrvr *Library:* MsAcClnt *Class:* MsAcUserProfile	*Process:* EcDsScienceDataServer *Library:* DsSr *Class:* DsSrManagedServer	• **User Profile Request -** The EcMsAcRegUserSrvr provides the EcDsScienceDataServer with user profile parameters such as e-mail address and shipping address upon request by authorized users to support their processing activities.

Table 4.1.1.5-3. SDSRV CSCI Process Interface Events (1 of 9)

Event	Event Frequency	Interface	Initiated By	Event Description
Request PGE Insert	One per insert request	*Process:* EcDsScienceDataServer *Library:* DsCl *Classes:* DsClRequest, DsClCommand	*Processes:* EcDpAtInsertExeTarFile, EcDpAtInsertStaticFile, EcDpAtInsertTestFile *Library:* PlCore2 *Classes:* DpAtDsrv, PlResourceRequirement	The EcDpAtInsertExeTarFile, EcDpAtInsertStaticFile, and EcDpAtInsertTestFile send PGE insert requests to the EcDsScienceDataServer for data that defines a PGE and allows it to be scheduled and executed.
Request Data Insert	One per data insert request	*Process:* EcDsScienceDataServer *Library:* DsCl *Classes:* DsClRequest, DsClCommand, DsGeESDT	*Processes:* EcDpAtInsertExeTarFile, EcDpAtInsertStaticFile, EcDpAtInsertTestFile, EcDpPrDM, EcDpPrEM, EcDpPrQaMonitorGUI Libraries: DpPrDssIF, DpAtDsrv, DpPrQaMonitor *Classes:* DpPrDSSInterface, DpAtDsrv, DpPrQAGranuleQaFlags	The EcDpAtInsertExeTarFile, EcDpAtInsertStaticFile, EcDpAtInsertTestFile, EcDpPrDM, EcDpPrEM, and EcDpPrQaMonitorGUI processes send requests to the EcDsScienceDataServer to insert a particular file or files into the archive. Inserted data is accompanied by metadata. The metadata is catalogued in the SDSRV inventory as a granule of a particular ESDT short name and version. For the EcDpPrEM and EcDpPrDM processes, these files can be granules or PGE tar files. For the EcDpPrQaMonitorGUI, these files are metadata updates. For the EcDpAtInsertExeTarFile, EcDpAtInsertStaticFile, and EcDpAtInsertTestFile processes these files can be processing output, static files received with PGEs, PGE Tape Archive (TAR) files, Algorithm Packages (APs), Science Software Archive Packages (SSAPs), or Delivered Algorithm Packages (DAPs), failed PGE tar files, or production history files.

Table 4.1.1.5-3. SDSRV CSCI Process Interface Events (2 of 9)

Event	Event Frequency	Interface	Initiated By	Event Description
Request MCF	One per set of external data received by the ECS	*Process:* EcDsScienceDataServer *Library:* DsCl *Class:* DsClDescriptor	*Processes:* EcDpPrEM, EcDpPrDM, EcDpAtGetMCF *Library:* DpPrDssIF *Class:* DpPrDSSInterface	The EcDpAtGetMCF, EcDpPrDM, and EcDpPrEM processes request the Metadata Configuration File (MCF) from the EcDsScienceDataServer, prior to a data insert request. The EcDsScienceDataServer provides the MCF information as part of the GetMCF service call.
Request SSAP Information	One per SSAP information request	*Process:* EcDsScienceDataServer *Library:* DsCl *Classes:* DsClESDTReferenceCollector, DsClRequest, DsClCommand	*Process:* EcDpAtSSAPGui *Libraries:* DpAtSSAP, DpAtDsrv *Classes:* DpAtSSAPManager, DpAtDsrv	The EcDpAtSSAPGui sends requests to the EcDsScienceDataServer for information about SSAPs, including names of existing SSAPs and the components associated with a specific SSAP.
Request DAPs	One per DAPs request	*Process:* EcDsScienceDataServer *Library:* DsCl *Classes:* DsClESDTReferenceCollector, DsClRequest, DsClCommand	*Process:* EcDpAtAcquireDAP *Library:* DpAtDsrv *Class:* DpAtDsrv	The EcDpAtStageDAP requests DAPs from the SDSRV Archives based on the UR. In response, the DAPs are returned and stored on the local AITTL disk.
Request Product	One per product order request	*Process:* EcDsScienceDataServer *Library:* DsCl *Classes:* DsClRequest, DsClCommand	*Process:* EcDpAtStageDAP *Library:* DpAtSrv *Class*: DpAtSrv	The EcDpAtStageDAP sends requests to the EcDsScienceDataServer for particular data granules to be pushed, via the FTP service, onto the DPS science processor as input for data processing or for SSIT work.

Table 4.1.1.5-3. SDSRV CSCI Process Interface Events (3 of 9)

Event	Event Frequency	Interface	Initiated By	Event Description
Insert SSAP Information	One per SSAP	*Process:* EcDsScienceDataServer *Library:* DsCl *Classes:* DsClRequest, DsClCommand	Operations Staff *Process:* EcDpAtSSAPGui *Library:* DpAtDsrv *Classes:* DpAtSSAPManager, DpAtDsrv	The Operations Staff uses the EcDpAtSSAPGui to send requests to the EcDsScienceDataServer to insert new SSAP information or update existing SSAP information.
Request Communications Support	One service per request	*Process:* DCE Security Server *Libraries:* EcSelogin, EcSeLogincontext *Classes:* EcSelogin, EcSeLogincontext *Library:* EcPf *Classes:* EcPfManagedServer, EcPfclient *Library(Common):* EcUr *Class:* EcUrServerUR *Library:* Event *Class:* EcLgErrormsg *Process:* EcSbSubServer *Library:* EcSbCl *Classes:* EcClEvent, EcClTriggerEventCb, EcClRegisterEventCb *Process:* EcCsEmailParser *Class:* EcCsEmailParser	*Process:* EcDsScienceDataServer *Libraries:* DsDe, DsBt *Classes:* DsDeEventCustomizer, DsBtSbSbrvNotifier	The DCCI CSCI Process Framework provides a library of services available to each SDPS or CSMS process. The services required to perform the specific process assignments are requested by the process from the Process Framework. These services include: Distributed Computing Environment (DCE) support, file transfer services, Network & Distributed File Services, Bulk Data transfer services, file copying services, name/address services, password services, Server Request Framework (SRF), Universal Reference (UR), Error/Event logging, message passing, Fault Handling services, User Authentication services, Mode information, and retrieving the requested configuration attribute-value pairs from the Configuration Registry for ECS applications that request them.

Table 4.1.1.5-3. SDSRV CSCI Process Interface Events (4 of 9)

Event	Event Frequency	Interface	Initiated By	Event Description
Register Events	One per ESDT installation	*Process:* EcSbSubServer *Library:* EcSbSrSh *Class:* EcSbEvent	*Process:* EcDsScienceDataServer *Library:* DsDe *Class:* DsDeEventCustomizer	The EcDsScienceDataServer sends the subscription events for an Earth Science Data Type to the EcSbSubServer when an ESDT is installed into the system or when an ESDT is updated by adding additional subscription events.
Replace Events	One per ESDT update	*Process:* EcSbSubServer *Library:* EcSbSrSh *Class:* EcClEvent	*Process:* EcDsScienceDataServer *Library:* DsDe *Class:* DsDeEventCustomizer	The EcDsScienceDataServer sends the updated subscription events for an Earth Science Data Type (ESDT) to the EcSbSubserver when an ESDT is updated in the system. This replaces the previous information.
Trigger Events	One per subscriptio n event	*Process:* EcSbSubServer *Library:* EcSbCl *Class:* EcClEvent	*Process:* EcDsScienceDataServer *Library:* DsBt *Class*: DsBtSbsrvNotifier	The EcDsScienceDataServer notifies the EcSbSubServer (via an event trigger) when a subscription eventoccurs on an Earth Science Data Type Service.
Send Acquire	One per acquire	*Process:* EcDsScienceDataServer *Library:* DsCl *Classes:* DsClRequest DsClCommand DsClESDTReferenceColl ector	*Process:* EcCsEmailParser *Class:* EcCsEmailParser *Process:* EcSbSubServer *Library:* EcSbSr *Class:* EcSbSubscription	An “acquire” (instruction to obtain data) is created by the EcCsEmailParser or the EcSbSubServer and sent to the EcDsScienceDataServer. This is similar to the “Request Product” interface event, except it applies to EDOS expedited data.
Get Info for EDN	One per request	*Process:* EcDsScienceDataServer *Library:* DsCl *Class:* DsClESDTReference	*Process:* EcCsEmailParser *Class:* EcCsEmailParser	The EcCsEmailParser sends requests to the EcDsScienceDataServer for the Expedited Data Set Notification (EDN) information and sends messages to users at the ASTER GDS.

Table 4.1.1.5-3. SDSRV CSCI Process Interface Events (5 of 9)

Event	Event Frequency	Interface	Initiated By	Event Description
Send Event ID	One per event	*Process:* EcDsScienceDataServer *Library:* DsDe *Class:* DsDeEventCustomizer	*Process:* EcSbSubServer *Library:* EcSbSrSh *Class:* EcSbEvent	The EcSbSubServer sends Event IDs to the EcDsScienceDataServer when ESDTs are installed or when ESDTs are updated by adding additional events.
Return Status	One per request	*Process:* EcDsScienceDataServer *Library:* DsBt *Class:* DsBtSbsrvNotifier	*Process:* EcSbSubServer *Library:* EcUt	Status returned by the EcSbSubServer to the EcDsScienceDataServer to simply indicate that the request was received, not that the action succeeded.
Request Granule Deletion	One per granule delete request	*Process:* EcDsScienceDataServer *Library:* DsCl *Classes:* DsClRequest DsClCommand DsClESDTReferenceCollector	*Process:* EcDpPrDeletion *Library:* DpPrDssIF *Class:* DpPrDSSInterface	The EcDpPrDeletion sends delete requests to the EcDsScienceDataServer for particular granules (interim data) in the SDSRV archives.
Acquire PGE Tar File	One per request	*Process:* EcDsScienceDataServer *Library:* DsCl *Classes:* DsClRequest, DsClCommand	*Process:* EcDpPrEM *Library:* DpPrDssIF *Class:* DpPrDSSInterface	The EcDpPrEM process acquires a tar file for any PGE not currently local to the science processor from the EcDsScienceDataServer. The executable is extracted from the tar file and used during PGE execution.
Insert Product History Tar Files	One per successful PGE execution	*Process:* EcDsScienceDataServer *Library:* DsCl *Classes:* DsClRequest, DsClCommand	*Process:* EcDpPrDM *Library:* DpPrDssIF *Class:* DpPrDSSInterface	After the PGE has successfully completed executing and archiving the resulting outputs, the EcDpPrDM requests the PGE Production History Tar file be inserted into the EcDsScienceDataServer for permanent archive.

Table 4.1.1.5-3. SDSRV CSCI Process Interface Events (6 of 9)

Event	Event Frequency	Interface	Initiated By	Event Description
Insert Failed PGE Tar File	One per unsuccessful PGE execution	*Process:* EcDsScienceDataServer *Library:* DsCl *Classes:* DsClRequest, DsClCommand	*Process:* EcDpPrEM *Library:* DpPrDssIF *Class:* DpPrDSSInterface	After an unsuccessful execution of a PGE, the EcDpPrEM obtains the Tar file containing the PGE log files, core dump (if any), PCF and other files, and requests the files be inserted into the EcDsScienceDataServer for permanent archive.
Update Product Metadata	One per metadata product update	*Process:* EcDsScienceDataServer *Library:* DsCl *Classes:* DsClCommand, DsClRequest, DsClESDTReferenceCollector	*Process:* EcDpPrQaMonitorGUI *Library:* DpPrQaMonitor *Class:* DpPrQAGranuleQaFlags	The EcDpPrQaMonitorGUI provides the operator with capabilities to update product metadata in the EcDsScienceDataServer.
Retrieve Product History	One per request	*Process:* EcDsScienceDataServer *Library:* DsCl *Class:* DsClAcquireCommand	*Process:* EcDpPrQaMonitorGUI *Library:* DpPrQaMonitor *Class:* DpPrQaMonitor	The EcDpPrQaMonitorGUI submits requests of this type to the EcDsScienceDataServer. It transfers the Production History tar file from the Science Data archive to the user's host machine.
Query Data	One per query	*Process:* EcDsScienceDataServer *Library:* DsCl *Class:* DsClESDTReferenceCollector	Operations Staff *Process:* EcDpPrQaMonitorGUI *Library:* DpPrQaMonitor *Class:* DpPrQaDataGranule	The Operations Staff uses the EcDpPrQaMonitorGUI to submit requests of this type to the EcDsScienceDataServer. It searches the archive for granules that match the user-supplied selection criteria: data type and begin/end date. Results are displayed to the user.

Table 4.1.1.5-3. SDSRV CSCI Process Interface Events (7 of 9)

Event	Event Frequency	Interface	Initiated By	Event Description
Retrieve Data	One per request	*Process:* EcDsScienceDataServer *Library:* DsCl *Classes:* DsClQuery, DsClAcquireCommand	Operations Staff *Process:* EcDpPrQaMonitorGUI *Library:* DpPrQaMonitor *Class:* DpPrQaMonitor	The Operations Staff uses the EcDpPrQaMonitorGUI to send retrieval requests, to the EcDsScienceDataServer, for a particular data granuleId. The product is transferred (pushed), via the FTP service, onto the DPS science processor and used as input for PGE processing or for SSIT work.
Send ESDT Installation Information	One per new ESDT installation	*Process:* EcDmDictServer *Library:* EcDmDdClient *Class:* DmDdClSchemaRequest	*Process*: EcDsScienceDataServer *Library:* DsDe *Class:* DsDeDataDictController	The EcDsScienceDataServer sends ESDT installation information, to the EcDmDictServer, whenever a new ESDT is installed. This data consists of Inventory and Collection level metadata.
Replace ESDT Installation Information	One per ESDT update	*Process:* EcDmDictServer *Library:* EcDmDdClient *Class:* DmDdClSchemaRequest	*Process:* EcDsScienceDataServer *Library:* DsDe *Class:* DsDeDataDictController	The EcDsScienceDataServer sends updated ESDT information to the EcDmDictServer whenever an ESDT is updated. This data consists of updated Inventory and Collection level metadata.
Insert ESDT Advertise-ments	One per advertise-ment insert request	*Process:* EcIoAdServer *Libraries:* IoAdCore IoAdSubs *Classes:* IoAdApprovedAdv IoAdGroup IoAdProvider IoAdProduct	*Process:* EcDsScienceDataServer *Library:* DsDe *Class:* DsDeIOSController	The EcIoAdServer receives requests to insert advertisements for data types (ESDTs) from the EcDsScienceDataServer including both data product and signature service advertisements.

Table 4.1.1.5-3. SDSRV CSCI Process Interface Events (8 of 9)

Event	Event Frequency	Interface	Initiated By	Event Description
Replace ESDT Advertise-ments	One per advertise-ment update request	*Process:* EcIoAdServer *Libraries:* IoAdCore, IoAdSubs *Classes:* IoAdApprovedAdv, IoAdGroup, IoAdProvider, IoAdProduct	*Process:* EcDsScienceDataServer *Library:* DsDe *Class:* DsDeIOSController	The EcIoAdServer receives requests to update advertisements for data types (ESDTs) from the EcDsScienceDataServer Including both data product and signature service advertisements.
Request L7 Product	One per request	*Process:* EcDsScienceDataServer *Library:* DsCl *Classes:* DsClRequest, DsClCommand	User *Process:* EcDmV0ToEcsGateway *Library:* RequestProcessing *Class:* DmGwAcquireRequest	The EcDmV0ToEcsGateway receives Landsat 7 product requests (via the EOS Data Gateway within the V0 IMS) and forwards the requests to the EcDsScienceDataServer.
Search Inventory	One per service request	*Process:* EcDsScienceDataServer *Library:* DsCl *Classes:* DsClQuery, DsClESDTReferenceCollector	*Process:* EcDmV0ToEcsGateway *Library:* RequestProcessing *Class:* DmGwInvSearchRequest	The EcDmV0ToEcsGateway sends requests to the EcDsScienceDataServer to search the SDPS Inventory (archives). In response, ESDT Universal References (URs) for the granules are returned from the EcDsScienceDataServer.
Request Browse Data	One per browse request	*Process:* EcDsScienceDataServer *Library:* DsCl *Classes:* DsClESDTReferenceCollector, DsClRequest, DsClCommand	*Process:* EcDmV0ToEcsGateway *Library:* RequestProcessing *Class*: DmGwBrowseRequest	The EcDmV0ToEcsGateway submits requests for browse data to the EcDsScienceDataServer to acquire reduced resolution products to support a product request.
Request Product	One per product order request	*Process:* EcDsScienceDataServer *Library:* DsCl *Classes:* DsClRequest, DsClCommand	*Process:* EcDmV0ToEcsGateway *Library:* RequestProcessing *Class:* DmGwAcquireRequest	The EcDmV0ToEcsGateway forwards requests to the EcDsScienceDataServer from an external user to be distributed by the EcDsDistributionServer upon receipt of the data from the EcDsStStagingDiskServer.

Table 4.1.1.5-3. SDSRV CSCI Process Interface Events (9 of 9)

Event	Event Frequency	Interface	Initiated By	Event Description
Request Inspect	One per price estimate request	*Process:* EcDsScienceDataServer *Library:* DsCl *Classes:* DsClESDTReferenceCollector, DsClRequest	*Process:* EcDmV0ToEcsGateway *Library:* RequestProcessing *Class:* DmGwPriceEstRequest	The EcDmV0ToEcsGateway sends a request for an inspection of granule metadata to the EcDsScienceDataServer in support of a price estimate request.
Request Management Services	One service per request	*Process:* EcDsScienceDataServer	*Process:* EcMsAgSubAgent *Library:* EcAgInstrm *Class:* EcAgManager	The EcMsAgSubAgent and EcMsAcRegUserSrvr provide a basic management library of services to the processes, implmented as client or server applications, using the DCCI CSCI process Framework. The basic management library of services include: • **Lifecycle Commands -** The HPOV Network Node Manager forwards (via DCE RPCs), to the MSS Sub Agent running on each managed host, requests to start and stop ECS applications. A start request has mode and temperature parameters that the MSS Sub Agent uses in constructing its command line startup request. Stop requests precipitate a PF shutdown RPC call to the target ECS application from the MSS Sub Agent. Managed applications use the application interface PFGETMODE to obtain their operational mode (e.g., Ops, test, or training).
	One request per Acquire Command	*Process:* EcMsAcRegUserSrvr *Library:* MsAcClnt *Class:* MsAcUserProfile	*Process:* EcDsScienceDataServer *Library:* DsGe *Class:* DsGeESDT	• **User Profile Request -** The EcMsAcRegUserSrvr provides the EcDsScienceDataServer with user profile parameters such as e-mail address and shipping address upon request by authorized users to support their processing activities.

4.1.1.6 Science Data Server Data Stores

Table 4.1.1.6-1 provides a description of the data stores for the SDSRV CSCI, and the conceptual model of the data store. The physical model for the SDSRV data stores can be found in the Science Data Server Database Design and Schema Specifications for the ECS Project (CDRL 311).

Table 4.1.1.6-1. SDSRV CSCI Data Stores

Data Store	Type	Description
ECS Inventory	Database	The ECS Inventory (archives) contains the metadata describing the earth science data for the Earth Science Data Types at a specific DAAC. The metadata describes: • Collection level information • Browse data • Science data (as granules) • Quality Assessments • Algorithm Packages • Delivered Algorithm Packages • Production History The ECS catalog also contains systems data for the dynamic configuration of the EcDsScienceDataServer. The ECS catalog also contains implementation of the "ECS Data Model" for Attribute Valids checking. The ECS catalog also contains system data for ESDT Configuration.

4.1.2 Data Distribution Software Description

4.1.2.1 Data Distribution Functional Overview

The Data Distribution (DDIST) CSCI monitors and controls processing for distribution requests. Data Distribution processing consists of directing the STMGT CSCI to place data for distribution in working storage and creating packing lists, and directing the STMGT CSCI to copy data on to tape or push data as required via the FTP, and sending notifications for pulls completed via the FTP. Data handled electronically is either pushed via the FTP to a user-specified location or placed in a directory to be pulled. If data is to be pulled, once the data is ready, the DDIST CSCI sends an electronic message to the user providing the required information for the user to pull the data. If data is to be distributed via tape, a complete packing list is generated as well as an inventory list for each tape generated. The DDIST CSCI has a GUI interface with the administration/operations staff (Admin. /Ops). The GUI provides error conditions and status to operations staff and enables the operations staff to set parameters and control operations including suspending, canceling, and resuming requests, changing the priorities of requests, performing multiple selects, and setting threshold sizes. The DDIST CSCI provides limited automatic error response by suspending requests when most errors are encountered. The physical media type supported is 8mm tape.

The DDIST CSCI determines the number of tapes for an order, the files to go on the tape(s), generates packing lists, and tape inventory lists. The DDIST CSCI directs the STMGT CSCI to pack one tape for a given request at a time.

The DDIST CSCI has an interface with the following:

- STMGT CSCI
- SDSRV CSCI
- Administrator/Operations staff (through GUI or command line)
- MSS (MCI/MACI)

The Administrator/Operations staff and the SDSRV CSCI control the DDIST CSCI activities. The DDIST CSCI receives direction to perform its functions from calls to the STMGT CSCI.

4.1.2.2 Data Distribution Context

Figure 4.1.2.2-1 is the DDIST CSCI context diagram. The diagram shows the events sent to the DDIST CSCI and the events the DDIST CSCI sends to other CSCIs and Users. Table 4.1.2.2-1 provides descriptions of the events (by service name) shown in the DDIST CSCI context diagram.

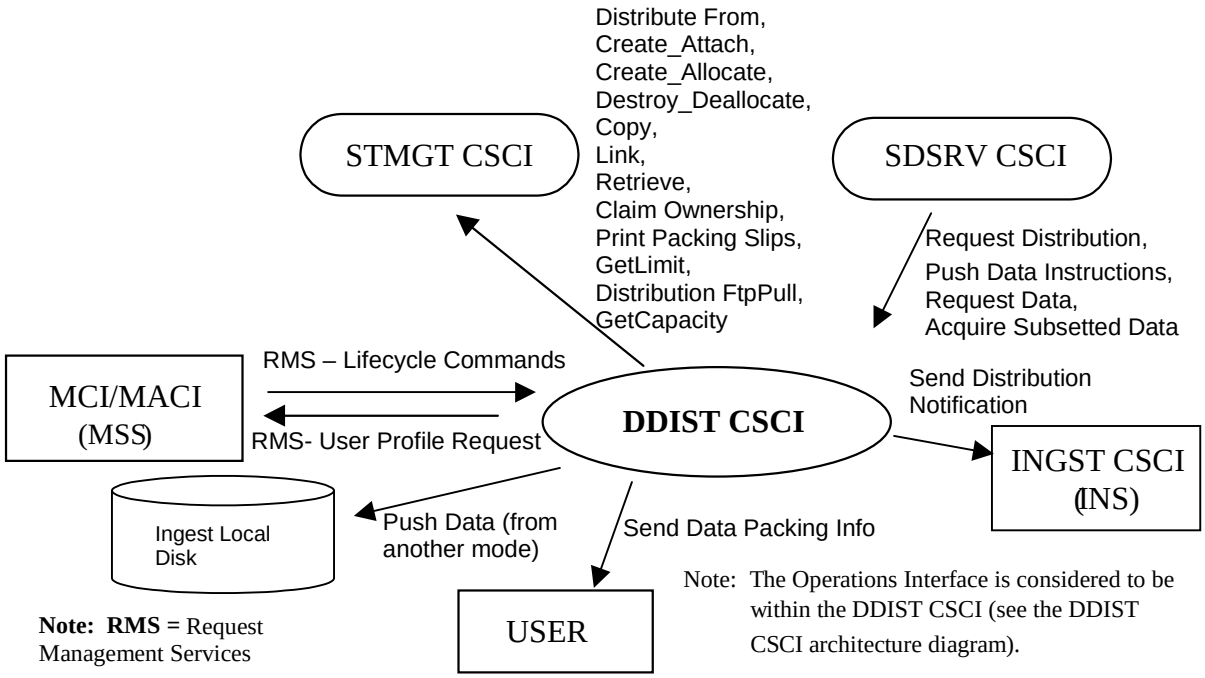


Figure 4.1.2.2-1. DDIST CSCI Context Diagram

Table 4.1.2.2-1. DDIST CSCI Interface Events (1 of 2)

Event	Interface Event Description
Distribute From	The DDIST CSCI sends requests to the STMGT CSCI to copy files from staging disks to an allocated peripheral resource.
Create_Attach	The DDIST CSCI sends requests to the STMGT CSCI to attach (gain access to an existing staging disk area allocated by another process) to a staging disk area.
Create_Allocate	The DDIST CSCI sends requests to the STMGT CSCI to allocate areas on the local staging disk to store data for distribution.
Destroy_Deallocate	The DDIST CSCI sends requests to the STMGT CSCI to deallocate (remove an existing staging disk area) a staging disk area.
Copy	The DDIST CSCI sends requests to the STMGT CSCI to copy data within staging disks and between staging disks.
Link	The DDIST CSCI sends requests to the STMGT CSCI to link files from read-only cache to a staging disk specified in the request.
Retrieve	The DDIST CSCI sends requests to the STMGT CSCI to retrieve data from the SDPS archives to be staged for distribution.
Claim Ownership	The DDIST CSCI sends requests to the STMGT CSCI to calim ownership of (take responsibility for deallocating) an existing staging disk area.
Print Packing Slips	The DDIST CSCI requests to print a file on a given staging disk. The DDIST CSCI also requests to print out a packing list file associated with a distribution request, which has been successfully completed.

Table 4.1.2.2-1. DDIST CSCI Interface Events (2 of 2)

Event	Interface Event Description
GetLimit	The DDIST CSCI determines the maximum size of a request, which can be electronically distributed using FTP.
Distribution FtpPull	The DDIST CSCI sends requests to the STMGT CSCI to distribute a file directly to a user or to move a file to the Pull area.
GetCapacity	The DDIST CSCI determines the effective maximum capacity of a media type to send to the STMGT CSCI. This is used to determine the number of media needed to satisfy a given request.
Request Distribution	A request sent from the SDSRV CSCI to the DDIST CSCI for science data or a product to be sent to a specified user.
Push Data Instructions	The SDSRV CSCI assembles instructions to send data and sends the instructions to the DDIST CSCI. The DDIST CSCI sends a request to the STMGT CSCI to push the data, via the FTP service, followed by a signal file, to the destination specified in an acquire instruction.
Request Data	The DDIST CSCI stores the request in a queue with the appropriate priority. When the request is taken from the queue, the STMGT CSCI is passed the data retrieval request from the DDIST CSCI for a particular data granule to be pushed onto the DPS science processor, via the FTP service. The data granule is to be used as input for PGE processing or for SSIT work.
Acquire Subsetted Data	The SDSRV CSCI sends requests to the DDIST CSCI to retrieve subsetted data files for distribution.
Send Distribution Notification	The DDIST CSCI sends a distribution notification, via e-mail, to the INGST CSCI when data being distributed is to be ingested.
Send Data Packing Info	Notification sent to the user via E-mail about a data product to be or has been distributed. Data handled electronically is either pushed, via the FTP service, to a user-specified location or placed in a directory to be pulled via the FTP service by the user.
Push Data (from another mode)	The DDIST CSCI pushes data, via the FTP service, to the Ingest local disk when it is distributing data to be ingested.
Request Management Services	The MACI and MCI provide a basic management library of services to the CSCIs, implemented as client or server applications, using the CSS Process Framework. The basic management library of services include: • **Lifecycle Commands** - The HPOV Network Node Manager forwards (via DCE RPCs), to the MSS Sub Agent running on each managed host, requests to start and stop ECS applications. A start request has mode and temperature parameters that the MSS Sub Agent uses in constructing its command line startup request. Stop requests precipitate a PF shutdown RPC call to the target ECS application from the MSS Sub Agent. Managed applications use the application interface PFGETMODE to obtain their operational mode (e.g., Ops, test, or training). The MCI also interfaces with other CSCIs or CSCs to perform the following: • **User Profile Request** – The MCI provides requesting CSCIs or CSCs with access to user profile information such as e-mail address and shipping address to support their processing activities.

4.1.2.3 Data Distribution Architecture

The DDIST CSCI is two SDPS developed processes with the addition of the Sybase Server COTS hardware and software process package as a data repository identified as:

- EcDsDistributionServer - Data Distribution
- EcDsDdistGui - Data Distribution GUI
- Sybase Server - Data Repository (storage area)

Figure 4.1.2.3-1 is the DDIST CSCI architecture diagram. The diagram shows the events sent to the DDIST CSCI processes and the events the DDIST CSCI processes send to other processes and the Operations staff.

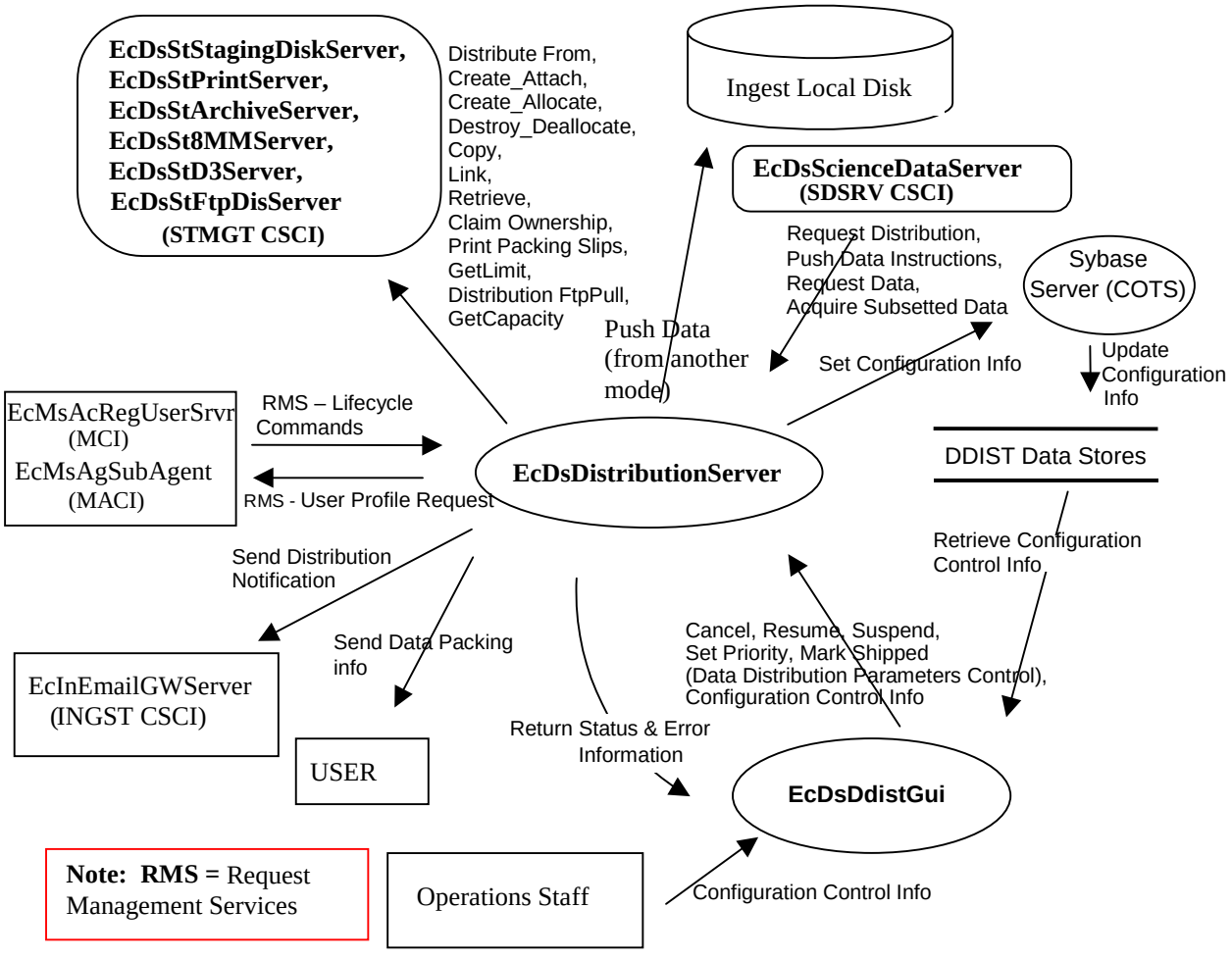


Figure 4.1.2.3-1. DDIST CSCI Architecture Diagram

4.1.2.4 Data Distribution Process Descriptions

Table 4.1.2.4-1 provides descriptions of the processes shown in the DDIST CSCI architecture diagram.

Table 4.1.2.4-1. DDIST CSCI Processes

Process	Type	COTS/ Developed	Functionality
EcDsDistribution Server	Server	Developed	This process provides the control and coordination for data distribution through request processing.
EcDsDdistGui	GUI	Developed	This process enables operations to initiate, track, and manipulate distribution requests by using input GUI controls and database information.
Sybase	Server	COTS	The process contains the request list and has a set of stored procedures, which updates the request configuration, provides the request configuration to GUI operations and checkpoints the state of the CSCI for fault recovery purposes.

4.1.2.5 Data Distribution Process Interface Descriptions

Table 4.1.2.5-1 provides descriptions of the interface events shown in the DDIST CSCI architecture diagram.

Table 4.1.2.5-1. DDIST CSCI Process Interface Events (1 of 8)

Event	Event Frequency	Interface	Initiated By	Event Description
Distribute From	One data copy from staging disk per request	*Processes:* EcDsSt8MMServer, EcDsStD3Server *Library:* DsStTape *Class:* DsStTape	*Process:* EcDsDistributionServer *Class:* DsDdGranules	The EcDsDistributionServer sends requests to the EcDsSt8mmServer and EcDsStD3Server to copy files from staging disks to an allocated peripheral resource.
Create_Attach	One attach per request	*Process:* EcDsStStagingDiskServer *Library:* DsStSt *Class:* DsStStagingDisk	*Process:* EcDsDistributionServer *Class:* DsDdMedia	The EcDsDistributionServer sends requests to the EcDsStStagingDiskServer to attach (gain access to an existing staging disk area allocated by another process) to a staging disk area.

Table 4.1.2.5-1. DDIST CSCI Process Interface Events (2 of 8)

Event	Event Frequency	Interface	Initiated By	Event Description
Create_Allocate	One allocation per request	*Process:* EcDsStStagingDiskServer *Library:* DsStSt *Class:* DsStStagingDisk	*Process:* EcDsDistributionServer *Class:* DsDdMedia	The EcDsDistributionServer send requests to the EcDsStStagingDiskServer to allocate areas on the local staging disk to store data for distribution.
Destroy_Deallocate	One deallocation per request	*Process:* EcDsStStagingDiskServer *Library:* DsStSt *Class:* DsStStagingDisk	*Process:* EcDsDistributionServer *Class:* DsDdMedia	The EcDsDistributionServer sends requests to the EcDsStStagingDiskServer to deallocate (remove an existing staging disk area) a staging disk area.
Copy	One per data copy operation	*Process:* EcDsStStagingDiskServer *Library:* DsStSt *Class:* DsStStagingDisk	*Process:* EcDsDistributionServer *Library:* DsDdS *Classes:* DsDdGranules, DsDdGranuleS	The EcDsDistributionServer sends requests to the EcDsStStagingDiskServer to copy data within staging disks and between staging disks.
Link	One link per file in a request	*Process:* EcDsStStagingDiskServer *Library:* DsStSt *Class:* DsStStagingDisk	*Process:* EcDsScienceDataServer *Library:* DsGe *Class:* DsGeESDT	The EcDsScienceDataServer sends requests to the EcDsStStagingDiskServer to link files from the read-only cache to a staging disk and from one staging disk to another.
Retrieve	One granule per retrieval request	*Process:* EcDsStArchiveServer *Library:* DsStSt *Class:* DsStArchive	*Process:* EcDsDistributionServer *Class:* DsDdGranules	The EcDsDistributionServer sends requests to the EcDsStArchiveServer to retrieve data from the SDPS archives to be staged for distribution.
Claim Ownership		*Process:* EcDsStStagingDiskServer *Library:* DsStSt *Class:* DsStStagingDisk	*Process:* EcDsDistributionServer *Class:* DsDdMedia	The EcDsDistributionServer sends requests to the EcDsStStagingDiskServer to claim ownership of (take responsibility for deallocating) an existing staging disk area.

Table 4.1.2.5-1. DDIST CSCI Process Interface Events (3 of 8)

Event	Event Frequency	Interface	Initiated By	Event Description
Print packing slips	As many needed per distribution request	*Process:* EcDsStPrintServer *Library:* DsStPrinter *Class:* DsStPrinter	*Process:* EcDsDistributionServer *Class:* DsDsReadytoShipQueue	The EcDsDistributionServer sends requests to the EcDsStPrintServer to print a file on a given staging disk. The EcDsDistributionServer requests the EcDsStPrintServer to print out a packing list file associated with a distribution request, which has been completed successfully.
GetLimit	One calculation per request	*Process:* EcDsStFtpDisServer *Library:* DsStDisFtp Class: DsStDistributionFtp	*Process:* EcDsDistributionServer *Class:* DsDdMedia	The EcDsDistributionServer determines the maximum size of a request, which can be electronically distributed using FTP.
Distribution FtpPull	One file per pull request	*Process:* EcDsStFtpDisServer *Library:* DsStPull	*Process:* EcDsDistributionServer *Class:* DsDdGranuleS	The EcDsDistributionServer sends requests to the EcDsStFtpDisServer to distribute a file directly to a user or to move a file to the Pull area.
GetCapacity	One calculation per request	*Processes:* EcDsSt8MMServer, EcDsStD3Server *Library:* DsStRes *Class:* DsStResourceProvider	*Process:* EcDsDistributionServer *Class:* DsDdMedia	The EcDsDistributionServer determines the effective maximum capacity of a media type to send to the EcDsSt8mmServer and EcDsStD3Server. This is used to determine the number of media needed to satisfy a given request.
Push Data (from another mode)	One distribution per request	*Process:* EcDsStStagingDiskServer *Library:* DsDdS *Class:* DsDdGranuleS	*Process:* EcDsDistributionServer *Class:* DsDdGranules	The EcDsDistributionServer pushes data, via the FTP Service, to the Ingest Local Disk when it is distributing data to be ingested.

Table 4.1.2.5-1. DDIST CSCI Process Interface Events (4 of 8)

Event	Event Frequency	Interface	Initiated By	Event Description
Request Distribution	One per request for science data or product order	*Process:* EcDsDistributionServer *Library:* DsDdSSh *Classes:* DsDdScheduler, DsDdRequestMgrReal, DsDdDCERequestMgrConcrete	*Process:* EcDsScienceDataServer *Class:* DsDdRequestMgrReal	The EcDsScienceDataServer sends requests to the EcDsDistributionServer for science data or a product to be sent to a specified user.
Push Data Instructions	One per distribution request	*Process:* EcDsDistributionServer *Libraries:* DsDdB, DsDdC, DsDdI *Classes:* DsDdRequestMgrC, DsDdGranuleC	*Process:* EcDsScienceDataServer *Library*: DsSr *Class:* DsSrWorkingCollection	The EcDsScienceDataServer assembles instructions to send data to the EcDsDistributionServer. The EcDsDistributionServer sends a request to the EcDsStStagingDiskServer to push the data, via the FTP service, followed by a signal file to the destination specified in an acquire instruction by particular ESDTs that function this way.
Request Data	One granule per retrieval request	*Process:* EcDsDistributionServer *Class:* DsDdGranuleS	*Process:* EcDsScienceDataServer *Class:* DsDbInterface	The EcDsScienceDataServer sends requests to the EcDsDistributionServer for a particular data granule(s) to be provided.
Acquire Subsetted Data	One file per request	*Process:* EcDsDistributionServer *Class:* DsDsgranuleS	*Process:* EcDsScienceDataServer *Class:* DsDbInterface	The EcDsScienceDataServer sends requests to the EcDsDistributionServer to retrieve subsetted data files for distribution.

Table 4.1.2.5-1. DDIST CSCI Process Interface Events (5 of 8)

Event	Event Frequency	Interface	Initiated By	Event Description
Set Configuration Info	One per scheduling request	Sybase Server (COTS)	*Process:* EcDsDistributionServer *Libraries:* DsDdSSh, DsDdC *Classes:* DsDdRequestMgrBaseC, DsDdConfiguration, DsDdDistRequestS	Current configuration information entered by the Operations staff via the EcDsDdistGui is sent to the Sybase database via the EcDsDistributionServer. The Operations staff can access the configuration information from the database for expedient data distribution or product order distribution scheduling.
Update Configuration Info	One set per request	DDIST Data Stores	*Process:* Sybase Server (COTS)	The Sybase Server updates the configuration data in the data stores as requested.
Retrieve Configuration Control Info	Upon Operations Staff request	DDIST Data Stores	*Process:* EcDsDdistGui *Classes:* DsDdConfiguration, DsDdPfConfigFile	The Operations Staff retrieve configuration control information from the database for viewing or update.
Cancel	One per priority cancel request	*Process:* EcDsDistributionServer *Library:* DsDdC *Class:* DsDdRequestMgrBaseC	Operations Staff *Process:* EcDsDdistGui *Class:* DsGuiDistRequest	The Operations Staff uses the EcDsDdistGui to send a command to the EcDsDistributionServer to cancel the priority of a request.
Resume	One per resume request	*Process:* EcDsDistributionServer *Libraries:* DsDdB, DsDdC, DsDdI *Class:* DsDdRequestMgrC	Operations Staff *Process:* EcDsDdistGui *Class:* DsGuiDistRequest	The Operations Staff uses the EcDsDdistGui to send a command to the EcDsDistributionServer to resume requests when resume requests are suspended with errors.
Suspend	One per suspend request	*Process:* EcDsDistributionServer *Libraries:* DsDdB, DsDdC, DsDdI *Class:* DsDdRequestMgrC	Operations staff *Process:* EcDsDdistGui *Class:* DsGuiDistRequest	The Operations staff uses the EcDsDdistGui to send a command to the EcDsDistributionServer to suspend a request(s).

