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Operating System Upgrade Plan for SGI Machines in ECS

White Paper

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Abstract

This document describes the plan for transitioning from SGI IRIX 6.2 to SGI IRIX 6.5. The plan addresses the process for transitioning and testing in the Landover environments (EDF, VATC, PVC) and at the DAACs. The document outlines the development, integration, transition, and Commercial Off the Shelf (COTS) product upgrades associated with the OS upgrade. This version also describes the upgrade approach at each DAAC. The plan also identifies resources required from both ECS as well as the DAACs during the OS upgrade transition activities.

Keywords: Release 55, OS upgrade, SGI, Challenge, Origin, IRIX, transition

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1. Introduction

1.1 Purpose

This document describes the plan for transitioning from SGI IRIX 6.2 to SGI IRIX 6.5. The plan addresses the process for transitioning and testing in the Landover environments (EDF, VATC, PVC) and at the DAACs.

1.2 Organization

Section 1 of this document provides information regarding the purpose, organization, and review and approval process dictated.

Section 2 of this document provides the overall plan for the OS upgrade on the ECS project.

Section 3 provides the COTS product upgrade information associated with the OS upgrade.

Section 4 provides the configuration and planned tests to be conducted in development labs.

Section 5 provides the information pertaining to the transition activities required for the OS upgrade.

Section 6 provides the configuration and planned tests to be conducted in PVC.

Section 7 provides the transition details associated with implementing the OS upgrade at the DAACs.

Note that the detailed procedures are in the following document which will be updated periodically:

Procedures for the Transition of ECS into the IRIX 6.5 Environment -- (420-WP-013-001).

1.3 Review and Approval

This White Paper is an informal document approved by Director, Systems Engineering, ECS Project. It does not require formal Government review or approval.

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2. The Overall Plan

2.1 The Big Picture

The ECS project is required to upgrade the OS on all the SGI machines in the EDF Landover facility as well as at all DAACs. There are two compelling reasons for the OS upgrade. First, the current SGI support of OS, IRIX 6.2, terminates as of 30 June 2000 and, second, the system performance requirement for Aqua requires SGI Origin machines at some sites; the Origin class is not capable of running an IRIX release prior to 6.5.

The SGI vendor recommendation is that we target the latest available maintenance release, IRIX 6.5.x, for our final upgrade release. The latest version will have more bugs identified and fixed and hence the project will incur less risk than the earlier version. Currently, the ECS baseline version is the IRIX 6.5.6 maintenance release. Several COTS products will need to be upgraded to the versions that are certified for the IRIX 6.5 release.

The proposed OS upgrade can happen only after the 5B release is moved to the OPS mode at the DAAC (estimated to be no earlier than June/July 2000) and must complete prior to MOSS testing for Aqua launch. For scheduling purposes Aqua launch is assumed to be in December 2000 with MOSS testing beginning 15 October, 2000.

Note also that ECS Release 6A is built on IRIX 6.5, so the DAACs must upgrade before taking Release 6A.

The OS upgrade plan includes the Origin hardware upgrade activities planned around the same time frame.

2.2 The Custom Code Release

The custom code that will be released with the new OS will be referred to as Release 55. Release 55 will be SGI custom code 5B built on IRIX 6.5 with upgraded COTS. It will be delivered as a release to 5B. At that time, the release will be known as 5B.n where n is the sequence number within the 5B releases. At the time of writing, it looks like 55 will be 5B.05.

Starting in March, a build of the 5B SGI source code will be maintained on IRIX 6.5, in addition to IRIX 6.2. The same code baseline will be built on the two IRIX versions, so that a mix of 6.2 and 6.5 machines can exist at a site.

The SGI source code will continue to be built with the new 32-bit ABI (application binary interface), but will be compiled with the mips4 option. This directs the compiler to generate the mips4 instruction set, which provides several optimizations in floating point processing not present in the mips3 instruction set currently used by ECS custom code. There are some good articles on the instruction sets at http://techpubs.sgi.com.

2.3 Transition at DAACs

The transition to Release 55 on IRIX 6.5 will affect the HWCIs (hardware configuration items) that contain SGI processors. The transition approach for the icg, drg, and acg machines involves configuring a substitute machine for each baseline machine. In some cases the substitute machine is new, and in other cases a secondary machine is used. Release 55 will be installed and tested on the substitute machine while operations continue. After testing is complete, operations are cut over to the substitute machine by copying over persistent data.

After operations have been successfully resumed on the substitute machine, the original machine is removed from the baseline.

The spg, wkg, and aqg hosts will be upgraded in place.

The above-mentioned substitution method requires very little downtime and provides a quick and easy fall back plan. Section 5 and 7 provide details about the transition activities.

3. COTS product upgrades

3.1 COTS Software upgrade

The software compatibility analysis of layered COTS identifies a set of products that must be upgraded before, or at the same time as upgrading to IRIX 6.5, because the current baseline versions of these products are not supported on IRIX 6.5. As many as possible of the COTS product PSRs are conducted in advance to minimize the overall risk. The products are summarized in Table 3.1-1.

Table 3.1-1. Products to be upgraded before IRIX 6.5

	Category #1	**Category #2**	**Category #3**	**Category #4**
Description	COTS that are upgraded for reasons other than OS upgrade	COTS that are upgraded due to OS upgrade but can be upgraded before OS upgrade	COTS that should be upgraded with custom code Release 5B	COTS that should be upgraded or rebuilt with OS upgrade i.e. with Release 55
PSR Dates NLT	5B CSR	5B CSR	5B CSR	55 PSR
Products	SGI Y2K/DCE patch HP Security patchTivoli 3.6 IQ, SQR HP Open View 6.0 Sybase Replication Server 11.5.1 Sybase Central 3.0	Sybase ASE 11.5.1 Sybase OC 11.1.1 (Sun) Netscape Comm. 4.7 Purify 4.5 (Sun) Visual Workshop 3.0 FORTRAN 77 Additional FLEXlm servers (LaRC and EDC) Legato 5.5.1 AMASS 4.12.3	**Statically linked in 5 B** HDF 4.1r3 <u>Rogue Wave:</u> Db Tools.h++ 3.1.4 Tools.h++ 7.0.b Tools Pro 1.02	**Upgraded + patches** IRIX 6.5.6/ DCE 1.2.2a DG RAID 3.3 / Flare Code/PROM BDS 2.1/HiPPI SW 3.3.1 IDL 5.3 Purify 4.5 (SGI) Sybase OC 12.0 (SGI) IMSL 3.01/4.01 ClearCase 3.2.1 Secure Shell 1.3.6 & 2.0.12/TCP Wrappers 7.6 Tripwire 1.3 **Rebuilt on IRIX 6.5** Perl 5.005-03 Tcl/Tk 8.0_PL_4

The COTS installation process for the IRIX upgrade is shown in the Procedures for the Transition of ECS into the IRIX 6.5 Environment document (420-WP-013).

3.2 COTS Software License Transition

There will be two types of COTS software licensing impact to the IRIX 6.5 transition. There will be COTS SW version upgrades associated with the transition to IRIX 6.5. Version upgrades will impact all hosts baselined for the COTS software. There will also be licensing impacts related to the planned hardware migration identified in this document. Both types of licensing impact have been incorporated into the IRIX 6.5 migration planning and are discussed in detail in the following sections.

3.2.1 Transition COTS Version Upgrade License Impact

The IRIX 6.5 Operating System will be upgraded during the transition, along with other SGI product upgrades that are required for the IRIX Operating System upgrade and baselined for the specific host. Other upgrades will also be included in the transition. Table 1-1 identifies the COTS version upgrades planned and the License Key impact of each of these upgrades. As part of the overall transition planning, the ILS Software License Administrator has work in progress to obtain new license keys for COTS products identified as requiring new license keys during the IRIX 6.5 transition.

The following products will be removed from the IRIX 6.5 baseline at transition and are therefore not included in the following tables. These COTS are either not required for SGI (BX/Epak and EMACS) or a version is not currently available for IRIX 6.5 (DCE Cell Manager Host Agent for IRIX 6.5).

- DCE Cell Manager Host Agent for SGI
- Builder Xcessory/Epak

The following product is not mandatory to install. The DAACs may upgrade if they desire:

- EMACS

Table 3.2.1-1. IRIX 6.5 COTS Product Version Upgrades (1 of 3)

COTS	Planned Version Upgrade	Upgrade Description	License Key Impact
Acrobat Reader	4.05	Upgrade for IRIX 6.5	No license key impact.
AMASS	4.12.3	COTS product installation on baselined hosts.	New license keys will be required for all baselined hosts.
BDS	2.1	Installed with OS upgrade on baselined hosts	No license key impact.
ClearCase	3.2.1	COTS product installation on baselined hosts	No license key impact.

Table 3.2.1-1. IRIX 6.5 COTS Product Version Upgrades (2 of 3)

COTS	Planned Version Upgrade	Upgrade Description	License Key Impact
DCE Client for SGI	1.2.2a	Installed with OS upgrade on baselined hosts	No license key impact.
FLEXlm	6.1	Installed with OS upgrade on baselined hosts.	If HW change or other baseline change occurs to one of the 3 SGI FLEXlm Servers, a new license key needs to be obtained that identifies all 3 of the IRIX 6.5 FLEXlm Servers. Contact Software License Administration at 301 925-0726 or 0718 for permanent keys and temporary keys as required. SGI FLEXlm Servers manage licenses for SGI Compilers and ProDev Workshop.
HiPPI SW	3.3.1	Installed with OS upgrade on baselined hosts	No license key impact.
IDL	5.3	Required for OS version	New license key required for upgrade on each baselined host. Contact Software License Administration at 301 925-0726 or 0718 for permanent keys and temporary keys as required.
IMSL C and FORTRAN Libraries	3.01/4.01	Required for OS version	License keys required. Contact Software License Administration at 301 925-0726 or 0718 for permanent keys and temporary keys as required.
Legato Networker Client	5.5.1	SGI clients will be included with general upgrade of Legato. Upgrade of Sun Legato Server required to precede SGI client upgrade.	New license keys required for Legato Server on Solaris. Contact Software License Administration at 301 925-0726 or 0718 for permanent keys. Although new license keys will not be needed related to SGI HW changes, some Legato Server configuration file edits will be required for SGI HW changes.
MIPSpro Compilers/ProDev Workshop	binary upgrade of current version for IRIX 6.5	Installed with OS upgrade on baselined hosts.	No direct license impact. Compiler and ProDev licenses managed by FLEXlm. See FLEXlm impact.
PERL	binary upgrade of current version for IRIX 6.5	binary upgrade of current version for IRIX 6.5	No license key impact.

Table 3.2.1-1. IRIX 6.5 COTS Product Version Upgrades (3 of 3)

COTS	Planned Version Upgrade	Upgrade Description	License Key Impact
Purify	4.5.	Required for IRIX 6.5	If host HW changes, new license keys will be required. Same license keys as previous version. Contact Software License Administration at 301 925-0726 or 0718 for new permanent and temporary keys for new SGI HW.
Secure Shell/TCP Wrappers	1.3.7/2.0.13.2;	Upgrade for all platforms	No license key impact.
SGI RAID SW/Firmware	3.3	Installed with OS upgrade on baselined hosts.	No license key impact.
Sybase OpenClient/C for SGI	12.0	Delivered with custom code and automounted	No license key impact.
TCL/tk	binary upgrade of current version for IRIX 6.5	binary upgrade of current version for IRIX 6.5	No license key impact.
Tools.h ++	7.0.b	COTS will be delivered with custom code/ will no longer be automounted and delivered as separate COTS product.	No license key impact.
ToolsPro.h ++	1.02	New COTS replacing net.h will be delivered with custom code/ will no longer be automounted and delivered as separate COTS.	No license key impact.
Tripwire	1.3	Version upgrade for all platforms.	No license key impact.

3.2.2 Hardware Transition License Impact

There will be two types of licensing impact to the IRIX 6.5 migration. The IRIX 6.5 hardware migration implementation will require temporary license keys as well as permanent license key changes. Some COTS software will have no software licensing impact during the IRIX 6.5 transition and will require only a simple reinstall on the new hardware host. COTS products, such as Sybase ASE, that will require only a reinstallation and have no FLEXlm or vendor license keys are not discussed in the following sections as there is no license key impact that needs to be managed for the transition.

3.2.3 Temporary License Keys

Temporary licenses may be necessary to support the hardware change implementation planned for the IRIX 6.5 transition. The ILS Software License Administrator has verified that temporary license keys will be made available for the planned transition implementation. Temporary keys are planned to be utilized in the IRIX 6.5 transition. Contact Software License Administration at 301 925-0726 or 0718 for temporary keys when these are necessary.

3.2.4 New Permanent License Keys

The hardware changes identified in the IRIX 6.5 transition discussed in other sections of this document will include some impacts to existing software licensing. These impacts fall into one of two of the following categories:

- FLEXlm license servers, which provides license access for COTS products whose vendors utilize FLEXlm for license management.
- COTS utilizing a vendor proprietary license management mechanism.

3.2.5 SGI FLEXlm License Server

The hardware changes of the IRIX 6.5 transition will impact one or more of the SGI FLEXlm License Servers at some sites. To assure license availability during the IRIX 6.5 transition period, the baselined redundant server implementation of SGI FLEXlm License Server is required. If the SGI FLEXlm License Servers are implemented as redundant servers, all FLEXlm-managed license will be available during the upgrade of any one of the three redundant FLEXlm License Servers. If the FLEXlm redundant server configuration is available during the IRIX 6.5 transition, all FLEXlm-managed licenses will be available at the DAAC during the IRIX 6.5 transition. At the time of writing, EDC and LaRC do not have three FLEXlm servers implemented, and must add servers before the IRIX upgrade. Currently, the SGI FLEXlm License Servers manage licenses for SGI Compilers and ProDev Workshop.

There are some planned changes to the SGI FLEXlm License Server baselines and/or the hardware that will be utilized as SGI FLEXlm License Servers. If there are changes to the SGI FLEXlm license servers either from a baseline change or a hardware implementation change, new SGI FLEXlm license keys need to be requested which include all 3 of the release 55 SGI FLEXlm License servers. Contact Software License Administration at 301 925-0726 or 0718 for permanent and/or temporary keys for SGI FLEXlm License Servers keys.

3.2.6 Proprietary License Management

Table 3.2.6-1outlines the FLEXlm and vendor proprietary licenses that will be impacted by the IRIX 6.5 transition to Origins and/or the introduction of new Origins.

Table 3.2.6-1. IRIX Origin Transition Licensing Impacts

Host Name	Impact Description	New SGI License Key Descriptions	Comments on non-impacted managed licenses
acg hosts migrating to Origins	Requires new license keys.	• Purify	• Legato Licenses managed by Sun Server. Legato license configuration update needed on Legato Sun License Server for SGI HW changes. • BDS/HiPPI SW not licensed key managed • Compiler Licenses managed by SGI FLEXlm Server license keys. If acg is a current or new SGI FLEXlm license server, a new key needs to be obtained which includes new host and 2 other SGI FLEXlm redundant license servers. • Tivoli Client licenses managed by HP Tivoli Server • Sybase/SQL Monitor/OpenClient/SQS not license-key managed.
drg hosts migrating to Origins	Requires new license keys for new HOST-ID for all FLEXlm server licenses. Requires new license keys for AMASS, Purify and Legato.	• SGI FLEXlm compiler/workshop • AMASS • Purify	• BDS/HiPPI SW not licensed managed • Tivoli Client licenses managed by HP Tivoli Server • Legato Licenses managed by Sun Server. Legato license configuration update needed on Legato Sun License Server for SGI HW changes.
spg hosts migrating to Origins	Requires new license keys.	New license keys for: • IDL • IMSL C Libraries • IMSL FORTRAN Libraries • Purify • C/C++ Compilers/Workshop(FLEXlm)	• Legato Licenses managed by Sun Server. Legato license configuration update needed on Legato Sun License Server. • BDS/HiPPI SW not licensed managed • Tivoli Client licenses managed by HP Tivoli Server

3.3 COTS Hardware upgrade

The following table describes the movement of Origin (O2K) and Challenge (CH) processors between the subsystems and sites. Some future moves, after the IRIX upgrade, are included.

