



# StorageTek™ Nearline Control Solution (NCS) MSP software

SMC • HSC • HTTP Server • LibraryStation

## Installation Guide

Part Number: 312613601

Revision: B

Version: 6.1





# StorageTek™ Nearline Control Solution (NCS)

SMC • HSC • HTTP Server • LibraryStation

MSP Software

---

## Installation Guide

Version 6.1

Sun Microsystems, Inc.  
[www.sun.com](http://www.sun.com)

Part No. 312613601  
February, 2009 Rev. B

Copyright © 2009 Sun Microsystems, Inc., 4150 Network Circle, Santa Clara, California 95054, U.S.A. All rights reserved.

U.S. Government Rights - Commercial software. Government users are subject to the Sun Microsystems, Inc. standard license agreement and applicable provisions of the FAR and its supplements.

Sun, Sun Microsystems, the Sun logo and Sun StorageTek are trademarks or registered trademarks of Sun Microsystems, Inc. in the U.S. and other countries.

UNIX is a registered trademark in the U.S. and other countries, exclusively licensed through X/Open Company, Ltd.

Products covered by and information contained in this service manual are controlled by U.S. Export Control laws and may be subject to the export or import laws in other countries. Nuclear, missile, chemical biological weapons or nuclear maritime end uses or end users, whether direct or indirect, are strictly prohibited. Export or reexport to countries subject to U.S. embargo or to entities identified on U.S. export exclusion lists, including, but not limited to, the denied persons and specially designated nationals lists is strictly prohibited.

DOCUMENTATION IS PROVIDED "AS IS" AND ALL EXPRESS OR IMPLIED CONDITIONS, REPRESENTATIONS AND WARRANTIES, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT, ARE DISCLAIMED, EXCEPT TO THE EXTENT THAT SUCH DISCLAIMERS ARE HELD TO BE LEGALLY INVALID.

Copyright © 2009 Sun Microsystems, Inc., 4150 Network Circle, Santa Clara, California 95054, Etats-Unis. Tous droits réservés.

Sun, Sun Microsystems, le logo Sun et Sun StorageTek sont des marques de fabrique ou des marques déposées de Sun Microsystems, Inc. aux Etats-Unis et dans d'autres pays.

UNIX est une marque déposée aux Etats-Unis et dans d'autres pays et licenciée exclusivement par X/Open Company, Ltd.

see above Les produits qui font l'objet de ce manuel d'entretien et les informations qu'il contient sont regis par la legislation americaine en matiere de controle des exportations et peuvent etre soumis au droit d'autres pays dans le domaine des exportations et importations. Les utilisations finales, ou utilisateurs finaux, pour des armes nucleaires, des missiles, des armes biologiques et chimiques ou du nucleaire maritime, directement ou indirectement, sont strictement interdites. Les exportations ou reexportations vers des pays sous embargo des Etats-Unis, ou vers des entites figurant sur les listes d'exclusion d'exportation americaines, y compris, mais de maniere non exclusive, la liste de personnes qui font objet d'un ordre de ne pas participer, d'une facon directe ou indirecte, aux exportations des produits ou des services qui sont regi par la legislation americaine en matiere de controle des exportations et la liste de ressortissants specifiquement designes, sont rigoureusement interdites.

LA DOCUMENTATION EST FOURNIE "EN L'ETAT" ET TOUTES AUTRES CONDITIONS, DECLARATIONS ET GARANTIES EXPRESSES OU TACITES SONT FORMELLEMENT EXCLUES, DANS LA MESURE AUTORISEE PAR LA LOI APPLICABLE, Y COMPRIS NOTAMMENT TOUTE GARANTIE IMPLICITE RELATIVE A LA QUALITE MARCHANDE, A L'APTITUDE A UNE UTILISATION PARTICULIERE OU A L'ABSENCE DE CONTREFACON.