Table 4.1.2.5-1. DDIST CSCI Process Interface Events (6 of 8)

Event	Event Frequency	Interface	Initiated By	Event Description
Set Priority	One per priority change	*Process:* EcDsDistributionServer *Library:* DsDdS *Classes:* DsDdMedia, DsDdRequestListS, DsDdRequestMgrReal, DsDdDistRequestS	Operations staff *Process:* EcDsDdistGui *Class:* DsGuiDistRequest	The Operations staff uses the EcDsDdistGui to send a command to the EcDsDistributionServer to change the priority of a distribution request.
Mark Shipped	One per tape request	*Process:* EcDsDistributionServer *Libraries:* DsDdB, DsDdC, DsDdl *Class:* DsDdRequestMgrC, DsDdMedia	*Process:* EcDsDdistGui *Class:* DsGuiDistRequest	The Operations staff uses the EcDsDdistGui to send a command to the EcDsDistributionServer to mark the tape request for shipment.
Configuration Control Info	One per configura-tion sent	*Process:* EcDsDistributionServer *Library:* DsDdSSh *Classes:* DsDdDistListS, DsDdDistFileS, DsDdDistRequestS	Operations staff *Process:* EcDsDdistGui *Classes:* DsDdConfiguration DsDdPfConfigFile	The Operations staff enters configuration control information (queues, thresholds, suspend and resume status) via the EcDsDdistGui or command line to send to the EcDsDistributionServer and eventually be stored in the DDIST data stores.
Return Status & Error Information	One per Distribution Request	*Process:* EcDsDdistGui *Class:* DsGuErrorDialog	*Process:* EcDsDistributionServer *Classes:* DsDdMedia, DsDdBaseQueue	The EcDsDistributionServer sends Distribution Request status and error information to the Operations staff via the EcDsDdistGui, if the acquire is asynchronous and the EcDsDistributionServer gets the request.
Send Data Packing Info	One per distributed data location	User	*Process:* EcDsDistributionServer *Library:* DsDsSSh *Class:* DsDdMedia	The EcDsDistributionServer sends notifications to the user via e-mail with the location of data to be distributed or has been distributed.

Table 4.1.2.5-1. DDIST CSCI Process Interface Events (7 of 8)

Event	Event Frequency	Interface	Initiated By	Event Description
Send Distribution Notification	One per distribution	*Process:* EcInEmailGWServer *Classes:* InEmailGWServer, InEmailParser	*Process:* EcDsDistributionServer *Library:* DsDdSSH *Classes:* DsDdMedia, DsDdMediadist	The EcDsDistributionServer sends distribution notifications, via e-mail, to the EcInEmailGWServer.

Table 4.1.2.5-1. DDIST CSCI Process Interface Events (8 of 8)

Event	Event Frequency	Interface	Initiated By	Event Description
Request Management Services	Upon initial system start-up or per CSCI request.	*Process:* EcDsDistributionServer	*Process:* EcMsAgSubAgent *Library:* EcAgInstrm *Class:* EcAgManager	The EcMsAgSubAgent provides a basic management library of services to the processes, implemented as client or server applications, using the DCCI CSCI Process Framework. The basic management library of services include: • **Lifecycle Commands** - The HPOV Network Node Manager forwards (via DCE RPCs), to the MSS Sub Agent running on each managed host, requests to start and stop ECS applications. A start request has mode and temperature parameters that the MSS Sub Agent uses in constructing its command line startup request. Stop requests precipitate a PF shutdown RPC call to the target ECS application from the MSS Sub Agent. Managed applications use the application interface PFGETMODE to obtain their operational mode (e.g., Ops, test, or training). The MCI also interfaces with other CSCIs or CSCs to perform the following: • **User Profile Request** – The MCI provides requesting CSCIs or CSCs with access to user profile information such as e-mail address and shipping address to support their processing activities.
	One per address request	*Process:* EcMsAcRegUserSrvr *Libraries:* MsAcClnt, MsAcComm	Process: EcDsDistributionServer *Library:* DsDdSSh Class: DsDdMedia	

4.1.2.6 Data Distribution Data Stores

Table 4.1.2.6-1 provides descriptions of the individual DDIST CSCI data stores entitled collectively “DDIST Data Stores” in the DDIST CSCI architecture diagram. More details on these database tables can be found in the Data Distribution Database Design and Schema Specifications for the ECS Project.

Table 4.1.2.6-1. DDIST CSCI Data Stores

Data Store	Type	Description
DsDdFile	Sybase	This data store holds the distribution files maintained/processed by the EcDsDistributionServer. Table Abbreviation "F" is used as the standard naming convention for stored procedures.
DsDdGranule	Sybase	This data store holds the distribution granules maintained/processed by the EcDsDistributionServer. Table Abbreviation "G" is used as the standard naming convention for stored procedures.
DsDdParameterList	Sybase	This data store holds the GlParameter list for each request maintained/processed by the EcDsDistributionServer. The EcDsScienceDataServer provides data from external metadata (i.e., via the MCF). Request information is initiated here first. Table abbreviation "PL" is used as the standard naming convention for stored procedures.
DsDdRequest	Sybase	This data store holds the distribution requests maintained/processed by the EcDsDistributionServer. Table abbreviation "R" is used as the standard naming convention for stored procedures.

4.1.3 Storage Management Software Description

4.1.3.1 Storage Management Functional Overview

The Storage Management (STMGT) CSCI stores/archives, manages, and retrieves non-document earth science data and provides a user friendly graphical user interface (GUI) for operations. The STMGT CSCI manages all physical storage resources for all the DSS CSCIs and processes including: tape robotic archive, RAID disk cache, on-line storage, and peripheral devices used for ingesting data from and distributing data to physical media such as various tape sizes or drive types.

The STMGT CSCI manages both long-term, high-capacity archival of data (data repository) and short term/temporary storage (working storage/cache management). The STMGT CSCI controls associated file access services to the archive, handles short-term data storage needs for the INGST CSCI, the DDIST CSCI, the SDSRV CSCI, and the PRONG CSCI. The STMGT CSCI also provides access to physical media peripheral devices for both the INGST CSCI and the DDIST CSCI.

During data ingest, the STMGT CSCI provides interfaces to enable ingest and obtain access to disk space, FTP services, and shared resource peripheral devices. The STMGT CSCI copies files into the archive for permanent storage. During data distribution, the SDSRV CSCI and the DDIST CSCI copy files from the archive and allocates magnetic disk space for staging the files. The DDIST CSCI also allocates the peripheral devices shared with the INGST CSCI for copying of files to hard media, or to copy files for electronic distribution. The STMGT CSCI maintains a user pull area to allow for electronic pull distribution.

The STMGT CSCI provides retrieval and storage methods to the DDIST CSCI and the SDSRV CSCI to support storing and providing data for their client CSCIs. The PRONG CSCI is a client CSCI in both storage and retrieval requests by retrieving lower level data via FTP Push Acquire through the SDSRV and DDIST CSCIs and by storing data via insert request to the SDSRV CSCI. In addition to the product files created by the PRONG CSCI, the following types of files are stored for the PRONG CSCI: intermediate product files (interim files), production history files, metadata files, and lower level data files such as raw science data. The STMGT CSCI stores files as a result of insert requests to the SDSRV CSCI by the INGST CSCI and the PRONG CSCI. The STMGT CSCI retrieves files from the archive to satisfy sub-setting requests submitted to the SDSRV CSCI and by acquire requests submitted to the SDSRV CSCI and routed through the DDIST CSCI.

The STMGT GUI provides a simple and consistent interface to set various system parameters, identify errors, analyze the underlying problem(s), and develop corrective measures. The persistence of the data is maintained in a database through a STMGT GUI interface. The GUI provides a method to manage system resources such as servers, cache thresholds, on-line storage availability, and peripherals. The GUI also provides the operator with the capability to track the status of files, tapes, and drives for an enhanced level of quality control.

4.1.3.2 Storage Management Context

Figure 4.1.3.2-1 is the STMGT CSCI context diagram. The diagram shows the events sent to other CSCIs and events received from other CSCIs. The STMGT CSCI has a direct interface with the INGST CSCI.

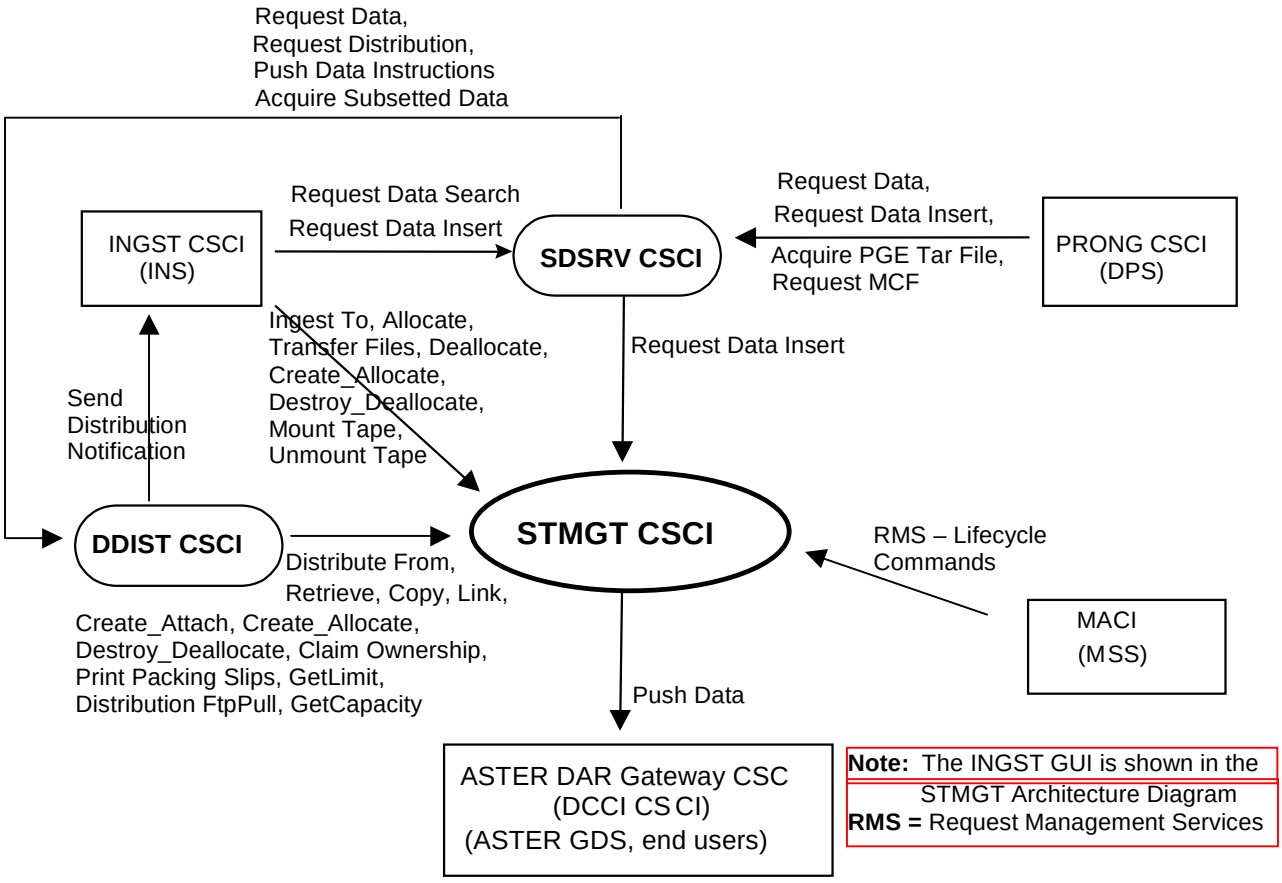


Figure 4.1.3.2-1. STMGT CSCI Context Diagram

Table 4.1.3.2-1 provides descriptions of the interface events shown in the STMGT CSCI context diagram.

Table 4.1.3.2-1. STMGT CSCI Interface Events (1 of 3)

Event	Interface Event Description
Request Data	The PRONG CSCI sends data retrieval requests to the SDSRV CSCI. The SDSRV CSCI sends the data retrieval request to the DDIST CSCI. The DDIST CSCI queues the request in a queue with the appropriate priority. When the request is taken from the queue, the STMGT CSCI is passed the data retrieval request from the DDIST CSCI for a particular data granule to be pushed onto the DPS science processor, via the FTP service. The data granule is to be used as input for PGE processing or for SSIT work.

Table 4.1.3.2-1. STMGT CSCI Interface Events (2 of 3)

Event	Interface Event Description
Request Data Insert	The PRONG CSCI sends data insert requests to the SDSRV CSCI. The SDSRV CSCI sends the data insert request to the STMGT CSCI. The STMGT CSCI receives the data insert request for a particular file or files to be inserted into the archive, and their metadata be catalogued into the SDSRV inventory, as a granule of a particular ESDT short name and version. These files can be processing output, static files received with PGEs, PGE Tape Archive (TAR) files, APs, SSAPs or DAPs, failed PGE tar files, or production history files. The INGST CSCI sends requests to the SDSRV CSCI to insert data into the data inventory including metadata.
Acquire PGE Tar File	The PRONG CSCI sends requests to the SDSRV CSCI to acquire a tar file for any PGE not currently local to the science processor. The executable is extracted from the tar file and used during PGE execution in the PRONG CSCI.
Request MCF	The INGST, PRONG, and AITTL CSCIs request the Metadata Configuration File (MCF) from the SDSRV CSCI for each input or output data type, respectively, prior to a data insert request. The SDSRV CSCI provides the MCF information as part of the GetMCF service call. Also, the PRONG CSCI can request from the SDSRV CSCI the MCF for a particular ESDT short name prior to a data insert request.
Request Management Services	The MACI provides a basic management library of services to the CSCIs, implemented as client or server applications, using the CSS Process Framework. The basic management library of services include: • **Lifecycle Commands** – The HPOV Network Node Manager forwards (via DCE RPCs), to the MSS Sub Agent running on each managed host, requests to start and stop ECS applications. A start request has mode and temperature parameters that the MSS Sub Agent uses in constructing its command line startup request. Stop requests precipitate a PF shutdown RPC call to the target ECS application from the MSS Sub Agent. Managed applications use the application interface PFGETMODE to obtain their operational mode (e.g., Ops, test, or training).
Push Data	The STMGT CSCI pushes data (i.e., EDS), via the FTP service and an FTP Daemon, to the ASTER DAR Gateway for data distribution per user request. A signal file is also sent to indicate the completion of the file transfer by particular ESDTs that function this way.
Distribute From	The DDIST CSCI sends requests to the STMGT CSCI to copy files from staging disks to an allocated peripheral resource.
Retrieve	The SDSRV CSCI sends requests to the STMGT CSCI to retrieve data or products from the archival storage.
Copy	The SDSRV and DDIST CSCIs send requests to the STMGT CSCI to copy data within staging disks and between staging disks.
Link	The DDIST CSCI sends requests to the STMGT CSCI to link files from read-only cache to a staging disk specified in the request.
Create_Attach	The STMGT CSCI receives requests from the DDIST CSCI to attach (gain access to an existing staging disk area allocated by another process) to a staging disk area.

Table 4.1.3.2-1. STMGT CSCI Interface Events (3 of 3)

Event	Interface Event Description
Create_Allocate	The STMGT CSCI receives requests from the DDIST CSCI and INGST CSCI to allocate areas on the local staging disk to store data for distribution.
Destroy_Deallocate	The STMGT CSCI receives requests from the DDIST CSCI and INGST CSCI to deallocate (remove an existing staging disk area) a staging disk area.
Claim Ownership	The STMGT CSCI receives requests from the DDIST CSCI to calim ownership of (take responsibility for deallocating) an existing staging disk area.
Print Packing Slips	The DDIST CSCI sends requests to the STMGT CSCI to print the packing list associated with distribution requests.
GetLimit	The STMGT CSCI receives from the DDIST CSCI the maximum size of a request, which can be electronically distributed using FTP.
Distribution FtpPull	The STMGT CSCI receives requests from the DDIST CSCI to distribute a file directly to a user or to move a file to the Pull area.
GetCapacity	The STMGT CSCI receives the effective maximum capacity of a media type from the DDIST CSCI. This is used to determine the number of media needed to satisfy a given request.
Send Distribution Notification	The DDIST CSCI sends a distribution notification, via e-mail, to the INGST CSCI when data being distributed is to be ingested.
Request Distribution	The SDSRV CSCI sends distribution requests to the DDIST CSCI for various categories of data. The distribution services on those data are essentially identical for all data categories. In response, data packaging information is sent back to the user via e-mail.
Push Data Instructions	The SDSRV CSCI assembles instructions to send data to users, sends the instructions to the DDIST CSCI and the DDIST CSCI sends a request to the STMGT CSCI FTP Distribution server to push the data followed by a signal file to the destination specified in an acquire instruction.
Acquire Subsetted Data	The SDSRV CSCI sends requests to the DDIST CSCI to retrieve subsetted data files for distribution.
Request Data Search	The INGST CSCI sends a search request to the SDSRV CSCI for a granule corresponding to a particular ESDT short name and version, which has a particular local granule id.
Ingest To	The INGST CSCI sends requests to the STMGT CSCI to copy files from peripheral resources to staging disk areas.
Allocate	The INGST CSCI sends requests to the STMGT CSCI to allocate peripheral devices for data ingesting.
Transfer Files	The INGST CSCI sends requests to the STMGT CSCI to transfer data files to the SDPS archives after data ingesting.
Deallocate	The INGST CSCI sends requests to the STMGT CSCI to deallocate previously allocated peripheral resources.

4.1.3.3 Storage Management Architecture

The STMGT CSCI architecture diagram consists of three diagrams to better display the functionality of the STMGT CSCI. Figure 4.1.3.3-1 is the STMGT CSCI INGEST architecture diagram. Figure 4.1.3.3.-2 is the STMGT CSCI DISTRIBUTION STAGING architecture diagram. Figure 4.1.3.3-3 is the STMGT CSCI DISTRIBUTION TRANSFER architecture diagram. The diagrams show the events sent to the STMGT CSCI processes and the events the STMGT CSCI processes sends to other processes or gateways for remote systems such as the ASTER GDS. **Note:** any items italicized and inside of < > are items which show consistency across the diagrams. These items do not have descriptions in the table associated with the diagram, but should have been shown in a previous diagram and described in a previous table.

Table 4.1.3.5-1 provides descriptions of the interface events shown in the STMGT CSCI INGEST architecture diagram. Table 4.1.3.5-2 provides descriptions of the interface events shown in the STMGT CSCI DISTRIBUTION STAGING architecture diagram. Table 4.1.3.5-3 provides descriptions of the interface events shown in the STMGT CSCI DISTRIBUTION TRANSFER architecture diagram.

The STGMT CSCI is composed of the following processes:

- EcDsStArchiveServer (used for archiving data)
- EcDsStStagingMonitorServer, EcDsStStagingDiskServer (used for staging data)
- EcDsSt8MMServer, EcDsStD3Server, EcDsStIngestFtpServer, EcDsStFtpDisServer, EcDsStPrintServer (used for resource management)
- EcDsStPullMonitorServer (used to monitor data transfers)

The STMGT GUI software (EcDsStmgtGui) is an interface with the database to set parameters and configurations to control the servers.

The Archival Management and Storage System (AMASS) is an automated library management system. See the AMASS R Overview by EMASS, version 4.9.1, dated August 1998, document number 600705 for more information about the AMASS management and storage system.

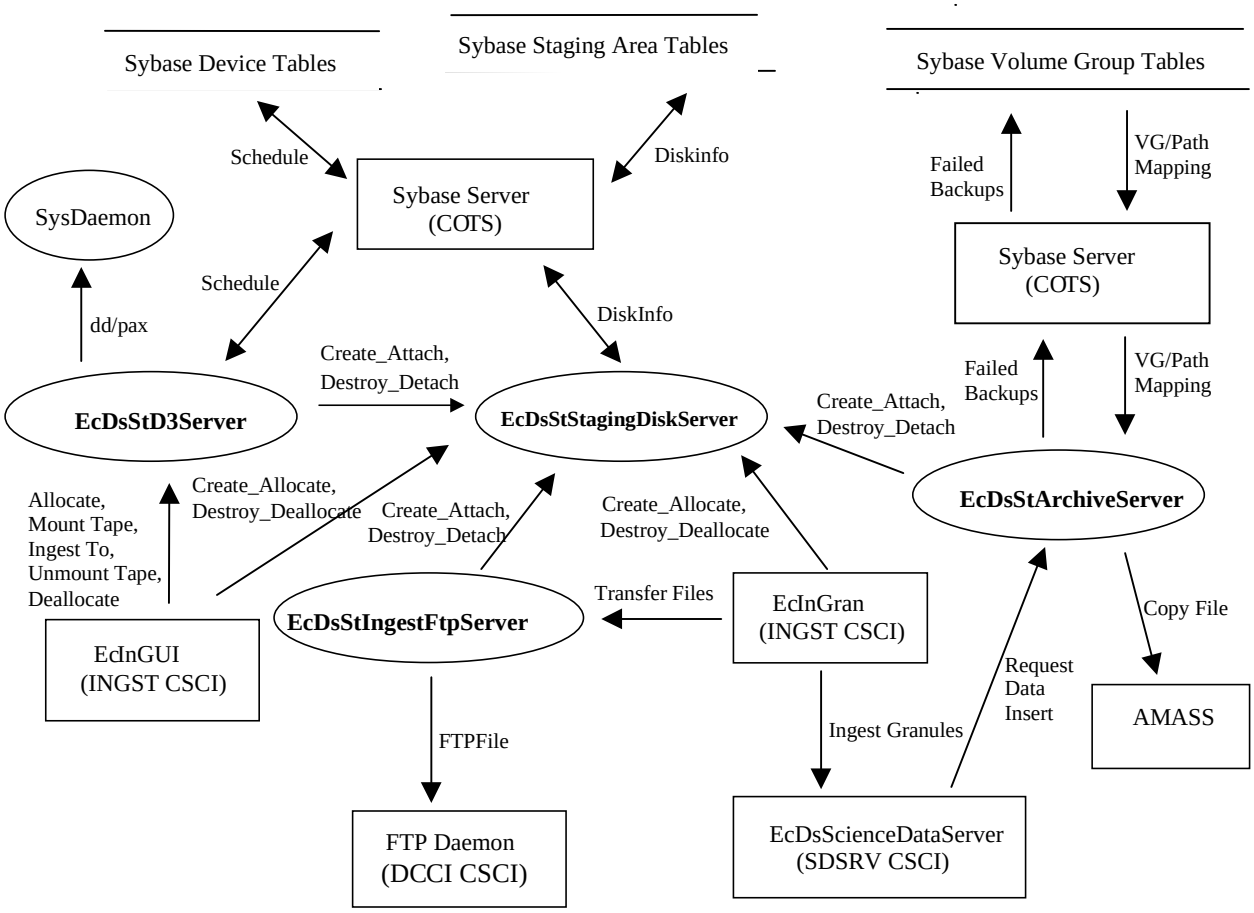


Figure 4.1.3.3-1. STMGT CSCI INGEST Architecture Diagram

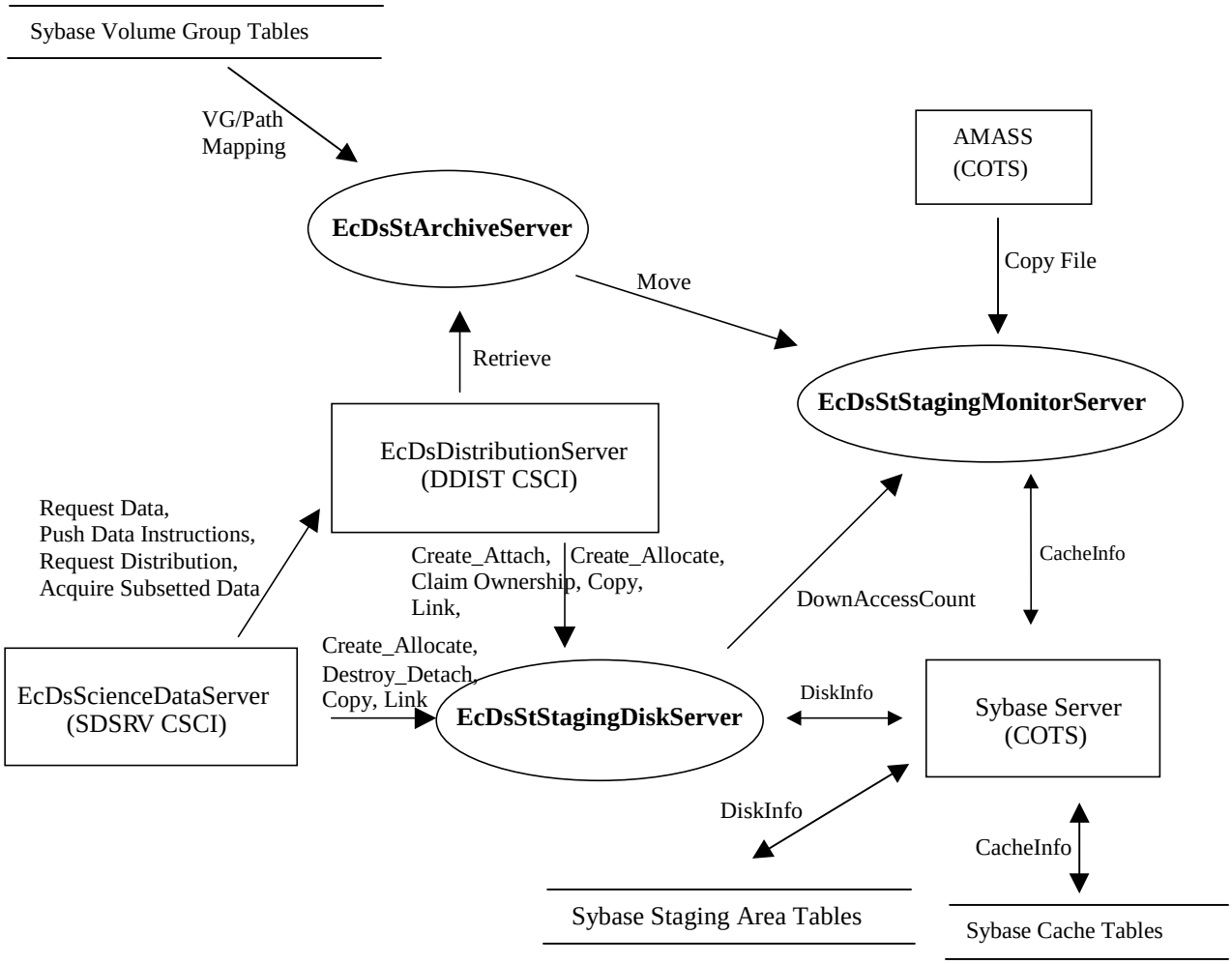


Figure 4.1.3.3-2. STMGT CSCI DISTRIBUTION STAGING Architecture Diagram

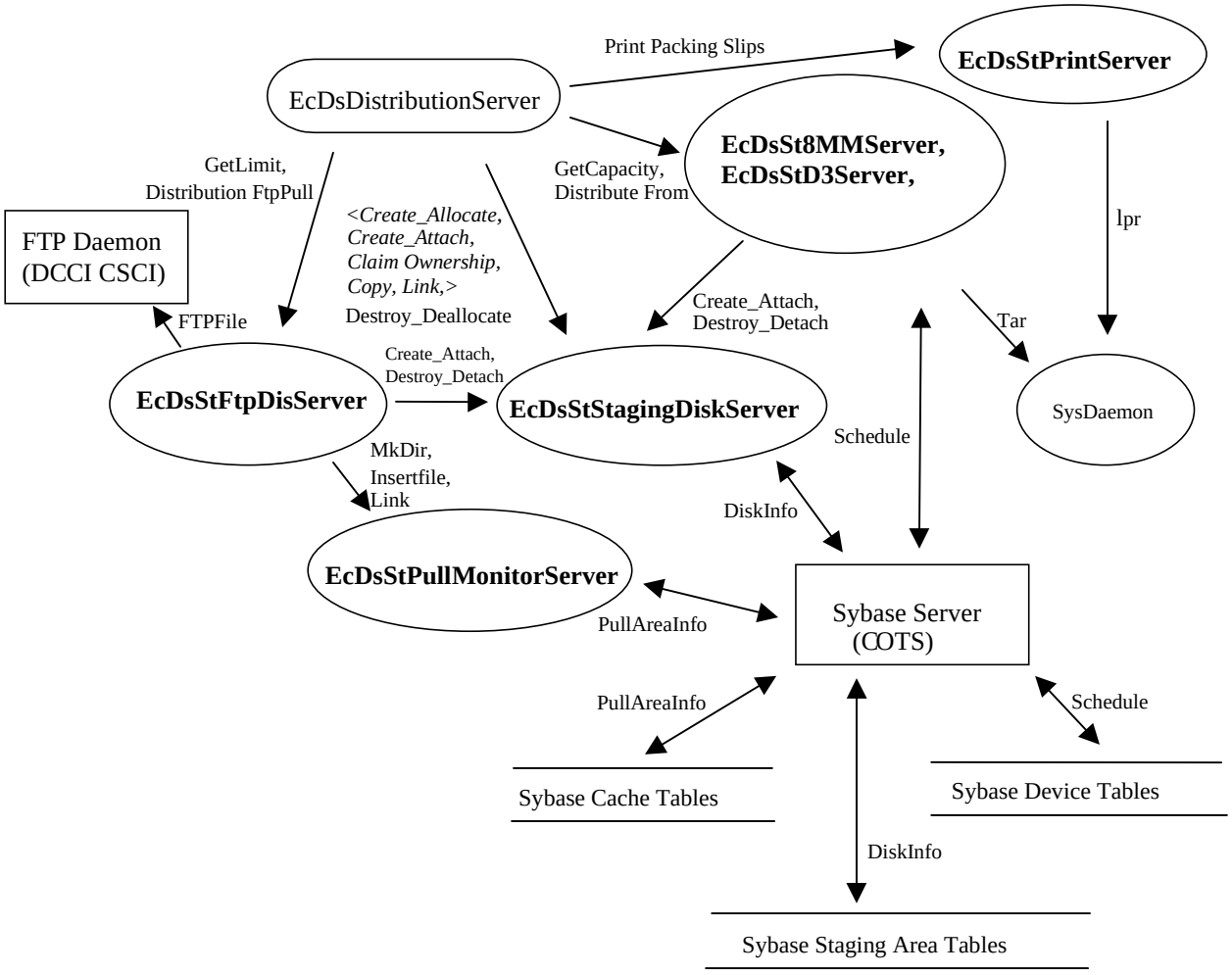


Figure 4.1.3.3-3. STMGT CSCI DISTRIBUTION TRANSFER Architecture Diagram

4.1.3.4 Storage Management Process Descriptions

Table 4.1.3.4-1 provide descriptions of the processes shown in the STMGT CSCI INGEST, DISTRIBUTION STAGING, and DISTRIBUTION TRANSFER architecture diagrams, respectively.

Table 4.1.3.4-1. STMGT CSCI Processes (1 of 2)

Process	Type	COTS/ Developed	Functionality
EcDsStArchiveServer	Server	Developed	An Archive Server provides access to stored data. There can be multiple archive servers running at a given site, each with its own type of data or storage media. Distinctions between Archive Servers are based on the Archive Id as part of the metadata for each ESDT. For requests retrieving files from the Archive, the staging disk is located on the same host as the Archive. For data being inserted, based on network architecture, files are moved to a staging disk located on a node with the appropriate network access. The server id can be configured differently based on an ESDT in the SDSRV and INGEST CSCIs for flexibility.
EcDsStStagingMonitorServer EcDsStStagingDiskServer	Servers	Developed	The Staging Monitor Server manages the group of data files retrieved from the archive and placed into a cache area on a staging disk. A list of these data files is maintained so subsequent data retrieval requests are fulfilled immediately without requiring an additional archive access. The Staging Monitor Server also deletes files with zero access to prevent the cache area from becoming too full. The STMGT CSCI supports multiple staging monitors. The Staging Disk Server manages shared disk space. The Staging Disk Server enables disk space allocations and file reservations between staging directories and from non-staging to staging directories. The STMGT software supports multiple instances of the Staging Disk Server.
(ResourceManager) EcDsSt8MMServer, EcDsStD3Server, EcDsStIngestFtpServer, EcDsStFtpDisServer, EcDsStPrintServer	Servers	Developed	The Resource Manager process schedules access to shared peripheral devices. Queues are maintained for requests based on priority and request receipt time. Each type of resource pool has its own resource manager. Individual resource manager processes identified are 8-mm tape, D3Tape, IngestFtp, DistributionFtp, and printer.
EcDsStPullMonitorServer	Server	Developed	The Pull Monitor Server manages the files in the user pull area. As files are retrieved (i.e., electronically pulled) from the user pull area by respective ECS users or as the files become stale (their time-out periods have expired), the Pull Monitor Server deletes them. Several algorithms are available for monitoring and maintaining the data levels at a specified capacity.
AMASS	Server	COTS	Provides a Unix File System interface to the robotics to control the media where data is written and read.

Table 4.1.3.4-1. STMGT CSCI Processes (2 of 2)

Process	Type	COTS/ Developed	Functionality
Sybase	Server	COTS	The Sybase Server interacts with other STMGT CSCI servers to copy files to be stored in the ECS archives via AMASS, to store schedules for media distribution processing, to create and delete staging disk storage areas, and to allow Operations staff to insert or update data distribution information.

4.1.3.5 Storage Management Process Interface Descriptions

Table 4.1.3.5-1 provides descriptions of the interface events shown in the STMGT CSCI INGEST architecture diagram.

Table 4.1.3.5-1. STMGT CSCI INGEST Process Interface Events (1 of 5)

Event	Event Frequency	Interface	Initiated By	Event Description
DiskInfo	One per ingest	Sybase Server (COTS) [Database Table: DsStStagingDisk]	*Process:* EcDsStagingDiskServer *Library:* DsStSt *Class:* DsStStagingManager	The EcDsStagingDiskServer submits a request to the Sybase Server to update the availability of space on the local disk. The Sybase Server updates its staging area tables (data stores).
Failed Backups	One log entry per failed file	Sybase Server (COTS) [Database Tables: DsStBackup, DsStBackupHistory, DsStRestore, DsStRestoreHistory]	*Process:* EcDsStArchiveServer *Library:* DsStSt *Class:* DsStArchiveReal	The EcDsStArchiveServer logs files, which are stored in the primary volume group but for which backup processing fails. The EcDsStmgGui is used to resume backup processing by the operator.
VG/Path Mapping	One per volume group	Sybase Server (COTS) [Database Tables: DsStVolumeGroup, DsStOffsite]	*Process:* EcDsStArchiveServer *Library:* DsStSt *Class:* DsStArchiveReal	The EcDsStArchiveServer obtains the physical Unix path used to store data for the specified ESDT.

Table 4.1.3.5-1. STMGT CSCI INGEST Process Interface Events (2 of 5)

Event	Event Frequency	Interface	Initiated By	Event Description
Create_Attach	One attach per request	*Process:* EcDsStStagingDiskServer *Library:* DsStSt *Class:* DsStStagingDisk	*Process:* EcDsStD3Server *Library:* DsStTape *Class:* DsStTape *Process:* EcDsStIngestFtpServer *Library:* DsStDisFtp *Class:* DsStDistributionFtp *Process:* EcDsStArchiveServer *Library:* DsStSt *Class:* DsStArchiveReal	The EcDsStD3Server, EcDsStIngestFtpServer and EcDsStArchiveServer send requests to the EcDsStStagingDiskServer to attach (gain access to an existing staging disk area allocated by another process) to a staging disk area.
Destroy_Detach	One detach per request	*Process:* EcDsStStagingDiskServer *Library:* DsStSt *Class:* DsStStagingDisk	*Process:* EcDsStD3Server *Library:* DsStTape Class: DsStTape *Process:* EcDsStIngestFtpServer *Library:* DsStIngestFtp *Class:* DsStIngestFtp *Process:* EcDsStArchiveServer *Library:* DsStSt *Class:* DsStArchiveReal	The EcDsStD3Server, EcDsStIngestFtpServer and EcDsStArchiveServer send requests to the EcDsStStagingDiskServer to detach (lose access to an existing staging disk area allocated by another process) from a staging disk area.

Table 4.1.3.5-1. STMGT CSCI INGEST Process Interface Events (3 of 5)

Event	Event Frequency	Interface	Initiated By	Event Description
Copy File	One file insert per request	AMASS (COTS)	*Process:* EcDsStArchiveServer *Library:* DsStSt *Classes:* DsStArchiveReal, DsStStagingMonitor	The EcDsStArchiveServer inserts data into the archives sending a request for a Unix file copy into the AMASS cache by buffered read/write software.
Request Data Insert	One granule insertion per request	*Process:* EcDsStArchiveServer *Library:* DsStSt *Class:* DsStArchive	*Process:* EcDsScienceDataServer *Class:* DsGeESDT	The EcDsScienceDataServer sends requests to the EcDsStArchiveServer to insert data into the SDPS archives, including metadata.
Ingest Granules	One per ingest request	*Process:* EcDsScienceDataServer *Library:* DsCl *Class:* DsClRequest	EcInGran *Library:* InResource *Class:* InResourceIF	The EcInGran sends requests to the EcDsScienceDataServer to add new granules to the SDSRV granule inventory.
Transfer Files	One per Science Data file activity	*Process:* EcDsStIngestFtpServer *Library:* DsStRes *Class:* DsStResourceProvider	*Process:* EcInGran *Library:* InResource *Class:* InResourceIFProcess	The EcInGran sends a request to the EcDsStIngestFtpServer to stage Science Data files for insertion into the SDPS archive.
Create_Allocate	One allocation per request	*Process:* EcDsStStagingDiskServer *Library:* DsStSt *Class:* DsStStagingDisk	*Process:* EcInGUI *Library:* InResource *Class:* InResourceIF *Process:* EcInGran *Library:* InResource *Class:* InResourceIF	The EcInGUI and the EcInGran processes send requests to the EcDsStStagingDiskServer to allocate areas on the local staging disk to store ingested data.

Table 4.1.3.5-1. STMGT CSCI INGEST Process Interface Events (4 of 5)

Event	Event Frequency	Interface	Initiated By	Event Description
Destroy_Deallocate	One deallocation per request	*Process:* EcDsStStagingDiskServer *Library:* DsStSt *Class:* DsStStagingDisk	*Process:* EcInGran *Library:* InResource *Class:* InResourceIF *Process:* EcInGUI *Library:* InResource *Class:* InResourceIF	The EcInGran and EcInGUI processes send requests to the EcDsStStagingDiskServer to deallocate (to remove an existing staging disk area) a staging disk area.
FTPFile	One per request	FTP Daemon	*Process:* EcDsStIngestFtpServer *Library:* DsStDisFtp *Class:* DsStDistributionFtp	The EcDsStIngestFtpServer sends requests to the FTP Daemon to transfer the files to the specified destination.
Allocate	One allocation per request	*Process:* EcDsStD3Server *Library:* DsStTape *Class:* DsStTape	*Process:* EcInGUI *Library:* InResource *Class:* InResourceIF	The EcInGUI sends requests to the EcDsStD3Server to allocate peripheral devices for data ingesting.
Mount Tape	One per physical tape	*Process:* EcDsStD3Server *Library:* DsStTape *Class:* DsStTape	*Process:* EcInGUI *Library:* InResource *Class:* InResourceIF	The EcInGUI process sends requests to the EcDsStD3Server to load tapes to hardware peripherals for reading the tapes.
Ingest To	One data copy from peripheral device(s) per request	*Process:* EcDsStD3Server *Library:* DsStTape *Class:* DsStTape	*Process:* EcInGUI *Library:* InResource *Class:* InResourceIF	The EcInGUI sends requests to the EcDsStD3Server to copy files from peripheral resources to staging disk areas.

Table 4.1.3.5-1. STMGT CSCI INGEST Process Interface Events (5 of 5)

Event	Event Frequency	Interface	Initiated By	Event Description
Unmount Tape	One per physical tape	*Process:* EcDsStD3Server *Library:* DsStTape *Class:* DsStTape	*Process:* EcInGUI *Library:* InResource *Class:* InResourceIF	The EcInGUI process sends requests to the EcDsStD3Server to unload and detach tapes from hardware peripherals after reading or writing to the tapes.
Deallocate	One deallocation per request	*Process:* EcDsStD3Server *Class:* DsStResourceProvider	EcInGUI *Library:* InResource *Class:* InResourceIF	The EcInGUI sends requests to the EcDsStD3Server to deallocate the previously allocated media resource.
Dd/pax	One per physical tape	SysDaemon	*Process:* EcDsStD3Server *Library:* DsStTape *Class:* DsStTape	The EcDsStD3Server sends Unix commands to the SysDaemon for execution in order to read files from the physical media.
Schedule	One per media	Sybase Server (COTS) Database Tables: DsStDevice, DsStSchedule, DsStSlot, DsStStacker]	*Process:* EcDsStD3Server *Library:* DsStRes	The EcDsStD3Server uses database tables obtained via the Sybase Server to determine if a drive is available to handle the request. The Sybase Server updates its device, schedule, slot, and stacker tables (data stores).

Table 4.1.3.5-2. STMGT CSCI DISTRIBUTION STAGING Process Interface Events (1 of 4)

Event	Event Frequency	Interface	Initiated By	Event Description
Move	One for each file per request	*Process:* EcDsStStagingMonitorServer *Library:* DsStStSh *Class:* DsStStagingMonitor	*Process:* EcDsStArchiveServer *Library:* DsStSt *Class:* DsStStagingMonitor	The EcDsStArchiveServer sends requests to the EcDsStStagingMonitorServer to move data from the archives to the read-only cache.
Copy file	One file copy per request	AMASS (COTS)	*Process:* EcDsStStagingMonitorServer *Library:* DsStSt *Class:* DsStStagingMonitorReal	The EcDsStStagingMonitorServer sends requests for a Unix file copy from the AMASS cache to the read-only cache by buffered read/write software.
CacheInfo	One file copy per request	Sybase Server (COTS) [Database Tables: DsStCache, DsStCacheDirectory, DsStCacheFile, DsStDeleteLogCacheFile, DsStFile Location]	*Process:* EcDsStStagingMonitorServer *Library:* DsStSt *Class:* DsStStagingMonitorReal	The EcDsStStagingMonitorServer submits requests to the Sybase Server to update the availability of space in the read-only cache upon receiving requests to move data from the EcDsStArchiveServer.
DownAccessCount	One per file copied	*Process:* EcDsStStagingMonitorServer *Library:* DsStSt *Class:* DsStStagingMonitor	*Process:* EcDsStStagingDiskServer *Class:* DsStStagingDiskReal	The EcDsStStagingDiskServer sends requests to the EcDsStStagingMonitorServer to decrease the access count to a given file. This is done after a file has been copied or a link to a file in the cache has been removed.
DiskInfo	Two per request (one each for allocation and deallocation)	Sybase Server (COTS) [Database Table: DsStStagingDisk]	*Process:* EcDsStagingDiskServer *Library:* DsStSt *Class:* DsStStagingManager	The EcDsStagingDiskServer submits a request to the Sybase Server to update the availability of space on the local disk. The Sybase Server updates its staging area tables (data stores).