Table 3.3-1 applies to the "new name" approach for the "e" machines and the "same name" approach for the other machines.

Table 3.3-1. Hardware Movement Plan (1 of 3)

Current Host/Platform	Future Host/Platform	ACTION	Reuse/Spare
e0acg01 - CH XL	e0acg11-Origin 2000	Replace with Origin 2000	Move to e0icg02
e0acg02 - CH XL	**Future:** e0acg12-Origin 2000	Remove from baseline	Move to e0icg01
e0icg01 - CH DM	e0icg11 - CH XL	Replace with XL (old e0acg01)	Move to e0aqg01
e0icg02 - CH DM	e0icg12 - CH XL	Replace with XL (old e0acg02)	Move to VATC t1acg08
e0aqg01 - CH S	e0aqg11-CH DM	Replace with CH DM (old e0icg01)	Move CH S to STOCK
e0aqg02 - Indigo Impact	no change	None, add additional disk	N/A
e0drg01 - CH XL	e0drg11-Origin 2000	Replace with Origin 2000	
e0drg02 - CH XL	e0drg12-Origin 2000	Replace with Origin 2000	
e0drg05 - CH XL			Move to e0akg02
N/A	e0console1-new O2K WS	ADD	New purchase
e0spg01	no change	Upgrade in place	N/A
e0spg05	no change	Upgrade in place	N/A
e0wkg01	no change	Upgrade in place	N/A
N/A	e0wkg02 - CH XL	ADD	**(future use)** - Move to e0wkg02
	e0console1 - O2 WS	ADD	New purchase
g0acg01 - CH XL	g0acg05-Origin 2000	Replace with Origin 2000	Spare Challenge g0acg01 to GSFC g0icg01
g0acg05 - CH XL	**Future:** g0acg05-Origin 2000	Replace with Origin 2000	Spare Challenge g0acg01 to GSFC g0icg02
g0drg01 - CH XL	g0drg01-Origin 2000 (Note this is g0drg07 temporarily for TS1 & TS2.)	Replace with Origin 2000	**(future upgrade)** Spare Challenge g0drg01 to l0icg01in 2001

Table 3.3-1. Hardware Movement Plan (2 of 3)

Current Host/Platform	Future Host/Platform	ACTION	Reuse/Spare
g0drg02 - CH XL	g0drg02-Origin 2000 (Note this is g0drg07 temporarily for TS1 & TS2.)	Replace with Origin 2000	**(future upgrade)** Spare Challenge g0drg02 to l0icg02 in 2001
g0drg07 - CH XL		Remove from baseline	Move to VATC as t1drg04
g0icg01 - CH DM	g0icg01 -CH XL	Replace with XL (old g0acg01)	Move to g0aqg01
g0icg02 - CH DM	g0icg02 - CH XL	Replace with XL (old g0acg02)	Move to VATC as t1wkg02
g0aqg01 - CH S	g0aqg01-CH DM	Replace with CH DM (old g0icg01)	Move CH S to STOCK
g0aqg02 - Indigo Impact	no change	None, add additional disk	N/A
g0mog01	no change	Upgrade in place	N/A
g0spg02	no change	Upgrade in place	N/A
g0spg07	no change	Upgrade in place	N/A
g0spg10	no change	Upgrade in place	N/A
	g0console1-INDY	ADD	reuse EIN 1241 g0teg01 and add console manager
	g0console2-INDY	ADD	reuse EIN 0758 - old wallace and add console manager
l0acg02 - CH XL	no change	None (disk only)	N/A
l0acg05 - CH XL	no change	None (disk only)	N/A
l0drg01	no change	Upgrade in place	N/A
l0drg03	no change	Upgrade in place	N/A
l0icg01 - CH DM	no change	Upgrade in place	To be upgrade to power challenge in 2001 from the old g0acg01 **(future upgrade)**
l0icg02 - CH DM	no change	Upgrade in place	To be upgrade to power challenge in 2001 from the old g0acg02 **(future upgrade)**
l0spg01	no change	Upgrade in place	N/A
l0spg05	no change	Upgrade in place	N/A
l0spg06	no change	Upgrade in place	N/A

Table 3.3-1. Hardware Movement Plan (3 of 3)

Current Host/Platform	Future Host/Platform	ACTION	Reuse/Spare
l0aqg01 -Indigo Impact	no change	None, add additional disk	N/A
l0aqg02 - CH S	no change	Upgrade in place	**(future upgrade)** from old l0icg01 in 2001
n0acg01 - CH XL	no change	Upgrade in place	N/A
n0acg02 - CH XL	no change	Upgrade in place	N/A
n0drg02	no change	Upgrade in place	N/A
n0drg01	no change	Upgrade in place	N/A
n0icg01 – CH DM	n0icg01-CH XL Temporarily n0icg02	Replace with XL (old g0drg07)	FROM GSFC
n0spg03	no change	Upgrade in place	N/A
N0aqg02 -Indigo Impact	no change	None	N/A
N0aqg01 - CH S	N0aqg01-CH DM	Replace with CH DM (n0icg01)	Move CH S to stock

3.4 Shared Mode Impacts

3.4.1 Impact to 5B shared mode

In order to assess all impacts, we will use a broad definition of shared mode in this paper: shared mode comprises all system components that can't be upgraded one mode at a time. All such components associated with 5B are discussed below.

1) Sun 4.2 Compiler

The Sun Compiler is being upgraded because 4.1 has reached end-of-life, and because the version of Rogue Wave needed for IRIX 6.5 is not certified for 4.1. At the same time, several OS patches, DCE patch level 43, and several OODCE fixes are being applied to the build machines (these OS and DCE patches were applied at the sites during the last year, so all sites are ready to run code built with the patches).

In order to avoid splitting Landover's compile engines between 4.1 and 4.2, both 5A and 5B were converted to 4.2 at the same time, in mid-January. The first 5A build on 4.2 was 5A.05 Electra, and all 5B releases have been built with 4.2. The Sun 4.2 shared mode was deployed with 5A.05 Electra, so that shared mode was already 4.2 before 5B reached the DAACs. The 4.2 upgrade requires no special effort from the DAACs - just standard procedures for custom software installation and checkout. The 4.2 shared mode does not need to be installed by the DAACs, since shared mode is now obsolete, and in any case Landover tests have shown that the 4.1 shared mode inter-operates with 4.2 ECS code.

The 4.2 upgrade causes other compiler-associated products to require upgrading. These are not part of shared mode since they are stand-alone, but are listed here for completeness:

a) Purify on Sun

b) Visual Workshop (this is the Sun development environment, and contains the C and C++ compilers)

c) Fortran 77 Compiler 4.2

These products went to PSR at the same time as 5A.05 Electra, and should be installed by the DAACs at the same time as Electra.

2) Rogue Wave

ECS currently uses the following Rogue Wave software component packages:

i) Tools.h++ 7.02

ii) DbTools.h++ 2.1.1

iii) Net.h++ 7.02

The upgrade will move ECS to the following Rogue Wave components:

i) Tools.h++ 7.0b

ii) DbTools.h++ 3.1.4

iii) ToolsPro 1.1 (the vendor has repackaged Net.h++ into ToolsPro).

The custom software part of shared mode uses the Rogue Wave components for strings and dates. During installation of 5B at the DAACs, the new shared mode will interoperate with 5A, which is built with the older versions of the string and date components. Inspection of the source code, and testing at Landover, show that this is feasible.

3.4.1.1 Digression On Linking

In the past, ECS has deployed Rogue Wave shared libraries to the DAACs. They are made available to all machines via the automounted /tools directory. Beginning with 5A.05 Electra, all future ECS custom executables will statically link the Rogue Wave libraries, and all other COTS libraries, including Sybase OpenClient. This will obviate the need to deploy new versions of these products simultaneously with the custom code, thus not only saving the deployment effort but eliminating the custom/COTS version mismatches that have occurred.

Surprisingly, there is no net increase in executable sizes due to static linking. This is due to a combination of factors:

- Open Client was already linked statically by most executables

- Most Rogue Wave components are templates. Template instantiations with a particular data type cause object code to be inserted into the executable rather than the shared library, so again the burden was already borne by the executables.

Obsolete versions of libraries such as Rogue Wave should be removed by the DAACs in order to reclaim disk space. Note that ECS does not plan to deploy new versions to the DAACs (other than inside the custom executables), so any DAAC that wants to build its own custom executables should request copies of these libraries. Landover will continue to PSR and deploy Sybase Open Client in order to provide utilities like isql and bcp for all machines, and to provide the Open Client libraries for the science processors for PGEs to link.

3.4.2 Impact to 55 shared mode

The IRIX upgrade impacts several shared mode COTS components, such as IRIX and DCE, but the impact is confined to the SGI machines being upgraded. In our substitution approach, the new machines are used, initially, only for test modes. So although it is a new shared mode on the 6.5 machines, for once it can be checked out without impact to operations!

The checkout will focus on the following upgraded/rebuilt products, which form part of shared mode:

1) IRIX itself, 6.2 to 6.5.6m 2) DCE 1.1c to 1.2.2a

3) BDS and HiPPI Software upgrades

4) Rebuilt versions of IMSL, HDF, Perl, TCL/Tk, TCP Wrappers, and Tripwire.

3.5 32-bit and 64-bit PGEs Will Be Supported

Some PGEs will compile under the 64-bit ABI (application binary interface) while others continue to compile with the new 32-bit ABI. Consequently, installations of libraries used by PGEs will include both new 32 and 64-bit versions. These libraries are:

- IRIX runtime libraries
- HDF
- Sybase OpenClient/C
- Toolkit

However the IMSL libraries on IRIX 6.5 support only 64-bit, and this is discussed below.

3.6 IMSL Transition

The new versions of IMSL (International Mathematics and Statistics Libraries) raise some transition issues.

ECS currently provides IMSL C lib v2.0 and Fortran lib v3.0 on the SGI IRIX 6.2 machines. When ECS upgrades to IRIX 6.5, the IMSL libraries will be upgraded to v3.0 of the C library and to v4.0 of the Fortran library.

The reason for upgrading IMSL is that the vendor (Visual Numerics, Inc) will not certify the older versions on IRIX 6.5. When queried, the vendor assured that the C lib v2.0 would NOT work on IRIX 6.5. However, the Fortran lib v3.0 will work on IRIX 6.5.

The new versions of IMSL will not work on IRIX 6.2. They were tested by ECS at Landover on IRIX 6.2, and did not compile. Therefore ECS will switch to the new versions at the same time that the Science Processor SGIs are upgraded to IRIX 6.5.

The new IMSL versions support neither the new 32-bit ABI (application binary interface) nor the old 32, so all PGEs that use IMSL must be compiled with the 64-bit ABI. (However, the Fortran library v3.0 does support 32-bit, and could be left in place on the SGIs if it was useful). Of course, the PGEs probably had to be recompiled in any case to link the IRIX 6.5 runtime libraries.

Each DAAC must plan a SSI&T period prior to the IRIX upgrade, during which IMSL-dependent PGEs are rebuilt with the new 64-bit ABI and the new libraries, and regression tested.

To mitigate the technical and schedule risk of the IRIX 6.5 upgrade for DAAC SSI&T, ECS has rebuilt in 64-bit mode those MODIS and ASTER PGEs which call IMSL routines. Command line testing of the PGEs on an IRIX 6.5 origin machine has been done. Testing within ECS on an ECS 55 configuration is scheduled to take place prior to deployment of 55 to the DAACs. It is our understanding that MISR is eliminating dependencies on IMSL and planning to run PGEs that have been built in new 32-bit mode. AIRS PGEs have no IMSL dependencies.

4. Development and Integration

This section describes the testing performed in the Landover environments (EDF including IDG cell and functionality lab, VATC, and PVC) prior to the DAAC upgrades.

4.1 Development in IDG cell

4.1.1 Configuration

The IDG (Infrastructure Development Group) cell consists of:

- An SGI Challenge running IRIX 6.5 called Protog2
- An SGI Origin running IRIX 6.5 called Camaro
- An SGI Challenge running IRIX 6.2 called Drpepper
- Sun and HP machines

These machines are used both to build custom software on the new COTS baseline, and to perform initial testing. The IDG cell does not have enough hardware to emulate all DAAC functions (e.g., there is no AutoSys installation), but it provides at least enough capability for infrastructure testing.

4.1.2 Completed Tests

1) The first use of the IDG cell for the IRIX upgrade has been to build the 5B SGI code baseline on IRIX 6.5 and associated COTS upgrades. This build has been completed with 2 liens:

a) Sybase Open Client 11.1.1 did not link on IRIX 6.5. On investigation, it was discovered that this version of OpenClient contained an interface to DCE CMA thread functions, plus DCE-threadsafe versions of several OS calls. Since DCE 1.2.2a does not support CMA threads (native threads are now used), the OpenClient calls could not be satisfied. The vendor delivered a version of OpenClient 12.0 for IRIX 6.5 in February, which fixed the problem. OpenClient 12.0 is compatible with Sybase Server 11.5.1.

   To workaround this problem, a package of functions was written to satisfy the unresolved symbols in OpenClient. These functions are mostly passthroughs to the native OS functionality, and therefore may allow initial testing to go ahead - important, since OpenClient is used in almost every subsystem.

b) HDF 4.1r3 did not compile on IRIX 6.5. HDF tests the date of the version of BSD (Berkeley) Unix. IRIX 6.5 #defines this symbol to exist, but does not give it a value, so the test does not compile. SGI have acknowledged this as their problem and assigned a bug #.

To workaround this problem, the HDF source code was modified to #define BSD to a value.

2) Interoperability testing for DCE 1.1c and DCE 1.2.2a has been completed successfully. While DCE is being upgraded with IRIX 6.5, it will remain at version 1.1c on the Sun and HP machines. All planned configurations were tested:

a) DCE 1.2.2a clients and servers using DCE 1.1c security, directory, and time servers

b) A DCE 1.2.2a client talking to a DCE 1.1c server

c) A DCE 1.1c client talking to a DCE 1.2.2a server

3) Interoperability testing for IRIX 6.5 machines with other machines running IRIX 6.2, Solaris, and HP-UX.

a) Interoperability testing for IRIX 6.5 machines with Suns has been completed successfully. The standard set of process framework tests was run.

b) Interoperability testing for IRIX 6.5 machines with IRIX 6.2 machines has been completed successfully. The standard set of process framework tests was run including remote procedure calls (RPCs) in both directions.

c) Interoperability testing for IRIX 6.5 machines with HPs will be run as time permits. No issues are expected since the Sun tests succeeded, and there are not many interactions between the SGIs and HPs.

4.2 Integration in Functionality Lab

4.2.1 Configuration

The functionality lab currently comprises a set of Sun, HP, and SGI machines used for software integration. While this string does not closely resemble a DAAC (e.g., there is no silo), it is adequate for software integration. However, the requirement to support the IRIX 6.5 baseline, while continuing to provide sustaining engineering support on IRIX 6.2, means that a second string of equipment needs to be added to the lab. The second string is needed in any case, to provide extra modes to meet the integration timescale for Release 6A. The string will contain only Origin machines.