Please  
Recycle



## Document Effectivity

---

EC Number	Date	Doc Kit Number	Type	Effectivity
132246	May 18, 2006	---	Revision A	This document applies to the Nearline Control Solution (MSP) Version 6.1.
	February, 2009		Revision B	



# Contents

---

<b>What's New?</b> .....	<b>xi</b>
<b>About this Guide</b> .....	<b>xv</b>
Intended Audience .....	xvi
About the Software .....	xvi
Organization of This Guide .....	xvi
Related Publications .....	xvii
Contact Us .....	xvii
Conventions Used in this Guide .....	xvii
Typographic .....	xvii
Symbols .....	xvii
Additional Information .....	xviii
Sun's External Web Site .....	xviii
Product Publications .....	xviii
Partners Site .....	xviii
Customer Support .....	xviii
Customer-initiated Maintenance .....	xix
Sun's Worldwide Offices .....	xx
<b>Chapter 1. Performing NCS Pre-installation Tasks</b> .....	<b>1</b>
Overview .....	1
NCS Pre-Installation Notes .....	2
Installation Materials .....	2
Migration and Coexistence Considerations .....	2
NCS Product License Keys .....	3
NCS Installation Base Tape Contents .....	4
NCS Installation Checklist .....	5
Verifying NCS Software and Hardware Requirements .....	6
NCS Software Requirements .....	6
NCS Hardware Requirements .....	7
Verifying NCS Virtual Storage Requirements .....	8
Verifying MSP Virtual Storage Requirements for SMC .....	8
Verifying MSP Virtual Storage Requirements for HSC .....	8
Reviewing the NCS FMIDs .....	9
Unloading the SMP JCL Library .....	10
Setting up the SMP Environment .....	10
NCS SMP Requirements .....	11

Defining and Initializing the SMP PRJ .....	11
Allocating NCS Target and Distribution Library Data Sets and Required DDDEF Entries .....	12
Updating the SYSLIB Concatenation .....	13
<b>Chapter 2. Installing the NCS Functions .....</b>	<b>15</b>
Overview .....	15
Receiving the NCS Base Functions and Communication Functions (SMP RECEIVE) .....	16
Installing the NCS Base Functions (SMP APPLY and ACCEPT) .....	16
Applying the NCS Base Functions (SMP APPLY) .....	16
Accepting the NCS Base Functions (SMP ACCEPT) .....	16
Installing NCS Product Maintenance .....	17
<b>Chapter 3. Performing SMC Post-installation Tasks .....</b>	<b>19</b>
Overview .....	19
Adding the SMC Load Library to the Authorized Program List .....	20
Using KAAAPFzz to authorize the SMC Load Library .....	20
Defining the SMC as an MSP Subsystem .....	20
Copying or Moving the SMCBPRESI Module to an MSP LNKLIST Library .....	21
Tape Management System Interaction and the Subsystem Name Table .....	21
Unicenter CA-MIA Interaction and the Subsystem Name Table .....	22
SMC, TMS, and Unicenter CA-MIA Interaction and the Subsystem Name Table .....	22
Running SMC under MSTR and the Subsystem Name Table .....	23
Notes on Subsystem Name Table Modifications for SMC .....	23
Modifying the MSP Program Properties Table for SMC .....	24
<b>Chapter 4. Performing Post-installation Tasks for the Sun StorageTek HTTP Server ...</b>	<b>25</b>
Overview .....	25
Adding the HTTP Server Libraries to the Authorized Program List .....	26
Using KAAAPFzz to Authorize the HTTP Load Libraries .....	26
Customizing the HTTP Server START Procedure .....	26
Customizing the HTTP Server Parameter File .....	27
Configuration Parameters .....	27
Network Parameters .....	27
CGI Parameters .....	28
Performance Considerations .....	28
Starting the HTTP Server .....	28
Stopping the HTTP Server .....	28
Displaying HTTP Server Status .....	29
Tracing the SMC in the HTTP Server .....	29
<b>Chapter 5. Performing HSC Post-installation Tasks .....</b>	<b>31</b>
Overview .....	31
Defining the HSC as an MSP Subsystem .....	32
Adding the HSC Load Library to the Authorized Program List .....	33
Using KAAAPFxx to authorize the HSC Load Library .....	33
Adding the HSC User Exit Library to the Authorized Program List .....	33
Copying or Moving the SLSBPRESI Module to an MSP LINKLIST Library .....	34