Table 4.1.3.5-2. STMGT CSCI DISTRIBUTION STAGING Process Interface Events (2 of 4)

Event	Event Frequency	Interface	Initiated By	Event Description
Create_Allocate	One allocation per request	*Process:* EcDsStStagingDiskServer *Library:* DsStSt *Class:* DsStStagingDisk	*Process:* EcDsScienceDataServer *Library:* DsGe *Class:* DsGeESDT *Process:* EcDsDistributionServer *Class:* DsDdMedia	The EcDsScienceDataServer and EcDsDistributionServer send requests to the EcDsStStagingDiskServer to allocate areas on the local staging disk to store data for distribution.
Destroy_Detach	One detach per request	*Process:* EcDsStStagingDiskServer *Library:* DsStSt *Class:* DsStStagingDisk	*Process:* EcDsScienceDataServer *Library:* DsGe *Class:* DsGeESDT	The EcDsScienceDataServer sends requests to the EcDsStStagingDiskServer to detach (lose access to an existing staging disk area owned by another process) from a staging disk area.
Copy	One file copy per request	*Process:* EcDsStStagingDiskServer *Library:* DsStSt *Class:* DsStStagingDisk	*Process:* EcDsScienceDataServer *Library:* DsGe *Class:* DsGeESDT *Process:* EcDsDistributionServer *Class:* DsDsgranuleS	The EcDsScienceDataServer and EcDsDistributionServer send requests to the EcDsStStagingDiskServer to copy data within staging disks and between staging disks.

Table 4.1.3.5-2. STMGT CSCI DISTRIBUTION STAGING Process Interface Events (3 of 4)

Event	Event Frequency	Interface	Initiated By	Event Description
Link	One link per file in a request	*Process:* EcDsStStagingDiskServer *Library:* DsStSt *Class:* DsStStagingDisk	*Process:* EcDsScienceDataServer *Library:* DsGe *Class:* DsGeESDT *Process:* EcDsDistributionServer *Class:* DsDsgranuleS	The EcDsScienceDataServer sends requests to the EcDsStStagingDiskServer to link files from the read-only cache to a staging disk and from one staging disk to another.
Create_Attach	One attach per request	*Process:* EcDsStStagingDiskServer *Library:* DsStSt *Class:* DsStStagingDisk	*Process:* EcDsDistributionServer *Class:* DsDdMedia	The EcDsDistributionServer sends requests to the EcDsStStagingDiskServer to attach (gain access to an existing staging disk area allocated by another process) to a staging disk area.
Claim Ownership		*Process:* EcDsStStagingDiskServer *Library:* DsStSt *Class:* DsStStagingDisk	*Process:* EcDsDistributionServer *Class:* DsDdMedia	The EcDsDistributionServer sends requests to the EcDsStStagingDiskServer to claim ownership of (take responsibility for deallocating) an existing staging disk area.
Request Data	One granule per retrieval request	*Process:* EcDsDistributionServer *Class:* DsDdGranuleS	*Process:* EcDsScienceDataServer *Class:* DsDbInterface	The EcDsScienceDataServer sends requests to the EcDsDistributionServer for a particular data granule(s) to be provided.
Push Data Instructions	One set of instructions per distribution request	*Process:* EcDsDistributionServer *Libraries:* DsDdB, DsDdC, DsDdl *Classes:* DsDdRequestMgrC, DsDdGranuleC	*Process:* EcDsScienceDataServer *Library:* DsSr *Class:* DsSrWorkingCollection	The EcDsScienceDataServer assembles instructions to send data and sends the instructions to the EcDsDistributionServer.

Table 4.1.3.5-2. STMGT CSCI DISTRIBUTION STAGING Process Interface Events (4 of 4)

Event	Event Frequency	Interface	Initiated By	Event Description
Request Distribution	One per distribution request	*Process:* EcDsDistributionServer *Library:* DsDdC *Class:* DsDdRequestMgrC	*Process:* EcDsScienceDataServer *Library:* DsSr *Class:* DsSrWorkingCollection	The EcDsScienceDataServer sends distribution requests to the EcDsDistributionServer for various categories of data. The distribution services are essentially identical for all data categories.
Acquire Subsetted Data	One file per request	*Process:* EcDsDistributionServer *Class:* DsDsgranuleS	*Process:* EcDsScienceDataServer *Class:* DsDbInterface	The EcDsScienceDataServer sends requests to the EcDsDistributionServer to retrieve subsetted data files for distribution.
Retrieve	One granule per retrieval request	*Process:* EcDsStArchiveServer *Library:* DsStSt *Class:* DsStArchive	*Process:* EcDsDistributionServer *Class:* DsDdGranules	The EcDsDistributionServer sends requests to the EcDsStArchiveServer to retrieve data from the SDPS archives to be staged for distribution.
VG/Path Mapping	One per volume group	Sybase Server (COTS) [Database Tables: DsStVolumeGroup, DsStOffsite]	*Process:* EcDsStArchiveServer *Library:* DsStSt *Class:* DsStArchiveReal	The EcDsStArchiveServer obtains the physical Unix path used to store data for the specified ESDT.

Table 4.1.3.5-3. STMGT CSCI DISTRIBUTION TRANSFER Process Interface Events (1 of 5)

Event	Event Frequency	Interface	Initiated By	Event Description
Print Packing Slips	One per distribution request	*Process:* EcDsStPrintServer *Library:* DsStPrinter *Class:* DsStPrinter	*Process:* EcDsDistributionServer *Class:* DsDsReadyToShipQueue	The EcDsDistributionServer sends requests to the EcDsStPrintServer to print a file on a given staging disk. The EcDsDistributionServer only prints out the packing list file associated with a distribution request when the request has been completed successfully.
Lpr	One per distribution request	SysDaemon	*Process:* EcDsStPrintServer *Library:* DsStPrinter *Class:* DsStPrinter	The EcDsStPrintServer sends Unix lpr commands to the SysDaemon for execution to physically print the packing list.
Tar	One per media	SysDaemon	*Processes:* EcDsSt8MMServer, EcDsStD3Server *Library:* DsStTape *Class:* DsStTape	The EcDsSt8MMServer and EcDsStD3Server send Unix tar commands to the SysDaemon for execution to physically write files to the media.
Create_Attach	One attach per request	*Process:* EcDsStStagingDiskServer *Library:* DsStSt *Class:* DsStStagingDisk	*Process:* EcDsStFtpDisServer *Library:* DsStDisFtp *Class:* DsStDistributionFtp *Processes:* EcDsSt8MMServer, EcDsStD3Server *Library:* DsStTape *Class:* DsStTape	The EcDsStFtpDisServer, EcDsSt8MMServer and send requests to the EcDsStStagingDiskServer to attach (gain access to an existing staging disk area allocated by another process) to a staging disk area.

Table 4.1.3.5-3. STMGT CSCI DISTRIBUTION TRANSFER Process Interface Events (2 of 5)

Event	Event Frequency	Interface	Initiated By	Event Description
Destroy_Detach	One detach per request	*Process:* EcDsStStagingDiskServer *Library:* DsStSt *Class:* DsStStagingDisk	*Process:* EcDsStFtpDisServer *Library:* DsStDisFtp *Class:* DsStDistributionFtp *Processes:* EcDsSt8MMServer, EcDsStD3Server *Library:* DsStTape *Class:* DsStTape	The EcDsStFtpDisServer, EcDsSt8MMServer and EcDsStD3Server send requests to the EcDsStStagingDiskServer to detach (lose access to an existing staging disk area allocated by another process) from a staging disk area.
Schedule	One per media	Sybase Server (COTS) [Database Tables: DsStDevice, DsStSchedule, DsStSlot, DsStStacker]	*Processes:* EcDsSt8MMServer, EcDsStD3Server *Library:* DsStRes	The EcDsSt8MMServer and EcDsStD3Server use database tables obtained via the Sybase Server to determine if a drive is available to handle the request. The Sybase Server updates its device, schedule, slot, and stacker tables (data stores).
DiskInfo	One per distribution request	Sybase Server (COTS) [Database Table: DsStStagingDisk]	*Process:* EcDsStStagingDiskServer *Library:* DsStSt *Class:* DsStStagingDisk	The EcDsStagingDiskServer submits a request to the Sybase Server to update the availability of space on the local disk. The Sybase Server updates its staging area tables (data stores).
PullAreaInfo	One per file to insert	Sybase Server (COTS) [Database Tables: DsStCache, DsStCacheDirectory, DsStCacheFile, DsStDeleteLogCacheFile, DsStFile Location]	*Process:* EcDsStPullMonitorServer *Library:* DsStPull *Class:* DsStPullMonitorReal	The EcDsStPullMonitorServer submits requests to the Sybase Server to update the availability of space in the Pull cache upon receiving requests to create new user directories and insert files from the EcDsStFtpDisServer.

Table 4.1.3.5-3. STMGT CSCI DISTRIBUTION TRANSFER Process Interface Events (3 of 5)

Event	Event Frequency	Interface	Initiated By	Event Description
MkDir	One per directory creation	*Process:* EcDsStPullMonitorServer *Library:* DsStPull *Class:* DsStPullMonitor	*Process:* EcDsStFtpDisServer *Class:* DsStDistributionFtp	The EcDsStFtpDisServer sends requests to the EcDsStPullMonitorServer to create directories in the user pull area to which files are linked and from which the external requester can pull files.
InsertFile	One file per insert request into the Pull cache	*Process:* EcDsStPullMonitorServer *Library:* DsStPull *Class:* DsStPullMonitor	*Process:* EcDsStFtpDisServer *Class:* DsStDistributionFtp	The EcDsStFtpDisServer sends requests to the EcDsStPullMonitorServer to insert files into the Pull cache. In response, the EcDsStPullMonitorServer returns status to indicate whether the file needs to be transferred to the cache or is already resident.
Link	One link per file in a request	*Process:* EcDsStPullMonitorServer *Library:* DsStPull *Class:* DsStPullMonitor	*Process:* EcDsStFtpDisServer *Library:* DsStDisFtp *Class:* DsStDistributionFtp	The EcDsStFtpDisServer sends requests to the EcDsStPullMonitorServer to link files from the Pull cache to the user pull area.
FTPFile	One per file in a request	FTP Daemon	*Process:* EcDsStFtpDisServer *Library:* DsStDisFtp *Class:* DsStDistributionFtp	The EcDsStFtpDisServer sends requests to the FTP Daemon to transfer files to the Pull cache or to an external user.
GetLimit	One calculation per request	*Process:* EcDsStFtpDisServer *Library:* DsStDisFtp Class: DsStDistributionFtp	*Process:* EcDsDistributionServer *Class:* DsDdMedia	The EcDsDistributionServer determines the maximum size of a request, which can be electronically distributed using FTP.
Distribution FtpPull	One file per pull request	*Process:* EcDsStFtpDisServer *Library:* DsStPull	*Process:* EcDsDistributionServer *Class:* DsDdGranuleS	The EcDsDistributionServer sends requests to the EcDsStFtpDisServer to distribute a file directly to a user or to move a file to the Pull area.

Table 4.1.3.5-3. STMGT CSCI DISTRIBUTION TRANSFER Process Interface Events (4 of 5)

Event	Event Frequency	Interface	Initiated By	Event Description
Destroy_Deallocate	One deallocation per request	*Process:* EcDsStStagingDiskServer *Library:* DsStSt *Class:* DsStStagingDisk	*Process:* EcDsDistributionServer *Class:* DsDdMedia	The EcDsDistributionServer sends requests to the EcDsStStagingDiskServer to deallocate (remove an existing staging disk area) a staging disk area.
GetCapacity	One calculation per request	*Processes:* EcDsSt8MMServer, EcDsStD3Server *Library:* DsStRes *Class:* DsStResourceProvider	*Process:* EcDsDistributionServer *Class:* DsDdMedia	The EcDsDistributionServer determines the effective maximum capacity of a media type to send to the EcDsSt8mmServer and EcDsStD3Server. This is used to determine the number of media needed to satisfy a given request.
Distribute From	One data copy from staging disk per request	*Processes:* EcDsSt8MMServer, EcDsStD3Server *Library:* DsStTape *Class:* DsStTape	*Process:* EcDsDistributionServer *Class:* DsDdGranules	The EcDsDistributionServer sends requests to the EcDsSt8mmServer and EcDsStD3Server to copy files from staging disks to an allocated peripheral resource.

Table 4.1.3.5-3. STMGT CSCI DISTRIBUTION TRANSFER Process Interface Events (5 of 5)

Event	Event Frequency	Interface	Initiated By	Event Description
Request Management Services	Upon initial system start-up or per process request.	*Processes:* EcDsStD3Server, EcDsStIngestFtpServer, EcDsStStagingDiskServer, EcDsStArchiveServer, EcDsStStagingMonitorServer, EcDsStFtpDisServer, EcDsStPullMonitorServer, EcDsSt8MMServer, EcDsStPrintServer	*Process:* EcMsAgSubAgent *Library:* EcAgInstrm *Class:* EcAgManager	The EcMsAgSubAgent provides a basic management library of services to the processes, implemented as client or server applications, using the DCCI CSCI Process Framework. The basic management library of services include: • **Lifecycle commands** – The HPOV Network Node Manager forwards (via DCE RPCs), to the MSS Sub Agent running on each managed host, requests to start and stop ECS applications. A start request has mode and temperature parameters that the MSS Sub Agent uses in constructing its command line startup request. Stop requests precipitate a PF shutdown RPC call to the target ECS application from the MSS Sub Agent. Managed applications use the application interface PFGETMODE to obtain their operational mode (e.g., Ops, test, or training).

4.1.3.6 Storage Management Data Stores

Table 4.1.3.6-1 provides descriptions of the individual data stores (entitled collectively "Database") in the STMGT CSCI architecture diagram. More detailed information on these database tables can be found in the CDRL 311 document on Storage Management.

Table 4.1.3.6-1. STMGT CSCI Data Stores (1 of 3)

Data Store	Type	Description
Sybase Device Tables		
DsStDevice	Sybase	The data store (database table) to contain an entry for each peripheral device the STMGT CSCI uses to service requests to ingest or distribute data. Since this data store is a look-up for entries in the Request entity, this data is initialized prior to software installation.
DsStSchedule	Sybase	This data store contains an entry for schedule requests of a peripheral device the Storage Management receives. An entry is inserted into the entity every time a peripheral device is reserved to service a request to ingest or distribute data. The unit of measure for the estimated duration is minutes.
DsStSlot	Sybase	This data store contains an entry for each peripheral stacker device's slots the EcDsStArchiveServer and EcDsDistributionServer use to service ingest or data distribution requests, respectively. Since this data store is a look-up entity for entries in the Request entity, this data is initialized prior to software installation.
DsStStacker	Sybase	This data store contains an entry for each peripheral stacker the STMGT CSCI uses to service ingest or data distribution requests. Since this data store is a look-up entity for entries in the Request entity, this data is initialized prior to software installation.
Sybase Cache Tables		
DsStCache	Sybase	This data store identifies every instance of a cache related to Pull Monitor Cache Management. The current default is for only one existing cache.
DsStCacheDirectory	Sybase	This data store contains an entry for each directory with a Storage Management cache. An entry is inserted into the data store every time a new cache is created, or a directory is added to an existing cache.
DsStCacheFile	Sybase	This data store contains an entry for each file Storage Management Pull Monitor is currently processing (originally implemented via the pull_list table). An entry is inserted into the entity for each file retrieved from the Archival Management And Storage System (AMASS). DsStFileLocation (originally implemented via the pull_link table) tracks the individual cache locations of (or links to) the file.
DsStDeleteLogCache File	Sybase	This data store contains a historic record of each file the STMGT CSCI deletes from its (Pull Monitor) cache (or the DsStCacheFile table). This entity maintains a history of file usage and cache usage for reporting and analysis purposes. An entry is inserted into the entity via a delete trigger in the DsStCacheFile table.

Table 4.1.3.6-1. STMGT CSCI Data Stores (2 of 3)

Data Store	Type	Description
DsStFileLocation	Sybase	This data store maintains the location(s), in a cache, of each file recorded in the DsStCacheFile table. As each file is retrieved from the archive and written to one of the Storage Management caches, an entry is inserted in the entity. The entry must correspond to an existing DsStCacheFile entry. Upon insertion of a DsStFileLocation record, the corresponding DsStCacheFile record is updated by incrementing or decrementing the ActiveLinkCount via a Trigger and setting the LastAccessDate to the current system date and time.
Sybase Staging Area Table		
DsStStagingDisk	Sybase	Stores information (e.g., staging disk size, owner, disk number, and priority request id) about requests for staging disk services.
Sybase Volume Group Tables		
DsStBackup	Sybase	Stores a reference to every file currently being backed-up related to Archive Backup and Restore functionality.
DsStBackupHistory	Sybase	Stores a history of every file successfully backed-up related to Archive Backup and Restore functionality.
DsStOffsite	Sybase	This data store is used for mapping the off-site identifiers (e.g., GSF, ERC,) with their appropriate Cell location (i.e., gsfc.nasa.gov) and identifying the specified Archive directory for (remote) backup.
DsStVolumeGroup	Sybase	This data store contains 'volume group' information (the section of the ECS Archive being accessed) from configuration files such as the path currently pointed to and a history of paths related ONLY to a specific Archive server type.
DsStRestore	Sybase	Stores information needed for the restoration from backup for files in the archive.
DsStRestoreHistory	Sybase	Historical records of all archive file restoration activities.
Sybase Configuration Tables (All Servers Use these Tables)		
DsStConfigParameter	Sybase	This data store contains an entry for information to configure and initialize each DsStServerType supported by Storage Management. The data consists of information currently accessed through configuration files (*.CFG) plus information as it pertains to the status and node of operation for each server. An entry is inserted for each parameter that a server uses. Two types of parameters can be defined within the constructs of the DsStConfigParameter table, startup and run-time. Startup parameters require the associated server be restarted in order for the parameters to be used. Run-time parameters can be changed without restarting the server (i.e., the server periodically queries the configuration table for new values).
DsStServerType	Sybase	This data store contains all types of servers administered and configured by Storage Management and their associated descriptions. 8 types of standard servers are currently pre-populated with the database construction due to no user interface currently existing to administer (e.g., Archive, Staging Monitor, Pull Monitor, Distribution FTP, 8MM Tape, Staging Disk, Ingest FTP, D3…)

Table 4.1.3.6-1. STMGT CSCI Data Stores (3 of 3)

Data Store	Type	Description
DsStVersion	Sybase	Contains version information about the installed database. Data includes the date of installation, the version number of the database installed, and the latest version number available for the loaded database.
Sybase Operator Logging Tables		
DsStErrorAttribute	Sybase	This data store is required for the DsStErrorDetails class. This data store provides a mapping between character mnemonics and numeric error codes. It defines the attributes for each error, and provides adequate characterization for appropriate retry/recovery procedures from the error attributes.
DsStErrorText	Sybase	This data store provides text descriptions and suggested recovery actions for each error code, and presents errors in a meaningful manner.
DsStEventLog	Sybase	This data store contains a history of events and COTS errors encountered by the STMGT CSCI. The STMGT CSCI inserts records into the table using the stored procedure DsStELInsert.sp. The calling sequence is: DsStELInsert @EventNumber=value, @EventMessage=value, @EventDate=value, @EventType=value. The STMGT CSCI inserts a new ERROR_LOG entry each time an event occurs or an error is encountered. The Operations staff has the capability to purge this entity periodically based on a date/time value.
Sybase Utility Table (All Servers use this Table)		
DsStNextId	Sybase	This data store is used to track the automatic, sequential generation of unique identifying keys for various tables in the Storage Management database (DsStErrorLog, DsStDeleteLogCacheFile, DsStBackupHistory, DsStRestoreHistory, and DsStConfigParameter.TimerId)
Sybase Checkpointing Tables (All Servers use these Tables)		
DsStArchiveRequest	Sybase	Stores all requests for archive services until they are completed.
DsStDistributedFile	Sybase	Contains an entry for each file STGMT is currently processing related to a DsStFtpRequest entry.
DsStFile	Sybase	Contains an entry for each file STGMT is currently processing related to a DsStArchiveRequest entry.
DsStFtpRequest	Sybase	Stores information (e.g., pull directory name and parameter list for FTP request) about FTP specific requests.
DsStGenericRequest	Sybase	Stores common information to all STMGT requests (e.g., checkpoint state, request status, and type of operation, and owner name) regardless of type.
DsStStgMonRequest	Sybase	Contains information (e.g., unique file name, original file name, file size, and compression type) for Staging Monitor specific requests.

4.1.4 Data Server Subsystem Hardware

4.1.4.1 Access Control and Management Hardware CI Description

The Access Control and Management HWCI (ACMHW), provides access to the Data Server subsystem for subsystem and direct "push/pull" user access, provides tools and capabilities for system administration, and supports the infrastructure of the Data Server. This HWCI controls logical data server access, maintains sessions, provides sub-setting support, directs service requests to other appropriate Data Server Subsystem configuration items, and supports the control and data flow for electronic distributions. The Access Control and Management hardware is logically divided into the Administration Stations (AS) and the Access/Process Coordinators (APCs). The number, type, and configuration of ASs and APCs depend on site requirements and the number of data servers supported. Table 4.1.4.1-1 provides descriptions of the ACMHW.

Table 4.1.4.1-1. Access Control and Management HWCI Descriptions

Server Name	Class/Type	Description
Administration Stations	OPS Workstation	SUN workstations
Access/Process Coordination	APC Data Server	Two SGI Servers with Multi-processor Capabilities and a SUN Server

Administration Stations (AS) hosts provide access to the Administration Services for one or more data servers. These services provide Data Server Administrators with the capability to modify and monitor the configuration of the data server. The data server configuration includes resource availability, number and location of items, data server schema, advertised services, data types and archiving strategy. In addition, this set of services includes the capability to perform Archive maintenance functions. The ASs are mid-sized workstations executing GUI packages to accommodate the imposed I/O and processing requirements.

The Access/Process Coordinators (APCs) are the interface to the data server services. The APCs support session establishment, management, and control, and are used to access the data server services. Sessions management (from a user perspective) provides a variety of data server resources including results sets, cached compute-on-demand data objects, search contexts, etc. These resources impose a computational load and an I/O load on the APC processors. A greater I/O load is imposed by the APCs functioning as a data throughput mechanism for electronic data distribution in Release 5A and for data manipulation via sub-setting in Release 5A. APC platforms also support the ingest, storage, and distribution of the Browse data. The Browse data hardware accomodates the different DAAC sizes. At the smaller DAACs, Browse data resides on a RAID disk, at larger sites, like GSFC, Browse data is stored in the EMASS Automated Media Library (AML) robotic libraries handling optical media for HP optical drives. Each APC consists of four platforms configured in pairs as follows: each pair is an SGI host acting as a server and running a Science Data Server database and a SUN host running the ECS Science Data Server custom code. One pair is primary, while the other is the standby. The APCs provide the computer resources, search engines, and tools to operate on data retrieved from repositories. Algorithms operating on site data can execute on an APC or a computer in the Data Processing Subsystem.

The APC SGI server host accommodates electronic ingest of Browse data and data from sources external to the DAAC, including electronic distribution, and manages the requests to the Data Server. APC storage supports functions such as sub-setting, storing user session context, keeping track of user session interactions that can be suspended or resumed, and the Browse collection.

Two identical AS workstations supply AS fail-over/recovery capability via redundant operation. Either workstation can be used independently as an operator workstation and in the event of a failure of one, the other can assume the full role. The two APC servers in a standby configuration share a common disk pool. This disk pool is configured as an outboard stack of RAID disk drives dual-ported to the two servers. One of the servers is configured as primary, the other as a standby secondary. The active server maintains the current system configuration files on disk. In some cases, both servers are active with separate primary responsibilities and shared secondary responsibilities. The servers can accommodate degraded mode fail-over capability in the event of a failure. When a failure on a primary APC is detected, the operator initiates a fail-over procedure. During a fail-over, the backup APC server reads the system status files from the shared disk and begins operating as primary.

Three types of network failures can affect the DSS. 1) If the FDDI cable between a host and the FDDI concentrator were damaged, a new cable would be required. No other configuration would be required. 2) If an individual port on the FDDI concentrator fails, the attached host must be moved to another port, and should be replaced quickly. Note the above failures result in a service interruption only for the workstations. Since all servers/processors are attached to two concentrators, they can communicate as normal in the event of a cable or concentrator fault, and the applications are unaffected by the event. 3) If the PowerHub 8000 fails, service interruption would occur for both the workstations and servers/processors until the faulty module is replaced.

4.1.4.2 Data Repositories Hardware CI Description

Data Repositories (DRs) HWCI (DRPHW) are hardware to store and maintain data permanently. Different technologies are used to instantiate DRs depending on the volume and type of data to be stored, the access patterns of the data, and additional unique requirements imposed on the repository (i.e., data maintenance requirements, backup and restore functions, media management and control, etc.).

DRs are classified as “permanent”, meaning the services to monitor and maintain data integrity for large data holdings are supported by this repository's storage technology. A copy of all data at a site not considered temporary is eventually maintained in a site permanent DR.

The File and Storage Management System (FSMS) host platform is an SGI machine. In DRPHW CIs there are at least two such hosts to serve as a primary and a backup. At the sites with more than two FSMS hosts, one of the hosts serves as a backup to all other hosts and the WKSHW host if any (See Section 4.1.4.3 for the WKSHW Description).

The Data Server's servers and workstations are directly connected to the DAAC FDDI network and HIPPI fabric. The Data Server processors/servers contain dual-attached station (DAS) cards, dual-homed to separate FDDI concentrators. This provides redundancy so full connectivity exists to the servers even in the event of a concentrator failure. The workstations contain single-

attached station (SAS) cards and each are connected to a single concentrator, and they are also split across concentrators so they are not all connected to the same unit. The FDDI concentrators are in turn connected to the FDDI switch.

Table 4.1.4.2-1 provides descriptions for the Data Repository HWCI.

Table 4.1.4.2-1. Data Repository HWCI Descriptions

Item Name	Class/Type	Description
Data Repository	Archive Robotics	STK Powderhorn
	Magnetic Tape Drives	STK Redwood
	SMP Server Workstation (FSMS Host)	SGI Server with Multi-processor Capabilities.

4.1.4.3 Working Storage Hardware CI Description

Working Storage HWCI (WKSHW) of the Data Server supplies storage for temporary file and buffer storage within the Data Server architecture. This pool contains the interim processing data. WKSHW provides the staging capacity for data acquires and inserts of the interim data.

EDC is the only site that requires interim product data. All interim product data used by the Data Processing Subsystem are staged in the WKSHW for a maximum period of 90 days (most interim products are far more short-lived). Disk storage is supplied for the interim products. Also at EDC, where interim product data accumulation is very significant, archival robotics and tapes are used for this storage as a second tier of WKSHW. A separate AMASS instance supports the functioning of the robotic WKSHW. Table 4.1.4.3-1 provides descriptions for the Working Storage HWCI.

Table 4.1.4.3-1. Working Storage HWCI Descriptions

Item Name	Class/Type	Comments
Working Storage Primary Tier	RAID (host attached)	EDC only
Working Storage Secondary Tier	Tape Robotics	EDC only

Using a RAID for storage implementation provides fault tolerance of the WKSHW. The RAID provides degraded mode of operations for a single disk failure. Second tier storage RMA is equivalent to the rest of the robotic library storage in the archive repository (See Section 4.1.4.2 for the Data Repository Hardware Description). The WKSHW host is backed up by a standby in the DRPHW configuration.

4.1.4.4 Distribution and Ingest Peripheral Management Hardware CI Description

The hardware of the Distribution and Ingest Peripheral Management (DIPHW) supports the media distribution methods for data dissemination from the system and hard media ingest of data into the system. Hard media distribution and ingest is used in an assortment of data recording peripherals. Robotic control is used where applicable to minimize operator involvement.

Data distributed from the data server is buffered for a full day shift (8 hours at most sites). The buffering of the data is provided by the Distribution Storage Management hardware in the data server.

The distribution and ingest peripheral hardware supply the hard media for inter-site, user data distribution scheduling and management. This HWCI contains media drives, jukeboxes/stackers, server hosts, and disk storage for network distribution.

Staging disks in the Distribution and Ingest configuration items of the DSS serve as a buffer to the data pull process. The buffered data pull optimizes performance of the data retrieval for distribution or data processing/archiving after ingest.

The Distribution and Ingest Management hardware includes SUN server controlled recording devices for both hard media data distribution and hard media data ingest.

Equipment complement: RAID (host attached), 8-mm tape drives and stackers, 3480/3490 drives, CD Recordable, printers, optical scanner, FAX, two SUN servers in a load sharing configuration.

4.2 Ingest Subsystem Overview

The Ingest Subsystem (INS) ingests data into Science Data Processing Segment (SDPS) repositories in accordance with approved ICDs. Data is accepted from a variety of external data providers in a variety of formats predefined within SDPS regarding the expected metadata and metadata characteristics. The INS supports a variety of Ingest requests and preprocesses the data for archiving into the SDPS. The preprocessing depends on the attributes of the ingested data such as data type, data format, and the level to which the ingested data has been processed from raw instrument data.

The data types are formally referred to as Earth Science Data Types (ESDTs). An ESDT is a defined data set associated with a given mission/instrument or identified grouping and is registered in an SDPS ESDT Baseline List. The ESDT is identified with a short name, a long name, a collection description, and information on file type, metadata, formats, and services provided such as sub-setting by a given attribute. An example of an ESDT is AST_L1A; the short name for the ASTER reconstructed Level 1A data set, unprocessed instrument digital counts with radiometric (LR) and geometric (LG) coefficients attached. ESDTs can also be ancillary data, algorithms, correlative and calibration data.

The INS software processes execute in a specific pattern based on the ESDT being ingested. The processes include an automated ingest process, a polling ingest process, a media ingest process, and a cross mode ingest process. Ingest processes provide for the receipt of external data, which is archived within the ECS SDPS archival system. Specific ingest process procedures are established to support each unique INS interface and allow the processing interface parameters to be modified as interface and mission requirements evolve. For a given incoming data set corresponding to an ESDT, the INS performs data preprocessing, metadata extraction, and directs the DSS SDSRV CSCI to perform metadata validation.

Data is staged (prepared for transfer) to one of two areas depending on the data level, ESDT, and other data set specific characteristics:

- Level 0 (L0) data received from external data providers and other selected data (EDOS ancillary data) is staged to the INS working storage area. Metadata is extracted and the format is validated in the working storage area. The L0 data is transferred to an archive data repository in the DSS for long-term storage.
- Non-L0 data (such as non-EDOS ancillary data and L1A - L4 data from external facilities) is staged directly to the working storage area in the DSS. Extraction of metadata is performed on the data by the INS software residing in the INS processor hardware. The DSS (SDSRV CSCI) is called by the INS software residing in the INS processor hardware to perform metadata validation. The non-L0 data is transferred to a DSS archive data repository for long-term storage.

Ingest Subsystem Context

Figure 4.2-1 is the INS context diagram. The diagram shows the events sent to the INS from other SDPS or CSMS subsystems and the events the INS sends to other SDPS or CSMS subsystems, the Operations staff, and external providers. Table 4.2-1 provides descriptions of the interface events shown in the Ingest Subsystem context diagram.

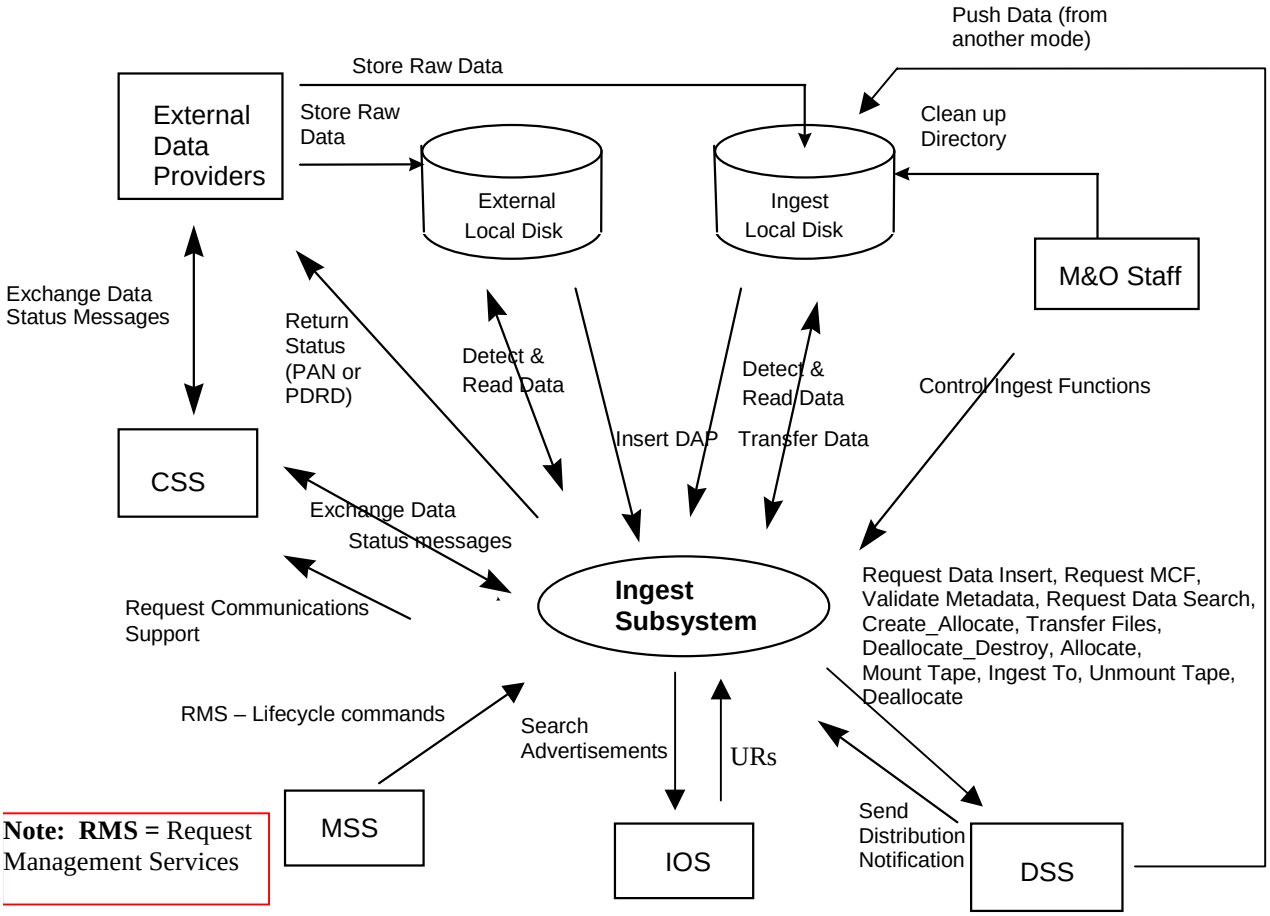


Figure 4.2-1. Ingest Subsystem Context Diagram

Table 4.2-1. Ingest Subsystem Interface Events (1 of 2)

Event	Interface Event Description
Push Data (from another mode)	The DSS pushes data, via the FTP service, to the Ingest local disk when it is distributing data to be ingested.
Clean up Directory	The Operations staff sends clean up instructions to the Ingest Local Disk for data clean up. Currently, delete and remove Unix commands are executed from the Unix command line to clean up the Ingest local disk.
Control Ingest Functions	The Operator controls the Ingest function by monitoring requests, canceling requests and granules, resuming suspended requests and granules, changing database parameters, viewing history, and performing manual media ingest via a GUI.
Detect & Read Data	The INS polls for data files, Delivery Record files, or distribution notification files in an agreed upon location (External to ECS or Ingest internal Local Disk).
Transfer Data	The INS retrieves data from the Ingest local disk and stores distribution notification files and PDRs for cross mode ingest on the Ingest local disk.
Insert DAP	Delivered Algorithm Packages (DAPs) are located on a Local Disk (external or internal to a DAAC) and are inserted into the SDPS via the automated polling ingest interface.
Request Data Insert	The INS sends requests to the DSS to insert a particular file or files into the SDSRV inventory and archive. Inserted data is accompanied by metadata. The metadata is catalogued in the SDSRV inventory as a granule of a particular ESDT short name and version.
Request MCF	The INS requests the Metadata Configuration File (MCF) template, from the DSS, for a particular ESDT short name prior to a data insert request.
Validate Metadata	The DSS validates the metadata files that the INS has populated.
Request Data Search	The INS requests a search, by the DSS, for the granule corresponding to a particular ESDT short name and version, which has a particular local granule id.
Create_Allocate	The INS sends requests to the DSS to allocate areas on the local staging disk to store ingested data.
Transfer Files	The INS sends requests to the DSS to transfer (copy) data files to a staging disk.
Destroy_Deallocate	The INS sends requests to the DSS to deallocate a staging disk area (to remove an existing staging disk area from usage).
Allocate	The INS sends requests to the DSS to allocate peripheral devices for data ingesting.
Mount Tape	The INS sends requests to the DSS to load tapes to hardware peripherals for reading the tapes.
Ingest To	The INS sends requests to the DSS to copy files from peripheral resources to staging disk areas.
Unmount Tape	The INS sends requests to the DSS to unload and detach tapes from hardware peripherals after reading or writing to the tapes.
Deallocate	The INS sends requests to the DSS to deallocate the previously allocated media resource.

Table 4.2-1. Ingest Subsystem Interface Events (2 of 2)

Event	Interface Event Description
Send Distribution Notification	The DSS sends a distribution notification, via e-mail, to the INS when data being distributed is to be ingested.
URs	The Interoperability Subsystem (IOS) returns Universal References (URs) for CSMS managed objects (hosts, servers, routers, other devices) to the INS.
Search Advertisements	The IOS receives requests to search for advertisements. The INS uses the advertisement information to locate the relevant data servers to interact with.
Request Management Services	The MSS provides a basic management library of services to the subsystems, implemented as client or server applications, using the CSS Process Framework. The basic management library of services include: • **Lifecycle Commands** - The HPOV Network Node Manager forwards (via DCE RPCs), to the MSS Sub Agent running on each managed host, requests to start and stop ECS applications. A start request has mode and temperature parameters that the MSS Sub Agent uses in constructing its command line startup request. Stop requests precipitate a PF shutdown RPC call to the target ECS application from the MSS Sub Agent. Managed applications use the application interface PFGETMODE to obtain their operational mode (e.g., Ops, test, or training).
Request Communications Support	The CSS provides a library of services available to each SDPS and CSMS subsystem. The services required to perform the specific subsystem assignments are requested by the subsystem from the CSS. These services include: Distributed Computing Environment (DCE) support, file transfer services, Network & Distributed File Services, Bulk Data transfer services, file copying services, name/address services, password services, Server Request Framework (SRF), Universal Reference (UR), Error/Event logging, message passing, Fault Handling services, User Authentication services, Mode information, and retrieving the requested configuration attribute-value pairs from the Configuration Registry for ECS applications that request them.
Exchange Data Status Messages	Data status messages are sent to and from the CSS Gateways via Remote Procedure Calls (RPCs). A Data Availability Notice (DAN) is sent to the CSS Gateways (by the External Data Providers) and afterwards additional data status messages are exchanged between the CSS Gateways and the INS. For Landsat 7 data exchanges, a Data Delivery Notice (DDN) is sent from the INS to the Landsat 7 Gateway Server and a Data Availability Acknowledgement (DAA) is sent to the Landsat 7 Gateway Server from the INS. A Data Delivery Acknowledgement (DDA) is returned from the LPS through the CSS to the INS.
Return Status (PAN or PDRD)	The INS returns the status of a request received from an External Data Provider by transmitting a Production Acceptance Notification (PAN) or a Product Delivery Record Discrepancy (PDRD) to the External Data Provider directly.
Store Raw Data	The raw data (L0) provided from the external provider to the ECS. Some external providers put this data on an external local disk for ECS to pull while others push the data onto a local INS internal disk.

Ingest Subsystem Structure

The INS is one CSCI and one HWCI. Ingest backup hardware runs in the Test Mode as long as there are no failures. The configuration items are:

- Ingest (INGST) CSCI provides the software capability to acquire data by various methods and transfers the data into the SDPS. These methods include an Automated transfer from the network, Polling with or without Delivery Records for data placed at predetermined locations, a Media transfer method which includes reading tapes and a cross mode ingest method. The INGST CSCI also stores and manages request information, and provides for data preprocessing and insertion into the appropriate SDPS storage location.
- Ingest Client HWCI (ICLHW) supports INGST in bringing data into the SDPS from an external interface. This HWCI also includes an Ingest Workstation for execution of the Ingest GUI.

Use of COTS in the Ingest Subsystem

- Rogue Wave's Tools.h++

  The Tools.h++ class libraries provide basic functions and objects. These libraries must be installed with the INS software for any of the INS processes to run.

- Rogue Wave's DBTools.h++

  The DBTools.h++ class libraries interact with the Sybase SQL database server. These libraries must be installed with the INS software to interact with Sybase. The INS uses an interface software process control file (PCF) to obtain access to the Sybase Server.

- Rogue Wave's Net.h++

  This is a C++ class library to provide an object-oriented interface to Inter-Process Communication (IPC) and network communication services. The Net.h++ framework enables developed code to be portable to multiple operating systems and network services. These libraries must be installed with the INS software to support the interface to other subsystems.

- Integrated Computer Solutions'(ICS) Builder Xcessory (built on X/Motif)

  The Builder Xcessory GUI builder tool modifies the displays of Ingest GUIs. The tool also generates the C++ code to produce Ingest GUIs at run time. There is no operational part of the Builder Xcessory needed at run-time.

- Sybase (xaClient, SQL Server)

  This set of Sybase products provides a relational database to store INS related information and must be installed on the platform where INS software resides.

- Tivoli Client

  This product provides the interface to monitor the INS software for system administration purposes. Although Tivoli Client is part of MSS, this COTS product must be installed on the platform where the INS resides for Ingest status to be available at the system level.