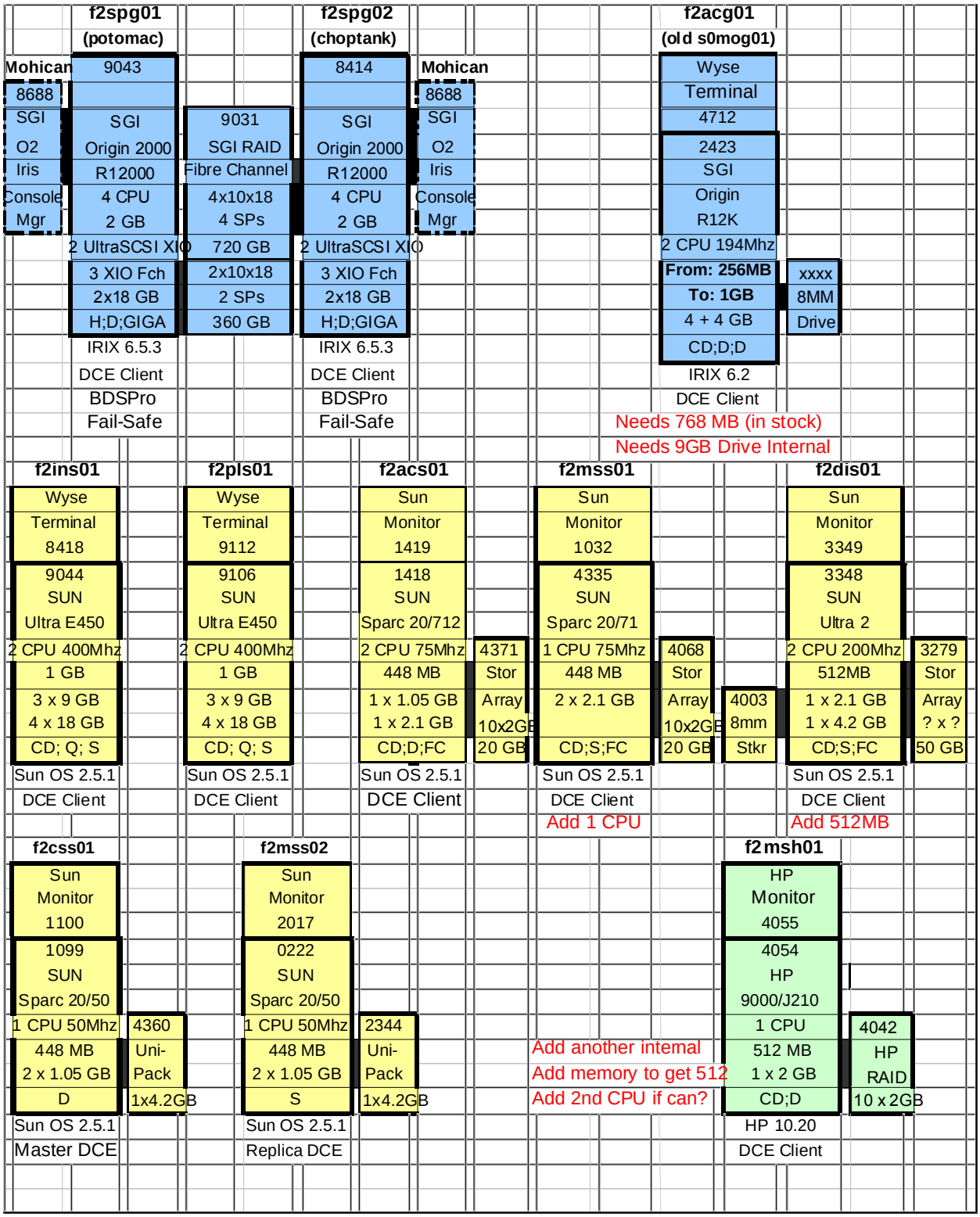

Figure 4.2.1-1. Integration Lab Second String Architecture

4.2.2 Completed Tests

The functionality lab is the software integration facility for the IRIX upgrade. The 55 build (i.e. 5B with the SGI code ported to IRIX 6.5) running on the upgraded COTS baseline, will be regression tested in the functionality lab.

The objectives of the testing are:

a) To regression test the ported custom code. For this purpose, the standard set of 5B lab regression tests will be used, excluding tests that involve only Sun and HP machines. These tests are documented in the Integration Test Plan, Technical Paper number 440-TP-016-001.

b) To regression test COTS and freeware products that have been rebuilt on IRIX 6.5. ECS builds the source code for several SGI-resident products, such as Tcl/Tk and Perl (see section 3.1.1 for a list of these products). The current baselined versions of these products have been rebuilt for IRIX 6.5, and will be checked out by the same set of regression tests used for the ported custom code.

c) To test COTS product upgrades. Several products, some resident on Sun and HP as well as SGI, are being upgraded either before or with the IRIX upgrade (see section 3.1 for a list of these products). As part of the normal COTS upgrade process, a test plan will be developed for each upgrade, to cover not only regression testing but also verification of any NCRs fixed, and testing of any new functionality.

In addition, the lab will integrate software needed to perform the DAAC upgrades, such as scripts needed to copy databases to substitute machines. However, the testing of the DAAC upgrade approach will be performed in the VATC.

4.3 Transition Testing And Integration In VATC

The VATC will be used to test the SGI OS upgrade as well as the COTS based solutions associated with the SGI OS upgrade. In the VATC the development staff will have an environment similar (as possible) to the DAACs operational environment. All representative transition test activities planned for the DAACs environment will be conducted in the VATC in order to establish a proof of concept for the COTS upgrade strategy at the DAACs. Where a test can not be conducted fully because of limited resources, provisions will be made to establish workarounds that can validate the upgrade strategy.

4.3.1 VATC Upgrade Approach

The VATC has to support the following baselines over the approximate timeframes shown in the following table:

Table 4.3-1. VATC Mission Requirements

Drop 5A (IRIX 6.2, Sybase 11.0.3.3)	5/00– 7/00
Drop 5B (IRIX 6.2, Sybase 11.5.1)	12/15/99 – 11/00
Drop 55 (IRIX 6.5, Sybase 11.5.1)	5/00 – 3/01
Drop 6A (IRIX 6.5, Sybase 11.9.3)	7/00 – 7/01
Drop 6B (IRIX 6.5, Sybase 11.9.3)	11/00 – 12/01

A cluster of SGI machines has been added to the VATC in the April – May time frame. These machines have been used for transition testing and will allow Test to support IRIX 6.2 systems and IRIX 6.5 systems in the VATC at the same time. A fourth mode, TS3, was added to the VATC to support the IRIX testing activities.

The SGI machines currently used in the VATC are t1spg01, t1acg01, t1drg01, t1wkg01, t1icg01, and t1aqg02 (PDPS uses t1aqg02 as a second science processor for test). The following table describes the SGI hosts that have been added to the VATC.

Table 4.3-2. Additional SGI Hosts in VATC

Machine Name	Machine Type	Functionality
t1spg03	Origin with Fiber Channel RAID	Science Proc 1, APC Server (local), Working Storage Host
t1icg03	Challenge L, sharing RAID with t1icg01	Ingest, Science Proc 2, Pull Monitor, Ingest and Registry databases
t1drg03	Origin with Fiber Channel RAID	Archive Server (DRG).
t1acg04	Origin with Fiber Channel RAID	APC Server, SDSRV and STMGT databases, staging area

Notes:

t1drg01 and t1drg03 will share the VATC archive. Separate drives and media must be assigned, but we have experience at sharing an archive between 2 machines. t1icg03 must have enough disk space for databases and ingest workspace.

During transition testing, the new machines are used as substitutes. After testing, the new machines are built into a new VATC cluster to support 55 sustaining engineering and 6A test.

An extra disk on the automount host for a 6.5 directory will be needed(10-20 Gig). More space on codedrop box was needed. More disks on Suns and HPs to support the fourth mode was needed.

The Sun and HP machines are not being duplicated, so the overall number of modes can't increase by more than 1, or 2 if activity is light.

Table 4.3-3 shows the tests to be completed for each additional SGI host in the VATC.

Table 4.3-3. Upgrade Testing of Sybase Open Client on SGI in VATC

No.	Test Names
1	Instal/Remove ESDT Add Volume Group QA granule Update STMGTGUI
2	8 MM Acquire
3	Track Orders with SDSRV GUI
4	Ingest granule
5	Sybase OC/SQL Server for INGEST GUI: Operator Tools Monitor/Control
6	V0 WEB Client Spatial Query - Non L7 Global Query - L7 Non L7 Acquire (FTP Pull) L7 Acquire (FTP Pull) FTP Push Acquire

In addition, the standard set of regression testing will be done in the VATC. These tests are detailed in the following section.

4.3.2 Transition Training

The transition training activities will primarily be conducted in the VATC. The VATC is the environment where ECS will prove its concept for performing the SGI IRIX6.2 to IRIX6.5 upgrade at the DAACs. Test and validation procedures will be developed reflecting the upgrade strategies to be employed at the DAACs. The DAACs will be invited to the Landover facility to witness and participate in non-formal test activities related to the IRIX upgrade. The training material developed by ECS and the tests performed, to ensure that each functional area's upgrade strategy is verified, will be provided to the DAACs.

The tests will include:

1) Substitution of t1icg01 with t1icg03

2) Substitution of t1acg01 with t1acg04

3) Substitution of t1drg01 with t1drg03

4) Upgrade of t1spg01 with replacement disks

The test procedures for the VATC are shown in the Procedures for the Transition of ECS into the IRIX 6.5 Environment document (420-WP-013).

A number of DAAC dedicated regression tests will be performed in the VATC for data ingest, subscription types for data types, data search and order, and PGE products. These are shown in the following tables:

Table 4.3.2-1. GSFC Regression Time Line and Data Tests in VATC

Table 4.3.2-2. EDC Regression Time Line and Data Tests in VATC

Table 4.3.2-3. LaRC Regression Time Line and Data Tests in VATC

Table 4.3.2-4. NSIDC Regression Time Line and Data Tests in VATC

Note the NSIDC tests will not be done until Release 6A is installed.

Table 4.3.2-1. GSFC Regression Time Line and Data Tests in VATC

TIME (Approx.)	ACTIVITY	Auto/Man
Setup	DPREP Production Plan entered and activated.	M
Setup	MODIS Production Plan entered and activated.	M
Setup	Place subscriptions (See List Below)	M
Setup	Shutdown EcDsStStagingDiskServer_ICL1	M
0	Continuous Searches and Orders (See List Below)	M
0	Ingest FDD Attitude (4 AM1ATTF granules) [Auto-Suspend / Restart EcDsStStagingDiskServer_ICL1 / Resume]	A / M
+20 min.	Ingest AM1 Ancillary (3 AM1ANC granules)	A
+35 min's.	Ingest MODIS L0 (1 MOD000 granule)	A
+50 min's.	Ingest ASTER L0 Expedited (1 AST_EXP granule)	A
+50 min's.	Email Parser (1 AST_EXP granule)	M
+1 hr. 5 min's.	Ingest MODIS L0 Expedited (1 MOD000X granule)	A
+1 hr. 15 min's.	Ingest MODAPS Science (4 MOD04_L2 granules, 4 MOD06_L2	A
+1 hr. 45 min's.	Ingest SCF DAP (2 DAP granules) [Cancel 1 DAP granule] Ingest EMOS Activity Schedule (1 ActSched granule)	A / M
+2 hrs. 15 min's.	Ingest MODAPS BR, QA, PH (2 MOD04_L2 granules and 2 MOD06_L2 granules)	A
+2 hrs. 30 mins's.	Ingest DAS (1 DFLAXCLD granule, 1 DFLAPCHM granule, 1 DLLAPMOM granule)	A
+2 hrs. 45 min's.	Ingest FDD Orbit (1 AM1EPHF granules)	A
+3 hrs.	Ingest NOAA data (Mult. Data Types, 1 granule each)	A
+3 hrs. 30 min's.	Ingest ACRIM (1 ACR3L2OM granules)	A

SUBSCRIPTION	DATA TYPE
Notification Only:	AM1ANC.001, MOD03.001, AST_EXP
Notification/Push:	DAP.001 MOD01.001 with qualifier: RANGEBEGINNING TIME (hh/mm/ss), RANGEENDING TIME (hh/mm/ss), RANGEBEGINNING DATE (mm/dd/yyyy), RANGEENDING DATE (mm/dd/yyyy)
Notification/8mm	ActSched.001

DATA TYPE	SEARCH/ORDER/TYPE
MOD04_L2.001	Spatial Search/Order via FTP Pull
DFLAPCHM.001	Global Search/Order via FTP Pull
MOD29.001	Global Search/Order via FTP Push
ACR3L2OM.001	Global Search/Order via 8mm tape
MOD06_L2.001	Global Search Search on QA Attributes, Core Metadata Attributes and PSA's Search by Granule ID

PGE'S	PRODUCTS
DPREP	AM1ATTN0, AM1ATTH0, AM1EPHN0, AM1EPHH0, AM1ATTNF, AM1ATTHF
MODIS Cloud Mask PGE01	MOD01, MOD03
MODIS Cloud Mask PGE02	MOD021KM
MODIS Cloud Mask PGE03	MOD29

Table 4.3.2-2. EDC Regression Time Line and Data Tests in VATC

TIME	ACTIVITY	Auto/Man
Setup	ASTER Production Plan entered and activated.	M
Setup	Place subscriptions (See List Below)	M
Setup	Shutdown EcDsStStagingDiskServer_ICL1	M
0	Order an OnDemand High level product	M
0	Continuous Searches and Orders (See List Below)	M
0	Ingest ASTER OSF (1 AST_POSF granule) [Auto-Suspend / Restart EcDsStStagingDiskServer_ICL1 / Resume]	A / M
+20 min's.	Ingest AST_L1B from D3 tape (10 AST_L1B granules)	M
+30 min's.	Ingest NOAA data (1 GDAS0ZFH granule)	A
+45 min's	Ingest NOAA data (1 OZ_DLHY granule)	A
+1 hr.	Ingest Landsat 7 LPS (2 L70RF1 granules; 4 and 8 scenes)	M
+1 hr. 30 min's.	Ingest MODAPS (4 MOD14 granules)	A
+2 hrs.	Ingest ASTER DEM (3 AST14DEM granules)	A
+ 2hrs. 15 min's.	Ingest AST_L1A from D3 tape (17 AST_L1A granules)	M
+ 2hr. 30 min's.	Ingest Landsat 7 LPS (1 L70RF2 granule; 4 and 8 scenes)	M
+3 hrs.	Ingest ASTER L0 Expedited (1 AST_EXP granule)	A
+3 hrs. 15 min's.	Ingest Landsat 7 IAS (1 L7CPF granule)	A
+3 hrs. 30 min's.	Ingest SCF DAP (2 DAP granules) [Cancel 1 DAP granule]	A / M
+3 hrs. 45 min's.	Ingest Landsat 7 IGS (3 L7IGS granules; 14, 18 and 22 scenes)	A

SUBSCRIPTION TYPE	DATA TYPE
Notification Only:	AST 08.001
Notification/Push:	DAP.001, GDAS0ZFH.001, OZ_DLYH.001 AST_EXP.001 with qualifier: RANGEBEGINNING TIME (hh/mm/ss), RANGEENDING TIME (hh/mm/ss), RANGEBEGINNING DATE (mm/dd/yyyy), RANGEENDING DATE (mm/dd/yyyy)
Notification/8mm	L7CPF.002

DATA TYPE	SEARCH/ORDER/TYPE
L70RWRS.002	Path/Row Search/Order via FTP Pull
L70RWRS.002	Global Search
AST_09T.001	Search/Order via FTP Pull
MOD14.001	Global Search/Order via FTP Push
L7IGSWRS.001	Global Search/Order via FTP Push
AST_05.001	Search/Order via 8mm tape
Browse.001	Integrated Browse
Browse.001	FTP Browse
AST_L1B.001	Spatial Search
L70R.002	Search/Order Floating Scenes Search on QA Attributes, Core Metadata Attributes and PSA's