- DCE Client

  This product provides the communications between INS and other subsystems. DCE can reside on one or both sides of the interface and must be installed on the platform where the INS resides. Although the DCE Client is part of the CSS, this COTS product must be installed on the platform where the INS software resides for INS to run in the ECS operational and test environments.

- HP OpenView Client

  This product provides system administration capabilities to control INS software applications (startup and shutdown). The HP OpenView Client must be installed on the platform where the INS software resides. Although HP OpenView Client is part of the MSS, this COTS product must be installed on the platform where the INS resides for INS to run.

- UNIX Network Services

  DNS, NFS, E-mail, FTP, TCP/IP and the other Unix services provided are obtained from the CSS and are described in section 4.8 of this document.

4.2.1 INGST Computer Software Configuration Item Description

4.2.1.1 INGST Functional Overview

The INGST CSCI supports a variety of interfaces to external systems. The application-level protocol set up for data transfer is potentially different for each of the external interfaces. As a result, a separate ingest software application is required to facilitate data transfer for each interface. To minimize the software development effort and make it easier to accommodate interfaces to new external systems, data ingest from external systems is categorized, based on common characteristics and ingest processes.

1) Automated Network Ingest Interface

Automated Network Ingest occurs when a Data Availability Notice (DAN) is supplied to the SDPS. The SDPS receives the DAN and schedules automated network data transfer from the source. The DAN describes the location of the available data. External data providers are responsible for developing application software to interact with CSMS automated network ingest software.

2) Automated Polling Ingest Interface

- Polling with Delivery Record -- The SDPS periodically checks an agreed-upon network location for a Delivery Record file. The Delivery Record file contains information identical to that in a DAN. The Delivery Record describes the location of the available

data. The data location could be on a working storage device within SDPS, where an external data provider has previously transferred the data.

- Polling without Delivery Record -- The SDPS periodically checks an agreed-upon network location for available data. All data in the location make up a collection of ingest data of one specific ESDT, with one file per data granule.

3) Manual Media Ingest Interface (via a GUI)

Manual data transfer mechanisms -- data can be transferred from physical media. Physical Media Ingest enables authorized institutions or science users to provide data on hard media and provides a backup procedure for facilities to submit data to the SDPS when automated network data transfer is temporarily unavailable. The hard media must contain information identical to the Delivery Records described above, in a standard file format, or the data provider must separately provide Delivery Records to a specified SDPS location in the standard file format. Hard media data transfer involves data transfer from one of several ingest peripheral types found at a DAAC.

4) Cross Mode Ingest Interface

The INGST CSCI receives a distribution notice, via e-mail, of data files transferred, via the FTP service. The distribution notification is used to create a Delivery Record File (describes the location of the available data). The Delivery Record file is put in an agreed-upon network location. The polling with Delivery Record process checks the location for the Delivery Record files.

The INGST CSCI includes the processes for ingesting data as described and provides a process for managing requests, and for inserting granule data into the SDPS.

4.2.1.2 INGST Context

Figure 4.2.1.2-1 is the INGST CSCI context diagram. The diagram shows the events sent to the INGST CSCI and the events the INGST CSCI sends to other CSCIs. Table 4.2.1.2-1 provides descriptions of the interface events shown in the INGST CSCI context diagram.

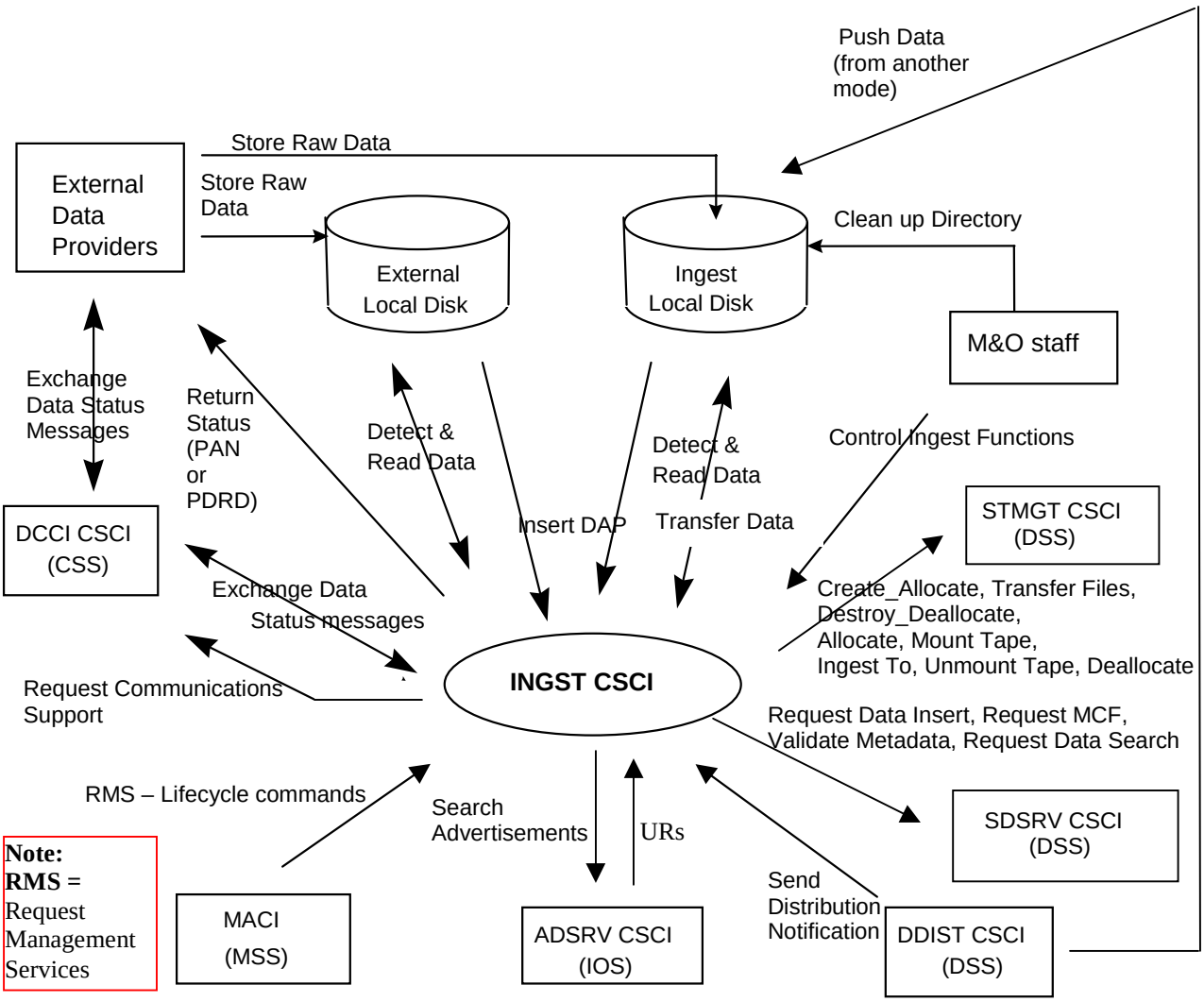


Figure 4.2.1.2-1. INGST CSCI Context Diagram

Table 4.2.1.2-1. INGST CSCI Interface Events (1 of 3)

Event	Interface Event Description
Push Data (from another mode)	The DDIST CSCI pushes data, via the FTP service, to the Ingest local disk when it is distributing data to be ingested.
Clean up Directory	The M&O staff sends clean up instructions to the Ingest local disk for data clean up. Currently, delete and remove Unix commands are executed from the Unix command line to clean up the Ingest local disk.
Control Ingest Functions	The M&O staff control the Ingest function by monitoring requests, canceling requests and granules, resuming suspended requests and granules, changing database parameters, viewing history, and performing manual media ingest via a GUI.

Table 4.2.1.2-1. INGST CSCI Interface Events (2 of 3)

Event	Interface Event Description
Detect & Read Data	The INGST CSCI polls for data files, Delivery Record files, or distribution notification files in an agreed upon location (External to ECS or Ingest internal local disk).
Transfer Data	The INGST CSCI retrieves data from the ingest local disk and stores distribution notification files and PDRs for cross mode ingest on the ingest local disk.
Insert DAP	Delivered Algorithm Packages (DAPs) are located on a local disk (external or internal to a DAAC) and are inserted into the SDPS via the automated polling Ingest interface.
Create_Allocate	The INGST CSCI sends requests to the STMGT CSCI to allocate areas on the local staging disk to store ingested data.
Transfer Files	The INGST CSCI sends requests to the STMGT CSCI to transfer (copy) data files into the STMGT CSCI staging disks.
Destroy_Deallocate	The INGST CSCI sends requests to the STMGT CSCI to deallocate a staging disk area (to remove an existing staging disk area from usage).
Allocate	The INGST CSCI sends requests to the STMGT CSCI to allocate peripheral devices for data ingesting.
Mount Tape	The INGST CSCI sends requests to the STMGT CSCI to load tapes to hardware peripherals for reading the tapes.
Ingest To	The INGST CSCI sends requests to the STMGT CSCI to copy files from peripheral resources to staging disk areas.
Unmount Tape	The INGST CSCI sends requests to the STMGT CSCI to unload and detach tapes from hardware peripherals after reading or writing to the tapes.
Deallocate	The INGST CSCI sends requests to the STMGT CSCI to deallocate the previously allocated media resource.
Request Data Insert	The INGST CSCI sends requests to the SDSRV CSCI to insert a particular file or files into the SDSRV inventory and archive. Inserted data is accompanied by metadata. The metadata is catalogued in the SDSRV inventory as a granule of a particular ESDT short name and version.
Request MCF	The INGST CSCI requests the Metadata Configuration File (MCF) template, from the SDSRV CSCI, for a particular ESDT short name prior to a data insert request.
Validate Metadata	The SDSRV CSCI validates the metadata files that the INGST CSCI has populated.
Request Data Search	The INGST CSCI requests a search, by the SDSRV CSCI, for the granule corresponding to a particular ESDT short name and version, which has a particular local granule id.
Send Distribution Notification	The DDIST CSCI sends a distribution notification, via e-mail, to the INGST CSCI when data being distributed is to be ingested.
URs	The ADSRV CSCI returns Universal References (URs) for CSMS managed objects (hosts, servers, routers, other devices) to the INS.
Search Advertisements	The INGST CSCI receives requests to search for advertisements. The INGST CSCI uses the advertisement information to locate the relevant data servers to interact with.

Table 4.2.1.2-1. INGST CSCI Interface Events (3 of 3)

Event	Interface Event Description
Request Management Services	The MACI provides a basic management library of services to the CSCIs, implemented as client or server applications, using the DCCI CSCI Process Framework. The basic management library of services include: • **Lifecycle Commands** - The HPOV Network Node Manager forwards (via DCE RPCs), to the MSS Sub Agent running on each managed host, requests to start and stop ECS applications. A start request has mode and temperature parameters that the MSS Sub Agent uses in constructing its command line startup request. Stop requests precipitate a PF shutdown RPC call to the target ECS application from the MSS Sub Agent. Managed applications use the application interface PFGETMODE to obtain their operational mode (e.g., Ops, test, or training).
Request Communications Support	The DCCI CSCI provides a library of services available to each SDPS and CSMS CSCI. The services required to perform the specific subsystem assignments are requested by the subsystem from the CSS. These services include: Distributed Computing Environment (DCE) support, file transfer services, Network & Distributed File Services, Bulk Data transfer services, file copying services, name/address services, password services, Server Request Framework (SRF), Universal Reference (UR), Error/Event logging, message passing, Fault Handling services, User Authentication services, Mode information, and retrieving the requested configuration attribute-value pairs from the Configuration Registry for ECS applications that request them.
Exchange Data Status Messages	Data status messages are sent to and received from the DCCI CSCI via Remote Procedure Calls (RPCs). A Data Availability Notice (DAN) is sent from the Landsat 7 Processing System (LPS) to the DCCI CSCI and then from the DCCI CSCI to the INGST CSCI. Afterwards, additional data status messages are exchanged between the INGST CSCI, the DCCI CSCI and the External Data Providers. For Landsat 7 data exchanges, A Data Availability Acknowledgment (DAA) and a Data Delivery Notice (DDN) is sent from the INGST CSCI to the DCCI CSCI and from the DCCI CSCI to the LPS. A Data Delivery Acknowledgement (DDA) is returned from the LPS through the DCCI CSCI to the INGST CSCI.
Return Status (PAN or PDRD)	The INGST CSCI returns the status of a request received from an External Data Provider by transmitting a Product Acceptance Notification (PAN) or a Product Delivery Record Discrepancy (PDRD) to the External Data Provider directly.
Store Raw Data	The raw data (L0) provided from the External Data Provider to the SDPS. Some External Data Providers put this data on an external local disk for SDPS to pull while others push the data onto a local INGST CSCI internal disk.

4.2.1.3 INGST Architecture

The Automated Network Ingest Interface (EcInAuto) sets up ingest sessions with External Data Providers, like Landsat 7 LPS, via the CSMS Gateways. External Data Providers submit Data Availability Notices (DANs) to request a data ingest session. The Polling Ingest Interface (EcInPolling) polls accessible file system locations to detect data to be ingested. This process submits an equivalent DAN or the information for INGST to create a DAN. The Media Ingest Interface (EcInGUI) enables authorized science users or institutions to submit a DAN and the

data to be ingested via physical media. The Cross-Mode Ingest Interface (EcInEmailGWServer) receives distribution notifications, via e-mail, and stores them as files in a location, which is polled. This process detects the notification files and creates Delivery Record files, which are put in a polling directory and detected by the Polling Ingest Interface.

The Automated Network Interface, the Polling Ingest Interface, and the Media Ingest all submit ingest requests (containing DANs) to the Ingest Request Manager (EcInReqMgr) and the EcInReqMgr submits data granule requests to the Ingest Granule Server (EcInGran). The EcInGran manages subsequent request processing. The EcInGran invokes a Data Transfer task to transfer data from external locations. The EcInGran also invokes a data preprocessing task to preprocess ingested data (e.g., process metadata and validate metadata parameters) and invokes the Data Server Insertion Task to insert data into the Data Server.

Figure 4.2.1.3-1 is the INGST CSCI architecture diagram. The diagram shows the events sent to the INGST CSCI processes and the events the INGST CSCI processes send to other processes.

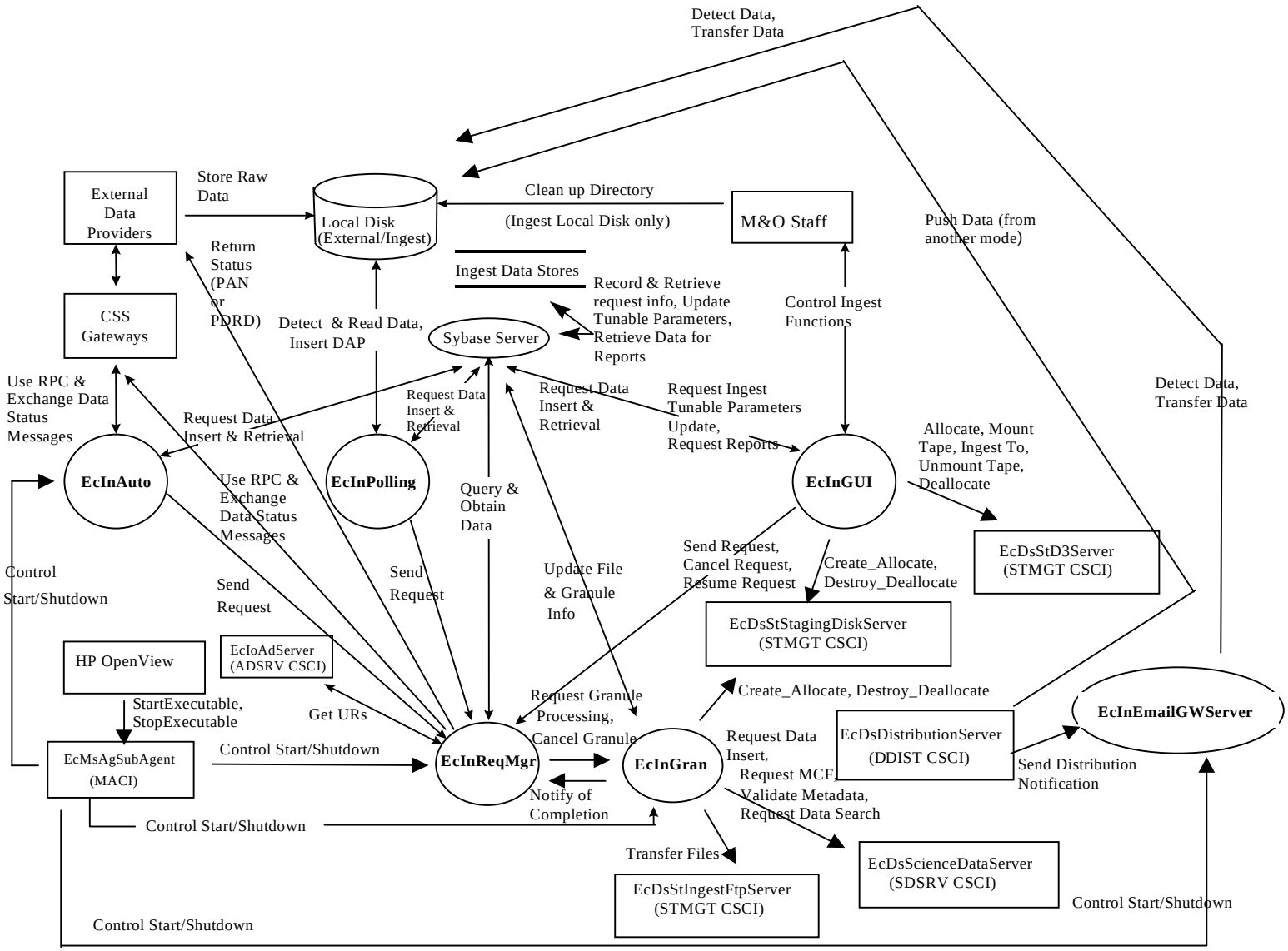


Figure 4.2.1.3-1. INGST CSCI Architecture Diagram

4.2.1.4 INGST Process Descriptions

Table 4.2.1.4-1 provides the descriptions of the processes shown in the INGST CSCI architecture diagram.

Table 4.2.1.4-1. INGST CSCI Processes (1 of 2)

Process	Type	Source	Functionality
EcInAuto	Server	Developed	Provides fundamental capabilities for data ingest into the SDPS, upon receipt of a DAN. This process can be tailored for a specific interface. RPCs are used to request ingest services to schedule data transfer from the source. EcInAuto also • manages single requests at a time • invokes an RPC to the EcInReqMgr to begin request processing • checks DAN information • sends and receives data status messages
EcInPolling	Client	Developed	• Creates the appropriate polling request • detects new files of interest at tunable periods of time in either external or local disk locations (by checking an agreed upon network location for available data) • creates a unique identifier for the request • submits requests • reports the status of the ongoing requests
EcInGUI	GUI	Developed	Provides Maintenance and Operations (M&O) personnel the capability, via GUI Interface, • to perform physical media ingest (to ingest data from hard media) • to monitor the ingest history log, to monitor the status of ongoing ingest requests, to cancel ingest requests and granules, and to resume suspended ingest requests and granules • to modify ingest configuration parameters
EcInReqMgr	Server	Developed	• Manages the ingest request traffic and the processing of the ingest requests, and • provides the capability to process multiple ingest requests concurrently by placing the request in a queue • In the event of a failure, the EcInReqMgr process restores on-going requests from the Ingest database
EcInEmailGWServer	Server	Developed	• Receives e-mail distribution notification messages • Stores e-mail messages into files • Detects new files of interest at a regular time interval, which can be configured, on a local disk • Creates a polling request and puts it on a local disk location

Table 4.2.1.4-1. INGST CSCI Processes (2 of 2)

Process	Type	Source	Functionality
EcInGran	Server	Developed	Provides services to perform the required data preprocessing and the subsequent data insertion into the appropriate Data Server. The preprocessing of data consists of: • converting the data (if needed) • extracting the metadata into the standard SDPS metadata format (if needed) • performing required metadata existence and parameter range checks • updating the metadata with ingest specific metadata (e.g., start and stop date/time for ingest) EcInGran coordinates the ingest granule processing including: • performing data preprocessing • sending an insertion request to the appropriate Data Server • updating the granule state • transferring data files into Ingest • building file lists • grouping files with a valid ESDT
Sybase	Server	COTS	Stores and provides access to the INS internal data. In particular, the database stores the Ingest operations databases -- Ingest History Logs and the Ingest request checkpoint state, and template information. See Section 4.2.1.6 INGST Data Stores.

4.2.1.5 INGST Process Interface Descriptions

Table 4.2.1.5-1 provides descriptions of the interface events shown in the INGST CSCI architecture diagram.

Table 4.2.1.5-1. INGST CSCI Process Interface Events (1 of 9)

Event	Event Frequency	Interface	Initiated By	Event Description
Clean up Directory (Ingest local disk only)	One per Unix command to delete or remove	Directories on Ingest Local Disk	M&O Staff Unix command	The M&O Staff send clean up instructions to the Ingest Local Disk for data clean up. The Unix commands for delete and remove are executed from the Unix command line to clean up the Ingest Local Disk.
Detect Data	One per poll from EcInEmailGWServer	Directory on local disk	*Process:* EcInEmailGWServer *Class:* InEmailGWServer	The EcInEmailGWServer polls for notification files in an agreed upon location (on the Ingest Local Disk).

Table 4.2.1.5-1. INGST CSCI Process Interface Events (2 of 9)

Event	Event Frequency	Interface	Initiated By	Event Description
Transfer Data	Upon detection	Ingest Local Disk	*Process:* EcInEmailGWServer *Class:* InEmailGWServer	The EcInEmailGWServer sends distribution notification files and Delivery Record files to an agreed upon location (on the Ingest local disk).
Push Data (from another mode)	One per distribution	Ingest Local Disk	*Process:* EcDsDistributionServer *Class:* DsDdGranules	The EcDsDistributionServer pushes data, via the FTP Service, to the Ingest Local Disk when it is distributing data to be ingested.
Control Ingest Functions	One per Ingest Operation	*Process:* EcInGUI *Library:* InGuiUt *Classes:* InRequestControllerRPUtil, InMediaIngestRPUtil, InHistoryLogRPUtil, InOperatorToolsRPUtil	M&O staff	The M&O staff control the Ingest function by monitoring requests, cancelling ingest requests and granules, resuming suspended ingest requests and granules, changing database parameters, viewing history, and performing manual media ingest via a GUI.
Record & Retrieve Request Info	One per request	Ingest Data Stores (database)	Sybase Server (COTS)	Requests from the EcInGUI, EcInPolling, and ECInAuto processes are recorded into the Ingest database for reference and are a source for restarts and re-initializations of outstanding requests.
Update Tunable Parameters	One per update of stored parameters	Ingest Data Stores (database)	*Process:* EcInGUI *Library:* InGuiUt *Class:* InOperatorToolsRPUtil	The EcInGUI is the interface to the Ingest database to update the stored parameters affecting the functions of the EcInAuto, EcInPolling, EcInReqMgr, and EcInGran processes.
Retrieve Data for Reports	One per data request	Sybase Server (COTS)	*Process:* EcInGUI *Library:* InGuiUt Class: InHistoryLogRPUtil	The EcInGUI obtains data from the Ingest database to generate reports.

Table 4.2.1.5-1. INGST CSCI Process Interface Events (3 of 9)

Event	Event Frequency	Interface	Initiated By	Event Description
Request Data Insert & Retrieval	One per request	Sybase Server (COTS)	Operations Staff *Processes:* EcInGUI, EcInPolling, EcInAuto *Library:* InDBaccUt	Requests from the EcInGUI, EcInPolling, and EcInAuto processes are recorded into the Ingest database for reference and are a source for restarts and re-initializations of outstanding requests.
Request Ingest Tunable Parameters Update	One per update of stored parameters	Sybase Server (COTS)	*Process:* EcInGUI *Library:* InGuiUt *Class:* InOperatorToolsRPUtil	The EcInGUI is the interface to the Ingest database to update the stored parameters affecting the functions of the EcInAuto, EcInPolling, EcInReqMgr, and EcInGran processes.
Request Reports	One per data request	Sybase Server (COTS)	*Process:* EcInGUI *Library:* InGuiUt Class: InHistoryLogRPUtil	The EcInGUI obtains data from the Ingest database to generate reports.
Allocate	One allocation per request	*Process:* EcDsStD3Server *Library:* DsStTape *Class:* DsStTape	*Process:* EcInGUI *Library:* InResource *Class:* InResourceIF	The EcInGUI sends requests to the EcDsStD3Server to allocate peripheral devices for data ingesting.
Mount Tape	One per physical tape	*Process:* EcDsStD3Server *Library:* DsStTape *Class:* DsStTape	*Process:* EcInGUI *Library:* InResource *Class:* InResourceIF	The EcInGUI process sends requests to the EcDsStD3Server to load tapes to hardware peripherals for reading the tapes.
Ingest To	One data copy from peripheral device(s) per request	*Process:* EcDsStD3Server *Library:* DsStTape *Class:* DsStTape	*Process:* EcInGUI *Library:* InResource *Class:* InResourceIF	The EcInGUI sends requests to the EcDsStD3Server to copy files from peripheral resources to staging disk areas.

Table 4.2.1.5-1. INGST CSCI Process Interface Events (4 of 9)

Event	Event Frequency	Interface	Initiated By	Event Description
Unmount Tape	One per physical tape	*Process:* EcDsStD3Server *Library:* DsStTape *Class:* DsStTape	*Process:* EcInGUI *Library:* InResource *Class:* InResourceIF	The EcInGUI process sends requests to the EcDsStD3Server to unload and detach tapes from hardware peripherals after reading or writing to the tapes.
Deallocate	One deallocation per request	*Process:* EcDsStD3Server *Class:* DsStResourceProvider	EcInGUI *Library:* InResource *Class:* InResourceIF	The EcInGUI sends requests to the EcDsStD3Server to deallocate the previously allocated media resource.
Create_Allocate	One allocation per request	*Process:* EcDsStStagingDiskServer *Library:* DsStSt *Class:* DsStStagingDisk	*Process:* EcInGUI *Library:* InResource *Class:* InResourceIF *Process:* EcInGran *Library:* InGranResource *Class:* InGranResourceIF	The EcInGUI and the EcInGran processes send requests to the EcDsStStagingDiskServer to allocate areas on the local staging disk to store ingested data.
Destroy_Deallocate	One deallocation per request	*Process:* EcDsStStagingDiskServer *Library:* DsStSt *Class:* DsStStagingDisk	*Process:* EcInGran *Library:* InGranResource *Class:* InGranResourceIF *Process:* EcInGUI *Library:* InResource *Class:* InResourceIF	The EcInGran and EcInGUI processes send requests to the EcDsStStagingDiskServer to deallocate a staging disk area (to remove an existing staging disk area from usage).

Table 4.2.1.5-1. INGST CSCI Process Interface Events (5 of 9)

Event	Event Frequency	Interface	Initiated By	Event Description
Send Request	One per request to Request Manager	*Process:* EcInReqMgr *Class:* InRequestManager	*Processes:* EcInAuto, EcInPolling, EcInGUI *Library:* InGuiUt *Classes:* InAutoNtwkIngestMgr, InPollingIngestSession, InMediaIngestRPUtil	Processing requests from one of the three ingest processes (EcInAuto, EcInPolling, and EcInGUI) are sent to the EcInReqMgr.
Cancel Request	One per Ingest Request/Granule	*Process:* EcInReqMgr *Class:* InRequestManager	*Process:* EcInGUI *Library:* InGuiUt *Class:* InRequestControllerRPUtil	The EcInGUI is the interface to the EcInReqMgr process to cancel a request or one of its granules.
Resume Request	One per suspended Ingest Request/Granule	*Process:* EcInReqMgr *Class:* InRequestManager	*Process:* EcInGUI *Library:* InGuiUt *Class:* InRequestControllerRPUtil	The EcInGUI is the interface to the EcInReqMgr process to resume a suspended request or one of its granules.
Update File & Granule Info	One per file or granule update	Sybase Server (COTS)	*Process:* EcInGran *Library:* InDBaccUt *Classes:* InRequestProcessData, InRequestFileInfo	The EcInGran process sends requests to the Sybase Server to update file and granule information obtained from the Ingest database.
Request Granule Processing	One per granule processing request	*Process:* EcInGran *Class:* InGranuleAsync_S	*Process:* EcInReqMgr *Class:* InRequest	The EcInReqMgr sends processing requests to the EcInGran process for granule processing.

Table 4.2.1.5-1. INGST CSCI Process Interface Events (6 of 9)

Event	Event Frequency	Interface	Initiated By	Event Description
Cancel Granule	One per Granule	*Process:* EcInGran *Class:* InGranuleAsync_C	*Process:* EcInReqMgr *Class:* InRequest	The EcInReqMgr sends a cancel message to the EcInGran process.
Notify of Completion	One per granule completion	*Process:* EcInReqMgr *Library:* InGranuleC *Class:* InGranuleAsync_C	*Process:* EcInGran *Class:* InGranuleAsync_S	The EcInGran process sends a completion notification to the EcInReqMgr when a granule for a request is completed.
Transfer Files	One per Science Data file activity	*Process:* EcDsStIngestFtpServer *Library:* DsStRes *Class:* DsStResourceProvider	*Process:* EcInGran *Library:* InGranResource *Class:* InGranResourceIF	The EcInGran sends requests to the EcDsStIngestFtpServer to transfer Science Data files to staging disks.
Request Data Insert	One per insert into the archive	*Process:* EcDsScienceDataServer *Library:* DsCl *Class:* DsClRequest	*Process:* EcInGran *Library:* InPreprocess *Class:* InDataServerInsertionTask	The EcInGran process requests a file or files to be inserted into the SDSRV inventory and archives, and the associated metadata is catalogued in the SDSRV inventory (archives), as a granule of a particular ESDT short name and version.
Request MCF	One per access of MCF	*Process:* EcDsScienceDataServer *Library:* DsCl *Class:* DsClDescriptor	*Process:* EcInGran *Library:* InPreprocess *Class:* InDataPreprocessTask	The EcInGran process requests the MCF template from the EcDsScienceDataServer.
Validate Metadata	One per metadata validation	*Process:* EcDsScienceDataServer *Library:* DsCl *Class:* DsClDescriptor	*Process:* EcInGran *Library:* InPreprocess *Class:* InDataPreprocessTask	The EcInGran process requests the EcDsScienceDataServer to perform a validation of the metadata files.

Table 4.2.1.5-1. INGST CSCI Process Interface Events (7 of 9)

Event	Event Frequency	Interface	Initiated By	Event Description
Request Data Search	One per granule pointer in linkage file	*Process:* EcDsScienceDataServer *Library:* DsCl *Classes:* DsClESDTReferenceCollector, DsClQuery	*Process:* EcInGran *Library:* InPreprocess *Class:* InDataPreprocessTask	The EcInGran process sends a search request to the EcDsScienceDataServer for a granule corresponding to a particular ESDT short name and version, which has a particular local granule id.
Send Distribution Notification	One per distribution request	*Process:* EcInEmailGWServer *Classes:* InEmailGWServer, InEmailParser	*Process:* EcDsDistributionServer *Library:* DsDdSSh *Classes:* DsDdMedia, DsDdMediadist	The EcInEmailGWServer receives distribution notifications via e-mail from the EcDsDistributionServer.
Control Start/Shutdown (Request Management Services)	One per start or stop system instruction	*Processes:* EcInAuto, EcInReqMgr, EcInGran, EcInEmailGWServer *Classes:* InAutoNtwkIngestMgr, InRequestServer, InGranuleServer, InManagedServer	*Process:* EcMsAgSubAgent Library: EcAgInstrm Class: EcAgManager	The HPOV Network Node Manager forwards (via DCE RPCs), to the MSS Sub Agent running on each managed host, requests to start and stop ECS applications. A start request has mode and temperature parameters that the MSS Sub Agent uses in constructing its command line startup request. Stop requests precipitate a PF shutdown RPC call to the target ECS application from the MSS Sub Agent. Managed applications use the application interface PFGETMODE to obtain their operational mode (e.g., Ops, test, or training).
StartExecutable	One per server	*Process:* EcMsAgSubAgent *Library:* EcAgInstrm *Class:* EcAgManager	HP OpenView (COTS)	The HP OpenView COTS product starts up the EcMsAgSubAgent with a mode and application id. The EcMsAgSubAgent in turn starts the servers by system command.

Table 4.2.1.5-1. INGST CSCI Process Interface Events (8 of 9)

Event	Event Frequency	Interface	Initiated By	Event Description
StopExecutable	One per server	*Process:* EcMsAgSubAgent *Library:* EcAgInstrm *Class:* EcAgManager	HP OpenView (COTS)	The HP OpenView COTS product sends a command to the EcMsAgSubAgent to shutdown the servers. The EcMsAgSubAgent sends a request to the server to shutdown.
Get URs (Search Advertisements)	One per advertisement	*Process:* EcIoAdServer *Library:* IoAdSearch *Class:* IoAdApprovedAdvSearchCommand	*Process:* EcInReqMgr *Library:* InUpdateUR *Class:* InUpdateUR	The EcInReqMgr receives Universal References from the EcIoAdServer as a result of an advertisement request. Ingest uses the Advertisement Information to locate the relevant Data Server to contact for data requests.
Query & Obtain Data	One per query of Ingest Database	Sybase Server (COTS)	*Process:* EcInReqMgr *Library:* InDBaccUt	The EcInReqMgr sends requests to the Sybase Server for ingest processing information from the Ingest database.
Return Status (PAN or PDRD)	One per request	External Data Provider	*Process:* EcInReqMgr *Class:* InRequest	The EcInReqMgr returns status of a request to the External Data Providers via a Product Acceptance Notification (PAN) or a Product Delivery Record Discrepancy (PDRD).
Detect and Read Data	One per poll from EclnPolling	Various ID directories on various Ingest Local Disks	*Process:* EcInPolling *Class:* InPollingIngestSession	The EcInPolling polls for data files or Delivery Record files in an agreed location (on the Ingest Local Disk).
Insert DAP	One per request	Ingest Local disk	*Process:* EcInPolling *Class:* InPollingIngestSession	Delivered Algorithm Packages (DAPs) are stored on the Local Disk for insertion into the SDPS with the Ingest Polling process.

Table 4.2.1.5-1. INGST CSCI Process Interface Events (9 of 9)

Event	Event Frequency	Interface	Initiated By	Event Description
Use RPC & Exchange Data Status Messages	One per RPC from CSS	*Process:* EcInAuto *Class:* InAutoIngestIF_1_0_Mgr	*Process:* EcCsLandsat7Gateway *Library:* EcCsIDLLIB *Classes:* CsGwLEG, CsGwELG	The EcCsLandsat7Gateway initiates a session with Auto Ingest by invoking a Remote Procedure Call (RPC). The EcInReqMgr receives DAN messages from the EcCsLandsat7Gateway. The EcInAuto sends DAA messages to the EcCsLandsat7Gateway. When requests are completed, the EcInReqMgr sends DDN messages to the EcCsLandsat7Gateway. DDA messages are sent back to the EcInReqMgr to acknowledge the DDN messages have been delivered.
Store Raw Data	One per data delivery	Ingest Local disk	External Data Providers	The External Data Providers send raw data to the ECS Ingest local disk via the FTP service.

4.2.1.6 INGST Data Stores

The INGST CSCI uses the COTS product Sybase to store related INGST information on a physical medium. The stored information is divided into four functional areas:

1. Checkpoint and reactivate ingest processing
2. Summary or historical information for collecting and reporting metrics
3. Ingest configuration (e.g., thresholds) and template information
4. Validation tables for the INS GUI and software

Table 4.2.1.6-1 provides descriptions of the individual data stores used by the INGST CSCI. The architecture diagram shows a single data store entitled “Ingest Data Stores” for simplification.

Table 4.2.1.6-1. INGST CSCI Data Stores (1 of 2)

Data Store	Type	Description
InRequestProcessHeader	Sybase	Provides checkpoint storage of ingest request processing information associated with a given ingest request. Upon request process completion, copies of these records are stored in InRequestSummaryHeader data store and the request processing ingest information is deleted.
InRequestProcessData	Sybase	Provides checkpoint storage of data granule processing information associated with a given ingest request. Upon request process completion, copies of these records are stored in the InRequestSummaryData data store and the granule processing data information is deleted.
InRequestFileInfo	Sybase	Provides checkpoint storage of file information associated with a data granule within a given ingest request.
InRequestSummaryHeader	Sybase	Provides long-term storage of summary request-level statistics associated with a given ingest request. Summary records are copied upon ingest request processing completion and the processing records are deleted from the system.
InRequestSummaryData	Sybase	Provides long-term storage of summary data type statistics associated with a given data granule in a given ingest request. Summary records are copied upon ingest request processing completion and the processing records are deleted from the system.
InSourceMCF	Sybase	Initially, pre-populated with the valid metadata types for each file type. It “points” to the metadata and indicates “how” to handle the data in a standard object description language (ODL) format.
InSystemParameters	Sybase	Stores current system thresholds that limit ingest request traffic and data volume.
InExternalDataProviderInfo	Sybase	Stores thresholds on ingest request traffic and data volume for External Data Providers.
InValGranuleServerUR	Sybase	Provides the name of each configured Granule Server.
InGranuleServerInfo	Sybase	Stores thresholds on granule traffic and data volume for each Granule Server.
InDataTypeTemplate	Sybase	Initially, pre-populated with current, valid Earth Science Data Types (ESDTs) that the INS is capable of ingesting.
InESDTMap	Sybase	Stores the information for special mappings of the ESDT and the Client data type.
InFileTypeTemplate	Sybase	Initially, pre-populated with all valid file types that make up an ESDT.
InMediaType	Sybase	Stores the valid values of the media type available that can be ingested.
InNextAvailableID	Sybase	Stores the next available RequestID to be given.
InValDataGranuleState	Sybase	Stores all the valid values for a data granule state.
InValIngestType	Sybase	Stores all the valid values for an ingest type.
InValNotifyType	Sybase	Stores all the valid values for a notify type.

Table 4.2.1.6-1. INGST CSCI Data Stores (2 of 2)

Data Store	Type	Description
InValParameterClass	Sybase	Initially, pre-populated with all the valid values for a parameter class.
InValRequestState	Sybase	Stores all the valid values for a request state.
InEDPAddressMap	Sybase	Initially, pre-populated with the IP address for an External Data Provider.
InCurrentDataTypeMap	Sybase	Initially pre-populated with current valid Earth Science Data Types (ESDTs) Ingest is capable of ingesting and the current Ingest version id for each one.

4.2.2 Ingest Subsystem Hardware

4.2.2.1 Ingest Client Hardware CI Description

The Ingest Client HWCI (ICLHW) Server accommodates the required ingest volumes, including I/O, and processing capabilities to support internal data transfers associated with metadata validation and extraction, and to transfer data to the Data Server or Data Processing Subsystem. The disks are sized to accommodate the functionality and provide contingency space for the transfer of more than one day's worth of data within a 24-hour period.

The Ingest Server is a 64-bit SGI machine. Dual processors are installed on the Ingest Server (See 920-TDx-001 series of base-line documents).

The Ingest Server is configured with at least 256 MB of memory with one-way interleaving to support the processors.

The SGI architecture provides configuration for I/O subsystems that attach to the backplane. These I/O subsystem items are referred to as IO cards. Each IO card provides serial and parallel connections, two fast-wide differential SCSI-2 channels, and space for two HIO controller cards. An HIO controller card offers a HIPPI card, a FDDI card, and a card supporting three SCSI-2 channels.

The number of IO cards specified for each Ingest Server is determined by allocating HIO slots to the FDDI and HIPPI interfaces, and counting the number of SCSI-2 interfaces required. The number of internal and external SCSI-2 devices supported by the system determines the number of SCSI-2 interfaces required. The first SCSI-2 channel is delegated to internal devices like CD-ROMs, floppy disk drives, and tape drives. Internal disks ranging in aggregate size from four GB to eight GB are allocated to the second SCSI-2 channel. External disk arrays are allocated to subsequent SCSI-2 channels and the number of channels is based on the required throughput of the external file systems (See 920-TDx-001 and 922-TDx-009 series of base-line documents).

The internal disks on an Ingest Server are used to provide swap space for the operating system and to provide file space for the operating system and applications (See 920-TDx-001 and 922-TDx-009 series of base-line documents).

The external disk arrays are SCSI-2 based RAID units from SGI. The implementation of these ingest buffer arrays are RAID Level 3 and RAID Level 1 for the database and logs (See 922-TDx-009 series of base-line documents). The SGI RAID units use one redundant disk for

each four data disks in the RAID Level 3 configuration, and these are built into groups of five disks, with up to four groups (20 disks) per RAID enclosure.

Each enclosure contains two controllers that can access one or more groups of disks in the enclosure. Both controllers can access a group of disks within an enclosure, however, only one controller can access the group at a time. This dual attachment enables the striping of disk volumes across controllers for high throughput and for implementing fail-over of controllers.

A FDDI subnetwork is implemented at each site. Each server of ICLHW is dual-attached to the SDPS FDDI subnetwork (See 920-TDx-001, 921-TDx-002, 921-TDx-003, and 921-TDx-004 series of base-line documents).

A central HIPPI switch HIPPI network is used to implement the ICLHW and Data Repositories with switched 800 Mbps interface ports connected directly to the ICLHW and Data Repository hosts (See 920-TDx-001, 920-TDx-002, 921-TDx-003, AND 921-TDx-004 series of base-line documents).

4.2.2.2 Ingest Workstation Description

The Ingest Workstation is provided to execute the Ingest GUI. This workstation enables the operator to remotely monitor the Ingest Servers and the Ingest processes, from media ingest to remote ingest.

The Ingest Workstation is a 64-bit SGI machine. For information on the processor used on the Ingest Workstation see the 920-TDx-001 series of base-line documents.

The Ingest Workstation is equipped with at least 128 MB of memory (See 920-TDx-001 series of base-line documents).

The Ingest Workstation is equipped with four EISA slots, with a transfer rate of at least 33 MB/second. A FDDI interface card and a graphics subsystem each use an EISA slot. Additionally, the Ingest Workstation is equipped with two fast SCSI-2 connections.

The Ingest Workstation internal disks, providing an aggregate space of eight GB, provide swap space and file system space for the operating system and applications (See 920-TDx-001 series of base-line documents). There are no external disk arrays.