PGE'S	PRODUCTS
ASTER ACT	AST 09T
ASTER ETS	AST_05, AST_08
ASTER BTS	AST_04
ASTER On-Demand Higher Level Processing	
ACVS	AST_04

Table 4.3.2-3. LaRC Regression Time Line and Data Tests in VATC

TIME	ACTIVITY	Auto/Man
Setup	MISR Production Plan entered and activated.	M
Setup	Place subscriptions (See List Below)	M
Setup	Shutdown EcDsStStagingDiskServer_ICL1	M
0	Continuous Searches and Orders (See List Below)	M
0	Ingest NOAA data (1 VegIndx3 granule) [Auto-Suspend / Restart EcDsStStagingDiskServer_ICL1 / Resume]	A / M
+20 min's.	Ingest MISR L0 (1 MISL0DF granule, 1MISCALBA granule and 1 MISL0SY1 granule)	A
+30 min's.	Ingest AM1 Ancillary (1 AM1ANC granule)	A
+45 min's.	Ingest MISR L0 Exp. (1 MISL0DFX, 1 MISCALBAX and 1 MISL0S1X granule) Ingest NOAA data (1 VegIxch1 granule)	A
+1 hr.	Ingest NOAA data (1 VegIxch2 granule)	A
+1 hr. 15 min's.	Ingest MOPITT L0 (1 MOP00BST granule and 1 MOP00ENG granule) Ingest NOAA data (1 VegIxch4 granule)	A
+1 hr. 30 min's.	Ingest NOAA data (1 VegIxch5 granule)	A
+1 hr. 45 min's.	Ingest SCF DAP (2 DAP granules) [Cancel 1 DAP granule] Ingest NOAA data (1 VegIxPWI granule)	A
+2 hrs.	Ingest MOPITT Science (4 MOP01 granules and 4 MOP02 granules) Ingest NOAA data (1 VegIxQCD granule)	A / M
+2 hrs. 15 min's.	Ingest NOAA data (1 VegIxSZA granule)	A
+2 hrs. 30 mins's.	Ingest SAGE III MOC (1 g3aeph, 1 g3aephh, 1 g3aexp and 1 g3aexph granule) Ingest NOAA data (1 VegIxScA granule)	A
+2 hrs. 45 min's.	Ingest MOPITT L0 Exp. (1 MOP00BSX granule and 1 MOP00ENX granule)	A
+3 hrs.	Ingest MOPITT BR, QA, PH (2 MOP01 granules and 2 MOP02 granules)	A
+3 hrs. 30 min's.	Ingest SAGE III SCF (1 g3assp granule)	A

SUBSCRIPTION TYPE	DATA TYPE
Notification Only:	VegIndx3.001
Notification/Push:	DAP.001 MIB2GEOP.001 with qualifier: RANGEBEGINNING TIME (hh/mm/ss), RANGEENDING TIME (hh/mm/ss), RANGEBEGINNING DATE (mm/dd/yyyy), RANGEENDING DATE (mm/dd/yyyy)
Notification/8mm	g3assp.001

DATA TYPE	SEARCH/ORDER/TYPE
MIB2GEOP.001	Global Search/Order via FTP Pull
MOP01.001	Global Search/Order via FTP Push
MISCALBA.001	Global Search/Order via 8mm tape
MOP02.001	Global Search Search on QA Attributes, Core Metadata Attributes and PSA's Search by Granule ID

PGE'S	PRODUCTS
PGE 07	MIB2GEOP

Table 4.3.2-4. NSIDC Regression Time Line and Data Tests in VATC

TIME	ACTIVITY	Auto/Man
Setup	Place subscriptions (See List Below)	M
Setup	Shutdown EcDsStStagingDiskServer_ICL1	M
0	Continuous Searches and Orders (See List Below)	M
0	Ingest AMSR data (4 granules of AMSR_L1A and 1 AE_L1A) [Auto-Suspend / Restart EcDsStStagingDiskServer_ICL1 / Resume]	A / M
+20 min's.	Ingest MODAPS data (2 granules of MOD10A1, MOD10A2 and MOD10_L2)	A
+30 min's.	Ingest MODAPS data (3 granules of MOD29, MOD29P1N and MOD29P1D)	A
+50 min's.	Ingest AMSR data (4 granules of AMSR_L1A and 1 AE_L1A)	A
+1 hr.	Ingest NISE data (2 granules of NISE) [Cancel 1 NISE granule]	A
+1 hr. 10 min's.	Ingest MODAPS data (2 granules of MOD10A1, MOD10A2 and MOD10_L2)	A
+1 hr. 30 min's.	Ingest MODAPS data (3 granules of MOD29, MOD29P1N and MOD29P1D)	A
+1 hr. 40 min's.	Ingest AMSR data (4 granules of AMSR_L1A and 1 AE_L1A)	A
+2 hrs.	Ingest MODAPS data (2 granules of MOD10A1, MOD10A2 and MOD10_L2)	A
+ 2hr. 30 min's.	Ingest AMSR data (4 granules of AMSR_L1A and 1 AE_L1A) Ingest MODAPS data (3 granules of MOD29, MOD29P1N and MOD29P1D)	A
+2 hrs. 50 min's.	Ingest MODAPS data (2 granules of MOD10A1, MOD10A2 and MOD10_L2)	A
+3 hrs. 20 min's.	Ingest AMSR data (4 granules of AMSR_L1A and 1 AE_L1A)	A
+3 hrs. 30 min's.	Ingest MODAPS data (3 granules of MOD29, MOD29P1N and MOD29P1D)	A
+3 hrs. 40 min's.	Ingest MODAPS data (2 granules of MOD10A1, MOD10A2 and MOD10_L2)	A

SUBSCRIPTION TYPE	DATA TYPE
Notification Only:	NISE
Notification/Push:	MOD29P1N, AE_L1A
Notification/8mm:	MOD10A2

DATA TYPE	SEARCH/ORDER/TYPE
MOD29	S/O/8mm
MOD10A1	S/O/FTP Pull
AMSR_L1A	S/O/FTP Pull
MOD29	S/O/FTP Push
MOD10_L2	S/O/FTP Push

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5. Transition Activities

5.1 Types of Transition

The transition to Release 55 on IRIX 6.5 will be conducted by substitution of SGI Origin machines (EDC and GSFC) for the current SGI Challenge machines, in the acg and drg HWCIs (hardware configuration items). In the spg, wkg, and aqg HWCIs, the SGI machines will be taken off line without stopping ECS operations and upgraded without substitution. The EDC and GSFC icg HWCI will be upgraded with a substituted SGI Challenge machine received during upgrade of the acg boxes. The icg HWCI at LaRC and NSIDC will be upgraded with in place hardware at LaRC and NSIDC.

The DAAC will decide which test mode is to be used first, but in this paper we will assume that transition activities will start in TS2 mode, then move to TS1, and finally into the OPS mode. At this point the new machine will become fully functional. Figure 5.1-1 illustrates the transition steps.

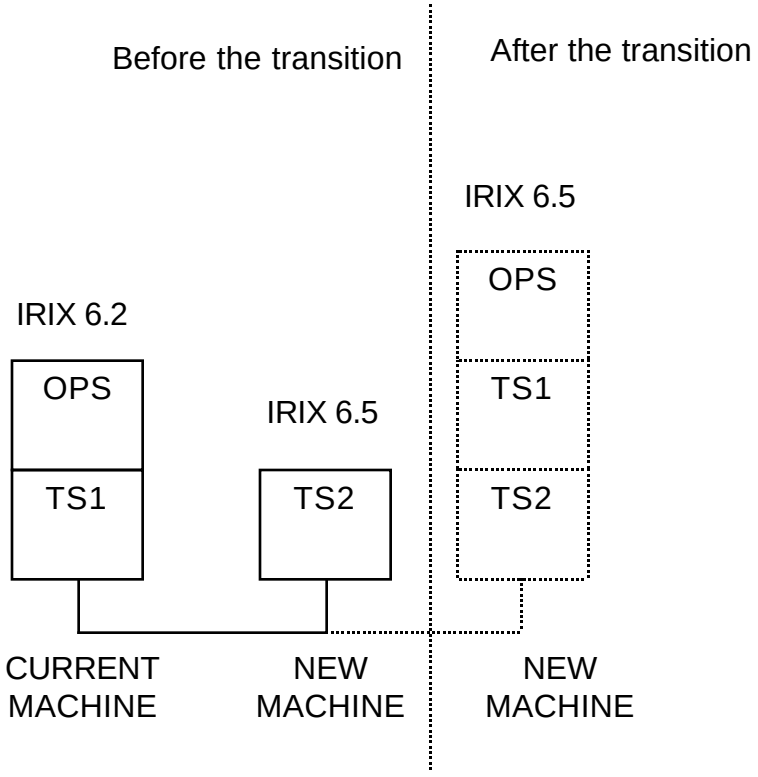

Figure 5.1-1. Transition steps

The following sections discuss the techniques employed to perform the SGI IRIX 6.2 to IRIX 6.5 OS upgrade. Each functional area of the ECS system will be discussed. The discussion will focus on providing a general overview of what function is performed by the affected subsystem, how the upgrade activity will take place, the transition down time for each functional area, and the task to be performed while at the DAACs. The discussion attempts to address each of the DAAC's issues. The Procedures for the Transition of ECS into the IRIX 6.5 Environment document (420-WP-013) provides more specific step by step procedural details necessary to accomplish the IRIX upgrade. The step by step test plans and procedures are being developed in the Procedures document.

5.2 Acg Hosts Transition Approach

The acg platform contains the Ftp Pull area, Storage Management (STMGT) and Science Data Server (SDSRV) Sybase databases, and the AMASS database for browse data. At EDC, GSFC, and LaRC, browse is stored on 9840 tape. At NSIDC, browse data is stored on disk during the Release 55 period. The transition approach for acg entails installing and configuring a second platform in parallel with the operational platform. The second platform will be configured with IRIX 6.5 and associated layered COTS and custom software components. At EDC and GSFC, the second acg platform will be an Origin 2000. At LaRC and NSIDC, the second platform will be a Challenge XL.

The second platform will be installed and configured well in advance of the transition. This will require 3 hours of downtime to configure the second platform into the HiPPI switch. Initially, the second platform will be configured to run one of the test modes (TS2 is assumed). The DAAC will use the second platform routinely for TS2 activities until confidence is gained that the hardware is stable and ECS Release 55 is operating correctly on IRIX 6.5.

Once the second platform is stable, a cut over process will be executed to transfer all operational data to the second platform and to make the second platform the operational acg platform. The objective of this cut over is to have ingest and production services down for 13 hours or less, to have user access down for less than 1 hour, and to have uninterrupted access to the Ftp Pull Area. In order to have uninterrupted access to the Ftp Pull Area (and to avoid copying the Pull Area between platforms), the approach will be to leave the Ftp server running on the original acg box during and after the transition until all files in the Pull Area have expired. No ECS servers need to be running on the old acg box, since users pull files by anonymous ftp.

The high level steps and estimated time to transition the acg platform are specified in Table 5.2-1 and 5.2-2.

Table 5.2-1. acg Transition Steps for EDC, GSFC and LaRC (1 of 3)

(Note: See the latest Procedures Document (420-WP-013) for detailed information)

	OLD MACHINE (e0acg01,g0acg05,l0acg05)		**NEW MACHINE (e0acg02,g0acg05,l0acg05)**		
Step #	**Description**	**Est Time (Hr)**	**Description**	**Est Time (Hr)**	**Comments**
0			In parallel with ongoing operations, a second acg platform is installed and configured. TS2 mode is configured to run on this platform and several 9840 drives are re-cabled from the operational acg platform (at EDC, GSF, LaRC) to support browse testing.		The intent is to perform these tasks prior to beginning of the upgrade task.
1	a. Shutdown the primary acg box. This could be during Release 5A to 5B transition. b. Shutdown the HiPPI switch c. Reconfigure HiPPI cables to accept new SGI Origin for EDC and GSFC(to be named e0acg02 and g0acg05). For LaRC reconfigure HiPPI switch to accept upgrade of SGI PC XL (to be named l0acg05). d. Restart the primary acg box and turn back over to production.	3 hrs	.		Performed prior to beginning of upgrade task. See the Procedures for the Transition of ECS into the IRIX 6.5 Environment document (420-WP-013) for further details associated with the reconfiguration task required at each DAAC's site.
2			DAAC tests second acg platform until confidence is gained that hardware and software are stable.	2 weeks	Assume a minimum of two weeks of testing is required. Then the actual transition proceeds with the next step.
3	Suspend OPS production by preventing new jobs from being released into Autosys and by putting the destaging job step of all active jobs on hold. Then wait for any in-progress staging or destaging requests to complete.	1 hr			

Table 5.2-1. acg Transition Steps for EDC, GSFC and LaRC (2 of 3)

Step #	OLD MACHINE (e0acg01,g0acg05,l0acg05)		NEW MACHINE (e0acg02,g0acg05,l0acg05)		
4	Suspend OPS ingest activities by shutting down all polling and auto-ingest servers. Then wait for any in-progress ingest requests to finish.	1 hr			Steps 2 and 3 are to be performed concurrently.
5	Set Data Distribution to "Suspend All" so that any requests passed to DDIST will automatically enter the suspend state.	0.1 hr			
6	The STMGT and SDSRV Sybase databases are dumped from the operational platform, and ftp'd to the new host.	10 hrs	The STMGT and SDSRV Sybase databases are loaded.		Assumes ~1M granules (7.8 GB of data and indexes). Assume dump takes 2 hrs and load takes 8 hrs. This step will take less time at LaRC because there are less granules. Issue: copy needs to go via HiPPI for speed.
7	The AMASS database is dumped from the operational platform, and ftp'd to the new host.	1 hr	The AMASS database is loaded.		Assume 500,000 files in database. Performed in parallel with Step 5. Issue: copy needs to go via HiPPI for speed.
8	Step 8 deleted.				
9	At EDC, GSFC, and LaRC, copy the AMASS cache from the operational platform to the second platform	1 hr	At EDC, GSFC, and LaRC, the AMASS cache is copied onto disk from the old primary.		Assume 30 GB of cache data at 10 MB/sec. Performed in parallel with AMASS database copy. Issue: copy needs to go via HiPPI for speed.

Table 5.2-1. acg Transition Steps for EDC, GSFC and LaRC (3 of 3)

Step #	OLD MACHINE (e0acg01,g0acg05,l0acg05)		NEW MACHINE (e0acg02,g0acg05,l0acg05)		
10	Shutdown all custom executables.	0.1 hr			
11			Recable remaining 9840 tape drives from the operational platform to the second platform.	1 hr	
11			Run AMASS Sybase archive comparison against the SDSRV Sybase holdings. Concurrently, compare SDSRV Sybase holdings to the AMASS holdings.	0.3 hr	Verify there are no missing and/or floating data between the two databases.
12			Reconfigure second platform to run OPS mode.	1 hr	Note: Because Ftp Server will remain running on the old platform for at least 24 hrs, the second platform must be brought up with a different host name and IP address. Mostly done in parallel with data copies.
13			Bring up OPS mode and enable ingest, production, distribution and user access.	0.4 hr	
14	Total Elapsed Time for Transition			**TBD hrs**	At EDC and GSFC. Will take less time at LaRC because data copy will be quicker.
15	After all files have expired in the Ftp Pull area on the original acg platform then the platform can be shutdown.	N/A			Depends on DAAC configuration of time for files in pull area to expire.

Table 5.2-2. NSIDC acg Transition Steps (1 of 3)

(Note: See the latest Procedures Document (420-WP-013) for detailed information)

	OLD MACHINE (n0acg01)		NEW MACHINE (n0acg02)		
Step #	**Description**	**Est Time (Hr)**	**Description**	**Est Time (Hr)**	**Comments**
0			In parallel with ongoing operations, a second acg platform is installed and configured. TS1 mode is configured to run on this platform.		The intent is to perform these task prior to beginning of upgrade task.
1	a. Shutdown the primary and secondary acg box. This could be during Release 5A to 5B transition. b. Remove SCSI cables that go from ACG RAID to n0acg02 c. Install new 20x18 RAID in ACG RAID rack and connect to n0acg02. d. Restart the primary acg box and turn back over to production.	3 hrs	·		Performed prior to beginning of upgrade task. See the Procedures for the Transition of ECS into the IRIX 6.5 Environment document (420-WP-013) for further details associated with the reconfiguration task required at each DAAC's site.
2			DAAC tests second acg platform until confidence is gained that hardware and software are stable.	2 weeks	Assume a minimum of two weeks of testing is required. Then the actual transition proceeds with the next step.
3	Step 3 deleted.				
4	Suspend OPS ingest activities by shutting down all polling and auto-ingest servers. Then wait for any in-progress ingest requests to finish.	1 hr			Steps 2 and 3 are to be performed concurrently.

Table 5.2-2. NSIDC acg Transition Steps (2 of 3)

	OLD MACHINE		NEW MACHINE		
5	Set Data Distribution to "Suspend All" so that any requests passed to DDIST will automatically enter the suspend state.	0.1 hr			
6	The STMGT and SDSRV Sybase databases are dumped from the operational platform, and ftp'd to the new host.	5 hrs	The STMGT and SDSRV Sybase databases are loaded.		Assumes ~500K granules (3.9 GB of data and indexes).
7	Copy the disk-resident browse archive from the operational platform to the second platform.	1 hr	The disk-resident browse archive is copied onto disk from the old primary.		Assume 30 GB of data at 10 MB/sec. Performed in parallel with Step 5.
8	Shutdown all custom executables.	0.1 hr			

Table 5.2-2. NSIDC acg Transition Steps (3 of 3)

	OLD MACHINE (n0acg01)		NEW MACHINE (n0acg02)		
9			Run Browse Sybase archive comparison against the SDSRV Sybase holdings.	0.3 hr	Verify there are no missing and/or floating data between the two databases.
10			Reconfigure second platform to run OPS mode.	1 hr	Note: Because Ftp Server will remain running on the old platform for at least 24 hrs, the second platform must be brought up with a different host name and IP address. Mostly done in parallel with data copies.
11			Bring up OPS mode and enable ingest, production, distribution and user access.	0.4 hr	
12	Total Elapsed Time for Transition			**TBD hrs**	
13	After all files have expired in the Ftp Pull area on the original acg platform then the platform can be shutdown.	N/A			Depends on DAAC configuration of time for files in pull area to expire.

5.3 Drg Hosts Transition Approach

At EDC, there are two primary drg platforms. One supports Landsat7 ingest/distribution, while the other supports ASTER/MODIS ingest, ASTER processing, and ASTER/MODIS distribution. Each primary drg platform contains an AMASS database and Journal, AMASS cache and Read Only Cache. When a drg platform is down the ability to archive, distribute and/or perform production processes ceases. During the upgrade activities at EDC the secondary or backup drg platform will be transitioned first. The backup drg platform, currently an SGI Challenge XL, will be replaced by an SGI ORIGIN 2000, and configured with IRIX 6.5 and associated layered COTS and custom software components.

At GSFC, there are two primary drg platforms to support the Terra mission. There will be another drg platform supplied to support the PM mission. The drg platforms at GSFC supports the MODIS, ASTER expedited data and ancillary data ingest/distribution as well as MODIS processing. The GSFC drg platform contains an AMASS database and Journal, AMASS cache and Read Only Cache. When a drg platform is down the ability to archive, distribute and/or perform production processes ceases. During the upgrade activities at GSFC the secondary or backup drg platform will be transitioned first. The backup drg platform, currently an SGI Challenge XL, will be replaced by an SGI ORIGIN 2000, and configured with IRIX 6.5 and associated layered COTS and custom software components.

At LaRC, there is one primary drg platform to support processing of MISR data and ingest/distribution of MISR, MOPITT, ACRIM, CERES, ancillary data and SAGE data. The LaRC drg platform contains an AMASS database and Journal, AMASS cache and Read Only Cache. When a drg platform is down the ability to archive, distribute and/or perform production processes ceases. During the upgrade activities at LaRC the secondary or backup drg platform will be transitioned first. The backup drg platform, currently an SGI Challenge XL, will be configured with IRIX 6.5 and associated layered COTS and custom software components. Once the IRIX upgrade is complete the backup drg platform will become the operational drg platform.

At NSIDC, there is one primary drg platform to support processing of MODIS data and ingest/distribution of MODIS and ancillary data. The NSIDC drg platform contains an AMASS database and Journal, AMASS cache and Read Only Cache. When a drg platform is down the ability to archive, distribute and/or perform production processes ceases. During the upgrade activities at NSIDC the secondary or backup drg platform will be transitioned first. The backup drg platform, currently an SGI Challenge L, will be configured with IRIX 6.5 and associated layered COTS and custom software components. Once the IRIX upgrade is complete the backup drg platform will become the operational drg platform. It is the intention for the replacement platforms to be installed and configured well in advance of the transition. Initially, the replacement platforms will be configured to run one of the test modes (TS2 or TS1). The DAAC will use the replacement platforms routinely for TS2 and TS1 activities until confidence is gained that the hardware is stable and ECS Release 55 is operating correctly on IRIX 6.5.

Once the replacement drg platforms are stable, a cut over process will be executed to transfer all operational functions to the replacement platforms and to make the replacement platforms the operational drg platforms. The downtime objective of the cut over is to cease Landsat, MISR,

ASTER, MODIS, and ancillary archive, distribution, and production services for only 12 hours, although system quiesce times may create additional downtime.

The high level steps and estimated time to transition one of the drg platforms are specified in Table 5.3-1 and Table 5.3-2.

Note: EDC is planning to use a “new name” approach. The transition steps for that approach may be found in the EDC documentation. The following table is for a “same name” approach.

Table 5.3-1. Drg Transition Steps for EDC and GSFC (1 of 7)

(Note: See the latest Procedures Document (420-WP-013) for detailed information)

	OLD MACHINE		NEW MACHINE		
Step#	**Description**	**Est Time (Hr)**	**Description**	**Est Time (Hr)**	**Comments**
1	Shutdown e0drg05 and e0drg01 (EDC). Shutdown g0drg01 and g0drg07 (GSFC) Shutdown the HiPPI switch Remove Parallel HiPPI card Install Serial HiPPI card Disconnect D3 tape drives Restart HiPPI switch Restart e0drg01 Restart g0drg01	3 hrs			All activities are to be performed prior to beginning of upgrade task. Assumes all HiPPI cards are in place prior to all activities below. Assumes extra suite of RAID is available to be attached to e0drg05 at EDC. Assumes extra suite of RAID is available to be attached to g0drg07 at GSFC.

Table 5.3-1. Drg Transition Steps for EDC and GSFC (2 of 7)

	OLD MACHINE		NEW MACHINE		
Step #	**Description**	**Est Time (Hr)**	**Description**	**Est Time (Hr)**	**Comments**
2			In parallel with ongoing operations, install and configure new e0drg05 (ORIGIN). In parallel with ongoing operations, install and configure new g0drg07 (ORIGIN).	2 weeks	Backup for e0drg01 and e0drg02 at EDC no longer available. Backup for g0drg01 and g0drg02 at GSFC no longer available. DAAC tests second drg platform until confidence is gained that hardware and software are stable. Assume a minimum of two weeks of testing is required including tests in TS2 and TS1 mode. Then the actual transition proceeds with the next step.
3	Suspend Landsat OPS Production (EDC) Suspend MODIS OPS Production (GSFC)	1 hr			Landsat processing requests for subsetting and/or subsampling data is ceased. All queued requests are processed off. MODIS processing requests for higher level products as well as distribution of all GSFC sponsored data requests are ceased. All queued requests are processed off

Table 5.3-1. Drg Transition Steps for EDC and GSFC (3 of 7)

	OLD MACHINE		NEW MACHINE		
Step#	**Description**	**Est Time (Hr)**	**Description**	**Est Time (Hr)**	**Comments**
4	Suspend Landsat Ingest activities, then wait for all in-progress ingest requests to complete (EDC). Suspend all GSFC Ingest activities, then wait for all in-progress ingest requests to complete (GSFC).	1 hr			Concurrently with previous step.
5	Set Data Distribution to "Suspend All" so that any requests passed to DDIST will automatically enter the suspend state.	3 hr			Concurrently with previous step. This time will cycle based on the number of tape and electronic distributions in the queue.
6	Flush all Landsat distribution read only cache (EDC). Flush distribution read only cache (GSFC).	0.5 hr			Note: Backup AMASS database
7	Shutdown old e0drg01 and RAID Shutdown old g0drg01 and RAID	0.1 hr			
8	Shutdown e0drg05 (ORIGIN) Shutdown g0drg07 (ORIGIN)	.05 hr			

Table 5.3-1. Drg Transition Steps for EDC and GSFC (4 of 7)

	OLD MACHINE		NEW MACHINE		
Step#	**Description**	**Est Time (Hr)**	**Description**	**Est Time (Hr)**	**Comments**
9			Change name and IP address of new e0drg05 to e0drg01. Change name and IP address of new g0drg07 to g0drg01	0.5 hr	Software configuration network change. Change name and ip address of machine. Reconfigure HiPPI switch "hunt group" to look for e0drg01 on e0drg05's port and g0drg01 on g0drg07's port.
10			Restart e0drg01 (ORIGIN) as new DRP primary production server Restart g0drg01 (ORIGIN) as new DRP primary production server	0.5 hr	Perform checkout in OPS mode. Restore AMASS database to ORIGIN
11			Perform AMASS to Sybase consistency check	1 hr	Compare Sybase holdings to archive holdings Compare archive holdings to Sybase holdings.

Table 5.3-1. Drg Transition Steps for EDC and GSFC (5 of 7)

	OLD MACHINE		NEW MACHINE		
Step#	**Description**	**Est Time (Hr)**	**Description**	**Est Time (Hr)**	**Comments**
12			Turnover new e0drg01 (ORIGIN) for production. Turnover new g0drg01 (ORIGIN) for production.	1 hr	Begin throttling LandSat data in the queue while checkout is performed on the new e0drg01 in OPS mode. Begin throttling MODIS data in the queue while checkout is performed on the new g0drg01 in OPS mode.
13			Perform checkout of new e0drg01 (ORIGIN) in TS2 mode Perform checkout of new g0drg01 (ORIGIN) in TS2 mode	8 hrs	Verification that TS2 mode continues to work.
14			Perform checkout of new e0drg01 (ORIGIN) in TS1 mode Perform checkout of new g0drg01 (ORIGIN) in TS1 mode	8 hrs	Verification that TS1 mode continues to work.
15			Shutdown e0drg01 (ORIGIN) Shutdown g0drg01 (ORIGIN)		

Table 5.3-1. Drg Transition Steps for EDC and GSFC (6 of 7)

	OLD MACHINE		NEW MACHINE		
Step#	**Description**	**Est Time (Hr)**	**Description**	**Est Time (Hr)**	**Comments**
16			Re-cable remaining 4 D3 drives from old e0drg01 to new e0drg01 at EDC. Re-cable remaining 4 D3 drives from old g0drg01 to new g0drg01 at GSFC.	2 hrs	
17			Shutdown HiPPI Switch	1 hr	Reconfigure HiPPI. Configure the HiPPI ports to allow for upgrade activities associated to e0drg02 and g0drg02 to begin. Relocate serial HiPPI cable from Port 9 to Port 5 (EDC). Relocate serial HiPPI cable from Port 5 to Port 3 (GSFC)Reconfigure HiPPI hunt group to look for drg01 because the cable has been moved to the proper location.
18			Restart e0drg01 with 7 D3 drives at EDC. Restart g0drg01 with 7 D3 drives at GSFC.	0.5 hrs	System is fully operational.
19			Total Elapsed Time for Transition	12 hrs	At EDC and GSFC.

Table 5.3-1. Drg Transition Steps for EDC and GSFC (7 of 7)

	OLD MACHINE		NEW MACHINE		
Step#	**Description**	**Est Time (Hr)**	**Description**	**Est Time (Hr)**	**Comments**
20	Remove FDDI cables and old e0drg01 and RAID from Data Center Floor and pack to ship back to EDF. Remove FDDI cables and old g0drg01 and RAID from Data Center Floor and pack to ship TBD.				
21	Turn back over to Ops.				

Table 5.3-2. Drg Transition Steps for LaRC and NSIDC (1 of 5)

(Note: See the latest Procedures Document (420-WP-013) for detailed information)

	OLD MACHINE		NEW MACHINE		
Step#	**Description**	**Est Time (Hr)**	**Description**	**Est Time (Hr)**	**Comments**
1	Shutdown l0drg01 and l0drg03 (LaRC). Shutdown n0drg01 and n0drg02 (NSIDC) Deactivate (4) D3 tape drives allocated to l0drg01 and switch to l0drg03 Deacativate (1) D3 tape drive allocated to n0drg01 and switch to n0drg02 Restart l0drg01 for production at LaRC Restart n0drg01 for production at NSIDC.	3 hrs			All activities are to be performed prior to beginning of upgrade task.

Table 5.3-2. Drg Transition Steps for LaRC and NSIDC (2 of 5)

	OLD MACHINE		NEW MACHINE		
Step#	**Description**	**Est Time (Hr)**	**Description**	**Est Time (Hr)**	**Comments**
2			In parallel with ongoing operations, install and configure OS/COTS (Disk Image) on l0drg03 at LaRC. In parallel with ongoing operations, install and configure OS/COTS (Disk Image) on n0drg02 at NSIDC.	2 weeks	Backup for l0drg01 at LaRC no longer available. Backup for n0drg01 at NSIDC LaRC no longer available. DAAC tests second drg platform until confidence is gained that hardware and software are stable. Assume a minimum of two weeks of testing is required. Test in TS2 and TS1 mode at LaRC. Test in TS1 mode at NSIDC Transition proceeds with the next step.
3	Suspend all MISR OPS production at LaRC.	1 hr			MISR processing requests for higher level data products are ceased at LaRC. All queued requests are processed off.

Table 5.3-2. Drg Transition Steps for LaRC and NSIDC (3 of 5)

	OLD MACHINE		NEW MACHINE		
Step#	**Description**	**Est Time (Hr)**	**Description**	**Est Time (Hr)**	**Comments**
4	Suspend all LaRC data ingest activities, then wait for all in-progress ingest requests to complete (LaRC). Suspend all NSIDC data ingest activities, then wait for all in-progress ingest requests to complete (NSIDC).	1 hr			Concurrently with previous step.
5	Set Data Distribution to "Suspend All" so that any requests passed to DDIST will automatically enter the suspend state.	3 hr			Concurrently with previous step. This time will cycle based on the number of tape and electronic distributions in the queue.
6	Flush distribution read only cache (LaRC). Flush distribution read only cache (NSIDC).	0.5 hr			Note: Backup AMASS database
7	Shutdown old l0drg01 and RAID Shutdown old n0drg01 and RAID	0.1 hr			
8	Shutdown l0drg03 Shutdown n0drg02	.05 hr			

Table 5.3-2. Drg Transition Steps for LaRC and NSIDC (4 of 5)

	OLD MACHINE		NEW MACHINE		
Step#	**Description**	**Est Time (Hr)**	**Description**	**Est Time (Hr)**	**Comments**
9	Deactivate (4) remaining D3 tape drives allocated to l0drg01 and switch to l0drg03 Deacativate (2) remaining D3 tape drives allocated to n0drg01 and switch to n0drg02				Configure AMASS to switch remaining 4 D3 drives from l0drg01 to upgraded l0drg03 at LaRC. Configure AMASS to switch remaining 2 D3 drives from n0drg01 to upgraded n0drg03 at LaRC
10			Restart l0drg03 with (8) D3 drives as the primary production server at LaRC Restart n0drg02 with (3) D3 drives as the primary production server at NSIDC.	0.5	Restore AMASS database Perform checkout of l0drg03 in OPS mode Perform checkout of l0drg03 in OPS mode
11			Perform AMASS to Sybase consistency check	1 hr	Compare Sybase holdings to archive holdings Compare archive holdings to Sybase holdings.
12			Turnover 10drg03 for production at LaRC. Turnover n0drg02 for production at NSIDC.	1 hr	Begin throttling data in the queue while checkout is performed on the upgraded server in OPS mode.