A FDDI subnetwork is implemented at each site. The Ingest Workstation uses a single-attached FDDI interface to connect to the SDPS FDDI subnetwork.

4.3 Client Subsystem Overview

The Client Subsystem (CLS) is a set of CSCIs and processes to access the services and data available in ECS and the other systems interoperable with the ECS. The CLS also includes the services needed to implement an ECS interface for an application such as automated or custom data access. An accessed service can be remote (i.e., via wide-area network to other sites) or local (i.e., to a database manager at the user's site).

The CLS CSCIs and processes fall into the following general category:

- Application programs accessible through user interfaces to implement the range of functionality available in the CLS.

In addition, the workstations operating within an ECS CLS contains infrastructure support software as part of the CSS and platform support software.

Client Subsystem Context

Figure 4.3-1 is the Client Subsystem context diagram. The diagram shows the events sent to the CLS and the events the CLS sends to other SDPS or CSMS subsystems.

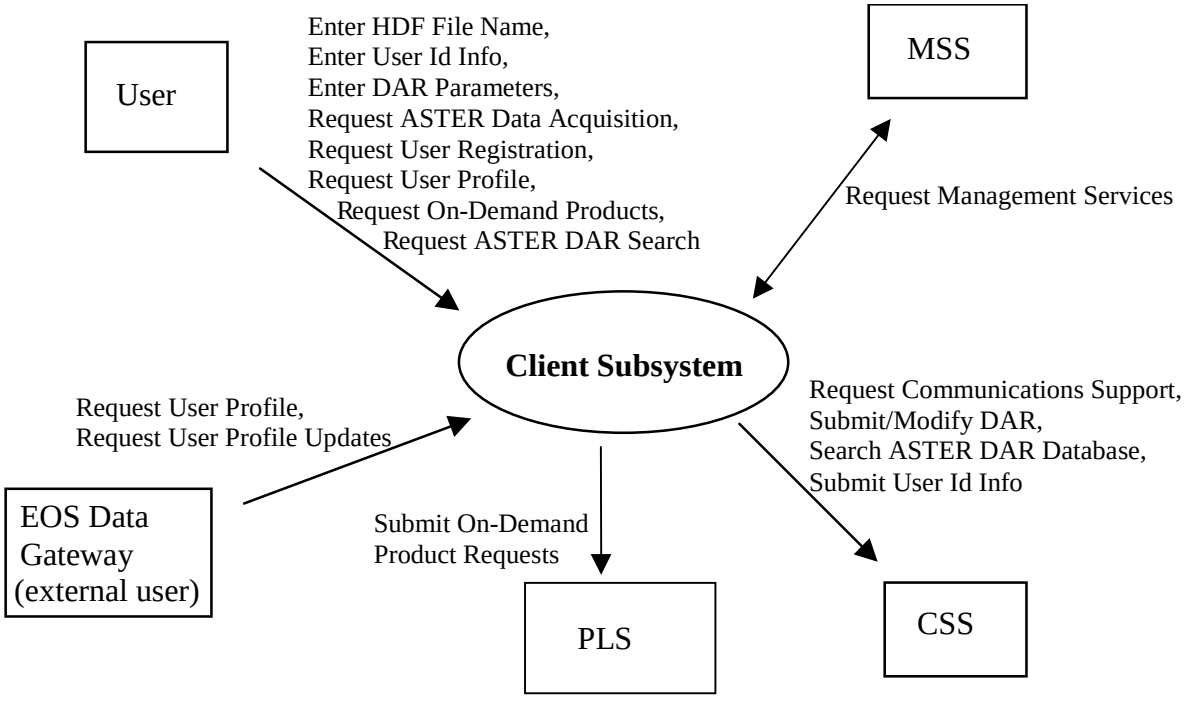


Figure 4.3-1. Client Subsystem Context Diagram

The search and retrieval of data are performed by the EOS Data Gateway, the Version 0 Client (Web version), ported to the ECS environment. The EOS Data Gateway is treated as an external

entity since the design and design documentation is controlled under another contract. Documentation on the V0 Web Client (EOS Data Gateway) design can be accessed through the Universal Resource Locator http://harp.gsfc.nasa.gov/~imswww/pub/manuals/imsdesign.html. Table 4.3-1 provides descriptions of the interface events shown in the Client Subsystem context diagram.

Table 4.3-1. Client Subsystem Interface Events (1 of 3)

Event	Interface Event Description
Enter HDF File Name	This is a file name for a Hierarchical Data Format (HDF) file. The user opens the file to see the data in the file.
Enter User ID Info	A user name and password for authenticating the user. The user name and password is turned into a User Authentication Request to the CSS (via a request for communications support).
Enter DAR Parameters	The user enters parameters (as specified in the Interface Control Document (ICD)) required for submittal or modification of Data Acquisition Requests (DARs) in accordance with the ASTER GDS Interface Requirements Document (IRD). Upon completion of the selection or modification of DAR parameters, the user may submit a DAR. In addition, the user may specify DAR parameters for a search of the DAR database.
Request ASTER Data Aquisition	A user submits a request (to the CLS) to have ASTER data taken (a data acquisition request or DAR) using the parameters entered into the Java DAR Tool. DAR parameters are required for submittal of DARs as specified in the ASTER GDS IRD/ICD. As the result of a successfully submitted DAR, the user receives a DAR ID. This is a string of characters used to track a DAR. The user receives notification every time data resulting from this DAR is received by the ECS.
Request User Registration	Users submit a request to be a registered user of the ECS. This enables special privileges not awarded to guests, such as the capability to order data on media at a cost. The request is submitted to the MSS for processing. In response, the CLS receives a user registration response indicating request receipt. The user receives the actual account information through the MSS.
Request User Profile	A User Profile Request is a search for a User Profile. There are two methods used, one is by an encrypted user name and password and the other is by user identification (ID). In response, the CLS receives the user profile, which contains information about a user that must be maintained. This includes mailing, billing, and shipping addresses, phone number, electronic mail address, etc.
Request On-Demand Products	The User selects the On-demand Product (ASTER L1B, ASTER DEM, ASTER higher Level) and a processing parameter(s) to provide to the PLS.
Request ASTER DAR Search	A user submits a request (to the CLS) to search the ASTER DAR database by DAR parameters or a specific DAR ID to determine if a scene of interest (to the user) has been acquired by the ASTER instrument.

Table 4.3-1. Client Subsystem Interface Events (2 of 3)

Event	Interface Event Description
Request Management Services	The MSS provides a basic management library of services to the subsystems, implemented as client or server applications, using the CSS Process Framework. The basic management library of services include: • **Lifecycle Commands** - The HPOV Network Node Manager forwards (via DCE RPCs), to the MSS Sub Agent running on each managed host, requests to start and stop ECS applications. A start request has mode and temperature parameters that the MSS Sub Agent uses in constructing its command line startup request. Stop requests precipitate a PF shutdown RPC call to the target ECS application from the MSS Sub Agent. Managed applications use the application interface PFGETMODE to obtain their operational mode (e.g., Ops, test, or training). • **User Profile Request** - The MSS provides requesting subsystems with User Profile parameters such as e-mail address and shipping address upon request by authorized users to support their processing activities. • **Order/Request Tracking** - The CLS uses CGI scripts to interface with the MSS Order/Request Tracking service to create a user product order and submit the order to the PLS. • **User Profile Updates** – The MSS receives user profile parameter updates from a user and makes the updates in the user profile database. • **User Registration Request** – The MSS receives user information for becoming a registered user of the ECS from the CLS. The MSS sends a response to the user when the request is received. The MSS sends the user the actual account information when the registration process is completed.
Request Communications Support	The CSS provides a library of services available to each SDPS or CSMS subsystem. The services required to perform the specific subsystem assignments are requested by the subsystem from the CSS. These services include: Distributed Computing Environment (DCE) support, file transfer services, Network & Distributed File Services, Bulk Data transfer services, file copying services, name/address services, password services, Server Request Framework (SRF), Universal Reference (UR), Error/Event logging, message passing, Fault Handling services, User Authentication services, Mode information, and retrieving the requested configuration attribute-value pairs from the Configuration Registry for ECS applications that request them.
Submit/Modify DAR	The user submits a DAR after selecting or modifying DAR parameters to the CSS. As the result of a DAR submission, the user receives a DAR ID. This is a string of characters used to track a DAR. The user receives notification every time data resulting from this DAR is received by the system.
Search ASTER DAR Database	The CLS submits a request to the CSS to search the ASTER GDS DAR database for DARs and their respective status (i.e., acquired scenes). Search qualifications may be in the form of DAR parameters or DAR Ids. To get a status of the search, users may view the Search Status via the Java DAR Tool.
Submit User Id Info	A request to authenticate the user given a user name and password. This uses the DCE services to authenticate the user. In response, a user authentication response is sent back as to whether the user name and password are valid.

Table 4.3-1. Client Subsystem Interface Events (3 of 3)

Event	Interface Event Description
Submit On-Demand Product Requests	The CLS submits the on-demand request to the PLS. As a result, the user receives an Order ID. The user receives a notification when the request is processed.
Request User Profile Updates	The user can update their User Profile information through the EOS Data Gateway. This includes their addresses (user, shipping, billing, and e-mail) and other important information. This updated profile information (profile2.odl) is forwarded through the CLS to the MSS. The EOS Data Gateway uses the profile2.odl file rather than a live interface with the CLS as its source of user information.

Client Subsystem Structure

The Client Subsystem is three CSCIs:

- The Workbench (WKBCH) CSCI includes the set of ECS applications and libraries that provide access to the ECS data and services. In Release 5A, there are three tools: the User Registration Tool (URT), the EOSView, and the Java DAR Tool (JDT). The URT is an HTML based tool. The EOSView is an X/Motif application resident on a science user's workstation. The Java DAR Tool is a java-based web application that can be accessed through a web browser.
- The ODFRM CSCI consists of HTML pages and CGI programs. The user creates an On-demand processing request and sends the request to the PLS. The PLS processes the request and sends a notification to the user.
- The Desktop (DESKT) CSCI provides the User Profile Gateway server to communicate with the MSS User Registration Server for obtaining user profile information to authenticate users or update user information.

The CLS contains no HWCIs. The DMS hardware (Interface Servers) provides the processing and storage for the WKBCH software. In addition, the User Profile Gateway Server is used to provide user profile information to the EOS Data Gateway for ECS users. The CLS is required to support the following hosts: SGI IRIX 5.3, HP UX 9.05, SUN Solaris, and IBM RS/6000 AIX 3.2.5. Currently, the ECS only supports Personal Computers running windows 95 and higher versions of windows and SUN Solaris running with Netscape versions of 3.01 and higher versions.

The Interface Servers are SUN Ultra 3000 Server class machines. Detailed specifications can be found in the site specific hardware design diagram, 920-TDx-001. Because of their common configuration, these servers can be used interchangeably. The Workbench software executed on these hosts enables user access to the ECS data and services. The Interface Servers also provide storage for user session data and the Java DAR Tool (JDT) map data. User session data is considered critical and thus stored in a Redundant Array of Inexpensive Disks (RAID) for high availability.

Detailed mappings can be found in the site-specific hardware/software mapping in baseline document number 920-TDx-002.

A SUN SPARC Storage Array Model 114, is dual ported between both hosts and provides storage for the user session data as described. A detailed configuration is specified per disk partition, and can be found in baseline document number 922-TDx-009.

Custom code and client applications are loaded on the internal disks of all hosts to prevent dependencies on specific hosts or peripherals. Real time or transaction oriented data (i.e., user session data) is stored in the RAID. The Interface Servers are both "hot" and share the resident RAID device. In the event of a host failure, the operational server assumes total ownership of the RAID and its processes. While in this state, the operational server is recognized to be running in degraded mode until recovery is completed.

Use of COTS in the Client Subsystem

- Netscape Navigator

  The Netscape Navigator Web browser accesses the CLS inside a DAAC. The users can use the Web browsers they already have at their facilities.

- Netscape Enterprise Server

  The Netscape Enterprise Server is used to serve the Web pages for the User Registration Tool, the Java DAR Tool and the ODFRM.

- XVT Software Inc.'s XVT

  The XVT is used as a widget set and development tool for the EOSView application of the WKBCH CSCI. There is no operational unit of XVT used at run-time.

- Interactive Data Language (IDL)

  IDL is used by EOSView to provide the visualization features for users.

- RogueWave's Tools.h++

  The Tools.h++ class libraries provide strings and collections to the User Registration Tool.

- DCE Client

  DCE Client provides CLS with communications between other subsystems. DCE can reside on one or both sides of the interface. An instance must be installed on the platform where CLS resides. Although the DCE Client is part of CSS, this COTS item must be installed for CLS to run in the SDPS operational and test environment. The Java DAR Tool does not require the use of DCE.

4.3.1 Workbench Computer Software Configuration Item Description

4.3.1.1 Workbench Functional Overview

The Workbench (WKBCH) CSCI is a set of application programs, which implement the core functionality of the CLS science user interface. The V0 Client, ported to the ECS environment performs the data search and retrieval. The EOS Data Gateway is treated as an external entity

since the design and design documentation is controlled under another contract. The WKBCH CSCI provides users the capability to register as users of the system, submit data acquisition requests for the ASTER instrument data, and to see data products in HDF format.

The User Registration Tool (URT) handles requests by users to become registered users of the ECS. URT requests specific mailing address, E-mail address, and phone number to pass to the MSS for processing. The user is contacted directly to receive the ECS login information. After the submission of the user registration request, the CLS is not involved in the rest of the transaction.

The Java DAR Tool handles user requests to acquire ASTER data from the satellite. The user specifies when and where the data is to be taken. The DAR is submitted to the ASTER GDS in Japan for review. The acceptance of the DAR by Japan is not immediate (though the acknowledgement of receipt is) and the Java DAR Tool can not determine the DAR status immediately. In addition to the submission and modification of acquisition requests, the Java DAR Tool allows users to search the ASTER DAR database (via MOJO and the DAR Comm Gateway) in order to examine the status of DARs (i.e., the number and quality of acquired scenes). DARs can be searched on a parameter basis or by their DAR IDs. The Java DAR Tool is a java-based web tool that runs on Sun workstations and PCs.

EOSView is an HDF-EOS viewer that enables users to visualize data they receive from the ECS. EOSView can take any HDF-EOS data file and perform basic visualization functionson it. EOSView is not meant to provide sophisticated data analysis functions like those found in COTS products such as IDL. EOSView is a GUI application used on UNIX platforms using X/Windows and Motif.

4.3.1.2 Workbench Context

Figure 4.3.1.2-1 is the WKBCH CSCI context diagram. The diagram shows the events sent by WKBCH to other SDPS and CSMS subsystems and events sent to WKBCH from the other SDPS and CSMS subsystems.

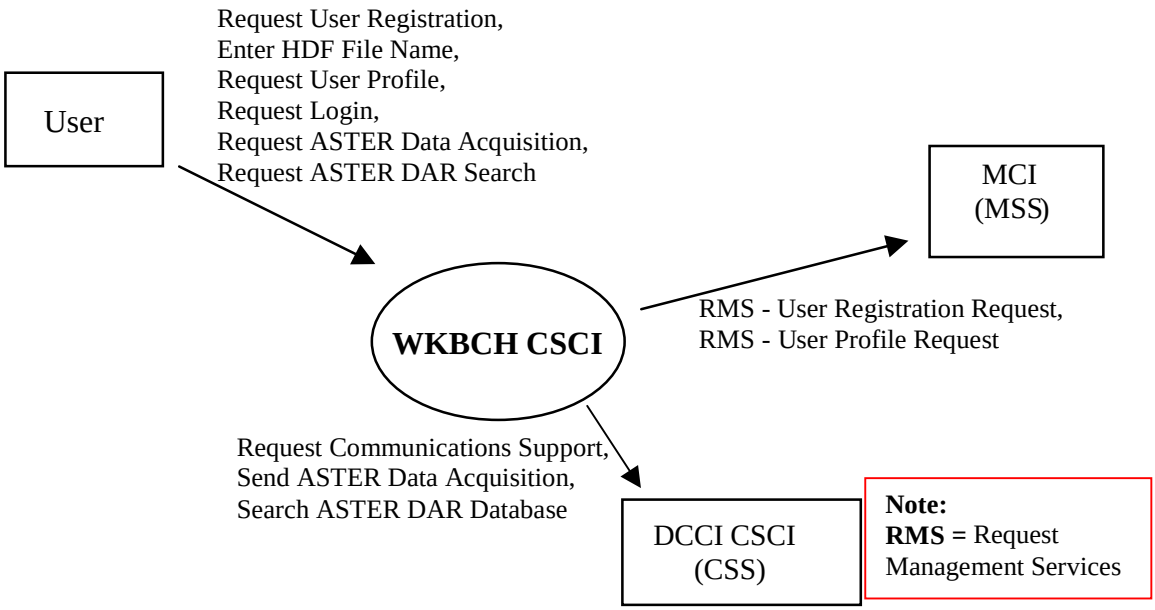


Figure 4.3.1.2-1. WKBCH CSCI Context Diagram

Table 4.3.1.2-1 provides descriptions of the interface events shown in the WKBCH CSCI Context Diagram.

Table 4.3.1.2-1. WKBCH CSCI Interface Events (1 of 2)

Event	Interface Event Description
Request User Registration	A user submits a request to be a registered user of the ECS. Registered users are given special privileges not awarded to guests, such as the capability to order data on a media at a cost. There is an immediate response to the user that the User Registration Request was received by the ECS. The user receives the actual account information through the MSS.
Enter HDF File Name	This is the name of an HDF file to be opened in EOSView. A file name passed to EOSView enables EOSView to present the file contents to the user. This file can be obtained through any means (i.e., from a search, browse, acquire, or from a friend). The EOSView enables the user to manipulate an HDF file into multiple types of displays. Images, metadata, and actual data values can be viewed. Multiple images can be animated.
Request User Profile	A User Profile Request is a search for a User Profile. There are two methods used, one is by an encrypted user name and password and the other is by user identification (ID). In response, the WKBCH CSCI receives the user profile, which contains information about a user that must be maintained. This includes mailing, billing, and shipping addresses, phone number, electronic mail address, etc.

Table 4.3.1.2-1. WKBCH CSCI Interface Events (2 of 2)

Event	Interface Event Description
Request Login	Enter the user name and password that identifies the user to the ECS.
Request ASTER Data Aquisition	A user submits a request (to the CLS) to have ASTER data taken (a data acquisition request or DAR) using the parameters entered into the Java DAR Tool. DAR parameters are required for submittal of DARs as specified in the ASTER GDS IRD/ICD. As the result of a successfully submitted DAR, the user receives a DAR ID. This is a string of characters used to track a DAR. The user receives notification every time data resulting from this DAR is received by the ECS.
Request ASTER DAR Search	A user submits a request (to the CLS) to search the ASTER DAR database by DAR parameters or a specific DAR ID to determine if a scene of interest (to the user) has been acquired by the ASTER instrument.
Request Management Services	The MCI provides a basic management library of services to the subsystems, implemented as client or server applications, using the DCCI CSCI Process Framework. The basic management library of services include: The HPOV Network Node Manager forwards (via DCE RPCs), to the MSS Sub Agent running on each managed host, requests to start and stop ECS applications. A start request has mode and temperature parameters that the MSS Sub Agent uses in constructing its command line startup request. Stop requests precipitate a PF shutdown RPC call to the target ECS application from the MSS Sub Agent. Managed applications use the application interface PFGETMODE to obtain their operational mode (e.g., Ops, test, or training). • **User Profile Request** - The MSS provides requesting subsystems with User Profile parameters such as e-mail address and shipping address upon request by authorized users to support their processing activities. • **User Registration Request** – The MSS receives user information for becoming a registered user of the ECS. The MSS sends a response to the user when the request is received. The MSS sends the user the actual account information when the registration process is completed.
Request Communications Support	The DCCI CSCI provides a library of services available to each SDPS and CSMS CSCI. The services required to perform the specific CSCI assignments are requested by the CSCI from the DCCI CSCI. These services include: DCE support, file transfer services, Network & Distributed File Services, Bulk Data transfer services, file copying services, name/address services, password services, Server Request Framework (SRF), Universal Reference (UR), Error/Event logging, message passing, Fault Handling services, User Authentication services, Mode information, and retrieving the requested configuration attribute-value pairs from the Configuration Registry for ECS applications that request them.
Send ASTER Data Aquisition	A user submits a request to have ASTER data taken (a data acquisition request or DAR) using the parameters entered into the Java DAR Tool. DAR parameters are required for submittal of DARs as specified in the ASTER GDS IRD/ICD. As the result of a successfully submitted DAR, the user receives a DAR ID. This is a string of characters used to track a DAR. The user receives notification every time data resulting from this DAR is received by the ECS.
Search ASTER DAR database	A user submits a request to search the ASTER GDS DAR database for DARs and their respective status (i.e., acquired scenes). Search qualifications may be in the form of DAR parameters or DAR Ids. To get a status of the search, users may view the Search Status via the Java DAR Tool.

4.3.1.3 Workbench Architecture

EOSView and the DAR Tool run on the user's workstation. For the URT, a Web browser is used on the workstation to access Common Gateway Interface (CGI) scripts located inside the DAAC. Since these tools have no interfaces to each other and have distinct operations, their uses are described separately. Figure 4.3.1.3-1 is the EOSView architecture diagram. The diagram shows the events sent to the EOSView tool.

Since EOSView is a stand-alone application, it has no interfaces and gets initialized from the command line of a Unix platform.

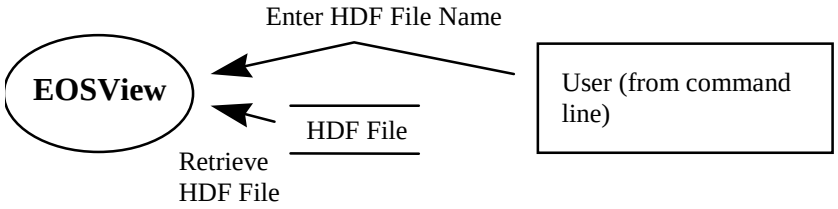


Figure 4.3.1.3-1. EOSView Architecture Diagram

Figure 4.3.1.3-2 is the Java DAR Tool architecture diagram. The diagram shows the events sent to the JDT process and the events the JDT process sends to other CSCIs, CSCs, or processes.

The Java DAR Tool is initiated from the web browser as an applet and can be initiated from the command line as a Java application. The Java DAR Tool uses the CSS MOJO Gateway as the gateway to all ECS services. JDT submits DARs to the CSS MOJO Gateway, which in turn submits them to the DAR Communications Gateway CSC. DAR requests can be a DAR submission or a modification to an existing DAR. After the DAR is successfully submitted, the Java DAR Tool submits a subscription on behalf of the user to get notification when the data associated with the DAR is ingested into the ECS. The Java DAR Tool retrieves the service advertisement from the Advertising Service to determine the parameters to send to the Subscription Server.

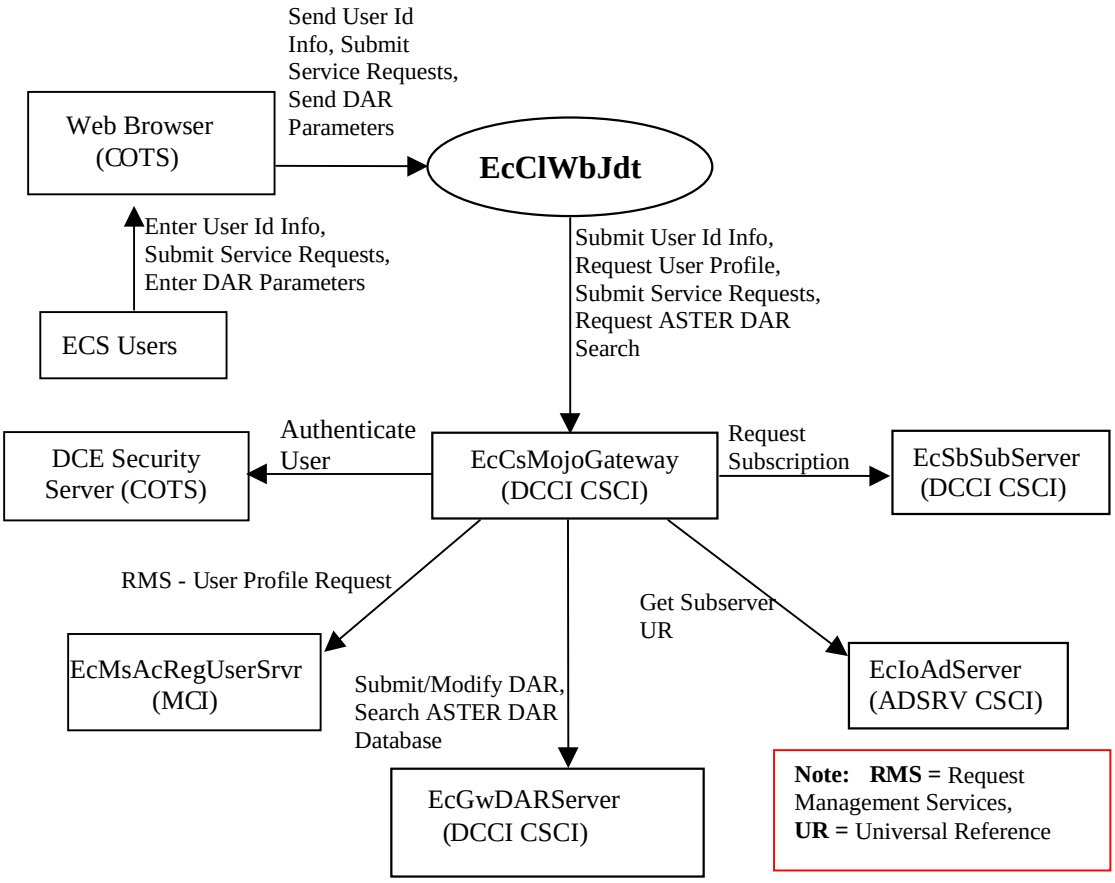


Figure 4.3.1.3-2. Java DAR Tool Architecture Diagram

Figure 4.3.1.3-3 is the URT architecture diagram. The diagram shows the events sent to the URT processes and the events the URT processes send to other CSCIs, CSCs, or processes.

The URT is an HTML application and resides inside each DAAC. The HTML pages are served from the Netscape Enterprise Server located on the INTHW-1 server. The URT communicates with the MSS User Profile Server to submit the registration request.

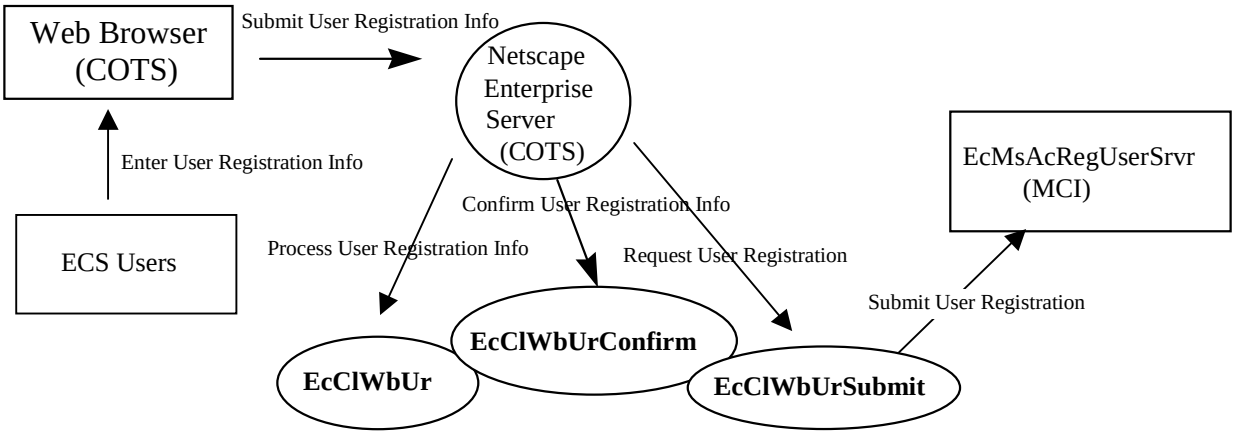


Figure 4.3.1.3-3. URT Architecture Diagram

4.3.1.4 Workbench Process Descriptions

Table 4.3.1.4-1 provides descriptions of the processes shown in the EOSView, DAR Tool and URT Architecture Diagrams.

Table 4.3.1.4-1. WKBCH CSCI Processes (1 of 2)

Process	Type	COTS/ Developed	Functionality
EOSView	GUI	Developed	This is the end user tool that provides data visualization functions for the ECS data. It is used by general users of the system and personnel within the DAAC and SCF for Quality Assurance (QA) checks of products.
EcClWbUr, EcClWbUrConfirm, EcClWbUrSubmit	CGI	Developed	These are the CGI scripts that display the URT user interface and provide the capability to submit a user registration request. There is a data entry screen, a confirmation screen, and finally a program to submit the request to the MSS.
EcClWbJdt	GUI	Developed	This is a Java GUI that enables users to submit DARs to the ASTER GDS through the CSS DAR Communications Gateway (via CSS MOJO Gateway). When the DAR is submitted, a DAR Identifier is returned to the user. A subscription is submitted on behalf of the user, asking for notification whenever a data granule with the specified DAR ID is inserted into the SDPS archives. The Java DAR Tool also has the capability to modify DARs in accordance with the ASTER ICD. In addition, the Java DAR Tool allows the user to search for and retrieve DARs and their status (i.e., the scenes acquired).

Table 4.3.1.4-1. WKBCH CSCI Processes (2 of 2)

Process	Type	COTS/ Developed	Functionality
EcClDtUserProfile Gateway	Server	Developed	The User Profile Gateway is a retrieval engine for users via the EOS Data Gateway. This enables users to be independent of DCE. The server listens for calls on a socket from the EOS Data Gateway. Server Supports: • Multiple concurrent requests.

4.3.1.5 Workbench Process Interface Descriptions

Table 4.3.1.5-1 provides descriptions of the process interface events shown in the EOSView, Java DAR Tool, and the URT Architecture Diagrams.

Table 4.3.1.5-1. WKBCH CSCI Process Interface Events (1 of 5)

Event	Event Frequency	Interface	Initiated By	Event Description
Enter HDF File Name	One per user identified file	Read from command line	User *Process:* EOSView (COTS)	The user types a file name on the EOSView user interface to tell the GUI which file to open.
Retrieve HDF File	One file per request	File name provided by the user as read from the script file that captured it while active.	*Process:* EOSView (COTS)	The EOSView process retrieves the HDF File from a data store based on the file name provided by the user.
Submit User Id Info	One per User	*Process:* EcCsMojoGateway *Class:* EcCsDCELoginProxy	*Process:* EcClWbJdt Class: Login	The EcClWbJdt sends the user name and password to the EcCsMojoGateway for user authentication and use of ECS data and services.
Request User Profile	One per request	*Process:* EcCsMojoGateway *Class:* EcMjRetrieveProfileProxy	*Process:* EcClWbJdt *Class:* JDTApplet	The EcClWbJdt sends user profile requests to the EcCsMojoGateway to get user profile information for DAR submit authorization based upon the user id information provided by the user.

Table 4.3.1.5-1. WKBCH CSCI Process Interface Events (2 of 5)

Event	Event Frequency	Interface	Initiated By	Event Description
Submit Service Requests	Per user request	*Process:* EcClWbJdt *Class:* JDTApplet	User *Process:* Web Browser (COTS)	The user submits service requests via the web browser. The EcClWbJdt accepts the requests of the user and submits the requests to the EcCsMojoGateway, which in turn sends the requests to the EcSbSubServer, the EcGwDARServer, the EcMsAcRegUser, or the EcIoAdServer.
Request ASTER DAR Search	One per set of DAR parameters or DAR ID	*Process:* EcCsMojoGateway Class: EcMjDarQueryxARScenesProxy	*Process:* EcClWbJdt Class: JDTApplet	The EcClWbJdt process sends, to the EcCsMojoGateway, the request to search the ASTER DAR database by DAR parameters or a specific DAR ID for a scene of interest (to the user) from the ASTER instrument.
Request Subscription	One per notification request	*Process:* EcSbSubServer *Library:* EcSbCl *Class:* EcClSubscription	*Process:* EcCsMojoGateway *Class:* EcMjECSSbsrvProxy	The EcCsMojoGateway passes a subscription request to the EcSbSubServer. This is a request for notification upon a specific event occurring in the system. An example would be subscribing to the insert of a particular granule type. A valid subscription request results in the return of a subscription identifier. The subscription Identifier is not returned to the user.
Get Subserver UR	One per advertising search	*Process:* EcIoAdServer *Library:* IoAdvSearch *Class:* EcIoAdSearch	*Process:* EcCsMojoGateway Library: EcCsMojoGateway *Class:* EcMjECSAdsrvProxy	The EcCsMojoGateway sends a search request to the EcIoAdServer to find the signature service advertisement for the subscription event related to the ASTER data. This provides the EcClWbJdt with the parameters needed to be filled in before sending the subscription request to the EcSbSubServer.

Table 4.3.1.5-1. WKBCH CSCI Process Interface Events (3 of 5)

Event	Event Frequency	Interface	Initiated By	Event Description
Submit/Modify DAR	One per request to DAR	*Process:* EcGwDARServer Library: EcGwDAR *Classes:* EcGwDARSubmit DarRequest_C, EcGwDARModifyDar Request_C	*Process:* EcCsMojoGateway Library: EcCsMojoGateway *Classes:* EcMjDarSubmitDarProxy, EcMjDarModifyDarProxy	The EcCsMojoGateway submits the DAR Submit request (and all other DAR related requests) after selecting or modifying DAR parameters to the EcGwDARServer. The EcGwDARServer interfaces directly with the ASTER GDS, and, in the event of a DAR Submit Request, returns a DAR ID to the EcCsMojoGateway. The EcCsMojoGateway, in turn, returns the DAR ID to the EcClWbJdt. The EcCsMojoGateway handles all ECS service requests from the EcClWbJdt via proxies.
Search ASTER DAR Database	One per set of DAR parameters or DAR ID	*Process:* EcGwDARServer Library: EcGwDAR Class: EcGwDARQueryxAR ScenesRequest_C	*Process:* EcCsMojoGateway Library: EcCsMojoGateway Class: EcMjDarQueryxARScene sProxy	The EcCsMojoGateway submits a request to the EcGwDARServer to search the ASTER GDS DAR database for DARs and their respective status (i.e., acquired scenes). Search qualifications may be in the form of DAR parameters or DAR IDs. To get a status of the search, users may view the Search Status via the Java DAR Tool.
Request Management Services (RMS)				The EcMsAcRegUserSrvr provides a basic management library of services to the processes, implemented as client or server applications, using the DCCI CSCI Process Framework. The basic management library of services include:
RMS (cont.)	One per notice received	*Process:* EcMsAcRegUserSrvr *Library:* MsAcClnt *Class:* MsAcUserProfile RWPortal	*Process:* EcMsMojoGateway *Class*: EcCsRetrieveProfileProx y	• **User Profile Request** – The EcMsAcRegUserSrvr provides requesting processes with User Profile parameters such as e-mail and shipping addresses to support their processing activities.

Table 4.3.1.5-1. WKBCH CSCI Process Interface Events (4 of 5)

Event	Event Frequency	Interface	Initiated By	Event Description
Authenticate User	Once per session	*Process:* DCE Security Server (COTS) *Library:* EcSelogincontext.a *Class:* EcSelogincontext	*Process:* EcCsMojoGateway Class: EcCsDCELoginProxy	The EcCsMojoGateway sends the user name and password to the DCE Security Server to authenticate the user. In response, the EcCsMojoGateway receives an authentication status.
Enter User Id Info	Once per session	*Process:* Web Browser (COTS)	User	A user name and password for authenticating the user. The user name and password are turned into Authenticate User request to the DCE Security Server (COTS).
Enter DAR Parameters	One set per data acquisition	*Process:* Web Browser (COTS)	User	A user enters data acquisition parameters (via the Web Browser) to obtain scientific data via the ASTER instrument for scientific research.
Send User Id Info	One per User	Process: EcClWbJdt Class: LoginDialog	*Process:* Web Browser (COTS)	The Web Browser sends the user id information to the EcClWbJdt process to obtain user authorization to submit data and service requests.
Send DAR Parameters	One set per data acquisition	*Process:* EcClWbJdt Class: JDTApplet	*Process:* Web Browser (COTS)	The Web Browser sends the ASTER DAR parameters to the EcClWbJdt to get the request processed.
Enter User Registration Info	One per user	*Process:* Web Browser (COTS)	User	The user enters information to become a registered user of the ECS.
Submit User Registration Info	One per user	*Process:* Netscape Enterprise Server (COTS)	*Process:* Web Browser (COTS)	The user information entered is sent to the Netscape Enterprise Server for processing.
Process User Registration Info	One per user	*Script:* EcClWbUr	*Process:* Netscape Enterprise Server (COTS)	The Netscape Enterprise Server initiates the URT CGI scripts, passing in the data from the HTML forms the user completed in the User Registration Request.The Netscape Server spawns the EcClWbUr CGI script to accept the registration information and prepare it for validation.

Table 4.3.1.5-1. WKBCH CSCI Process Interface Events (5 of 5)

Event	Event Frequency	Interface	Initiated By	Event Description
Confirm User Registration Info	One per user	*Script:* EcClWbUrConfirm	*Process:* Netscape Enterprise Server (COTS)	The Netscape Server spawns the EcClWbUrConfirm CGI script to validate the user information.
Request User Registration	One per user request	*Script:* EcClWbUrSubmit	*Process:* Netscape Enterprise Server (COTS)	The Netscape Server spawns the EcClWbUrSubmit CGI script to accept and prepare the registration request for submission to the EcMsAcRegSrvr.
Submit User Registration	One per registration request to MSS	*Process:* EcMsAcRegUserSrvr *Libraries:* MsAcClnt, MsAcComm *Classes:* EcAcUsrRequestMgr, MsAcUsrRequest	*Script:* EcClWbUrSubmit	The URT CGI script takes the confirmed user inputs and submits the registration request to the EcMsAcRegUserSrvr.

4.3.1.6 Workbench Data Stores

Table 4.3.1.6-1 provides descriptions of the WKBCH CSCI data storage areas shown on the EOSView, Java DAR Tool, and URT Architecture Diagrams. To simplify the table, the list of data stores is limited to the areas shown.

Table 4.3.1.6-1. WKBCH CSCI Data Stores

Data Store	Type	Functionality
HDF File	File	A listing of the HDF files accessible by EOSView.
Session Data	File	The Java DAR Tool maintains user session data, which includes submitted and in process DARs, search criteria and search results.
Profile2.odl	File	This file is where the WKBCH writes the user profile information. This is required since the EOS Data Gateway does not have a “live” link to the User Profile Gateway to retrieve it. The WKBCH writes the profile information to the file and EOS Data Gateway uses it upon startup.

4.3.2 ODFRM Software Description

4.3.2.1 ODFRM Functional Overview

The ODFRM is a combination of HTML web pages and CGI programs called from the HTML web pages to communicate with the PLS. The web pages provide an interface to allow users to:

- Create Aster On-demand Product Requests: ASTER L1B, ASTER DEM and ASTER higher level Products (AST_04, AST_05, AST_06V, AST_06T, AST_06S, AST_07S, AST_07V, AST_09T, AST_09V, AST_09S, AST08) using the web interface.

4.3.2.2 ODFRM Context

Figure 4.3.2.2-1 is the ODFRM CSCI context diagram. The diagram shows the events sent to the ODFRM CSCI and the events the ODFRM CSCI sends to other CSCIs. Table 4.3.2.2-1 provides descriptions of the interface events shown in the ODFRM CSCI context diagram.

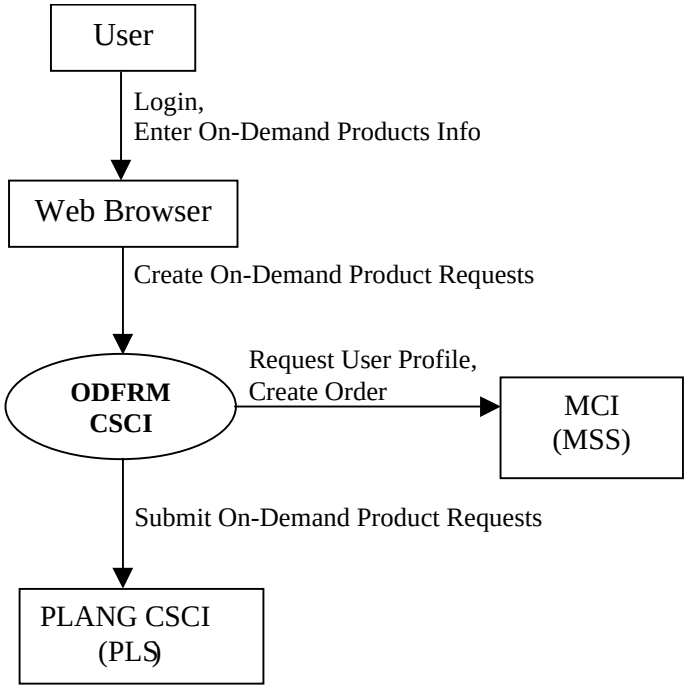


Figure 4.3.2.2-1. ODFRM CSCI Context Diagram

Table 4.3.2.2-1. ODFRM CSCI Interface Events

Event	Interface Event Description
Login	The user logs into the ECS via a Web Browser.
Enter On-Demand Product Info	The user fills in the user information on the Login screen and presses the submit button.
Create On-demand Product Requests	The Web Browser creates an On-Demand Processing Request from information supplied by the user and sends the request to the ODFRM CSCI.
Request User Profile	The ODFRM CSCI gets User Profile Information by submitting a request to the MSS Sybase SQL Server.
Create Order	The CGI program automatically sends a request to the MCI to create a new order for a particular ECS product. The MCI forwards the request to the MSS Sybase Server, which creates a new order.
Submit On-Demand Product Requests	The ODFRM CSCI sends the request to the PLANG CSCI to be scheduled for processing.

4.3.2.3 ODFRM Architecture

Figure 4.3.2.3-1 is the ODFRM CSCI architecture diagram. The diagram shows the events sent to the ODFRM CSCI processes and the events the ODFRM CSCI processes send to other processes.

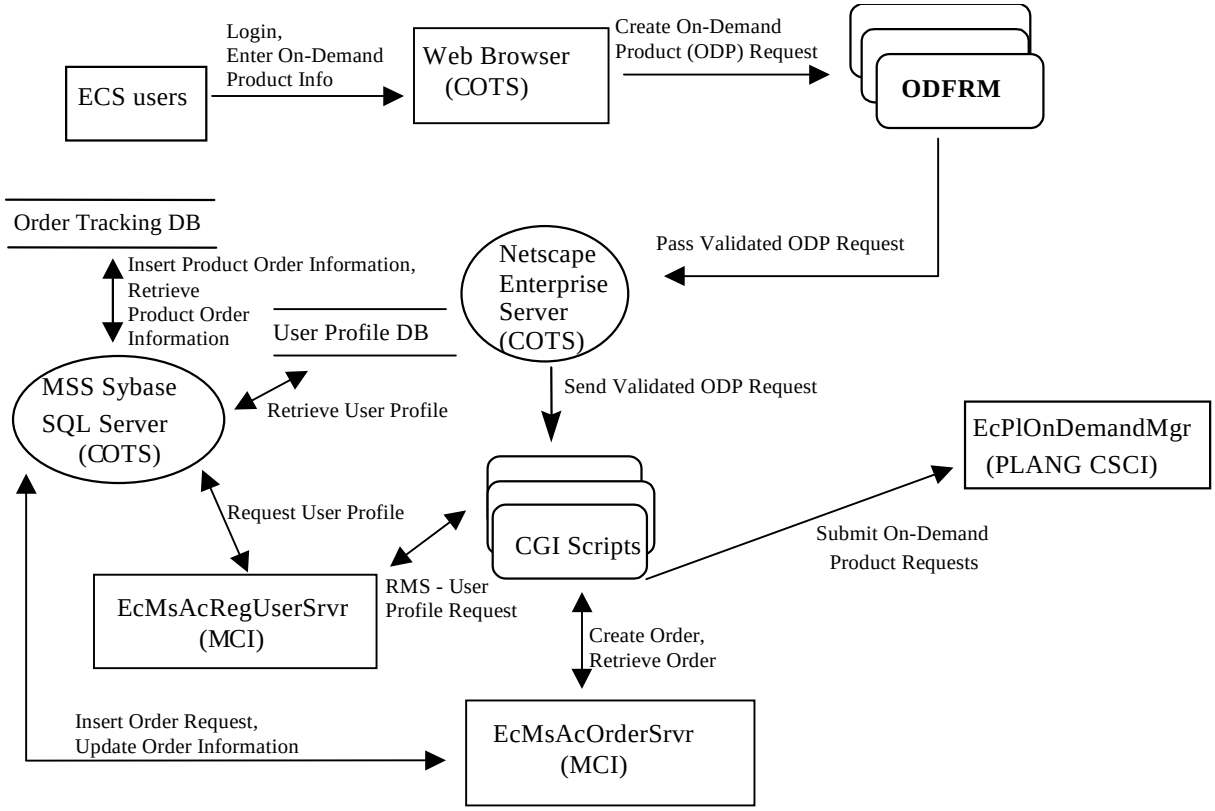


Figure 4.3.2.3-1. ODFRM Architecture Diagram

4.3.2.4 ODFRM Process Description

Table 4.3.2.4-1 provides descriptions of the processes shown in the ODFRM architecture diagram.

Table 4.3.2.4-1. ODFRM Processes

Process	Type	COTS/ Developed	Functionality
ODFRM	HTML	Developed	The ODFRM user interface uses generic HTML that is accessible via common web browsers (no JAVA involved). This is the CSC that uses the HTML Framework to build the actual HTML files that are viewed by the users using a Web browser. Using this ODFRM, 1) A user can login to the system to create Aster On-demand Product requests 2) Once the user logs into the system, he can create an On-demand product request and submit it for processing.
Netscape Enterprise Server	Server	COTS	The Netscape Enterprise Server runs at the DAACs and receives and interprets the Hypertext Transport Protocol (HTTP) from the ODFRM web pages. Refer to the Netscape Server administration documentation for further information.
CGI	CGI	Developed	The ODFRM HTML interface communicates with the MSS Database to create On-demand product requests, accessing User Profile Information through the use of CGI programs. After pressing the Submit button on the ODFRM, the CGI program EcClOdRequest is spawned from the Netscape Enterprise Server. EcClOdRequest CGI Program: This program receives an On-demand product request from the ODFRM (web client) and creates an order with the MSS and sends the request to the PLS for processing.
Sybase Server	Server	COTS	The Sybase Server acts as a SQL server for the MSS CSCI (MCI). Refer to the Sybase documentation for details.

4.3.2.5 ODFRM Interface Descriptions

Table 4.3.2.5-1 provides descriptions of the interface events shown in the ODFRM architecture diagram.

Table 4.3.2.5-1. ODFRM Process Interface Events (1 of 4)

Event	Event Frequency	Interface	Initiated By	Event Description
Login	One per session	*Process:* Web Interface (COTS)	User	The user logs into the ECS via a Web Browser.

Table 4.3.2.5-1. ODFRM Process Interface Events (2 of 4)

Event	Event Frequency	Interface	Initiated By	Event Description
Enter On-Demand Product Info	One per user request	*Process:* Web Interface (COTS)	User	The user fills in the User Information on the Login screen and presses the submit button.
Create On-Demand Product (ODP) Requests	One per user request	*Process:* ODFRM	Process: Web Browser (COTS)	The ODFRM receives the On-Demand product information and validates the information.
Pass Validated ODP Request	One per user request	*Process:* Netscape Server (COTS)	*Process:* ODFRM	The Netscape Enterprise Server spawns the process EcClOdRequest with the User Login information.
Send Validated ODP Request	One per user request	CGI Interface, *Process:* EcClOdRequest	Netscape Server (COTS)	The EcClOdRequest process accesses the MSS database and sends the user back the Authentication.
Submit On-demand product requests	One per user request	*Process:* EcPlOdMgr *Library:* EcPlOnDemandMgr *Class:* PlOdMsgProxy	CGI Interface, *Process:* EcClOdRequest	The EcClOdRequest process causes an order to be created in the MSS database and sends the request to the EcPlOdMgr to be scheduled for processing and sends the user back the OrderId.
Create Order	One per request	*Process:* EcMsAcOrderSrvr *Libraries:* MsAcClnt, MsAcComm	CGI Interface, Process: EcClOdRequest	The EcClOdRequest automatically sends a request to the EcMsAcOrderSrvr to create a new order for a particular ECS product.
Retrieve Order	One per request	Process: EcMsAcOrderSrvr *Libraries:* MsAcClnt, MsAcComm	CGI Interface, Process: EcClOdRequest	The EcClOdRequest receives an order id for the requested ECS product from the EcMsAcOrderSrvr and the user can track the order.

Table 4.3.2.5-1. ODFRM Process Interface Events (3 of 4)

Event	Event Frequency	Interface	Initiated By	Event Description
Request Management Services (RMS)				The EcMsAcRegUserSrvr and EcMsAcOrderSrvr provide a basic management library of services to the processes, implemented as client or server applications, using the DCCI CSCI Process Framework. The basic management library of services include:
RMS (cont.)	One per notice received	*Process:* EcMsAcRegUserSrvr *Library:* MsAcClnt *Class:* MsAcUserProfile RWPortal	CGI Interface, CGI scripts	• **User Profile Request** – The EcMsAcRegUserSrvr provides requesting processes with User Profile parameters such as e-mail and shipping addresses to support their processing activities.
RMS (cont.)	One per order request	*Process:* EcMsAcOrderSrvr Library: MsAcClnt Class: EcAcOrderCMgr	CGI Interface, CGI scripts	• **Order/Request Tracking** - The CLS uses a Server and CGI scripts to interface with the MSS Order/Request Tracking service to create a user product order and submit the order to the PLS.
Request User Profile	One per user request	*Process:* EcMsAcRegUsersrvr *Libraries:* MsAcClnt, MsAcComm	CGI Interface, Process: EcClOdRequest	The EcClOdRequest automatically sends a request to the EcMsAcRegUserSrvr to get the user's profile.
Insert Order Request	One per insert order request	Sybase Server (COTS)	*Process:* EcMsAcOrderSrvr *Libraries:* MsAcClnt, MsAcComm	The EcMsAcOrderSrvr submits a request to the MSS Sybase Server to insert a product order request into the Order tracking database (DB).
Update Order Information	One per update of order information	Sybase Server (COTS)	Process: EcMsAcOrderSrvr *Libraries:* MsAcClnt, MsAcComm	The EcMsAcOrderSrvr submits a request to the MSS Sybase Server to update order information in the Order tracking database (DB).

Table 4.3.2.5-1. ODFRM Process Interface Events (4 of 4)

Event	Event Frequency	Interface	Initiated By	Event Description
Insert Product Order Information	One per order request	*Data Store:* Order Tracking DB	*Process:* Sybase Server (COTS)	The MSS Sybase Server inserts product order information in the Order Tracking DB.
Retrieve Product Order Information	One per order request	*Data Store:* Order Tracking DB	*Process:* Sybase Server (COTS)	The MSS Sybase Server retrieves product order information from the Order Tracking DB.
Retrieve User Profile	One per user	*Process:* Sybase Server (COTS)	*Process:* EcMsAcRegUsersrvr *Libraries:* MsAcClnt, MsAcComm	The EcMsAcRegUserSrvr forwards the request to the MSS Sybase server, which retrieves the requested profile information.

4.3.2.6 ODFRM Data Stores

Table 4.3.2.6-1 provides descriptions of the data stores shown in the ODFRM architecture diagram.

Table 4.3.2.6-1. ODFRM Data Stores

Data Store	Type	Functionality
User Profile DB	Database	The User Profile DB contains requests for user registration and also profile information including mailing addresses, e-mail address, and project affiliations of approved registered users.
Order Tracking DB	Database	The Order Tracking DB contains product orders and user requests with the associated current processing status.

4.3.3 Desktop Software Description

4.3.3.1 Desktop Functional Overview

The DESKT CSCI provides the User Profile Gateway server to communicate with the MSS User Registration Server for obtaining user profile information to authenticate users or update user information.

4.3.3.2 Desktop Context

Figure 4.3.1.2-1 is the DESKT CSCI context diagram. The diagram shows the events sent to the DESKT CSCI and events the DESKT CSCI sends to other CSCIs. Table 4.3.1.2-1 provides descriptions of the interface events shown in the DESKT CSCI context diagram.

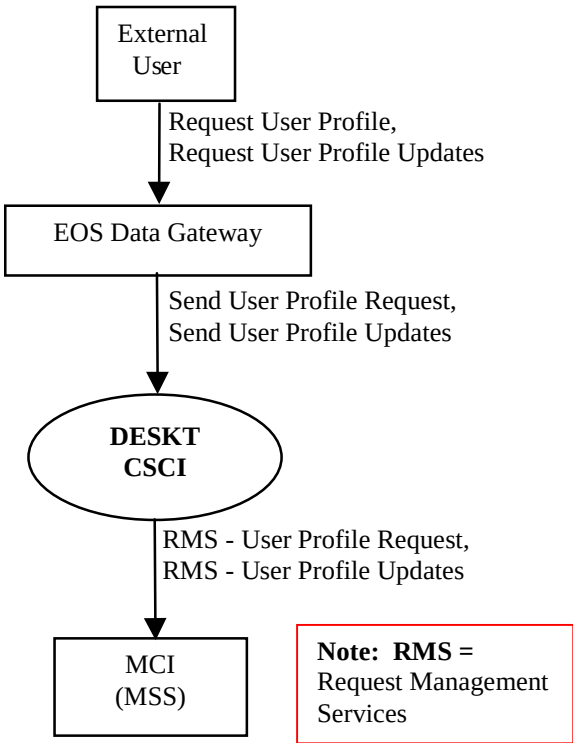


Figure 4.3.1.2-1. DESKT CSCI Context Diagram

Table 4.3.1.2-1. DESKT CSCI Interface Events (1 of 2)

Event	Interface Event Description
Request User Profile	This is a request to the EOS Data Gateway (to the MCI) for retrieval of a User Profile. The user profile is the important information about a user that must be maintained. This includes, but is not limited to, mailing, billing, and shipping addresses, phone number, and electronic mail address. User Profiles can be retrieved either with the ECS userID or the ECS Authenticator. The Authenticator is an encrypted version of the userID and password. It is encrypted so it can be passed over a socket without threat of being stolen.
Request User Profile Updates	Users can update their User Profile information through the EOS Data Gateway (EDG). This includes their addresses (user, shipping, billing, and e-mail) and other information. The EDG uses this file rather than a live interface with the DESKT CSCI as its source of user information. This file gets forwarded to the DESKT CSCI and the DESKT CSCI forwards the file to the MCI.
Send User Profile Request	The EOS Data Gateway sends the user profile request to the DESKT CSCI.
Send User Profile Updates	The EOS Data Gateway sends the user profile updates to the DESKT CSCI.

Table 4.3.1.2-1. DESKT CSCI Interface Events (2 of 2)

Event	Interface Event Description
Request Management Services	The MCI provides a basic management library of services to the CSCIs, implemented as client or server applications, using the DCCI CSCI Process Framework. The basic management library of services include: • **User Profile Request** - The MSS provides requesting subsystems with User Profile parameters such as e-mail address and shipping address upon request by authorized users to support their processing activities. • **User Profile Updates** – The MSS receives user profile parameter updates from a user and makes the updates in the user profile database.

4.3.3.3 Desktop Architecture

Figure 4.3.1.3-1 is the DESKT CSCI architecture diagram. The diagram shows the events sent to the DESKT CSCI processes and the events the DESKT CSCI processes send to other processes.

The DESKT CSCI consists of one process. This process is the User Profile Gateway, a server that listens for calls on a socket. This process resides inside the DAAC on the INTHW-1 server.

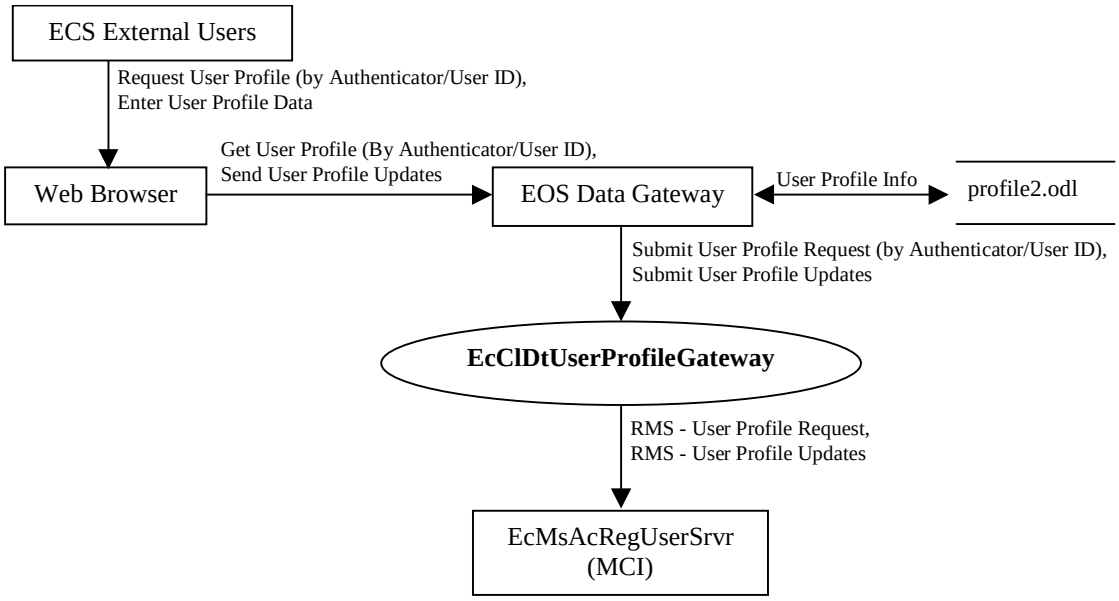


Figure 4.3.1.3-1. DESKT CSCI Architecture Diagram

4.3.3.4 Desktop Process Description

Table 4.3.1.4-1 provides descriptions of the processes shown in the DESKT CSCI architecture diagram.

Table 4.3.1.4-1. DESKT CSCI Processes

Process	Type	COTS/ Developed	Functionality
EcClDtUserProfileGateway	Server	Developed	The User Profile Gateway is a retrieval and update engine for the user profile information. The server listens for calls on a socket. Interfaces: • User Profile Request: Request for a user profile given the user's authenticator • Profile Update Request: Request to update the user's profile with new information. Server Supports: • Multiple concurrent requests.

4.3.3.5 Desktop Process Interface Descriptions

Table 4.3.1.5-1 provides descriptions of the interface events shown in the DESKT CSCI architecture diagram.

Table 4.3.1.5-1. DESKT CSCI Process Interface Events (1 of 2)

Event	Event Frequency	Interface	Initiated By	Event Description
Request User Profile (by Authenticator/ User Id)	One per User Profile	*Process:* Web Browser (COTS)	User	This is the request to the EcMsAcRegUserSrvr using the ECS Authenticator from the EcClDtUserProfileGateway or the user's ID.
Enter User Profile Data	One per User Profile request	*Process:* Web Browser (COTS)	User	Users can update their profiles via the Web Browser through the EOS Data Gateway.
Get User Profile (By Authenticator/ User ID)	One per User Profile	*Process:* EOS Data Gateway	*Process:* Web Browser (COTS)	The Web Browser sends the request to obtain a profile to the EOS Data Gateway.
Send User Profile Updates	One set of parameters per request	*Process:* EOS Data Gateway	*Process:* Web Browser (COTS)	The Web Browser sends a request to update profile information. This interface to the EcClDtUserProfileGateway requests an update to the user's profile.
User Profile Info	One per User Profile store to file	Profile2.odl	EOS Data Gateway	The User Profile information is stored locally in a flat file after retrieval and returned to the DESKT processes.

Table 4.3.1.5-1. DESKT CSCI Process Interface Events (2 of 2)

Event	Event Frequency	Interface	Initiated By	Event Description
Submit User Profile Request (by Authenticator/ User ID)	One per user request	*Process:* EcClDtUserProfile Gateway *Class:* ClDtUserProfileSer ver	*Process:* EOS Data Gateway	The EOS Data Gateway submits the request to obtain a profile to the EcClDtUserProfileGateway and ultimately processed by the EcMsAcRegUserSrvr.
Submit User Profile Updates	One set of parameters per request	*Process:* EcClDtUserProfile Gateway *Class:* ClDtUserProfileSer ver	*Process:* EOS Data Gateway	The EOS Data Gateway submits the request to update a profile to the EcClDtUserProfileGateway and ultimately processed by the EcMsAcRegUserSrvr.
Request Management Services (RMS)				The EcMsAcRegUserSrvr provides a basic management library of services to the processes, implemented as client or server applications, using the DCCI CSCI Process Framework. The basic management library of services include:
RMS (cont.)	One per user request	*Process:* EcMsAcRegUserSr vr *Library:* MsAcClnt *Class:* MsAcUserProfile RWPortal	*Process:* EcClDtUserProfileGateway *Class:* ClDtUserProfileServer	• **User Profile Request** – The EcMsAcRegUserSrvr provides requesting processes with User Profile parameters such as e-mail and shipping addresses to support their processing activities.
RMS (cont.)	Oner set of parameters per user request	*Process:* EcMsAcRegUserSr vr *Library:* MsAcClnt *Class:* MsAcUserProfile RWPortal	*Process:* EcClDtUserProfileGateway *Class:* ClDtUserProfileServer	• **User Profile Updates** – The EcMsAcRegUserSrvr provides requesting processes with access to User Profile parameters such as e-mail and shipping addresses to support the update of the parameters.

4.3.3.6 Desktop Data Stores

Table 4.3.1.6-1 provides descriptions of the DESKT CSCI data storage areas. To simplify the table, the list of data stores is limited to the areas shown.

Table 4.3.1.6-1. DESKT CSCI Data Stores

Data Store	Type	Functionality
profile2.odl	File	This file is where the EOS Data Gateway writes the User Profile information.

4.4 Data Management Subsystem Overview

The Data Management Subsystem (DMS) provides catalog interoperability between the Version 0 (V0) Information Management System (IMS) and the ECS. The V0 EOS Data Gateway (V0 Web Client) communicates with the DMS using the Version 0 protocol. The DMS provides this service by supplying a gateway process and an information manager. The DMS maintains a Data Dictionary of data collection information with metadata, attributes and keywords used by the gateway and information manager in achieving interoperability. The Data Dictionary also contains collection attribute and keyword mappings used to translate requests between the ECS and V0 systems and between the ECS and the ASTER GDS in order to translate requests between the systems. Documentation on the V0 Web Client design can be accessed through the Universal Resource Locator -

http://harp.gsfc.nasa.gov/~imswww/pub/manuals/imsdesign.html.

Data Management Subsystem Context

Figure 4.4-1 is the Data Management Subsystem context diagram. The diagram shows the events sent to the Data Management Subsystem and the events the Data Management Subsystem sends to other SDPS and CSMS subsystems. Table 4.4-1 provides descriptions of the interface events shown in the Data Management Subsystem context diagram.

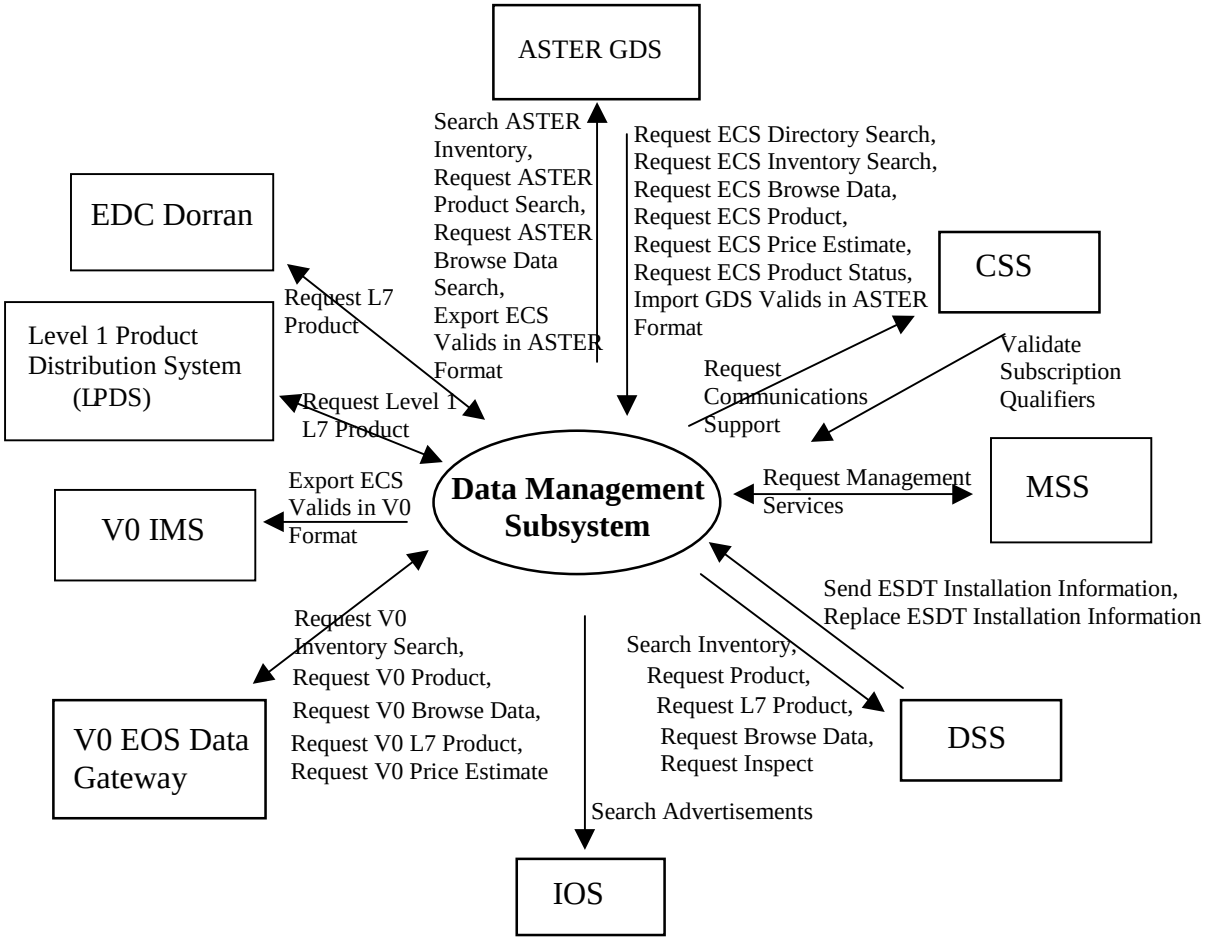


Figure 4.4-1. Data Management Subsystem Context Diagram

Table 4.4-1. Data Management Subsystem Interface Events (1 of 2)

Event	Interface Event Description
Request ECS Directory Search	The DMS receives directory search requests from the ASTER GDS for the discovery of collection level information.
Request ECS Inventory Search	The DMS receives inventory search requests from a user at the V0 IMS via the EOS Data Gateway or the ASTER GDS.
Request ECS Browse Data	The DMS receives browse requests provided by users from the EOS Data Gateway within the V0 IMS or the ASTER GDS.
Request ECS Product	The DMS receives product requests provided by users from the EOS Data Gateway within the V0 IMS or the ASTER GDS.
Request ECS Price Estimate	The DMS receives price estimate requests provided by users from the EOS Data Gateway within the V0 IMS or the ASTER GDS and submits the requests to the DSS.
Request ECS Product Status	The DMS receives product status requests from the ASTER GDS and returns the status of ASTER GDS initiated orders back to the ASTER GDS.
Import GDS Valids in ASTER Format	The DMS receives the valids (in ASTER format) from the ASTER GDS.
Request Communications Support	The CSS provides a library of services available to each SDPS and CSMS subsystem. The services required to perform the specific subsystem assignments are requested by the subsystem from the CSS. These services include: DCE support, file transfer services, Network & Distributed File Services, Bulk Data transfer services, file copying services, name/address services, password services, Server Request Framework (SRF), UR, Error/Event logging, message passing, Fault Handling services, User Authentication services, Mode information, and retrieving the requested configuration attribute-value pairs from the Configuration Registry for ECS applications that request them.
Validate Subscription Qualifiers	The DMS data dictionary is queried by the CSS for type and range information to validate qualifiers.
Request Management Services	The MSS provides a basic management library of services to the subsystems, implemented as client or server applications, using the CSS Process Framework. The basic management library of services include: • **Lifecycle Commands** - The HPOV Network Node Manager forwards (via DCE RPCs), to the MSS Sub Agent running on each managed host, requests to start and stop ECS applications. A start request has mode and temperature parameters that the MSS Sub Agent uses in constructing its command line startup request. Stop requests precipitate a PF shutdown RPC call to the target ECS application from the MSS Sub Agent. Managed applications use the application interface PFGETMODE to obtain their operational mode (e.g., Ops, test, or training). The MSS also interfaces with other subsystems to perform the following: • **DMS Order/Request tracking update** - The DMS interfaces with the MSS Order/Request Tracking service to create a user product order. • **User Profile Request** - The MSS provides requesting subsystems with User Profile parameters such as e-mail address and shipping address to support their processing activities.

Table 4.4-1. Data Management Subsystem Interface Events (2 of 2)

Event	Interface Event Description
Send ESDT Installation Information	The DSS inserts new collection level information into the DMS Data Dictionary database as new Earth Science Data Types (ESDTs) are added to the SDPS.
Replace ESDT Installation Information	The DSS sends updated ESDT information to the DMS Data Dictionary whenever an ESDT is updated. This data consists of updated Inventory and Collection level metadata.
Search Inventory	The DMS submits inventory search requests to the Science Data Server within the DSS.
Request Product	The DMS submits the product requests to the DSS to acquire data granules.
Request L7 Product	The DMS submits the Landsat 7 product requests provided by users to the EDC Dorran Billing and Accounting System and to the SDSRV CSCI. The EDC Dorran Billing and Accounting System approves and tracks Landsat 7 orders. The SDSRV CSCI retrieves Landsat 7 products from the archives.
Request Browse Data	The DMS submits the browse requests to the DSS to obtain browse data to determine the type of product to order.
Request Inspect	The DMS sends a request for an inspection of granule metadata to the DSS in support of a price estimate request.
Search Advertisements	The DMS verifies an ESDT's acquire signature before a product request is serviced by querying the Interoperability Subsystem (IOS) for the signature.
Request V0 Inventory Search	The DMS receives inventory search requests from the V0 EOS Data Gateway on behalf of an external ECS user.
Request V0 Browse Data	The DMS receives browse data requests from the V0 EOS Data Gateway on behalf of an external ECS user
Request V0 Product	The DMS receives product requests from the V0 EOS Data Gateway on behalf of an external ECS user.
Request V0 L7 Product	The DMS receives requests for Landsat 7 products from the V0 EOS Data Gateway on behalf of an external ECS user.
Export ECS Valids in V0 Format	The DMS sends the valids with the ECS core and PSA Attributes to the V0 IMS.
Request Level 1 L7 Product	The DMS requests Level 1 data products from the Level 1 Product Distribution System (LPDS). The LPDS creates level 1 products from the Landsat level 0 products ordered through the V0 Gateway upon request.
Search ASTER Inventory	The DMS submits inventory search requests to the ASTER GDS on behalf of an ECS user.
Request ASTER Product	The DMS submits product requests to the ASTER GDS on behalf of an ECS user.
Request ASTER Browse Data	The DMS submits browse data requests to the ASTER GDS on behalf of an ECS user.
Export ECS Valids in ASTER Format	The DMS sends the valids with the ECS core and PSA Attributes to the ASTER GDS.

Data Management Subsystem Structure

The DMS is three CSCIs and two Hardware Configuration Items (HWCIs):

- The Data Dictionary (DDICT) is a software configuration item. DDICT manages the definitions of data collections including the metadata, data domains (valid values), and data location. The Data Dictionary information is stored persistently in a Relational Database Management System (DBMS).
- The Local Information Manager (LIMGR) is a software configuration item. The LIMGR CSCI provides access to the data and services of a site with respect to data made available by the data servers of the site. The LIMGR CSCI accepts requests, such as a search, and produces and executes the corresponding requests required by the site data servers. An operator specifies the accessible objects at the various site data servers.
- The Version 0 Gateway (V0 GTWAY) is a software configuration item. The V0 GTWAY CSCI provides access to data and services between the SDSRV CSCI and the V0 IMS. V0 GTWAY services include inventory searches, requests for browse data, product requests, and price estimate requests.
- The ASTER Gateway (ASGTW) is a software configuration item. The ASGTW provides access to data and services between the ECS Science Data Server and the ASTER GDS. Services include inventory searches, requests for browse data, product requests, and price estimate requests.
- The DMS hardware comprises one hardware configuration item Data Management Hardware (DMGHW) CI and one hardware configuration item it shares with the Interoperability Subsystem (IOS), Interoperability Hardware (INTHW) CI. DMGHW and INTHW provide the servers and workstations needed for all data management functions. The DMGHW and INTHW provide processing and storage for the DDICT and V0 GTWAY CSCIs. The DMS hardware also supports the processing requirements of the IOS. The IOS consists of a single hardware configuration item (INTHW) and is described in Section 4.5.2.1.

Use of COTS in the Data Management Subsystem

- RogueWave's Tools.h++

  The Tools.h++ class libraries are used by the DMS to provide basic functions and objects such as strings and collections. The Tools libraries must be installed with the DMS software for any of the DMS processes to run.

- RogueWave's DBTools.h++

  The DBTools.h++ C++ class libraries are used to interact with the Sybase database Structured Query Language (SQL) server. The use of DBTools buffers the DMS processes from the relational database used. The DBTools libraries must be installed with the DMS for the Data Dictionary Server, Information Managers, and ECS to V0 and V0 to ECS Gateways to run and allow client applications to perform queries of DDICT.

- The ICS Builder Xcessory GUI

  The Builder Xcessory GUI builder tool modifies the displays of the Data Dictionary Maintenance Tool (Mtool). The builder tool also generates the C++ code to produce the Mtool displays at run time. There is no operational component of Builder Xcessory needed at run-time.

- Sybase Server

  Sybase's SQL server provides access for the Data Dictionary to insert, update, and delete Data Dictionary database information. The Sybase SQL Server must be running during operations for the Data Dictionary Server to execute, search, and update requests on the Data Dictionary database.

- DCE Client

  DCE Client provides DMS with communications between other subsystems. DCE can reside on one or both sides of the interface. An instance must be installed on the platform where DMS resides. Although the DCE Client is part of CSS, this COTS software item must be installed for DMS to run in the SDPS operational and test environment.

4.4.1 Data Dictionary Software Description

4.4.1.1 Data Dictionary Functional Overview

The Data Dictionary (DDICT) CSCI provides access to the Data Dictionary database containing information about science data collections, data attributes, data operations, and the domain(s) of the attributes. The DDICT CSCI describes the data objects accessible through Data Servers, the LIMGR, and the Gateways. The DDICT CSCI provides information support for users to retrieve definitions of the available items and provides infrastructure support to the other CSCIs within the DMS.

The Information contained within the Data Dictionary database includes all collections known within the SDPS. Clients (other SDPS or CSMS CSCIs, CSCs, or processes) of the Data Dictionary obtain data collection information by sending queries to the Data Dictionary. Mappings between the SDPS and the V0 IMS attributes and keywords and the SDPS and ASTER GDS attributes and keywords are also maintained within the Data Dictionary. These mappings are used to translate requests between the V0 IMS and the ECS and the ASTER GDS and the ECS.

The location of a data collection within a data server at a particular site is also stored within the data dictionary. This information allows users to perform queries through user software such as the V0 EOS Data Gateway from any geographical location to forward inventory search, browse, and acquire requests to the appropriate Data Server, LIMGR, or Gateway located at the site where the data is physically stored.

4.4.1.2 Data Dictionary Context

Figure 4.4.1.2-1 is the DDICT CSCI context diagram. The diagram shows the events sent to other CSCIs or CSCs and the events the DDICT CSCI receives from other CSCIs and CSCs.

Table 4.4.1.2-1 provides descriptions of the interface events shown in the DDICT CSCI context diagram.

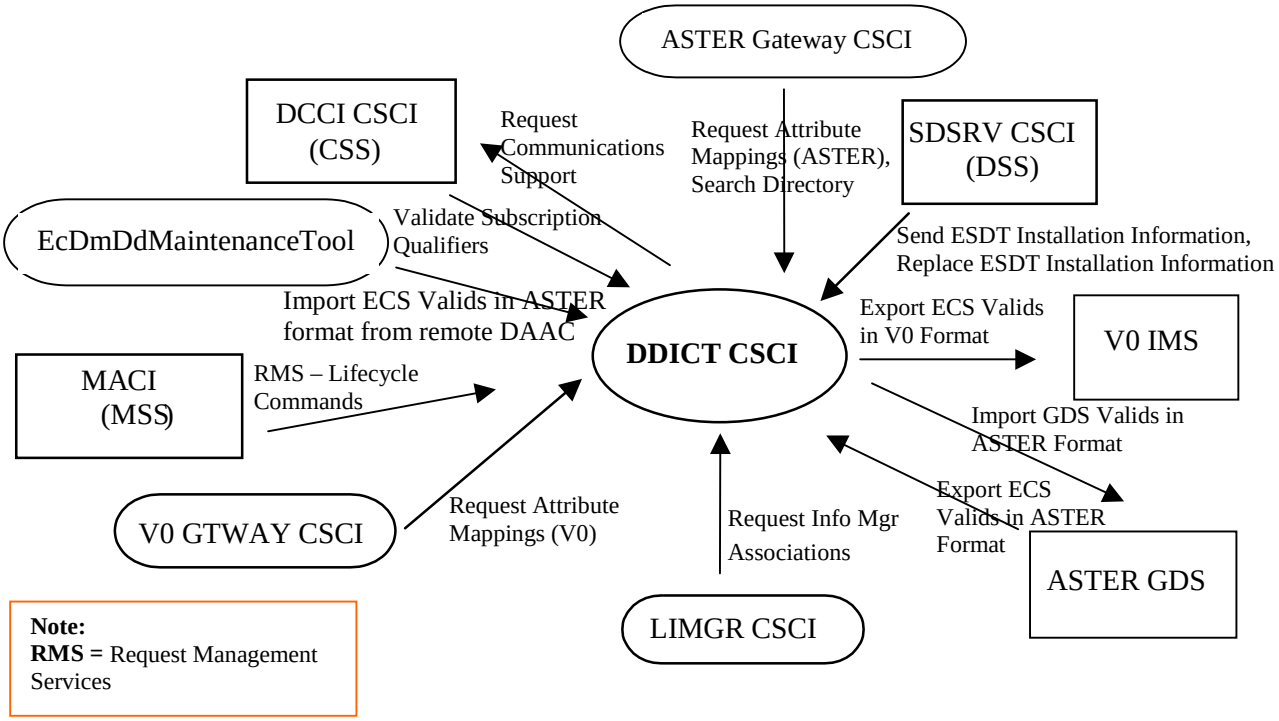


Figure 4.4.1.2-1. Data Dictionary CSCI Context Diagram

Table 4.4.1.2-1. Data Dictionary CSCI Interface Events (1 of 2)

Event	Interface Event Description
Request Attribute Mappings (ASTER)	A user, via the ASTER Client, requests data collection attribute and keyword mappings (via the ASTER Gateway CSCI) from the DDICT CSCI to translate requests from the ASTER GDS to the ECS and back again.
Search Directory	The DDICT CSCI receives directory search requests from the ASTER Gateway CSCI.
Send ESDT Installation Information	The SDSRV CSCI inserts new collection level information into the DMS Data Dictionary database via the DDICT CSCI, as new Earth Science Data Types (ESDTs) are added to the SDPS.
Replace ESDT Installation Information	The SDSRV CSCI sends updated ESDT information to the DDICT CSCI whenever an ESDT is updated. This data consists of Inventory and Collection level metadata. The updated information replaces the ESDT information in the DDICT CSCI.

Table 4.4.1.2-1. Data Dictionary CSCI Interface Events (2 of 2)

Event	Interface Event Description
Export ECS Valids in V0 Format	The DDICT CSCI sends the valids with the ECS core and PSA Attributes to the V0 IMS.
Import GDS Valids in ASTER format	The DDICT CSCI receives the valids (in ASTER format) from a remote DAAC.
Export ECS Valids in ASTER format	The DDICT CSCI sends the valids with the ECS core and PSA Attributes to the ASTER GDS.
Request Info Mgr. Associations	The LIMGR CSCI requests the Information Manager associated with a given data collection to determine where to forward user requests such as browse and product requests. This is a user-initiated event from the WKBCH CSCI or the EOS Data Gateway within the V0 IMS via the V0 GTWAY CSCI.
Request Attribute Mappings (V0)	A user, via the EOS Data Gateway within the V0 IMS, requests data collection attribute and keyword mappings (via the V0 GTWAY CSCI) from the DDICT CSCI to translate requests from the V0 IMS to the ECS and back again.
Request Management Services	The MACI provides a basic management library of services to the CSCIs, implemented as client or server applications, using the DCCI CSCI Process Framework. The basic management library of services include: • **Lifecycle Commands** - The HPOV Network Node Manager forwards (via DCE RPCs), to the MSS Sub Agent running on each managed host, requests to start and stop ECS applications. A start request has mode and temperature parameters that the MSS Sub Agent uses in constructing its command line startup request. Stop requests precipitate a PF shutdown RPC call to the target ECS application from the MSS Sub Agent. Managed applications use the application interface PFGETMODE to obtain their operational mode (e.g., OPS, test, or training).
Import ECS Valids in ASTER format from remote DAAC	The DDICT CSCI receives the valids (in ASTER format) from a remote DAAC.
Validate Subscription Qualifiers	The DDICT CSCI is queried by the DCCI CSCI for type and range information to validate qualifiers.
Request Communications Support	The DCCI CSCI provides a library of services available to each SDPS and CSMS CSCI. The services required to perform the specific CSCI assignments are requested by the CSCI from the DCCI CSCI. These services include: DCE support, file transfer services, Network & Distributed File Services, Bulk Data transfer services, file copying services, name/address services, password services, Server Request Framework (SRF), UR, Error/Event logging, message passing, Fault Handling services, User Authentication services, Mode information, and retrieving the requested configuration attribute-value pairs from the Configuration Registry for ECS applications that request them.

4.4.1.3 Data Dictionary Architecture

Figure 4.4.1.3-1 is the DDICT CSCI architecture diagram. The diagram shows the events sent to the DDICT CSCI processes and the events the DDICT CSCI processes send to other processes.

The DDICT CSCI is two SDPS processes, the Data Dictionary Server (EcDmDictServer) and the Data Dictionary Maintenance Tool (EcDmMaintenanceTool) and a COTS process (the Sybase Server). The Data Dictionary Server, Maintenance Tool, and Sybase Server processes reside inside a DAAC and run on the DMGHW. The Data Dictionary uses one data store per DAAC, the EcDmDictServer Database, as shown in Figure 4.4.1.3-1.