Table 5.3-2. Drg Transition Steps for LaRC and NSIDC (5 of 5)

	OLD MACHINE		NEW MACHINE		
Step#	**Description**	**Est Time (Hr)**	**Description**	**Est Time (Hr)**	**Comments**
13			Perform checkout of new OPS server in TS2 mode at LaRC.	8 hrs	Verification that TS1 Mode continues to work well.
14			Perform checkout of new OPS server in TS1 mode at LaRC. Perform checkout of new OPS server in TS1 mode at NSIDC.	8 hrs	Verification that TS1 Mode continues to work well.
15	Transition Complete. Turn back over to Ops.				

5.4 Icg Hosts Transition Approach

The icg platform contains the Ingest and Registry databases, and the polling directories. During the upgrade activities at EDC and GSFC the reconfigured acg server removed during the acg upgrade will become the icg transition/upgrade server. During the upgrade activities at LaRc and NSIDC the icg platform will be upgraded with spare PC XL platforms received from other sites. The current icg backup servers and current icg primary servers (when upgraded) will be removed and spared (See Table 3.3-1 Hardware Movement Plan). Prior to the IRIX upgrade activities at EDC and GSFC related to the icg, the primary server (e0icg01 and g0icg01) will be configured as a virtual host (e0vicgaa and g0vicgaa) and all necessary interface providers will be notified of the change. The downtime associated to making the primary host a virtual host is accounted for during the Release 5A to 5B transition, and is not reflected in this plan.

The new icg server is thoroughly checked out in TS2 and TS1 modes (NSIDC test is only conducted in TS1 mode). There will not be any cycle (system operational) down times experienced during the icg TS2 and TS1 transitions to the replacement server.

Once the replacement server is stable in the TS2 and TS1 environments, a cut over process will be executed to transfer all operational functions to the replacement server and to make the replacement server the operational server. All ingest of data will be stopped and all queued ingest data will be processed off to insure that data is archived successfully. The Ingest server is then brought down and the Ingest and Registry databases from the primary server will be dumped to the replacement server. During this time future ingest data accumulates on the MODAPS PDR server and within LPS. The Ingest server downtime objective for the operational mode upgrade is **tbd hours.** Downtime is based on time to quiesce the ingest functions, time to dump the sybase databases (including all ingest history data), time to bring the replacement server back up in operational mode and time required to perform testing of ECS test data and live data in operational mode. Circumstances may require significantly more downtime because of system quiesce times as well as the time it takes to test and validate the upgrade. The DAAC will determine the amount of testing that is required before ingest operational transition is complete.

The high level steps and estimated time to transition the icg platform are specified in Tables 5.4-1 through Table 5.4-3. For NSIDC there is a transition in place approach because there is only one ingest server.

Note: EDC is planning to use a “new name” approach. The transition steps for that approach may be found in the EDC documentation. The following table is for a “same name” approach.

Table 5.4-1. Icg Transition Steps for EDC (1 of 3)

(Note: See the latest Procedures Document (420-WP-013) for detailed information)

	OLD MACHINE		NEW MACHINE		
Step#	**Description**	**Est Time (Hr)**	**Description**	**Est Time (Hr)**	**Comments**
0			The old e0icg02 is shutdown and removed.		
1			The acg server (Challenge XL) released during the acg upgrade is reconfigured to become e0icg02 with its own suite of RAID (and therefore will not share RAID with the OPS icg server).	4 hrs	e0icg01 (operations primary server) has been configured as a virtual host prior to the upgrade activity beginning.
2	Shutdown TS2 mode on the primary server e0icg01.			0.5 hrs	
3	Dump the e0icg01 databases from the TS2 mode on the primary server, and ftp to the new host.	Hr	Restore the TS2 databases on the retrofitted acg server (e0icg02) platform under the icg environment.	0.5 hrs	
4			Checkout in TS2 mode	2 days	Verify all Ingest functions properly in TS2 mode.
5	Shutdown TS1 mode on the primary server e0icg01.			0.5 hrs	
6	Dump the e0icg01 databases from the TS1 mode on the primary server, and ftp to the new host.	Hr	Restore the databases on the retrofitted acg server (e0icg02) platform under the icg environment.	0.5 hrs	
7			Checkout in TS1 mode	2 days	Verify all Ingest functions properly in TS1 mode.
8	Suspend Ops Ingest activities on e0icg01			0.5 hrs	

Table 5.4-1. Icg Transition Steps for EDC (2 of 3)

	OLD MACHINE		NEW MACHINE		
Step#	**Description**	**Est Time (Hr)**	**Description**	**Est Time (Hr)**	**Comments**
9	Quiesce Ingest activities			1 hr	Verify that all pending jobs are complete and that the Request manager queue has completed.
10	Verify data is being staged to appropriate location (MODAPS, ICL storage, etc.)				Monitor data being staged to verify stagging area is not overwritten.
11	Shutdown Ingest executables in Ops mode			0.5 hrs	
12	Dump Ingest and Registry databases, and ftp to new host.		Restore Ingest and Registry databases.	0.5 hrs	
13	Disable the virtual hosts on e0icg01			0.25 hrs	This was the primary ingest server
14			Enable the virtual hosts on e0icg02	0.25 hrs	Mount points are active for e0icg02. This now becomes the primary ingest server.
15			Start Ops mode on evicgaa (e0icg02)	0.5 hrs	The e0icg01 (ev0icgaa) primary server was a virtual host machine configured as virtual before upgrade activity begins. The plan is to now make the e0icg02 the virtual host machine until upgrade of e0icg01 takes place.
16			Perform checkout using suite of test data to verify Ingest functions properly	1 hr	Using test data suite to simulate external data provider.

Table 5.4-1. Icg Transition Steps for EDC (3 of 3)

	OLD MACHINE		NEW MACHINE		
Step#	**Description**	**Est Time (Hr)**	**Description**	**Est Time (Hr)**	**Comments**
17			Initialize Ingest request.		Begin processing in ops mode. External data providers pipes are open for ingesting/processing data.
18			Verify Ingest Ops functions properly.		
19			While processing data in Ops mode bring up TS2 mode on the evicgaa (e0icg02) primary server.	0.5 hrs	Performed to ensure TS1 and TS2 work in the virtual host environment ontheon the new machine.
20			Perform testing in TS2 mode on the new evicgaa (e0icg02) primary server	3 hrs	
21			Bring up TS1 mode on the new evicgaa (e0icg02) primary server	0.5 hrs	
22			Perform checkout of TS1 mode	3 hrs	
23					If the backup server is desired to be a fail-over server at the DAAC then the new box will have to be configured and would have to be checked out as e0icg01. A repeat of some of the steps above will have to be performed.

Table 5.4-2. Icg Transition Steps for GSFC (1 of 4)

(Note: See the latest Procedures Document (420-WP-013) for detailed information)

	OLD MACHINE		NEW MACHINE		
Step#	**Description**	**Est Time (Hr)**	**Description**	**Est Time (Hr)**	**Comments**
0	Shutdown g0icg02 and g0icg01				
1	Disconnect and remove 4 SCSI cables that connect the RAID to g0icg02 Terminate SCSI connections on RAID that had cables removed.				
2	Restart g0icg01 and turn back over to OPS.				
3	1. Disconnect and relocate FDDI cables from g0icg02 to new g0icg02 Disconnect and relocate HiPPI cables. From g0icg02 to new g0icg02				
4			The old g0acg05 server (Challenge XL) released during the acg upgrade is reconfigured to become g0icg02. Install OS/COTS (Disk Image)		Remove 1 CPU and FDDI board and return to stock. Install (2) 9GB internal disk drives for Sybase dumps.
5			1. Restart new g0icg02. 2. DAAC begins tests on new g0icg02 until confidence is gained that the hardware and software are stable.		Assume a minimum of two weeks of testing is required. Then the actual transition proceeds with the next step.
6	Shutdown TS2 mode on the primary server g0icg01.			0.5 hrs	
7	Dump the g0icg01 databases from the TS2 mode on the primary server, and ftp to the new host.	hr	Restore the TS2 databases on the retrofitted acg server (g0icg02) platform under the icg environment.	0.5 hrs	

Table 5.4-2. Icg Transition Steps for GSFC (2 of 4)

	OLD MACHINE		NEW MACHINE		
Step#	**Description**	**Est Time (Hr)**	**Description**	**Est Time (Hr)**	**Comments**
8			Checkout in TS2 mode	2 days	Verify all Ingest functions properly in TS2 mode.
9	Shutdown TS1 mode on the primary server g0icg01.			0.5 hrs	
10	Dump the g0icg01 databases from the TS1 mode on the primary server, and ftp to the new host.	hr	Restore the databases on the retrofitted acg server (g0icg02) platform under the icg environment.	0.5 hrs	
11			Checkout in TS1 mode	2 days	Verify all Ingest functions properly in TS1 mode.
12	Suspend Ops Ingest activities on g0icg01			0.5 hrs	
13	Quiesce Ingest activities			1 hr	Verify that all pending jobs are complete and that the Request manager queue has completed.
14	Verify data is being staged to appropriate location (MODAPS, ICL storage, etc.)				Monitor data being staged to verify stagging area is not overwritten.
15	Shutdown Ingest executables in Ops mode			0.5 hrs	

Table 5.4-2. Icg Transition Steps for GSFC (3 of 4)

	OLD MACHINE		NEW MACHINE		
Step#	**Description**	**Est Time (Hr)**	**Description**	**Est Time (Hr)**	**Comments**
16	Dump Ingest and Registry databases, and ftp to new host.		Restore Ingest and Registry databases.	0.5 hrs	
17	Disable the virtual hosts on e0icg01			0.25 hrs	This was the primary ingest server
	Bring down the g0icg01 platform.				
18			Enable the virtual hosts on gv0icg02. Change the name=g0icgaa	0.25 hrs	Mount points are active for e0icg02. This now becomes the primary ingest server.
19			1. Bring down new g0icg02		
20			1. Disconnect SCSI cables from g0icg01 and RAID. 2. Relocate ICL RAID Rack "00001616" and connect to new g0icg02		
21			Start Ops mode on gv0icgaa (g0icg02)	0.5 hrs	The g0icg01 (gv0icgaa) primary server was a virtual host machine configured as virtual before upgrade activity begins. The plan is to now make the gv0icg02 the virtual host machine until upgrade of g0icg01 takes place.
22			Perform checkout using suite of test data to verify Ingest functions properly	1 hr	Using test data suite to simulate external data provider.

Table 5.4-2. Icg Transition Steps for GSFC (4 of 4)

	OLD MACHINE		NEW MACHINE		
Step#	**Description**	**Est Time (Hr)**	**Description**	**Est Time (Hr)**	**Comments**
23			Initialize Ingest request.		Begin processing in ops mode. External data providers pipes are open for ingesting/processing data.
24			Verify Ingest Ops functions properly.		
25			While processing data in Ops mode bring up TS2 mode on the evicgaa (g0icg02) primary server.	0.5 hrs	Performed to ensure TS1 and TS2 work in the virtual host environment ontheon the new machine.
26			Perform testing in TS2 mode on the new evicgaa (g0icg02) primary server	3 hrs	
27			Bring up TS1 mode on the new evicgaa (g0icg02) primary server	0.5 hrs	
28			Perform checkout of TS1 mode	3 hrs	
29					If the backup server is desired to be a fail-over server at the DAAC then the new box will have to be configured and would have to be checked out as g0icg01. A repeat of some of the steps above will have to be performed.

Table 5.4-3. Icg Transition Steps for LaRC (1 of 4)

(Note: See the latest Procedures Document (420-WP-013) for detailed information)

	OLD MACHINE		NEW MACHINE		
Step#	**Description**	**Est Time (Hr)**	**Description**	**Est Time (Hr)**	**Comments**
1			Configure old l0acg02 to meet ICL requirements		
2	Shutdown l0icg01 (CL)				
3	Shutdown l0icg02 (CL)				
4	Disconnect SCSI RAID cables from l0icg02 (CL). a. Disconnect SCSI RAID cables from RAID. b. Terminate SCSI ports on RAID. c. Disconnect FDDI cables LB045 and LB046. d. Remover l0icg02 from Data Center Floor.				
5			Install old l0acg02 Disconnect FDDI cables LB045 and LB046.		
6			Install OS/COTS (Disk Image)		
7			Configure system disk a. name=l0icg02 b. IP=198.118.217.6		
8a			Start up new l0icg02		
8b			DAAC begins tests on new l0icg02 until confidence is gained that the hardware and software are stable.		Assume a minimum of two weeks of testing is required. Then the actual transition proceeds with the next step.

Table 5.4-3. Icg Transition Steps for LaRC (2 of 4)

	OLD MACHINE		NEW MACHINE		
Step#	**Description**	**Est Time (Hr)**	**Description**	**Est Time (Hr)**	**Comments**
9	Shutdown TS2 mode on the primary server l0icg01.			0.5 hrs	
10	Dump the l0icg01 databases from the TS2 mode on the primary server, and ftp to the new host.	hr	Restore the TS2 databases on the retrofitted acg server (l0icg02) platform under the icg environment.	0.5 hrs	
11			Checkout in TS2 mode	2 days	Verify all Ingest functions properly in TS2 mode.
12	Shutdown TS1 mode on the primary server l0icg01.			0.5 hrs	
13	Dump the l0icg01 databases from the TS1 mode on the primary server, and ftp to the new host.	hr	Restore the databases on the retrofitted acg server (l0icg02) platform under the icg environment.	0.5 hrs	
14			Checkout in TS1 mode	2 days	Verify all Ingest functions properly in TS1 mode.
15	Suspend Ops Ingest activities on l0icg01			0.5 hrs	
16	Quiesce Ingest activities			1 hr	Verify that all pending jobs are complete and that the Request manager queue has completed.
17	Verify data is being staged to appropriate location				Monitor data being staged to verify stagging area is not overwritten.

Table 5.4-3. Icg Transition Steps for LaRC (3 of 4)

	OLD MACHINE		NEW MACHINE		
Step#	**Description**	**Est Time (Hr)**	**Description**	**Est Time (Hr)**	**Comments**
18	Shutdown Ingest executables in Ops mode			0.5 hrs	
19	Dump Ingest and Registry databases, and ftp to new host.		Restore Ingest and Registry databases.	0.5 hrs	
20	Bring down the l0icg01 platform.				
21			Change name an IP address: a. Disconnect FDDI cablesLB045 and LB046 from new l0icg02 (PC XL) b. Relocate FDDI cables LB043 and LB044 from l0icg01 to new l0icg02. c. Change IP address on new l0icg02 to 198.118.217.5 d. Change name of new l0icg02 to l0icg01.		
22			Shutdown new l0icg01 (PC XL) a. Relocate SCSI cables from old l0icg01 (CL) to new l0icg01 (PC XL) per disk configuration documents.		
23			Flush Router		
24			Start Ops mode on new l0icg01	0.5 hrs	
25			Perform checkout using suite of test data to verify Ingest functions properly	1 hr	Using test data suite to simulate external data provider.