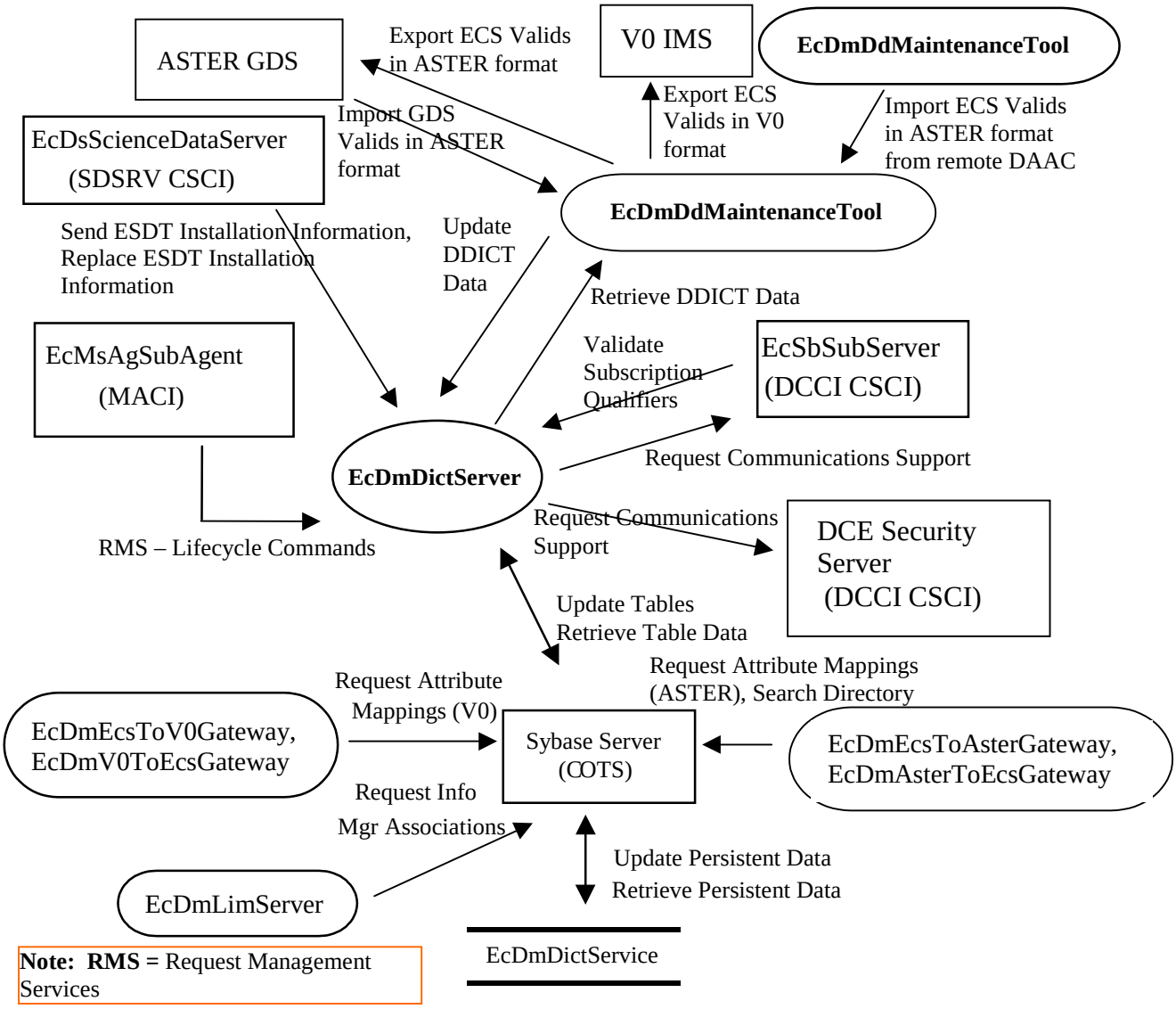


Figure 4.4.1.3-1. Data Dictionary CSCI Architecture Diagram

4.4.1.4 Data Dictionary Process Descriptions

Table 4.4.1.4-1 provides descriptions of the processes shown in the Data Dictionary CSCI architecture diagram.

Table 4.4.1.4-1. Data Dictionary CSCI Processes (1 of 2)

Process	Type	COTS/ Developed	Functionality
EcDmDictServer	Server	Developed	The Data Dictionary Server is the primary server interface to collection and collection related information for the DMS and other subsystems. It allows DDICT client processes the capability to perform data searches, insertions, updates, or deletions to the collection information held in the DDICT database. The Data Dictionary offers two basic interfaces DDICT Data Search: The Data Dictionary Server allows a user to specify search requests on the Data Dictionary database using a GlParameterList. DDICT Data Insert and Delete: Provides a client process with the capability to insert and delete data within the Data Dictionary database. The Data Dictionary Server supports: Single requests at a time Synchronous request processing Asynchronous request processing

Table 4.4.1.4-1. Data Dictionary CSCI Processes (2 of 2)

Process	Type	COTS/ Developed	Functionality
EcDmDdMaintenanceTool	GUI	Developed	Provides a graphical user interface (GUI) to insert, update, or delete schema information held in the DDICT database, allowing DAAC operations staff to maintain the data stored in the Data Dictionary database. The Data Dictionary Maintenance Tool also provides the following capabilities: Import and Export of Valids: The tool allows DAAC operations staff to import and export data collection attribute valids to and from the GDS, ECS, and V0 IMS for catalog interoperability. Data Collection Attribute and Keyword Mapping: Allows DAAC operations staff to map data collection attributes and keyword valids from ECS to V0 IMS and between the ASTER GDS and ECS. The V0 GTWAY CSCI processes (EcDmEcsToV0Gateway and EcDmV0ToEcsGateway) that translate requests from ECS to V0 IMS and the ASTER Gateway CSCI processes (EcDmEcsToAsterGateway and EcDmAsterToEcsGateway) that translate requests between ECS and the ASTER GDS use this information.
Sybase Server	Server	COTS	The Sybase Server acts as a SQL server for the Data Dictionary, and is only run at the DAACs by DAAC operations staff. Refer to Sybase documentation for details.

4.4.1.5 Data Dictionary Process Interface Descriptions

Table 4.4.1.5-1 provides descriptions of the interface events shown in the Data Dictionary CSCI architecture diagram.

Table 4.4.1.5-1. Data Dictionary CSCI Process Interface Events (1 of 6)

Event	Event Frequency	Interface	Initiated By	Event Description
Export ECS Valids in V0 Format	Based on V0 valids processing cycle ~ once per week	V0 IMS Host	DAAC Operations Staff *Process:* EcDmDdMaintenanceTool *Classes:* DmLmDbiUtils, DmDdMtMainWindow	The DAAC Operations Staff pushes the valids file, using the FTP service, manually to its destination location agreed upon earlier on a V0 IMS Host.

Table 4.4.1.5-1. Data Dictionary CSCI Process Interface Events (2 of 6)

Event	Event Frequency	Interface	Initiated By	Event Description
Import ECS Valids in ASTER Format from remote DAAC	Based on ASTER GDS valids processing cycle ~ once per week	ECS Host - EDC	DAAC Operations Staff *Process:* EcDmDdMaintenanceTool *Classes:* DmLmDbiUtils, DmDdMtMainWindow	The DAAC Operations Staff at EDC receives a valids file from another DAAC in ASTER format via the FTP service.
Retrieve DDICT data	One per Maintenance Tool search	*Process*: EcDmDdMaintenanceTool *Classes:* DmDdMtDBExtract, DmDdMtMainWindow	*Process:* EcDmDictServer *Library*: EcDmDdClient *Class*: DmDdClRequest	The EcDmDictServer returns data collection information including collection lists, and collection attributes and keyword valids to the EcDmDdMaintenanceTool.
Update DDICT data	One per table information update	*Process:* EcDmDictServer *Library*: EcDmDdClient *Class*: DmDdClSchemaRequest	Operations Staff *Process*: EcDmDdMaintenanceTool *Classes:* DmLmDbiUtils, DmDdMtMainWindow	The Operations Staff using the EcDmDdMaintenanceTool, updates table information within the DDICT database (via the EcDmDictServer) including mapping collection attributes to keywords and mapping collections to information managers and adding, modifying, and deleting SDPS Core Attributes.
Validate Subscription Qualifiers	One set per request	*Process:* EcDmDictServer *Library:* EcDmDdClient *Class:* DmDdClRequest	*Process:* EcSbSubServer *Library:* EcSbSr *Class:* EcSbSubscription	The EcDmDictServer is queried by the EcSbSubServer for type and range information to validate qualifiers.

Table 4.4.1.5-1. Data Dictionary CSCI Process Interface Events (3 of 6)

Event	Event Frequency	Interface	Initiated By	Event Description
Request Communications Support	Request service(s) as required	*Process:* DCE Security Server *Libraries:* EcSelogin, EcSeLogincontext *Classes:* EcSelogin, EcSeLogincontext *Library:* EcPf *Classes:* EcPfManagedSer ver, EcPfclient *Library(Common):* EcUr *Class:* EcUrServerUR Process: EcSbSubServer *Library:* EcSbSr *Class*: EcSbSubscription *Library:* Event *Class:* EcLgErrormsg	*Process:* EcDmDictServer *Libraries:* EcDmDdClient, DmDdReqProc, DmDdServer *Classes:* DmDdClSchemaRequest, DmDdClRequest, DmDdMapper, DmDdProcMsg, DmDdSearchRequest	The DCCI CSCI Process Framework provides a library of services available to each SDPS and CSMS process. The services required to perform the specific process assignments are requested by the process from the Process Framework. These services include: DCE support, file transfer services, Network & Distributed File Services, Bulk Data transfer services, file copying services, name/address services, password services, Server Request Framework (SRF), UR, Error/Event logging, message passing, Fault Handling services, User Authentication services, Mode information, and retrieving the requested configuration attribute-value pairs from the Configuration Registry for ECS applications that request them.
Update Tables	One per database update	*Process:* Sybase Server (COTS SW) RWDBTools.h++ classes	*Process:* EcDmDictServer *Library*: DmDdReqProc *Classes*: DmDdMapper, DmDdProcMsg	The EcDmDictServer updates data within the Data Dictionary database by inserting and deleting collections and collection metadata, attributes and keywords, and attribute and keyword mappings.

Table 4.4.1.5-1. Data Dictionary CSCI Process Interface Events (4 of 6)

Event	Event Frequency	Interface	Initiated By	Event Description
Retrieve Table Data	One per retrieve from the database	*Process:* Sybase Server (COTS SW) RWDBTools.h++ classes	*Process:* EcDmDictServer *Library*: DmDdServer *Class*: DmDdSearchRequest	The EcDmDictServer retrieves data within the Data Dictionary database such as collections and collection metadata, attributes and keywords, and attribute and keyword mappings.
Request Attribute Mappings (ASTER)	One per request from ASTER Gateway	*Process:* EcDmDictServer *COTS SW Library:* RWDBTools.h++ *Library:* DmLmDbi *Class:* DmLmIntQuery	*Processes:* EcDmEcsToAsterGateway, EcDmAsterToEcsGateway *Library:* DmAsGwCommon *Class:* DmAsGwTranslate	The EcDmEcsToAsterGateway and EcDmAsterToEcsGateway request data collection attribute and keyword mappings from the Data Dictionary database via the Sybase Server to translate requests from the ASTER GDS to the SDPS and back again.
Update Persistent Data	One per set number of queries	*Process:* Sybase server (COTS SW)	*Process:* Sybase server (COTS)	The Sybase Server updates data persistently stored on disk(s) based on queries from the Data Dictionary Server.
Retrieve Persistent Data	One per set number of queries	*Process:* Sybase server (COTS SW)	*Process:* Sybase server (COTS)	The Sybase Server retrieves data persistently stored on disk(s) based on search queries from the Data Dictionary Server.
Request Info Mgr Associations	One per request from Local Information Manager Server	*Process:* Sybase Server (COTS SW) RWDBTools.h++ *Classes*: Many DDICT classes	*Process:* EcDmLimServer *Library*: DmLmReqProc *Class*: DmLmParser	The EcDmLimServer requests identification of the server from the server associated with a collection in the Dictionary database to forward requests to the identified server.
Request Attribute Mappings (V0)	One per request from V0 Gateway	*Process:* Sybase Server (COTS SW) RWDBTools.h++ *Classes:* Many DDICT classes	*Processes:* EcDmEcsToV0Gateway, EcDmV0ToEcsGateway *Library:* Persistent *Class*: DmGwAttributeMap	The EcDmEcsToV0Gateway and EcDmV0ToEcsGateway request data collection attribute and keyword mappings from the Data Dictionary database via the Sybase Server to translate requests from the V0 IMS to the SDPS and back again.

Table 4.4.1.5-1. Data Dictionary CSCI Process Interface Events (5 of 6)

Event	Event Frequency	Interface	Initiated By	Event Description
Request Management Services	One per command start or stop network applications	*Process:* EcDmDictServer	*Process*: EcMsAgSubAgent Library: EcAgInstrm Class: EcAgManager *Script*: EcDmDataDictionaryAppStart	The EcMsAgSubAgent provides a basic management library of services to the processes, implemented as client or server applications, using the DCCI CSCI Process Framework. The basic management library of services include: • **Lifecycle Commands** - The HPOV Network Node Manager forwards (via DCE RPCs), to the MSS Sub Agent running on each managed host, requests to start and stop ECS applications. A start request has mode and temperature parameters that the MSS Sub Agent uses in constructing its command line startup request. Stop requests precipitate a PF shutdown RPC call to the target ECS application from the MSS Sub Agent. Managed applications use the application interface PFGETMODE to obtain their operational mode (e.g., Ops, test, or training).
Send ESDT Installation Information	One per new ESDT added to ECS	*Process:* EcDmDictServer *Library*: EcDmDdClient *Class*: DmDdClSchemaRequest	*Process:* EcDsScienceDataServer *Library*: DsDe1 *Class*: DsDeDataDictController	The EcDsScienceDataServer inserts new collection information into the DMS Data Dictionary database when new Earth Science Data Types (ESDTs) are added to the SDPS.

Table 4.4.1.5-1. Data Dictionary CSCI Process Interface Events (6 of 6)

Event	Event Frequency	Interface	Initiated By	Event Description
Replace ESDT Installation Information	One per ESDT update	*Process:* EcDmDictServer *Library:* EcDmDdClient *Class:* DmDdClSchema Request	*Process:* EcDsScienceDataServer *Class:* DsDeDataDictController	The EcDsScienceDataServer sends updated ESDT information to the EcDmDictServer whenever an ESDT is updated. This data consists of updated Inventory and Collection level metadata.
Import GDS Valids in ASTER Format	Based on ASTER valids processing cycle ~ once per week	ECS Host - EDC	DAAC Operations Staff *Process:* EcDmDdMaintenanceTool *Classes:* DmLmDbiUtils, DmDdMtMainWindow	The DAAC Operations Staff at the EDC receives a valids file from GDS in ASTER format via e-mail (included as text, not as an attachment).
Export ECS Valids in ASTER Format	Based on ASTER valids processing cycle ~ once per week	ASTER GDS Host	DAAC Operations Staff *Process:* EcDmDdMaintenanceTool *Classes:* DmLmDbiUtils, DmDdMtMainWindow	The DAAC Operations Staff sends the valids file to GDS in ASTER format via e-mail (included as text, not as an attachment).

4.4.1.6 Data Dictionary CSCI Data Stores

Table 4.4.1.6-1 provides descriptions of the data stores shown in the Data Dictionary CSCI architecture diagram.

Table 4.4.1.6-1. Data Dictionary CSCI Data Stores

Data Store	Type	Functionality
EcDmDictService	Database	The Data Dictionary database, EcDmDictService is a Sybase relational database that persistently stores the collection and collection related information on a physical disk medium. Data stores in the Data Dictionary database include: • Collection Types: A list of all the data types within the ECS. • Collection Metadata: Various types of collection metadata including instrument, platform, sensor, topic, keyword, temporal and spatial data. • Collection Attributes and Keywords: Attributes and keywords associated with collections originating within and outside the ECS. • Collection Attribute and Keyword Mappings: Associations between the V0 IMS attributes and valid keywords and the ECS attributes and keywords are maintained. • Collection to Information Manager Mappings: Associations between the information manager and the ECS collections stored within them are maintained.

4.4.2 Information Manager Software Description

4.4.2.1 Information Manager Functional Overview

The Information Manager CSCI provides the capability to forward Landsat 7 product requests to the V0 Gateway CSCI in support of the Landsat 7 Billing and Accounting work-around.

4.4.2.2 Information Manager Context

Figure 4.4.2.2-1 is the Local Information Manager CSCI context diagram. The diagram shows the events sent to other CSCIs or CSCs and the events the Local Information Manager CSCI receives from other CSCIs or CSCs. Table 4.4.2.2-1 provides descriptions of the interface events shown in the Local Information Manager context diagram.

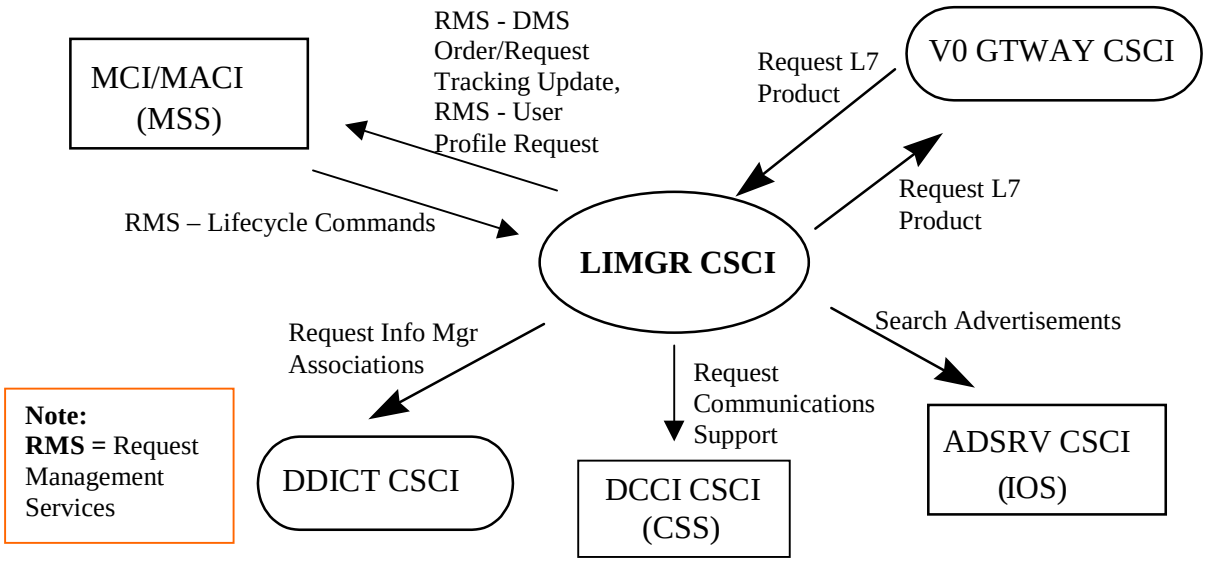


Figure 4.4.2.2-1. Local Information Manager CSCI Context Diagram

Table 4.4.2.2-1. Local Information Manager CSCI Interface Events (1 of 2)

Event	Interface Event Description
Request L7 Product	The LIMGR CSCI receives requests for Landsat 7 products from the V0 GTWAY CSCI on behalf of an ASTER GDS or external ECS user. The LIMGR submits Landsat 7 product requests to the V0 IMS to allow the user to be billed by the EDC's Dorran Billing and Accounting System for acquiring Landsat 7 data granules.
Search Advertisements	The ADSRV CSCI receives requests to search for subscription event and signature service advertisements from the LIMGR CSCI on behalf of a user.

Table 4.4.2.2-1. Local Information Manager CSCI Interface Events (2 of 2)

Event	Interface Event Description
Request Communications Support	The DCCI CSCI provides a library of services available to each SDPS and CSMS CSCI. The services required to perform the specific CSCI assignments are requested by the CSCI from the DCCI CSCI. These services include: DCE support, file transfer services, Network & Distributed File Services, Bulk Data transfer services, file copying services, name/address services, password services, Server Request Framework (SRF), UR, Error/Event logging, message passing, Fault Handling services, User Authentication services, Mode information, and retrieving the requested configuration attribute-value pairs from the Configuration Registry for ECS applications that request them.
Request Info Mgr Associations	The LIMGR CSCI requests the Local Information Manager associated with a given data collection to determine where to forward user requests such as browse and product requests.
Request Management Services	The MACI and MCI provide a basic management library of services to the CSCIs, implemented as client or server applications, using the CSS Process Framework. The basic management library of services include: • **Lifecycle Commands** – The HPOV Network Node Manager forwards (via DCE RPCs), to the MSS Sub Agent running on each managed host, requests to start and stop ECS applications. A start request has mode and temperature parameters that the MSS Sub Agent uses in constructing its command line startup request. Stop requests precipitate a PF shutdown RPC call to the target ECS application from the MSS Sub Agent. Managed applications use the application interface PFGETMODE to obtain their operational mode (e.g., Ops, test, or training). The MCI also interfaces with other CSCIs to perform the following: • **DMS Order/Request Tracking Update** - The LIMGR CSCI interfaces with the MCI Order/Request Tracking service to create a user product order. • **User Profile Request** - The MCI provides requesting CSCIs with User Profile parameters such as e-mail address and shipping address to support their processing activities.

4.4.2.3 Local Information Manager Architecture

Figure 4.4.2.3-1 is the Local Information Manager architecture diagram. The diagram shows the events sent to the LIMGR CSCI processes and the events the LIMGR CSCI processes send to other processes.

The LIMGR CSCI is one process, EcDmLimServer, a background server for the DAAC and forwards requests to the V0 Gateway processes. Typically a DAAC is configured to run one server as shown in the Local Information Manager architecture diagram.

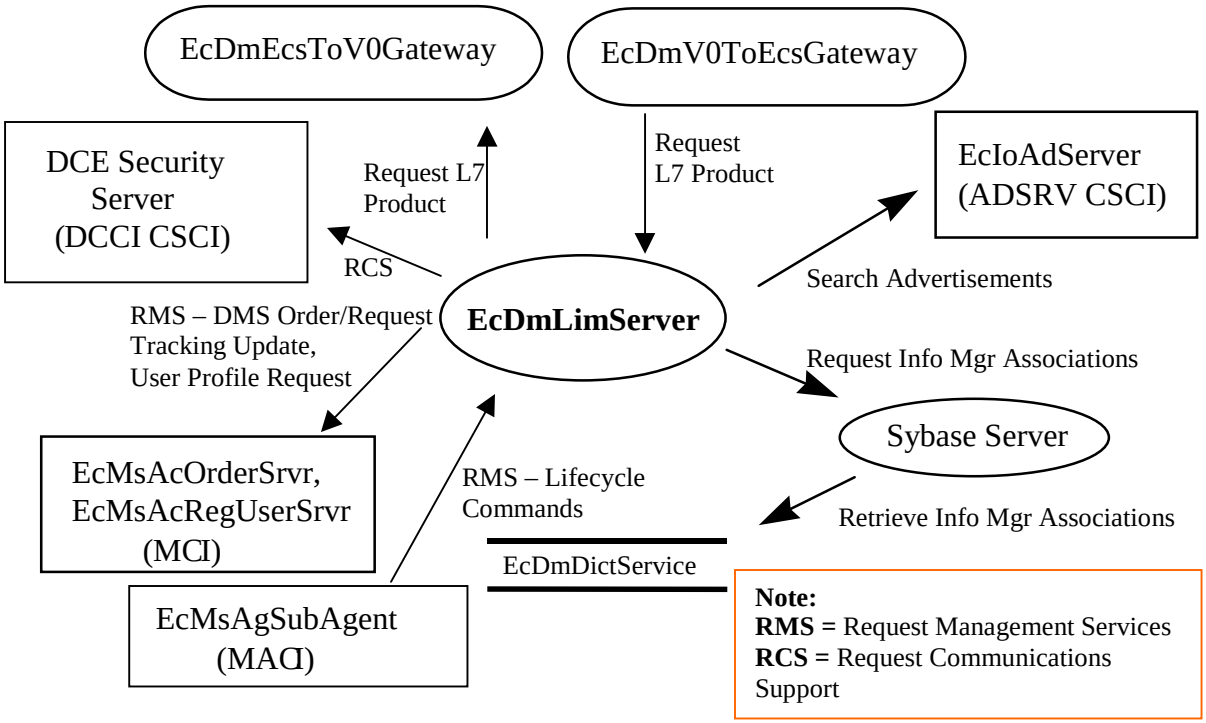


Figure 4.4.2.3-1. Local Information Manager CSCI Architecture Diagram

4.4.2.4 Local Information Manager Process Descriptions

Table 4.4.2.4-1 provides a description of the process shown in the Local Information Manager CSCI architecture diagram.

Table 4.4.2.4-1. Local Information Manager CSCI Processes (1 of 2)

Process	Type	COTS/ Developed	Functionality
EcDmLimServer	Server	Developed	The EcDmLimServer receives acquire requests from the EcDmV0ToEcsGateway, translates it, and forwards it to the local EcDsScienceDataServer or the EcDmEcsToV0Gateway. The EcDmLimServer determines where to send the data types requested and queries the EcDmDictServer to find the server to contact. The results received from the local EcDmV0ToEcsGateway or EcDsScienceDataServer are translated appropriately and returned to the requester. Major Interfaces: Product request: Provides the capability for client processes to submit data acquire requests for obtaining data granules. The EcDmLimServer supports synchronous request processing, asynchronous request processing, and multiple concurrent requests.

Table 4.4.2.4-1. Local Information Manager CSCI Processes (2 of 2)

Process	Type	COTS/ Developed	Functionality
Sybase Server	Server	COTS	The Sybase Server is the device used for storage and retrieval of the information manager associations to science data collections.

4.4.2.5 Local Information Manager Process Interface Descriptions

Table 4.4.2.5-1 provides descriptions of the interface events shown in the Local Information Manager CSCI architecture diagram.

Table 4.4.2.5-1. Local Information Manager Process Interface Events (1 of 3)

Event	Event Frequency	Interface	Initiated By	Event Description
Request L7 Product	One per L7 product request	*Process:* EcDmV0ToEcsGateway *Library:* EcDmLmClient *Classes:* DmLmClRequest, DmLmClRequestServer Process: EcDmEcsToV0Gateway *Library:* EcDmLmClient *Classes:* DmLmClRequest, DmLmClRequestServer	*Process:* EcDmLimServer *Library:* DmLmExtIf *Class:* DmLmInfoMgrIF	The EcDmLimServer receives requests for Landsat 7 products from the EcDmV0ToEcsGateway on behalf of an ASTER GDS or external ECS user. The EcDmLimServer submits Landsat 7 product requests to the EcDmEcsToV0Gateway to be forwarded to the V0 IMS for billing and accounting on behalf of an ASTER GDS or external ECS user.
Search Advertisements	One per advertisement search request sent to IOS	*Process:* EcIoAdServer *Library:* IoAdSearch *Class:* IoAdApprovedAdvSearchCommand	*Process:* EcDmLimServer *Library:* DmLmReqProc *Class:* DmLmProductPlan	The EcIoAdServer receives requests to search for subscription event and signature service advertisements from the EcDmLimServer. **Note:** The EcDmLimServer obtains the proper signatures for acquiring data granules from the EcDsScienceDataServer (for the insert and update of metadata within the SDSRV archives).
Request Info Mgr Associations	One per LIMGR request for user forwarding information	*Process:* Sybase Server (COTS) RWDBTools.h++ *Classes:* Many RWDB Tools classes	*Process:* EcDmLimServer *Library:* DmLmReqProc *Class:* DmLmParser	The EcDmLimServer requests the Information Manager associated with a given data collection from the Sybase Server to determine where to forward user requests such as browse and product requests.

Table 4.4.2.5-1. Local Information Manager Process Interface Events (2 of 3)

Event	Event Frequency	Interface	Initiated By	Event Description
Retrieve Info Mgr Associations	One LIMGR request	*Data Store:* EcDmDictService	*Process:* Sybase Server (COTS) RWDBTools.h++ *Classes:* Many RWDB Tools classes	The Sybase Server retrieves the Information Manager associations from the EcDmDictService data base tables.
Request Management Services (RMS)				The EcMsAgSubAgent and EcMsAcOrderSrvr provide a basic management library of services to the processes, implemented as client or server applications, using the DCCI CSCI Process Framework. The basic management library of services include:
RMS (Cont.)	One per command to start or stop network applications	*Process:* EcDmLimServer	*Process*: EcMsAgSubAgent Library: EcAgInstrm Class: EcAgManager *Script* EcDmLimServerStart	• **Lifecycle Commands** - The HPOV Network Node Manager forwards (via DCE RPCs), to the MSS Sub Agent running on each managed host, requests to start and stop ECS applications. A start request has mode and temperature parameters that the MSS Sub Agent uses in constructing its command line startup request. Stop requests precipitate a PF shutdown RPC call to the target ECS application from the MSS Sub Agent. Managed applications use the application interface PFGETMODE to obtain their operational mode (e.g., Ops, test, or training).

Table 4.4.2.5-1. Local Information Manager Process Interface Events (3 of 3)

Event	Event Frequency	Interface	Initiated By	Event Description
RMS (Cont.)	One per notice received	*Process:* EcMsAcOrderSrvr *Library*: MsAcClnt *Class*: EcAcOrderCMgr	*Process:* The EcDmLimServer *Library*: DmLmReqProc *Class*: ?	• **DMS Order/Request Tracking Update** - The EcDmLimServer has an interface with the EcMsAcOrderSrvr (Order/Request Tracking service) to create a user product order.
RMS (Cont.)		*Process:* EcMsAcRegUserSrvr *Libraries:* MsAcClnt MsAcComm *Class:* MsAcUserProfile	*Process:* EcDmLimServer *Library*: DmLmReqProc *Class*: DmLmProductPlan	• **User Profile Request** – The EcMsAcRegUserSrvr provides requesting processes with User Profile parameters such as e-mail and shipping addresses to support their processing activities.
Request Communications Support	Request service(s) as required	*Process:* DCE Security Server *Libraries:* EcSelogin, EcSeLogincontext *Classes:* EcSelogin, EcSeLogincontext *Library:* EcPf *Classes:* EcPfManagedServer, EcPfclient *Library(Common):* EcUr *Class:* EcUrServerUR Process: EcSbSubServer *Library:* EcSbSr *Class*: EcSbSubscription *Library:* Event *Class:* EcLgErrormsg	*Process:* EcDmLimServer *Library:* DmLmReqProc *Class:* ?	The DCCI CSCI Process Framework provides a library of services available to each SDPS and CSMS process. The services required to perform the specific process assignments are requested by the process from the Process Framework. These services include: DCE support, file transfer services, Network & Distributed File Services, Bulk Data transfer services, file copying services, name/address services, password services, Server Request Framework (SRF), UR, Error/Event logging, message passing, Fault Handling services, User Authentication services, Mode information, and retrieving the requested configuration attribute-value pairs from the Configuration Registry for ECS applications that request them.

4.4.2.6 Local Information Manager Data Stores

Table 4.4.2.6-1 provides descriptions of the data stores shown in the Local Information Manager CSCI architecture diagram.

Table 4.4.2.6-1. Local Information Manager Data Stores

Data Store	Type	Functionality
EcDmDictService	Database	The Data Dictionary database, EcDmDictService, is a Sybase relational database that persistently stores the collection and collection related information on a physical disk medium. The DDICT database is replicated wholly to each DAAC. The data stores in the Data Dictionary database used by the Local Information Managers are: • Collection Types: A list of all the data types within the SDPS. • Collection Attributes and Keywords: Attributes and keywords associated with collections originating within and outside the SDPS are used by the LIM to validate request attribute parameters. • Collection to Information Manager Mappings: Collections are associated with data servers and Information Managers at a given DAAC site for user requests to be forwarded to the correct data archive for processing.

4.4.3 V0 Gateway Software Description

4.4.3.1 V0 Gateway Functional Overview

The Version 0 Gateway (V0 GTWAY) CSCI provides interoperability with the V0 Information Management System for inventory searches, browse requests, product orders, and price estimate requests.

The V0 GTWAY CSCI is two processes, the V0 to ECS Gateway server and the ECS to V0 Gateway server. Queries are passed between the V0 IMS and the V0 Gateway processes using the Object Description Language (ODL) format. The V0 GTWAY CSCI translates ODL requests used by the V0 Gateway into V0 IMS requests via the ECS Hierarchical Data Format (HDF) since HDF is used by the V0 GTWAY CSCI and SDPS servers. The structure of the V0 ODL messages is documented in "Messages and Development Data Dictionary for v5.0 of IMS Client" (IMS V0-PD-SD-002 v1.0.14 950928).

Since the V0 IMS uses different attributes to describe data collections within its data archive, the V0 GTWAY CSCI translates those attributes as defined in the SDPS. To perform the translation, the V0 Gateway uses the data collection attribute and valid keyword mapping information contained within the Data Dictionary database to translate the V0 attributes into equivalent SDPS attributes.

4.4.3.2 V0 Gateway Context

Figure 4.4.3.2-1 is the V0 GTWAY CSCI context diagram. The diagram shows the events sent to the V0 GTWAY CSCI and the events the V0 GTWAY CSCI sends to other CSCIs. Table 4.4.3.2-1 provides descriptions of the interface events shown in the V0 GTWAY CSCI context diagram.

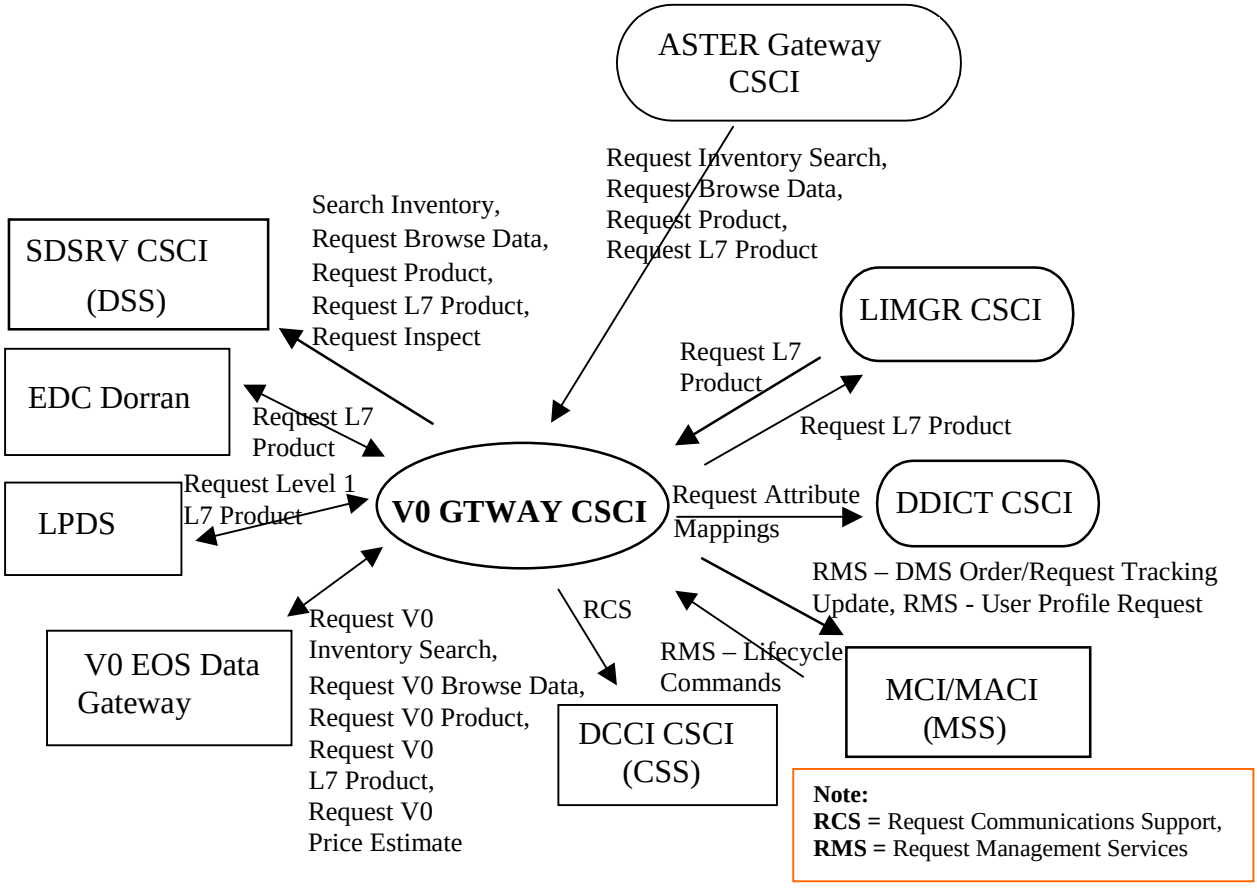


Figure 4.4.3.2-1. V0 GTWAY CSCI Context Diagram

Table 4.4.3.2-1. V0 GTWAY CSCI Interface Events (1 of 3)

Event	Interface Event Description
Request Inventory Search	The V0 GTWAY CSCI receives ECS inventory search requests from the ASTER Gateway CSCI on behalf of an ASTER GDS or external ECS user.
Request Browse Data	The V0 GTWAY CSCI receives requests for ECS browse data requests from the ASTER Gateway CSCI on behalf of an ASTER GDS or external ECS user.

Table 4.4.3.2-1. V0 GTWAY CSCI Interface Events (2 of 3)

Event	Interface Event Description
Request Product	The V0 GTWAY CSCI receives ECS product requests from the ASTER Gateway CSCI on behalf of an ASTER GDS or external ECS user.
Request L7 Product	The V0 GTWAY CSCI receives Landsat 7 product requests from the ASTER Gateway CSCI or V0 EOS Data Gateway. The V0 GTWAY CSCI sends requests for Landsat 7 products to the LIMGR CSCI on behalf of an ASTER GDS or external ECS user. The LIMGR CSCI submits Landsat 7 product requests to the SDSRV CSCI and V0 GTWAY CSCI to be forwarded to the V0 IMS for billing and accounting via EDC's Dorran Billing and Accounting System. The SDSRV CSCI retrieves Landsat 7 products from the archives.
Request Attribute Mappings	The V0 GTWAY CSCI receives requests for data collection attribute and keyword mappings on behalf of a user from the Data Dictionary database via the Sybase Server to translate requests from the V0 IMS to the ECS protocol and back again.
Request Management Services	The MCI and MACI provide a basic management library of services to the CSCIs, implemented as client or server applications, using the DCCI CSCI Process Framework. The basic management library of services include: • **Lifecycle Commands** - The HPOV Network Node Manager forwards (via DCE RPCs), to the MSS Sub Agent running on each managed host, requests to start and stop ECS applications. A start request has mode and temperature parameters that the MSS Sub Agent uses in constructing its command line startup request. Stop requests precipitate a PF shutdown RPC call to the target ECS application from the MSS Sub Agent. Managed applications use the application interface PFGETMODE to obtain their operational mode (e.g., OPS, test, or training). The MCI also interfaces with other CSCIs to perform the following: • **DMS Order/Request Tracking Update** - The V0 GTWAY CSCI interfaces with the MCI Order/Request Tracking service (EcMsAcOrderSrvr) to create a user product order. • **User Profile Request** - The MCI provides requesting CSCIs with User Profile parameters such as e-mail address and shipping address to support their processing activities.
Request Communications Support	The DCCI CSCI provides a library of services available to each SDPS and CSMS CSCI. The services required to perform the specific CSCI assignments are requested by the CSCI from the DCCI CSCI. These services include: DCE support, file transfer services, Network & Distributed File Services, Bulk Data transfer services, file copying services, name/address services, password services, Server Request Framework (SRF), UR, Error/Event logging, message passing, Fault Handling services, User Authentication services, Mode information, and retrieving the requested configuration attribute-value pairs from the Configuration Registry for ECS applications that request them.
Request V0 Inventory Search	The V0 GTWAY CSCI receives inventory search requests from the V0 EOS Data Gateway on behalf of an external ECS user.

Table 4.4.3.2-1. V0 GTWAY CSCI Interface Events (3 of 3)

Event	Interface Event Description
Request V0 Browse Data	The V0 GTWAY CSCI receives browse data requests from the V0 EOS Data Gateway on behalf of an external ECS user
Request V0 Product	The V0 GTWAY CSCI receives product requests from the V0 EOS Data Gateway on behalf of an external ECS user.
Request V0 L7 Product	The V0 GTWAY CSCI receives requests for Landsat 7 products from the V0 EOS Data Gateway on behalf of an external ECS user.
Request V0 Price Estimate	The V0 GTWAY CSCI receives price estimate requests from the V0 EOS Data Gateway on behalf of an external ECS user
Request Level 1 L7 Product	The V0 GTWAY CSCI requests Level 1 data products from the Level 1 Product Distribution System (LPDS). The LPDS creates level 1 products from the Landsat Level 0 products ordered through the V0 GTWAY CSCI upon request.
Request L7 Product	The V0 GTWAY CSCI submits Landsat product requests to the V0 IMS for billing and accounting via the EDC Dorran billing and accounting system on behalf of a user.
Search Inventory	The V0 GTWAY CSCI submits inventory search requests to the SDSRV CSCI within the DSS on behalf of a user.
Request Browse Data	The V0 GTWAY CSCI receives browse requests from the V0 IMS via the EOS Data Gateway and submits the browse requests to the SDSRV CSCI within the DSS on behalf of a user.
Request Product	The V0 GTWAY CSCI submits product requests to the SDSRV CSCI within the DSS on behalf of a user.
Request Inspect	The V0 GTWAY CSCI sends a request for an inspection of granule metadata to the SDSRV CSCI in support of a price estimate request.

4.4.3.3 V0 Gateway Architecture

Figure 4.4.3.3-1 is the V0 GTWAY CSCI architecture diagram. The diagram shows the events sent to the V0 GTWAY CSCI processes and the events the V0 GTWAY CSCI processes send to other processes.

The V0 GTWAY CSCI is two processes, the EcDmEcsToV0Gateway and the EcDmV0ToEcsGateway, as shown in the V0 GTWAY CSCI architecture diagram.