Table 5.4-3. Icg Transition Steps for LaRC (4 of 4)

	OLD MACHINE		NEW MACHINE		
Step#	**Description**	**Est Time (Hr)**	**Description**	**Est Time (Hr)**	**Comments**
26			Initialize Ingest request.		Begin processing in ops mode. External data providers pipes are open for ingesting/processing data.
27			Verify Ingest Ops functions properly.		
28			While processing data in Ops mode bring up TS2 mode new l0icg01 primary server.	0.5 hrs	Performed to ensure TS1 and TS2 work properly on the new server.
29			Perform testing in TS2 mode on the new l0icg01 primary server	3 hrs	
30			Bring up TS1 mode on the new l0icg01 primary server	0.5 hrs	
31			Perform checkout of TS1 mode	3 hrs	
32					If the backup server is desired to be a fail-over server at the DAAC then the new box will have to be configured and would have to be checked out as g0icg01. A repeat of some of the steps above will have to be performed.

5.5 Spg Hosts Transition Approach

The spg platform contains the Processing Software, the Toolkit Software and the International Mathematics and Statistical Libraries (IMSL) necessary for processing on-demand and scheduled data to higher level products. While performing the IRIX 6.5 upgrade activities on the spg platforms it is the intention of the project to experience no interruption in service and zero operations downtime. This will be accomplished by bringing down only one of the spg platforms while concurrently performing all of the spg functions on the other platform. The DAAC, during this time performs the spg functions in a degraded mode until system upgrade and checkout is completed on the platform being upgraded.

Prior to the DAAC's transition activities involving the spg platforms, a new system (data) disk and boot disk will be configured with the IRIX 6.5 OS and associated layered COTS and custom software components. The existing disks will be copied, and then OS and COTS installed. These disks will become the replacement disk used during the transition process at the DAACs.

Once the transition activities begin, all planning and scheduling activities will be suspended on one of the spg platforms at EDC, GSFC and LaRC (there is only one spg platform at NSIDC therefore the process will be different). All processing activities in the queue directed to the targeted platform will be allowed to run their course. Future processing requests planned and scheduled will be targeted to the spg platform not being upgraded at the time. Once the processing activities in the queue directed to the platform being upgraded are completed, the targeted platform is shutdown. Once the targeted platform is shutdown the data disk and the boot disk running the IRIX 6.2 and associated layered COTS and custom software components are removed and replaced with disks running the IRIX 6.5 OS and associated layered COTS and custom software components.

Once the replacement disks are substituted in the targeted platform, system initialization and checkout procedures will begin in TS2 mode. The toolkit libraries are verified by acquiring pre-built product generation executables (PGEs). The PGEs acquired will be used to validate the environment in TS2 mode. Planning and scheduling activities using basic instrument processing scenarios for synthetic as well as real PGEs for ASTER (EDC), MODIS (EDC and GSFC) and/or MISR (LaRC) related data is employed during TS2 testing. The plans and schedules are activated in AutoSys, executed and verified during a Post Run analysis. These steps are repeated during checkout of TS1 mode.

When transitioning to the Operations mode, the targeted spg platform registers the science software into AutoSys. The operations staff logs into the planning and scheduling software that plans future production routines to run on the transition platform. Plans and schedules are activated in AutoSys and post run analysis is verified to determine if products created using the PGEs are created successfully. If all indications are that the products have been successfully created using the transition platform, operations will continue on the transition platform. After confidence is gained in the transition platform the spg platform that has not been upgraded to IRIX 6.5 will be scheduled for upgrade activities.

If the transition spg platform is deemed not to be successful testing will begin again in the Test mode. If problems cannot be rectified with the spg transition platform and it is determined that operations is falling behind in its production activities a decision will be made to roll back to the previous configuration using the IRIX6.2 OS and associated layered COTS and custom software components.

The high level steps and estimated time to transition the spg platform are specified in Table 5.5-1.

Table 5.5-1. Spg Transition Steps (1 of 2)

(Note: See the latest Procedures Document (420-WP-013) for detailed information)

Step #	Description	Est Time (Hr)	Comments
1	In parallel with ongoing operations suspend all planning, scheduling and production activities related to the e0spg05 platform.	12 hrs	Production Operations activities continue in a degraded mode using the e0spg01 platform. Complete all jobs left remaining in the queue for e0spg05.
2	Flush activities pertaining to e0spg05 in Autosys.	1 hr	
3	Shutdown e0spg05.	1 hr	
4	Remove the boot disk and the data disk from the e0spg05 platform	0.5 hrs	Package and store removed disk. The disk removed will continue to have the IRIX 6.2 OS on it until the upgrade solution starting in step 5 is proven successful. Eventually, the disk removed will serve as the replacement disk for e0spg01.
5	Install new boot disk with IRIX 6.5 operating system and new data disk with custom software upgrade and COTS products.	0.5 hrs	The ip address has been changed at the DAAC or Landover facility to reflect the proper ip address already existing at the site. The test libraries to be used during TS2 and TS1 testing have been built and validated in the IRIX 6.5 environment at the Landover facility. Autosys has already been checked out at the Landover facility.
6	Startup the e0spg05 platform with the new disk installed and the custom code configured for TS2 mode.	0.5 hrs	
7	Begin checkout testing in TS2 mode	2 days	

Table 5.5-1. Spg Transition Steps (2 of 2)

Step #	Description	Est Time (Hr)	Comments
8	Verify Toolkit libraries are already up and running.		Acquire some already built PGE's
9	Register the Science S/W (PGE's) that will be used to validate the environment in TS2 mode.	1 hr	PGE's used will be built for the IRIX 6.5 OS environment.
10	Begin planning and scheduling activities using basic instrument processing scenarios.	0.5 hrs	May use synthetic or real PGE's.
11	Activate plans and schedules for jobs in autosys.	1 hr	
12	Evaluate post run analysis to verify products were created correctly.	1 hr	
13	Bring up e0spg05 in TS1 mode.	0.5 hrs	
14	Perform checkout testing in TS1 mode.	2 days	SSI&T testing, plus assumes PGEs have been previously tested under IRIX 6.5.
15	Evaluate post run analysis to verify products were created correctly.	1 hr	
16	Bring up e0spg05 in OPS mode	0.5 hrs	Toolkit libraries are up and running.
17	Register science software	1 hr	
18	Login to planning and scheduling	0.1 hrs	Notify that e0spg05 is available for processing request.
19	Activate plans and schedules or jobs in Autosys.	1 hr	
20	Evaluate post run analysis to verify products are created successfully.	1 hr	a. If products are produced successfully continue to operate in Ops environment using the IRIX 6.5 OS. If products produced are unsuccessful testing may need to continue in the Test modes. If there is a severe problem, go back to the 6.2 OS. Shutdown the e0spg05 platform and replace the current boot and data disk with the disks previously removed.

5.6 Wkg Hosts Transition Approach

The wkg or HDF EOS platform contains the processing software necessary for performing Landsat 7 subsetting functions based on user requests. The wkg platform only exists at EDC. It is the intention of the project to perform the IRIX 6.5 upgrade activities on the wkg platform concurrently with performing the upgrade on e0drg01 (which is the Landsat 7 archive platform). The decision to perform the upgrade activities on wkg and e0drg01 concurrently is made to take advantage of the fact that once e0drg01 is down there will be no Landsat order processing taking place.

Prior to the DAAC's transition activities involving the wkg platform, a new system (data) disk and boot disk will be configured with the IRIX 6.5 OS and associated layered COTS and custom software components. The existing disks will be copied, and OS and COTS installed on the copies. These copies will become the replacement disks used during the transition process at the DAAC. Once the transition activities begin, all planning and scheduling activities will be suspended on the wkg platform located at EDC. All processing activities in the queue, directed to the wkg platform, are allowed to complete. Once the processing activities in the queue directed to the wkg platform are completed the wkg platform is shutdown. Once the wkg platform is shutdown the data disk and the boot disk running the IRIX 6.2 and associated layered COTS and custom software components are removed and replaced with disks running the IRIX 6.5 OS and associated layered COTS and custom software components.

Once the replacement disks running the IRIX 6.5 OS and associated layered COTS and custom software components are substituted in the wkg platform, system initialization and checkout procedures will begin in TS2 mode. It is assumed that the e0drg01 is up and running or an instance of the Landsat 7 functions is running on an appropriate drg platform. During the testing in TS2 mode the wkg platform software will perform subsetting activities on synthetic and/or real Landsat 7 data. User requests and orders will be processed accordingly. After validation in TS2 mode is complete testing will begin in TS1 mode to validate the TS1 environment.

When transitioning to the operations mode using the IRIX 6.5 OS and associated layered COTS and custom software components, the wkg platform will process regularly scheduled user request and orders. If all indications are that the products have been successfully subsetted while using the upgraded OS, the operations environment will continue. If the wkg transition activities are deemed to be unsuccessful, then testing will begin again in the TS2 and TS1 modes. If problems cannot be rectified with the wkg transition and it is determined that operations is falling behind, a decision will be made to roll back to the previous configuration using the IRIX 6.2 OS and associated layered COTS and custom software components. The down time related to the wkg IRIX 6.5 upgrade activities coincides with the time to perform the e0drg01 platform upgrade in section 5.3. The estimated down time is on the order of 12 hours.

The high level steps and estimated time to transition the wkg platform is specified in Table 5.6-1.

Table 5.6-1. Wkg Transition Steps (1 of 2)

(Note: See the latest Procedures Document (420-WP-013) for detailed information)

Step #	Description	Est Time (Hr)	Comments
1	In parallel with on-going e0drg01 upgrade activities suspend all Landsat 7 request and orders activities on the e0wkg01 platform.	3 hrs	All Landsat 7 subsetting requests and orders are halted.
2	Flush Landsat distribution Read only cache.	0.5 hrs	
3	Shutdown e0wkg01.	0.5 hrs	
4	Remove the boot disk and the data disk from the e0wkg01 platform	0.5 hrs	Package and store removed disk. The disk removed will continue to have the IRIX 6.2 OS on it until the upgrade solution starting in step 5 is proven successful. Eventually, the disk will serve as the replacement disk for future applications.
5	Install new boot disk with IRIX 6.5 operating system running on it and new data disk with system software upgrade and COTS products on it.	0.5 hrs	The ip address has been changed at the Landover facility to reflect the proper ip address already existing at the site. The dynamic link libraries have been test and validated in the IRIX 6.5 environment at the Landover facility.
6	Startup the e0wkg01 platform with the new disk installed and the custom code configured for TS2 mode.	0.5 hrs	
7	Begin checkout testing in TS2 mode	8 hrs	
8	Submit a list of pre-built Landsat orders and request.		
9	Process pre-built Landsat orders and request.		
10	Evaluate post run analysis to verify products were subset correctly.		Verify the distribution chain works correctly.
11	Bring up e0wkg01 in TS1 mode.	0.5 hrs	
12	Perform checkout testing of TS1 mode	8 hrs	
13	Evaluate post run analysis to verify products were subset correctly.		Verify the distribution chain works correctly.
14	Bring up e0wkg01 in OPS mode	0.5 hrs	
15	Submit a list of Landsat orders and request.		
16	Process Landsat orders and request.		

Table 5.6-1. Wkg Transition Steps (2 of 2)

Step #	Description	Est Time (Hr)	Comments
17	Evaluate post run analysis to verify products were subset correctly.		Verify the distribution chain works correctly. If products are produced successfully continue to operate in Ops environment using the IRIX 6.5 OS. If products produced are unsuccessful testing may need to continue in the Test modes. If there is a severe problem a may be determined that we have to go back to the 6.2 OS. If this is the case we would shutdown the e0wkg01 platform and replace the current boot and data disk with the disk previously removed in step

5.7 Aqa Hosts Transition Approach

The aqa boxes, e0aqg01 and e0aqg02, are used only for offline activities, and will be upgraded in place via direct installs of the OS and COTS.

6. Performance and Stability Testing

6.1 PVC Configuration

Following the performance testing of Release 5B, the PVC facility will be upgraded to IRIX 6.5.6, and Release 55 will be performance tested in the PVC facility using the same test scenarios that were used for Release 5B. Table 6.1-1 identifies the machines that will be upgraded to IRIX 6.5.6 prior to installing ECS Release 55. This upgrade will be performed in a "big bang" approach during scheduled downtime when all machines will be upgraded in place at once. Following the upgrade, a suite of infrastructure checkout scripts will be run to verify correct operation and connectivity of the PVC. Release 55 will then be installed per the 55 release instructions. This will require either a new installation on the SGI machines or a full installation across both SGI and SUN machines. Following the installation will be a brief manual checkout followed by a regression test. Performance and stability testing will then start. This testing is intended to establish that:

1) The 55 release can meet the 5B workload specification.

2) The system, after upgrade to IRIX 6.5 and Origins, is at least as stable as before the upgrade.

Table 6.1-1. PVC machines to be upgraded to IRIX 6.5

Machine Name	Type Of Machine	Function
p0spg01	Challenge XL	Science Processor
p0aqg01	Challenge S	QA Processor
p0drg01	Challenge XL	FSMS Server
p0acg01	Challenge XL	APC Server
p0wkg01	Challenge XL	Sub-setting Server
p0icg01	Challenge DM	Ingest Server

These upgrades will be done in July & August 2000.

6.2 Planned Tests

The performance and stability test consists of executing a shortened form of one of the two scenarios of 24 hour testing (GSFC and EDC) as specified in the 5B Workload Specification. Automated scripts are run to generate the required profile of system activity for Ingest; Science Processing; Search, Browse and Ordering; Daily Planning; and Distribution. Log files are generated for later analysis of Workload compliance that is provided in a Performance Test Summary.

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7. Transition at DAACs

7.1 Scope

The proposed OS upgrade is only for the SGI machines. Table 7.1-1 shows the scope of the proposed OS upgrade at each DAAC.

Table 7.1-1. Number of SGI machines at each DAAC

DAAC	Number of SGI machines	Total number of machines (SUN, SGI, X-term, HP, PC)
EDC	12	53
GSFC	14	67
LaRC	12	52
NSIDC	8	40

7.2 Assumptions

To plan and perform the transition the following assumptions are made:

The transition is from a single baseline. That is, the custom software for the modes should be at 5B release.

1. COTS software versions match required baseline versions (reference 910-TDA-003, 920-TDx-002 as updated by a CCR prior to the actual upgrade).
2. The DAAC is in conformance with the mount point baseline (reference 920-TDx-008 as updated by a CCR prior to the actual upgrade).
3. The transition is from a single baseline. That is, the custom SGI software for all modes should be at 5B release 03.
4. Full system backup and any associated incremental backup are complete and available prior to the start of transition.
5. The DAACs will delete all unused/test data that is outside the ESDT baseline from the archive prior to transition.
6. All producers of higher-level data products (L1 and higher) are capable of holding/buffering products that could not be ingested during the transition period.
7. Prior to shutdown the system is quiesced (work queues are allowed to run until they are empty).
8. The downtime clock starts when system inputs are disabled, and completes when the system is able to receive operational data.

9. Once operations are restored, the use of the other modes is kept to a minimum to allow backlogged processing to catch-up.
10. IP addresses are available for the new machine to bring it on-line while the current machine is still operational.

7.3 Individual DAAC Requirements

This section looks at different DAAC requirements that are unique to each DAAC. The ECS transition team in coordination with each DAAC will develop this information unless stated otherwise.

Regression tests for each mode

The type of regression tests for each mode should be developed by each DAAC based on their operational requirements.

Type of transition

Based on the operational requirements, the type of transition for each DAAC (i.e. to transition either one subsystem or multiple subsystems or all subsystems at one time) will have to be determined.

Floor Space/Power Supply/Air Conditioning

The ECS Systems Engineering Hardware team has completed site surveys at all sites, and the results are shown in the Procedures for the Transition of ECS into the IRIX 6.5 Environment document (420-WP-013)– Updated Floor Plans.

There are no issues with power and air conditioning for the additional equipment at any of the DAACs.

Network requirements

The FDDI to Ethernet transition using CAT 6006 must be completed by GSFC, EDC, and NSIDC DAACs before the OS upgrade.

GSFC	Cat6006 switch has been installed (COMPLETE).
NSIDC	Cat6006 switch has been installed (COMPLETE).
EDC	Cat6006 switch has been installed (COMPLETE).
LaRC	N/A.

Resource requirements

The ECS M&O team is assigned to ensure that each DAAC has enough personnel to manage the transition activities. As soon as the information is available this section will be updated. Currently, it has been identified as a risk item.

DAAC Unique Extensions

Each DAAC will be responsible to work porting for any DAAC unique extensions.

7.4 Pre-transition activities

All the following activities need to be performed at DAAC sites before the transition. These items do not entail impacts to DAAC operations. The DAAC point-of-contact for these items are as follows:

GSFC ---- Gary Roth

LaRC ---- Gerry LeMay

EDC ----- Wayne Hanson

NSIDC –- Renea Ericson

Hook-up and burn-in

A system hook-up and burn-in period will be performed for SGI Origin machines prior to the transition.

RAID configuration

The RAID should be configured so that an NFS mount from the old primary server to the new primary server for TS1 and TS2 mode can be done.

Sybase transition

Sybase login accounts must be migrated from the old server to the new server prior to migration of any data, since the restoration of data will require that the same accounts exist as on the old server.

To migrate data for the mode being transitioned, the Sybase database will be dumped to disk on the old primary, and then ftp'd to the new primary, using a HiPPI connection if possible. On the new primary the data will be restored into the new Sybase server. The old primary will be retained until it is clear that a fall back is no longer needed. Database scripts will be used to validate that the databases are loaded correctly.

The overview approach for transferring databases from an IRIX 6.2 machine to a 6.5 machine is as follows:

1. All devices from Sybase Device Baseline are allocated and added to Sybase.
2. Database allocations match, in size and order (not device), database allocations on the IRIX 6.2 machines.
3. Quiesce ECS
4. Dump database transaction logs
5. Run dbcc on the IRIX 6.2 databases.

6. Dump databases.
7. Make database dump "visible" to Sybase on the IRIX 6.5 boxes.
8. Create Sybase logins in same order as created on the IRIX 6.2 Sybase Server.
9. Load databases to Sybase on IRIX 6.5.
10. Verify ECS application user ids in IRIX 6.5 databases. Correct any discrepancies.
11. Run dbcc on IRIX 6.5 databases
12. Dump IRIX 6.5 databases.

The detailed procedure for transferring databases is outlined in the Procedures Document (420-WP-013).

DCE transition for the VATC

DCE will be upgraded to 1.2.2a with the OS upgrade. However, the following activities will have to be done by the DAACs prior to transition:

- Create DCE endpoints to cleanup CDS for new primary servers in the mode.
- Add temporary server to DCE namespace. This is a one time operation for each new server installed into the environment.

(See the Procedures Document (420-WP-013) for details including DCE transition for DAACs.)

Management of the System Baseline

Prior to the start of the IRIX upgrade at each site, a CCR will be brought to the appropriate control board to request approval for the work, and to update the baseline for the site. Most of the baseline changes for the IRIX upgrade will be included in this one CCR, rather than writing a separate CCR for each individual change. The baseline updates may include:

1. HW Diagrams 920-TDx-001
2. Site-Host Map 910-TDA-005
3. Floor plans 920-TDx-004
4. Networking docs 921-TDx series
5. Disk partitions 922-TDx series
6. Mount points 920-TDx-008
7. HW-SW Maps 920-TDx-002
8. COTS Baseline 910-TDA-003
9. IRIX patch list 911-TDA-005

10. HW-patch maps 920-TDx-014
11. System infrastructure 920-TDx-003
12. SGI Unix Kernel Configs 920-TDx-016
13. Host Memory 920-TDx-018
14. HW-Database maps 920-TDx-009

Management of Mount Points

In order to reduce the amount of work to be accomplished during system downtime, mount points will be created in advance from each new machine to other machines, and from other machines to the new machine. This will require creation of some new directories, since the new mount points will have to coexist with the existing mounts until the transition is over. The details of the mount points will be specified in the 920-TDx-008 document for each site.

The selection of the new mount points during transition will occur by changing configuration parameters, by means of the Storage Management GUI, and by patches to the Configuration Registry Database.

Management of Custom Configuration Parameters

The changes to the custom configuration parameters during this upgrade are fairly extensive. Most of the changes are caused by the renaming of machines, and are necessary for TS2 and TS1 modes regardless of whether the machine's name in OPS mode will be changed to be the same as the replaced machine.

For example, the changes needed in one mode at EDC for the replacement of e0acg01 with e0acg11 will include:

1) A registry patch, shown in Table 7.4-1.
2) Selection of new mount points using the Storage Management GUI: the ftp pull area resides on a new machine (e0acg11) so:
    a) all ACM archive server 'temp file directory' values need to be amended.
    b) all ACM staging monitor server 'root path' values need to amended.
    c) all Distribution Ftp server 'Pull Ftp Host' values need to be amended.
3) Addition of e0acg11 to Whazzup config files
4) Addition of new Sybase servers to the Sybase interfaces file

Table 7.4-1. Configuration Parameter Change - rgypatch example

```
# Hand generated rgypatch for IRIX 6.5 upgrade at EDC.
# Damian Anderson - Fri Jun 30 15:03:27 EDT 2000
#  /home/danderso/PATCH.e0acg11

EDC UPD e0acs05/config/CFG/EcDsScienceDataServer/DBServer=e0acg11_srvr
EDC UPD e0acs05/config/CFG/EcDsScienceDataServer/DSQUERY=e0acg11_sqs322_srvr
EDC UPD e0acs05/config/CFG/EcDsScienceDataServer/SDSRV_SYBASE_SERVER=e0acg11_srvr

EDC UPD e0acs06/config/CFG/EcDsScienceDataServer/DBServer=e0acg11_srvr
EDC UPD e0acs06/config/CFG/EcDsScienceDataServer/DSQUERY=e0acg11_sqs322_srvr
EDC UPD e0acs06/config/CFG/EcDsScienceDataServer/SDSRV_SYBASE_SERVER=e0acg11_srvr

EDC UPD e0dis01/config/CFG/EcDsSt8MMServer/DBServer=e0acg11_srvr
EDC UPD e0dis01/config/CFG/EcDsStD3Server/DBServer=e0acg11_srvr
EDC UPD e0dis01/config/CFG/EcDsStPrintServer/DBServer=e0acg11_srvr
EDC UPD e0dis01/config/CFG/EcDsStStagingDiskServer/DBServer=e0acg11_srvr
EDC UPD e0dis01/config/CFG/EcDsStmgtGui/DBServer=e0acg11_srvr

EDC UPD e0dis02/config/CFG/EcDsDdistGui/DBServer=e0acg11_srvr
EDC UPD e0dis02/config/CFG/EcDsDistributionServer/DBServer=e0acg11_srvr
EDC UPD e0dis02/config/CFG/EcDsSt8MMServer/DBServer=e0acg11_srvr
EDC UPD e0dis02/config/CFG/EcDsStPrintServer/DBServer=e0acg11_srvr
EDC UPD e0dis02/config/CFG/EcDsStmgtGui/DBServer=e0acg11_srvr

EDC UPD e0drg01/config/CFG/EcDsStArchiveServer/DBServer=e0acg11_srvr
EDC UPD e0drg01/config/CFG/EcDsStFtpDisServer/DBServer=e0acg11_srvr
EDC UPD e0drg01/config/CFG/EcDsStFtpDisServer/UserPullHost=e0acg11u.ecs.nasa.gov
EDC UPD e0drg01/config/CFG/EcDsStIngestFtpServer/DBServer=e0acg11_srvr
EDC UPD e0drg01/config/CFG/EcDsStStagingDiskServer/DBServer=e0acg11_srvr
EDC UPD e0drg01/config/CFG/EcDsStStagingMonitorServer/DBServer=e0acg11_srvr

EDC UPD e0drg02/config/CFG/EcDsStArchiveServer/DBServer=e0acg11_srvr
EDC UPD e0drg02/config/CFG/EcDsStFtpDisServer/DBServer=e0acg11_srvr
EDC UPD e0drg02/config/CFG/EcDsStFtpDisServer/UserPullHost=e0acg11u.ecs.nasa.gov
EDC UPD e0drg02/config/CFG/EcDsStIngestFtpServer/DBServer=e0acg11_srvr
EDC UPD e0drg02/config/CFG/EcDsStStagingDiskServer/DBServer=e0acg11_srvr
EDC UPD e0drg02/config/CFG/EcDsStStagingMonitorServer/DBServer=e0acg11_srvr

EDC UPD e0icg01/config/CFG/EcDsStIngestFtpServer/DBServer=e0acg11_srvr
EDC UPD e0icg01/config/CFG/EcDsStStagingDiskServer/DBServer=e0acg11_srvr

EDC UPD e0wkg01/config/CFG/EcDsHdfEosServer_1/DBServer=e0acg11_srvr
EDC UPD e0wkg01/config/CFG/EcDsHdfEosServer_2/DBServer=e0acg11_srvr
```

```
EDC UPD e0wkg01/config/CFG/EcDsHdfEosServer_3/DBServer=e0acg11_srvr
EDC UPD e0wkg01/config/CFG/EcDsStArchiveServer/DBServer=e0acg11_srvr
EDC UPD e0wkg01/config/CFG/EcDsStFtpDisServer/DBServer=e0acg11_srvr
EDC UPD e0wkg01/config/CFG/EcDsStFtpDisServer/UserPullHost=e0acg11u.ecs.nasa.gov
EDC UPD e0wkg01/config/CFG/EcDsStStagingDiskServer/DBServer=e0acg11_srvr
EDC UPD e0wkg01/config/CFG/EcDsStStagingMonitorServer/DBServer=e0acg11_srvr

EDC UPD e0acg11/config/CFG/EcDsStArchiveServer/DBServer=e0acg11_srvr
EDC UPD e0acg11/config/CFG/EcDsStFtpDisServer/DBServer=e0acg11_srvr
EDC UPD e0acg11/config/CFG/EcDsStFtpDisServer/UserPullHost=e0acg11u.ecs.nasa.gov
EDC UPD e0acg11/config/CFG/EcDsStIngestFtpServer/DBServer=e0acg11_srvr
EDC UPD e0acg11/config/CFG/EcDsStPullMonitorServer/DBServer=e0acg11_srvr
EDC UPD e0acg11/config/CFG/EcDsStStagingDiskServer/DBServer=e0acg11_srvr
EDC UPD e0acg11/config/CFG/EcDsStStagingMonitorServer/DBServer=e0acg11_srvr
```

The configuration registry enables most of the parameter changes to be made in one place, as opposed to modifying config files for more than a dozen executables on various machines and then running the mkconfig process. The complete set of registry patches needed for the IRIX upgrade is shown in Table 7.4-2. Note that after the IRIX upgrade, the config files will be out of date and the configuration registry will be the master source of config values.

Table 7.4-2. Registry Patches (rgypatchs) Needed for the 55 Transition

	VATC	GSFC	NSIDC	LARC	EDC
TS2	t1acg01 -> t1acg04 t1drg01 -> t1drg03 t1icg01 -> t1icg03	g0acg01 -> g0acg05 g0drg01 -> g0drg07 g0drg02 -> g0tmp01 g0icg01 -> goicg02 g0icg02 -> g0icg01	n0drg01 -> n0drg02 n0drg02 -> n0drg01 n0acg02 -> n0acg01 n0acg01 -> n0acg02 n0icg01 -> n0icg02	l0acg02 -> l0acg05 l0drg01 -> l0drg03 l0icg01 -> l0icg02	e0acg01 -> e0acg11 e0acg02 -> e0acg12 e0drg01 -> e0drg11 e0drg02 -> e0drg12 e0drg05 -> e0drg15 e0icg01 -> e0icg11 e0icg02 -> e0icg12 e0wkg01 -> e0wkg02
TS1	t1acg01 -> t1acg04 t1drg01 -> t1drg03 t1icg01 -> t1icg03	g0acg01 -> g0acg05 g0drg01 -> g0drg07 g0drg02 -> g0tmp01 g0icg01 -> goicg02 g0icg02 -> g0icg01	n0drg01 -> n0drg02 n0drg02 -> n0drg01 n0acg02 -> n0acg01 n0acg01 -> n0acg02 n0icg01 -> n0icg02	l0acg02 -> l0acg05 l0drg01 -> l0drg03 l0icg01 -> l0icg02	e0acg01 -> e0acg11 e0acg02 -> e0acg12 e0drg01 -> e0drg11 e0drg02 -> e0drg12 e0drg05 -> e0drg15 e0icg01 -> e0icg11 e0icg02 -> e0icg12 e0wkg01 -> e0wkg02
OPS	t1acg01 -> t1acg04 t1icg01 -> t1icg03 t1drg01	g0acg01 g0drg01 g0drg02 g0icg01 g0icg02	n0drg01 -> n0drg02 n0drg02 -> n0drg01 n0acg02 -> n0acg01 n0acg01 -> n0acg02 n0icg01	l0acg02 l0drg01 -> l0drg03 l0icg01	e0acg01 -> e0acg11 e0acg02 -> e0acg12 e0drg01 -> e0drg11 e0drg02 -> e0drg12 e0drg05 -> e0drg15 e0icg01 -> e0icg11 e0icg02 -> e0icg12 e0wkg01 -> e0wkg02
All modes at same time	t1spg01 t1wkg01 t1aqg01 t1aqg02	g0spg01 g0spg07 g0aqg01	n0spg03 n0aqg02 n0aqg01	l0spg01 l0spg05 l0spg06 l0icg02 l0aqg01 l0aqg02	

Each entry in this table identifies a rgypatch (a set of config parameter changes).

A single machine name means that the mode is being upgraded to IRIX 6.5 on that machine. An example parameter change for this would be changing SYBASE to point to OpenClient 12.0. If there are not many changes, they may be made by hand via the GUI rather than via a rgypatch.

Machine -> machine means the mode is transferring to another machine, so all references to the machine name, on this machine and on other machines, must be changed to the new name, in addition to changes needed just for IRIX 6.5.

To enable rollback, the registry tree should always be saved before applying any rgypatch. Rollback will be tested after each mode's upgrade.

7.5 Sequence of Transition Activities

The following provides a general ordering of activities. A detailed plan for each DAAC is provided in the Procedures for the Transition of ECS into the IRIX 6.5 Environment document (420-WP-013).

1) Receive Origin machines (EDC and GSFC), add to floor, cable to network, and burn in
2) CSR for 5B
3) PSR for Sybase Server 11.5.1
4) PSR for IRIX 6.5/DCE 1.2.2a and associated COTS (see table 3.1-1).
5) Re-install OS on the Origins to the baseline version
6) COTS installs on the Origins to the baseline versions
7) Upgrade AQG boxes in place to IRIX 6.5 (no OPS downtime) to establish early experience with IRIX 6.5 at the DAAC (there is no custom code on the AQG boxes)
8) PSR for Release 55
9) Perform SSI&T for PGEs on IRIX 6.5
10) Install Release 55 in TS2 mode on ACG and DRG substitutes, and checkout
11) Install Release 55 in TS1 mode on ACG and DRG (if DAAC desires additional checkout)
12) Perform OPS transition to IRIX 6.5 for the first SPG machine (no OPS downtime).
13) Perform OPS transition to IRIX 6.5 for the second SPG machine (no OPS downtime).
14) Perform OPS transition for ACG, DRG, and WKG
15) Perform OS and COTS installs on substitute machines for ICG, using 2 Challenges released from ACG (EDC, GSFC)
16) Install Release 55 in a test mode on ICG substitutes, and checkout
17) Perform OPS transition for ICG

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