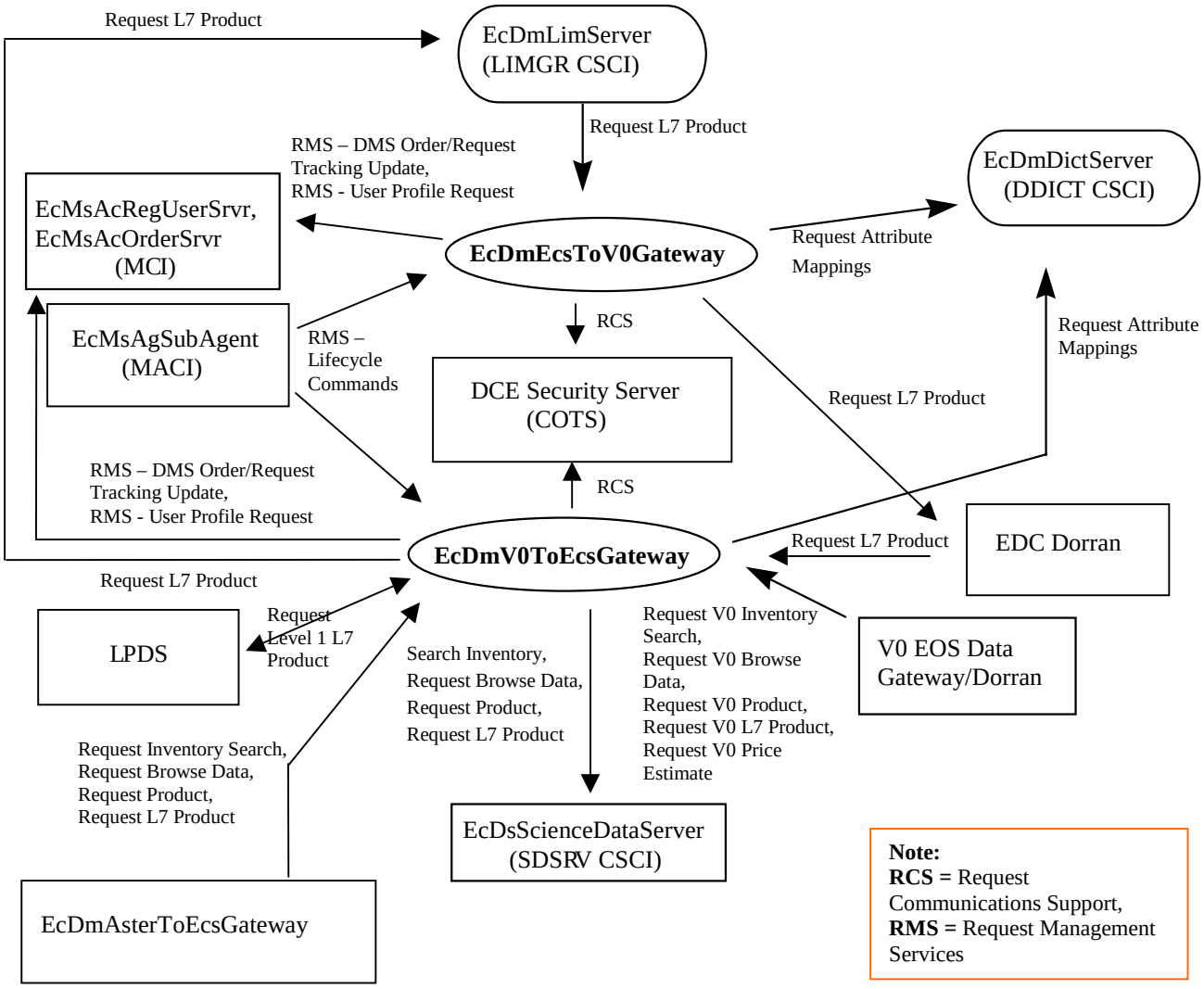


Figure 4.4.3.3-1. V0 GTWAY CSCI Architecture Diagram

4.4.3.4 V0 Gateway Process Descriptions

Table 4.4.3.4-1 provides descriptions of the processes shown in the V0 GTWAY CSCI architecture diagram.

Table 4.4.3.4-1. V0 GTWAY CSCI Processes

Process	Type	COTS/ Developed	Functionality
EcDmEcsToV0Gateway	Server	Developed	The ECS to V0 Gateway server allows users to search for data and request data in the V0 IMS data archive and request services of the V0 IMS. Major Interfaces: • Inventory Search: The ECS to V0 Gateway allows requesters to perform searches for data granules within the V0 IMS archive • Browse: Allows users to browse data granules previously found during a search • Acquire: Provides the capability for requesters to submit data acquire requests for obtaining billing and accounting information from the V0 IMS Server Supports: • Synchronous request processing • Asynchronous request processing • Multiple concurrent requests
EcDmV0ToEcsGateway	Server	Developed	The V0 to ECS Gateway server allows users of the V0 IMS to query on data and services defined within the SDPS. Major Interfaces: • Inventory Search: Allows a user to perform searches for data granules within the SDPS archive • Browse: Allows users to browse data granules previously found during a search • Product request: Provides the capability for users to submit data acquire requests for obtaining data granules from the SDPS archive • Price Estimate requests: Allows users to request a price estimate for a given set of granules with spatial and/or band sub-setting constraints • Inspect Requests: Requests DSS to inspect granule metadata in support of a price estimate request. Server Supports: • Synchronous request processing • Asynchronous request processing • Multiple concurrent requests

4.4.3.5 V0 Gateway Process Interface Descriptions

Table 4.4.3.5-1 provides descriptions of the interface events shown in the V0 GTWAY CSCI architecture diagram.

Table 4.4.3.5-1. V0 GTWAY CSCI Process Interface Events (1 of 6)

Event	Event Frequency	Interface	Initiated By	Event Description
Request L7 Product	One per L7 product request	*Process:* EOS Data Gateway *Library:* lk *Class:* lk_txODL	*Processes:* EcDmV0ToECSGateway, EcDmEcsToV0Gateway *Library:* DmGwV0If *Class*: DmGwEcsServRequest	The EcDmV0ToECSGateway receives Landsat 7 product requests from the EcDmAsterToEcsGateway CSCI or V0 EOS Data Gateway. The EcDmV0ToECSGateway sends requests for Landsat 7 products to the EcDmLimServer on behalf of an ASTER GDS or external ECS user. The EcDmLimServer submits Landsat 7 product requests to the EcDsScience0ataServer and the EcDmEcsToV0Gateway to be forwarded to the V0 IMS for billing and accounting via EDC's Dorran Billing and Accounting System. The EcDsScienceDataServer retrieves Landsat 7 products from the archives.
Request Attribute Mappings	One per data request to DDICT	COTS SW Library: RWDBTools.h++ Classes: RWDBSelect, RWDBReader, RWDBDatabase, RWDBResult, RWDBConnection	*Processes:* EcDmEcsToV0Gateway, EcDmV0ToEcsGateway *Library:* Persistent *Class:* DmGwAttributeMap	The EcDmEcsToV0Gateway and EcDmV0ToEcsGateway request data collection attribute and valid keyword mappings, on behalf of a user, from the EcDmDictServer to translate requests from the V0 IMS to the SDPS and back again.
Request V0 Inventory Search	One per inventory search request	*Process:* EcDmV0ToEcsGateway *Library:* RequestProcessing *Class:* DmGwInvSearchRequest	*Process:* EOS Data Gateway	The EcDmV0ToEcsGateway receives inventory search requests from the V0 EOS Data Gateway on behalf of an external ECS user.

Table 4.4.3.5-1. V0 GTWAY CSCI Process Interface Events (2 of 6)

Event	Event Frequency	Interface	Initiated By	Event Description
Request V0 Browse Data	One per browse request	*Process:* EcDmV0ToEcsGateway *Library:* RequestProcessing *Class*: DmGwBrowseRequest	*Process:* EOS Data Gateway	The EcDmV0ToEcsGateway receives browse data requests from the V0 EOS Data Gateway on behalf of an external ECS user
Request V0 Product	One per product request	*Process:* EcDmV0ToEcsGateway *Library:* RequestProcessing *Class:* DmGwAcquireRequest	*Process:* EOS Data Gateway	The EcDmV0ToEcsGateway receives product requests from the V0 EOS Data Gateway on behalf of an external ECS user.
Request V0 L7 Product	One per L7 product request	*Process:* EcDmV0ToEcsGateway *Library:* RequestProcessing *Class:* DmGwAcquireRequest	*Process:* EOS Data Gateway	The EcDmV0ToEcsGateway receives requests for Landsat 7 products from the V0 EOS Data Gateway on behalf of an external ECS user.
Request V0 Price Estimate	One per product	*Process:* EcDmV0ToEcsGateway *Library:* RequestProcessing *Class:* DmGwPriceEstRequest	*Process:* EOS Data Gateway	The EcDmV0ToEcsGateway receives price estimate requests from the V0 EOS Data Gateway on behalf of an external ECS user
Search Inventory	One per inventory search request	*Process:* EcDsScienceDataServer *Library:* DsCl *Classes:* DsClESDTReferenceCollector, DsClRequest	*Process:* EcDmV0ToEcsGateway *Library:* RequestProcessing *Class:* DmGwInvSearchRequest	The EcDmV0ToEcsGateway submits inventory search requests to the EcDsScienceDataServer on behalf of a user.

Table 4.4.3.5-1. V0 GTWAY CSCI Process Interface Events (3 of 6)

Event	Event Frequency	Interface	Initiated By	Event Description
Request Browse Data	One per browse request	*Process:* EcDsScienceDataServer *Library:* DsCl *Classes:* DsClESDTReferenceCollector, DsClRequest	*Process:* EcDmV0ToEcsGateway *Library:* RequestProcessing *Class*: DmGwBrowseRequest	The EcDmV0ToEcsGateway submits requests for browse data to the EcDsScienceDataServer on behalf of a user.
Request Product	One per product request	*Process:* EcDsScienceDataServer *Library:* DsCl *Classes*: DsClESDTReferenceCollector, DsClRequest	*Process:* EcDmV0ToEcsGateway *Library:* RequestProcessing *Class:* DmGwAcquireRequest	The EcDmV0ToEcsGateway submits product requests to the EcDsScienceDataServer on behalf of a user.
Request ECS Inventory Search	One item per request	*Process:* EcDsScienceDataServer *Library:* DsCl *Classes:* DsClESDTReferenceCollector, DsClRequest	*Process:* EcDmV0ToEcsGateway *Library:* RequestProcessing *Class:* DmGwInvSearchRequest	The EcDmV0ToEcsGateway submits inventory search requests to the EcDsScienceDataServer on behalf of an ASTER GDS user.
Request ECS Browse Data	One product per request	*Process:* EcDsScienceDataServer *Library:* DsCl *Classes:* DsClESDTReferenceCollector, DsClRequest	*Process:* EcDmV0ToEcsGateway *Library:* RequestProcessing *Class*: DmGwBrowseRequest	The EcDmV0ToEcsGateway submits requests for browse data to the EcDsScienceDataServer on behalf of an ASTER GDS user.

Table 4.4.3.5-1. V0 GTWAY CSCI Process Interface Events (4 of 6)

Event	Event Frequency	Interface	Initiated By	Event Description
Request ECS Product	One product per request	*Process:* EcDsScienceDataServer *Library:* DsCl *Classes*: DsClESDTReferenceCollector, DsClRequest	*Process:* EcDmV0ToEcsGateway *Library:* RequestProcessing *Class:* DmGwAcquireRequest	The EcDmV0ToEcsGateway submits product requests to the EcDsScienceDataServer on behalf of an ASTER GDS user.
Request ECS Price Estimate	One per price estimate request	*Process:* EcDmV0ToEcsGateway *Library:* RequestProcessing *Class:* DmGwPriceEstRequest	EOS Data Gateway ASTER GDS	The EcDmV0ToEcsGateway receives price estimate requests provided by users from the EOS Data Gateway within the V0 IMS or the ASTER GDS and submits the requests to the EcDsScienceDataServer.
Request Inspect	One per price estimate request	*Process:* EcDsScienceDataServer *Library:* DsCl *Classes:* DsClESDTReferenceCollector, DsClRequest	*Process:* EcDmV0ToEcsGateway *Library:* RequestProcessing *Class:* DmGwPriceEstRequest	The EcDmV0ToEcsGateway sends a request for an inspection of granule metadata to the EcDsScienceDataServer in support of a price estimate request.

Table 4.4.3.5-1. V0 GTWAY CSCI Process Interface Events (5 of 6)

Event	Event Frequency	Interface	Initiated By	Event Description
Request Management Services (RMS)				The EcMsAgSubAgent provides a basic management library of services to the processes, implemented as client or server applications, using the DCCI CSCI Process Framework. The basic management library of services include:
	One per command to start or stop network applications	*Processes:* EcDmEcsToV0Gateway, EcDmV0ToEcsGateway	*Process*: EcMsAgSubAgent Library: EcAgInstrm Class: EcAgManager *Script:* EcDmV0GatewaysAppStart	• **Lifecycle Commands** - The HPOV Network Node Manager forwards (via DCE RPCs), to the MSS Sub Agent running on each managed host, requests to start and stop ECS applications. A start request has mode and temperature parameters that the MSS Sub Agent uses in constructing its command line startup request. Stop requests precipitate a PF shutdown RPC call to the target ECS application from the MSS Sub Agent. Managed applications use the application interface PFGETMODE to obtain their operational mode (e.g., Ops, test, or training).
	One per product order	*Process:* EcMsAcOrderSrvr *Library:* MsAcClnt *Class:* EcAcOrderCMgr	*Process:* EcDmV0ToEcsGateway *Class:* DmGwRequestReceiver	• **DMS Order/Request Tracking Update** – The V0 GTWAY interfaces with the Order/Request tracking service, EcMsAcOrderSrvr, to create a user product order.

Table 4.4.3.5-1. V0 GTWAY CSCI Process Interface Events (6 of 6)

Event	Event Frequency	Interface	Initiated By	Event Description
RMS (Cont.)	One per profile request	*Process:* EcMsAcRegUserSrvr *Library:* MsAcClnt *Class:* EcAcProfileMgr	*Process:* EcDmV0ToEcsGateway *Class:* DmGwRequestReceiver	• **User Profile Request** - The EcMsAcRegUserSrvr provides requesting processes with User Profile information such as e-mail address and shipping address to support their processing activities.

4.4.3.6 V0 Gateway Data Stores

Table 4.4.3.6-1 provides descriptions of the data stores shown in the V0 GTWAY CSCI architecture diagram. The V0 to ECS and ECS to V0 Gateway processes access the Data Dictionary data store.

Table 4.4.3.6-1. V0 GTWAY CSCI Data Store

Data Store	Type	Functionality
EcDmDictService	Database	The Data Dictionary database, EcDmDictService, is a Sybase relational database that persistently stores the collection and collection related information on a physical disk medium. The DDICT database is replicated wholly to each DAAC. The data stores in the Data Dictionary database used by the V0 GTWAY CSCI are: • Collection Types: A list of all the data types within the SDPS • Collection Attributes and Keywords: Attributes and keywords associated with collections originating within and outside the SDPS are used by the V0 GTWAY CSCI to translate requests between the V0 IMS and the SDPS

4.4.4 ASTER Gateway Software Description

4.4.4.1 ASTER Gateway Functional Overview

The ASTER Gateway provides access to data and services accessible at local and remote sites. It decomposes requests and dispatches the component parts to other components (i.e., Information Manager or Gateways) of the local site or to other components via the ASTER Gateway to a remote site.

The ASTER Gateway makes itself accessible to the remote information by exporting schema information to the Data Dictionary Server (EcDmDictServer) and making services available through the Data Dictionary Service (DDICT) portion of the Data Management Subsystem (DMS).

4.4.4.2 ASTER Gateway Context

Figure 4.4.4.2-1 is the ASTER Gateway context diagram. The diagram shows the events sent to other CSCIs or CSCs and the events the ASTER Gateway receives from other CSCIs and CSCs. Table 4.4.4.2-1 provides descriptions of the interface events shown in the ASTER Gateway context diagram.

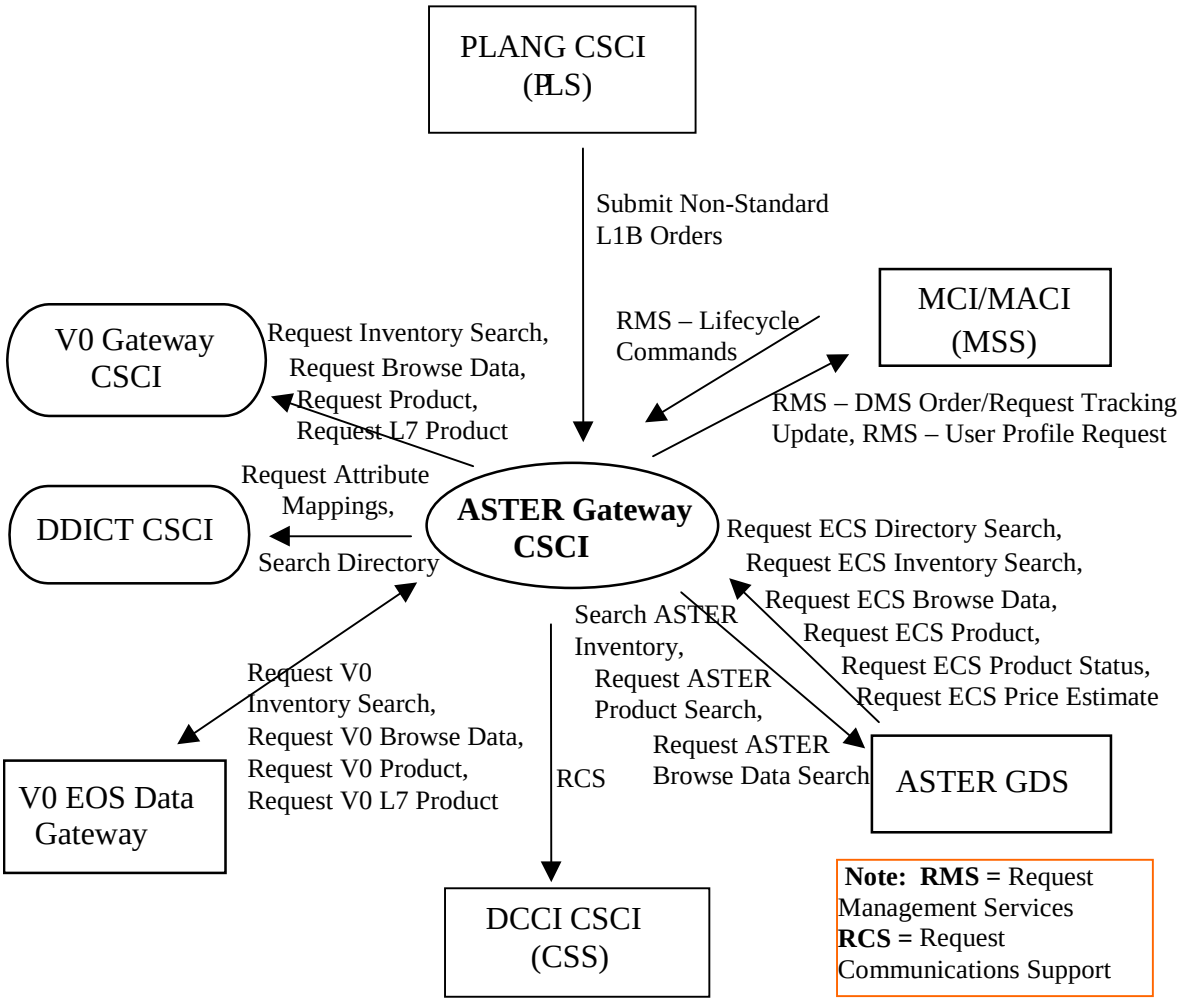


Figure 4.4.4.2-1. ASTER Gateway CSCI Context Diagram

Table 4.4.4.2-1. ASTER Gateway CSCI Interface Events (1 of 2)

Event	Interface Event Description
Submit Non-Standard L1B Orders	The PLANG CSCI submits requests through the ASTER Gateway CSCI for the production of non-standard L1B on-demand products.
Request Management Services	The MCI and MACI provide a basic management library of services to the CSCIs, implemented as client or server applications, using the DCCI CSCI Process Framework. The basic management library of services include: • **Lifecycle Commands** - The HPOV Network Node Manager forwards (via DCE RPCs), to the MSS Sub Agent running on each managed host, requests to start and stop ECS applications. A start request has mode and temperature parameters that the MSS Sub Agent uses in constructing its command line startup request. Stop requests precipitate a PF shutdown RPC call to the target ECS application from the MSS Sub Agent. Managed applications use the application interface PFGETMODE to obtain their operational mode (e.g., OPS, test, or training). The MCI also interfaces with other CSCIs to perform the following: • **DMS Order/Request Tracking Update** - The ASTER Gateway CSCI interfaces with the MCI Order/Request Tracking service (EcMsAcOrderSrvr) to create a user product order. • **User Profile Request** - The MCI provides requesting CSCIs with User Profile parameters such as e-mail address and shipping address to support their processing activities.
Request ECS Directory Search	The ASTER Gateway CSCI receives directory search requests from the ASTER GDS on behalf of a GDS user.
Request ECS Inventory Search	The ASTER Gateway CSCI receives inventory search requests from the ASTER GDS on behalf of a GDS user.
Request ECS Browse Data	The ASTER Gateway CSCI receives browse data requests from the ASTER GDS on behalf of a GDS user.
Request ECS Product	The ASTER Gateway CSCI receives product requests from the ASTER GDS on behalf of a GDS user.
Request ECS Product Status	The ASTER Gateway CSCI receives product status requests from the ASTER GDS on behalf of a GDS user.
Request ECS Price Estimate	The ASTER Gateway CSCI receives price estimate requests from the ASTER GDS on behalf of a GDS user.
Search ASTER Inventory	The ASTER Gateway CSCI submits inventory search requests to the ASTER GDS on behalf of an ECS user.
Request ASTER Product Search	The ASTER Gateway CSCI submits product search requests to the ASTER GDS on behalf of an ECS user.
Request ASTER Browse Data Search	The ASTER Gateway CSCI submits browse data search requests to the ASTER GDS on behalf of an ECS user.

Table 4.4.4.2-1. ASTER Gateway CSCI Interface Events (2 of 2)

Event	Interface Event Description
Request Communications Support	The DCCI CSCI provides a library of services available to each SDPS and CSMS CSCI. The services required to perform the specific CSCI assignments are requested by the CSCI from the DCCI CSCI. These services include: DCE support, file transfer services, Network & Distributed File Services, Bulk Data transfer services, file copying services, name/address services, password services, Server Request Framework (SRF), UR, Error/Event logging, message passing, Fault Handling services, User Authentication services, Mode information, and retrieving the requested configuration attribute-value pairs from the Configuration Registry for ECS applications that request them.
Request V0 Inventory Search	The ASTER Gateway CSCI receives inventory search requests from the V0 EOS Data Gateway on behalf of an external ECS user.
Request V0 Browse Data	The ASTER Gateway CSCI receives browse data requests from the V0 EOS Data Gateway on behalf of an external ECS user
Request V0 Product	The ASTER Gateway CSCI receives product requests from the V0 EOS Data Gateway on behalf of an external ECS user.
Request V0 L7 Product	The ASTER Gateway CSCI receives requests for Landsat 7 products from the V0 EOS Data Gateway on behalf of an external ECS user.
Request Attribute Mappings	The ASTER Gateway CSCI requests data collection attribute and keyword mappings on behalf of a user from the Data Dictionary database via the Sybase Server to translate requests from the ASTER GDS or V0 IMS to the ECS protocol and back again.
Search Directory	The ASTER Gateway CSCI submits the directory search requests to the DDICT CSCI.
Request Inventory Search	The ASTER Gateway CSCI submits inventory search requests to the V0 GTWAY CSCI on behalf of a GDS user or an external ECS user.
Request Browse Data	The ASTER Gateway CSCI submits browse data requests to the V0 GTWAY CSCI on behalf of an ASTER GDS or external ECS user.
Request Product	The ASTER Gateway CSCI submits product requests to the V0 GTWAY CSCI on behalf of an ASTER GDS or an external ECS user.
Request L7 Product	The ASTER Gateway CSCI submits Landsat 7 product requests to the V0 GTWAY CSCI on behalf of an ASTER GDS or an external ECS user.

4.4.4.3 ASTER Gateway Architecture

Figure 4.4.4.3-1 is the ASTER Gateway CSCI architecture diagram. The diagram shows the events sent to the ASTER Gateway CSCI processes and the events the ASTER Gateway CSCI processes send to other processes.

The ASTER Gateway CSCI is two processes, the EcDmEcsToAsterGateway and the EcDmAsterToEcsGateway, as shown in the ASTER Gateway CSCI architecture diagram.

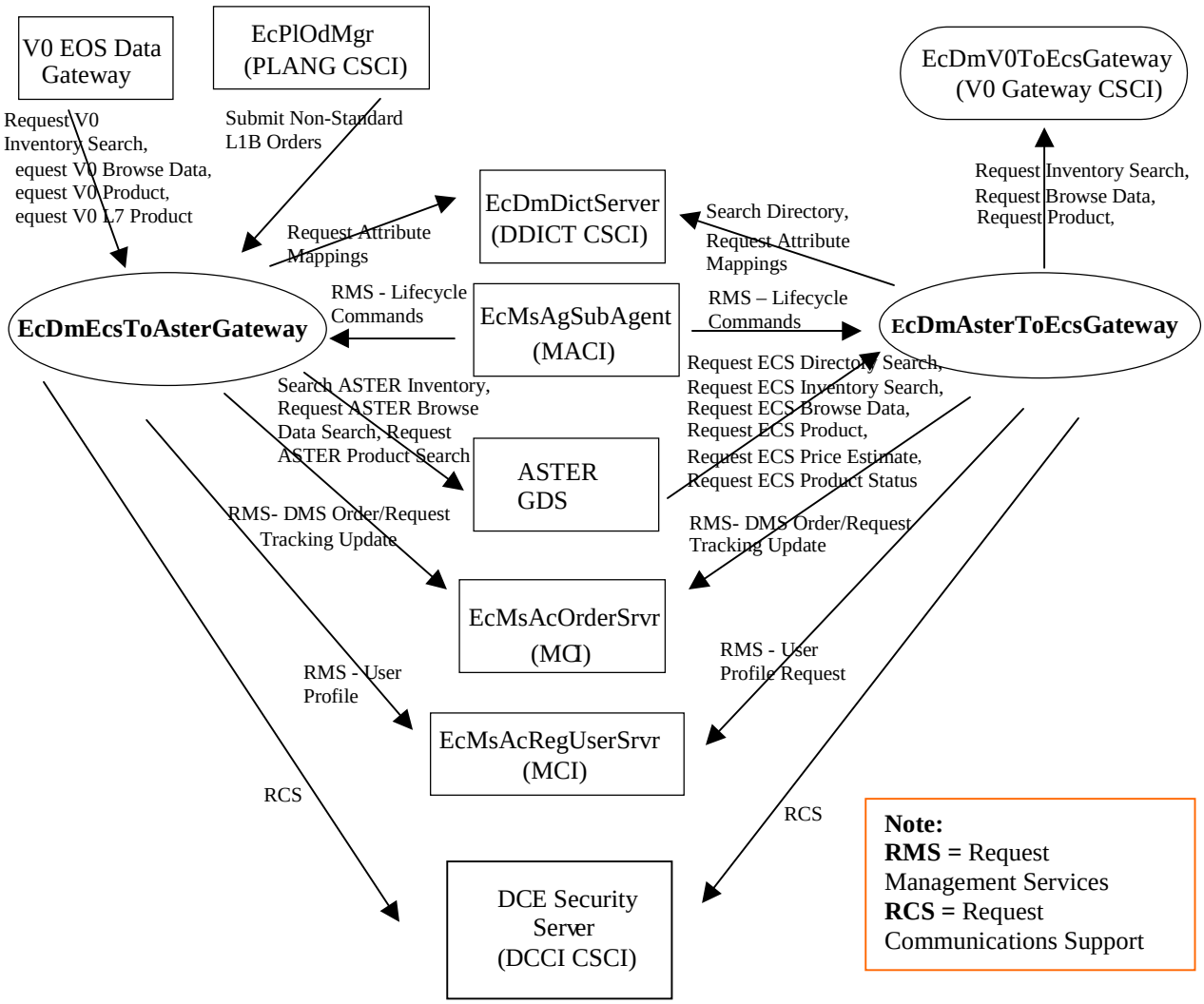


Figure 4.4.4.3-1. ASTER Gateway CSCI Architecture Diagram

4.4.4.4 ASTER Gateway Process Description

Table 4.4.4.4-1 provides the descriptions of the processes shown in the ASTER Gateway CSCI architecture diagram.

Table 4.4.4.4-1. ASTER Gateway CSCI Processes

Process	Type	COTS/ Developed	Functionality
EcDmAsterToEcsGateway	Server	Developed	The server receives requests for science data from ASTER GDS in ODL format. Each request is translated into the EcDsScienceDataServer format and processed as follows: **Directory Search** - sent to the Advertising Service (EcIoAdServer) Inventory Search – sent to the local EcDsScienceDataServer **Browse data** - sent to the local EcDsScienceDataServer **Product** – requests for data resident at the local DAAC are sent to the local EcDsScienceDataServer. Requests for data resident at other DAACs are translated into EOS Data Gateway ODL and sent to the V0 Gateway. **Price Estimate** – computed from configuration files **Status** – sent to the EcMsAcOrderSrvr. The results are translated back into ODL format and returned to the ASTER GDS.
EcDmEcsToAsterGateway	Server	Developed	The server receives search, browse, and acquire science data requests (from the V0 EOS Data Gateway in ODL and from the EcPlOdMgr (PLANG CSCI) in ECS format), translates them into ASTER GDS ODL format and sends them to the ASTER GDS. The results received from the ASTER GDS are translated back into the requestor's format and sent to the requestor.

4.4.4.5 ASTER Gateway Process Interface Descriptions

Table 4.4.4.5-1 provides the descriptions of the interface events shown in the ASTER Gateway CSCI architecture diagram.

Table 4.4.4.5-1. ASTER Gateway CSCI Process Interface Events (1 of 6)

Event	Event Frequency	Interface	Initiated By	Event Description
Search Directory	One per directory search request	*Process:* EcDmDictServer *Library:* EcDmDdClient *Class:* DmDdClSchemaRequest	*Process:* EcDmAsterToEcsGateway *Library:* DmAsGwAsterReqProc *Class:* DmAsGwDirQuery	The EcDmDictServer receives directory search requests from the EcDmAsterToEcsGateway.
Request Attribute Mappings	One per data request to DDICT	*Process:* EcDmDictServer *COTS SW Library:* RWDBTools.h++ *Library:* DmLmDbi *Class:* DmLmIntQuery	*Processes:* EcDmAsterToEcsGateway, EcDmEcsToAsterGateway *Library:* DmAsGwCommon *Class:* DmAsGwTranslate	The EcDmAsterToEcsGateway and EcDmEcsToAsterGateway request data collection attribute and valid keyword mappings, on behalf of a user, from the EcDmDictServer to translate requests from the GDS to the ECS and back again.
Request Communications Support	Request service(s) as required	*Process:* DCE Security Server *Libraries:* EcSelogin, EcSeLogincontext *Classes:* EcSelogin, EcSeLogincontext *Library:* EcPf *Classes:* EcPfManagedServer, EcPfclient *Library(Common):* EcUr *Class:* EcUrServerUR *Library:* Event *Class:* EcLgErrormsg	*Processes:* EcDmEcsToAsterGateway, EcDmAsterT0EcsGateway *Libraries:* EcDmDdClient, DmDdReqProc, DmDdServer *Classes:* DmDdClSchemaRequest, DmDdClRequest, DmDdMapper, DmDdProcMsg, DmDdSearchRequest	The DCCI CSCI Process Framework provides a library of services available to each SDPS and CSMS process. The services required to perform the specific process assignments are requested by the process from the Process Framework. These services include: DCE support, file transfer services, Network & Distributed File Services, Bulk Data transfer services, file copying services, name/address services, password services, Server Request Framework (SRF), UR, Error/Event logging, message passing, Fault Handling services, User Authentication services, Mode information, and retrieving the requested configuration attribute-value pairs from the Configuration Registry for ECS applications that request them.

Table 4.4.4.5-1. ASTER Gateway CSCI Process Interface Events (2 of 6)

Event	Event Frequency	Interface	Initiated By	Event Description
Request Inventory Search	One per request	*Process:* EcDmV0ToEcsGateway *Library:* RequestProcessing *Class:* DmGwInvSearchRequest	*Process:* EcDmAsterToEcsGateway *Library:* DmAsGwAsterReqProc *Class:* DmAsGwAsterInvRequestor	The EcDmAsterToEcsGateway submits inventory search requests to the EcDmV0ToEcsGateway for data stored at other DAACs on behalf of a GDS user.
Request Browse Data	One image per request	Process: EcDmV0ToEcsGateway *Library:* EcsReqProc *Class:* DmAsGwEcsBrowseRequest	*Process:* EcDmAsterToEcsGateway *Library:* DmAsGwAsterReqProc *Class:* DmAsGwAsterBroRequestor	The EcDmAsterToEcsGateway submits browse data requests to the EcDmV0ToEcsGateway for data stored at other DAACS on behalf of a GDS user.
Request Product	One product per request	Process: EcDmV0ToEcsGateway *Library:* EcsReqProc *Class:* DmAsGwEcsProRequest	*Process:* EcDmAsterToEcsGateway *Library:* DmAsGwAsterReqProc *Class:* DmAsGwAsterProRequestor	The EcDmAsterToEcsGateway submits product requests to the EcDmV0ToEcsGateway for data stored at other DAACs on behalf of a GDS user.
Request L7 Product	One product per request	Process: EcDmV0ToEcsGateway *Library:* EcsReqProc *Class:* DmAsGwEcsProRequest	*Process:* EcDmAsterToEcsGateway *Library:* DmAsGwAsterReqProc *Class:* DmAsGwAsterProRequestor	The EcDmAsterToEcsGateway submits Landsat 7 product requests to the EcDmV0ToEcsGateway for data stored at other DAACs on behalf of a GDS user.

Table 4.4.4.5-1. ASTER Gateway CSCI Process Interface Events (3 of 6)

Event	Event Frequency	Interface	Initiated By	Event Description
Request Management Services (RMS)				The EcMsAgSubAgent, EcMsAcRegUserSrvr and EcMsAcOrderSrvr provide a basic management library of services to the processes, implemented as client or server applications, using the DCCI CSCI Process Framework. The basic management library of services include:
RMS (cont.)	One per command to start or stop network applications	*Processes:* EcDmEcsToAsterGateway, EcDmAsterToEcsGateway	*Process*: EcMsAgSubAgent Library: EcAgInstrm Class: EcAgManager *Script:* EcDmV0Gateways AppStart	• **Lifecycle Commands** - The HPOV Network Node Manager forwards (via DCE RPCs), to the MSS Sub Agent running on each managed host, requests to start and stop ECS applications. A start request has mode and temperature parameters that the MSS Sub Agent uses in constructing its command line startup request. Stop requests precipitate a PF shutdown RPC call to the target ECS application from the MSS Sub Agent. Managed applications use the application interface PFGETMODE to obtain their operational mode (e.g., Ops, test, or training).
RMS (cont.)	One per product order	*Process:* EcMsAcOrderSrvr *Library:* MsAcClnt *Class:* EcAcOrderCMgr	*Processes:* EcDmEcsToV0Gateway, EcDmV0ToEcsGateway *Class:* DmGwRequestReceiver	• **DMS Order/Request tracking update** – The V0 GTWAY interfaces with the Order/Request tracking service, EcMsAcOrderSrvr, to create a user product order.
RMS (cont.)	One per request	*Process:* EcMsAcRegUserSrvr *Libraries:* MsAcClnt MsAcComm *Class:* MsAcUserProfile	*Processes:* EcDmEcsToV0Gateway, EcDmV0ToEcsGateway *Class:* DmGwRequestReceiver	• **User Profile Request** – The EcMsAcRegUserSrvr provides requesting processes with User Profile parameters such as e-mail and shipping addresses to support their processing activities.

Table 4.4.4.5-1. ASTER Gateway CSCI Process Interface Events (4 of 6)

Event	Event Frequency	Interface	Initiated By	Event Description
Request ECS Directory Search	One per request	*Process:* EcDmAsterToEcsGateway *Library:* DmAsGwAsterReqProc *Class:* DmAsGwAsterInvRequestor	ASTER GDS	The ASTER GDS submits directory search requests to the EcDmAsterToEcsGateway on behalf of a GDS user.
Request ECS Inventory Search	One per request	*Process:* EcDmAsterToEcsGateway *Library:* DmAsGwAsterReqProc *Class:* DmAsGwAsterInvRequestor	ASTER GDS	The ASTER GDS submits inventory search requests to the EcDmAsterToEcsGateway on behalf of a GDS user.
Request ECS Browse Data	One per browse request	*Process:* EcDmAsterToEcsGateway *Library:* DmAsGwAsterReqProc *Class:* DmAsGwAsterBroRequestor	ASTER GDS	The ASTER GDS submits browse data requests to the EcDmAsterToEcsGateway on behalf of a GDS user.
Request ECS Product	One per product request	*Process:* EcDmAsterToEcsGateway *Library:* DmAsGwAsterReqProc *Class*: DmAsGwAsterProRequestor	ASTER GDS	The ASTER GDS submits product requests to the EcDmAsterToEcsGateway on behalf of a GDS user.
Request ECS Price Estimate	One per price estimate request	*Process:* EcDmAsterToEcsGateway *Library:* DmAsGwAsterReqProc *Class:* DmGwPriceEstRequest	ASTER GDS	The ASTER GDS submits price estimate requests to the EcDmAsterToEcsGateway on behalf of a GDS user.
Request ECS Product Status	One per Media Type requested	*Process:* EcDmAsterToEcsGateway *Library:* DmAsGwAsterReqProc *Class*: DmAsGwAsterProductStatusRequest	ASTER GDS	The ASTER GDS submits product status requests to the EcDmAsterToEcsGateway on behalf of a GDS user.

Table 4.4.4.5-1. ASTER Gateway CSCI Process Interface Events (5 of 6)

Event	Event Frequency	Interface	Initiated By	Event Description
Search ASTER Inventory	One per inventory request	ASTER GDS	*Process:* EcDmEcsToAsterGateway *Library:* RequestProcessing *Class:* DmGwInvSearchRequest	The EcDmEcsToAsterGateway submits inventory search requests to the ASTER GDS on behalf of an ECS user.
Request ASTER Browse Data Search	One per browse request	ASTER GDS	*Process:* EcDmEcsToAsterGateway *Library:* DmAsGwAsterReqProc *Class:* DmAsGwAsterBroRequestor	The EcDmEcsToAsterGateway sends browse requests, provided by users from the EOS Data Gateway within the V0 IMS, to the ASTER GDS.
Request ASTER Product Search	One per product request	ASTER GDS	*Process:* EcDmEcsToAsterGateway *Library:* EcsReqProc *Class*: DmAsGwEcsProRequest	The EcDmEcsToAsterGateway submits product requests to the ASTER GDS on behalf of an ECS external user (sent via the EOS Data Gateway).
Submit Non-Standard L1B Orders		*Process:* EcDmEcsToAsterGateway *Library:* DmAsGwEcsReqProc *Classes:* DmGwEcsAsterRequestReceiver, DmGwEcsProductRequest	*Process:* EcPlOdMgr *Library:* PlCore2 *Class:* PlNonStandardOrder	The EcPlOdMgr submits requests through the EcDmEcsToAsterGateway for the production of non-standard L1B on-demand products.
Request V0 Inventory Search	One per inventory request	*Process:* EcDmEcsToAsterGateway *Library:* RequestProcessing *Class:* DmGwInvSearchRequest	V0 EOS Data Gateway	The V0 EOS Data Gateway sends inventory search requests to the EcDmEcsToAsterGateway for ASTER data on behalf of an external ECS user.

Table 4.4.4.5-1. ASTER Gateway CSCI Process Interface Events (6 of 6)

Event	Event Frequency	Interface	Initiated By	Event Description
Request V0 Browse Data	One per browse request	*Process:* EcDmEcsToAsterGateway *Library:* DmAsGwAsterReqProc *Class:* DmAsGwAsterBroRequestor	V0 EOS Data Gateway	The V0 EOS Data Gateway sends browse data requests to the EcDmEcsToAsterGateway for ASTER data on behalf of an external ECS user.
Request V0 Product	One per product request	*Process:* EcDmEcsToAsterGateway *Library:* EcsReqProc *Class*: DmAsGwEcsProRequest	V0 EOS Data Gateway	The V0 EOS Data Gateway sends product requests to the EcDmEcsToAsterGateway for ASTER data on behalf of an external ECS user.
Request V0 L7 Product	One per L7 product request	*Process:* EcDmEcsToAsterGateway *Library:* EcsReqProc *Class*: DmAsGwEcsProRequest	V0 EOS Data Gateway	The V0 EOS Data Gateway sends L7 product requests to the EcDmEcsToAsterGateway for ASTER data on behalf of an external ECS user.

4.4.4.6 ASTER Gateway Data Stores

Table 4.4.4.6-1 describes the ASTER Gateway data stores shown in the ASTER Gateway architecture diagram.

Table 4.4.4.6-1. ASTER Gateway CSCI Data Stores

Data Store	Type	Functionality
EcDmDictService	Database	The Data Dictionary database, EcDmDictService, is a Sybase relational database that persistently stores the collection and collection related information on a physical disk medium. The DDICT database is replicated wholly to each DAAC. The data stores in the Data Dictionary database used by the ASTER GATEWAY CSCI are: • Information managers or gateways in the ECS federation that access these collections. • Collection Types: A list of all the data types within the SDPS • Collection Attributes and Keywords: Attributes and keywords associated with collections originating within and outside the SDPS are used by the ASTER GATEWAY CSCI to translate requests between the GDS IMS and the SDPS

4.4.5 Data Management Subsystem Hardware

The primary components of the Data Management Subsystem include two hardware CIs, Data Management Hardware CI (DMGHW) and Interface Hardware CI (INTHW), co-owned by the Interoperability Subsystem, as described below. Custom code and applications are loaded on the internal disks of all hosts to prevent dependencies on specific hosts or peripherals. The general-purpose workstations are standalone hosts without fail-over capability. In the event of a host failure, any of the available workstations could be used to support end user DAAC maintenance.

4.4.5.1 Data Management Hardware CI (DMGHW) Description

The DMGHW CI includes general-purpose low-end SUN and HP workstations, and one mid-range HP Server. These workstations are used as end user workstations in maintenance of each of the respective DAAC sites. The Server is used to support Sybase database replication and backup.

4.4.5.2 Interface Hardware CI (INTHW) Description, as used by the Data Management Subsystem

The INTHW CI includes two Interface Servers. The Interface Servers support the Client Subsystem and a portion of the Communications Subsystem. The servers are SUN class machines with detailed specifications in the site specific hardware design diagram, baseline document number 920-TDx-001. Because of their common configuration, these hosts can be configured interchangeably. DMS software runs on these hosts: DDICT, LIMGR and V0 GTWAY. The Data Dictionary Server (EcDmDictServer) allows authorized users to perform data searches, inserts, updates and deletions to data within the Data Dictionary Database. The LIMGR executes a single process, EcDmLimServer, to enable the Information Manager to access data and services from each DAAC site and accept and process requests. The V0 GTWAY consists of multiple processes to allow access to data and services between the ECS Data Server and the V0 IMS System. Detailed information can be found in the site-specific hardware/software mapping, baseline document number 920-TDx-002.

A SUN SPARC Storage Array, Model 114, is dual ported between both hosts and provides storage for the Data Dictionary Database and Sybase Replication software. A detailed configuration is specified in baseline document number 920-TDx-009.

The Interface Servers are both “hot” and share the resident RAID device. In the event of a host failure, the operational server assumes total ownership of the RAID and all processes. In this state, the server is recognized to be running in degraded mode until recovery is completed.