Modifying the MSP Program Properties Table for HSC .....	34
Adding SMF Parameters for the HSC .....	35
HSC SMF Record Subtypes .....	36
Re-assembling the SLUCONDB (Scratch Conversion) Modules .....	36
<b>Chapter 6. Performing LibraryStation Post-Installation Tasks .....</b>	<b>37</b>
Overview .....	37
Adding LibraryStation Libraries to the Authorized Program List .....	38
Using KAAAPFxx to authorize the LibraryStation Load Libraries .....	38
Defining the Persistent Data File (Optional) .....	38
PDF Data Set Names .....	40
Volume Location .....	40
Values for Record Keywords .....	40
<b>Appendix A. NCS Samples, Source Code Modules, and Macros .....</b>	<b>41</b>
Overview .....	41
Sample Installation JCL .....	42
SMC Base Samples and Macros .....	43
HSC Samples, Source Code Modules, and Macros .....	45
LibraryStation Samples and Source Code Modules .....	50
<b>Appendix B. Installing Product Maintenance .....</b>	<b>51</b>
Overview .....	51
Maintenance Installation Data Sets .....	51
Maintenance Tape Descriptions .....	51
SMP Sample JCL .....	52
SMP RECEIVE an Accumulated PTF Tape .....	52
SMP RECEIVE a PUT .....	52
SMP APPLY JCL .....	52
SMP ACCEPT JCL .....	53
Separate HELD HSC PTFs .....	53
<b>Index .....</b>	<b>57</b>



## Tables

---

Table 1.	NCS Release 6.1 Installation Tape Contents .....	4
Table 2.	NCS Target Library Data Sets .....	12
Table 3.	NCS Distribution Library Data Sets .....	13
Table 4.	PDF Data Set Names .....	40
Table 5.	Sample Installation JCL Members .....	42
Table 6.	SMC Samples .....	43
Table 7.	SMC Macros .....	44
Table 8.	HSC Samples .....	45
Table 9.	HSC Source Code Modules .....	46
Table 10.	HSC Macros .....	47
Table 11.	LibraryStation Samples .....	50
Table 12.	LibraryStation Source Code Modules .....	50



## What's New?

---

NCS Release 6.1 provides support for:

- SMC Release 6.1
- HSC Release 6.1
- LibraryStation Release 6.1

NCS 6.1 for MSP introduces a new component; the Storage Management Component (SMC).

The SMC software is a **required** NCS component. It **replaces** the allocation functions for HSC, and allows customers to customize their allocation routine to meet the specific needs of their environment. It resides on the MSP host along with HSC.

Its primary functions are:

- Influencing tape allocation according to hardware requirements and customer policies to ensure that appropriate tape drives are selected.
- Intercepting tape management, and operating system mount, dismount, and swap messages and translating them in order to request the required tape hardware functions from the appropriate NCS automated library control system.
- Coordinating requests among multiple Sun StorageTek automated libraries.

Refer to the *SMC/MSP Configuration and Administration Guide* for more information.

NCS 6.1 includes the following enhancements and modifications:

Enhancement/Modification	Publication(s)/ Primary Locations
<b>Revision B:</b>	
Support for the Sun StorageTek™ T9840D tape drive	<i>SMC Configuration and Administration Guide</i>
Support for the Sun StorageTek™ T10000 and T10000B tape drives	<i>SMC Configuration and Administration Guide</i>
Support for the Sun StorageTek™ SL3000 modular library	<i>SMC Configuration and Administration Guide</i>
<b>Revision A:</b>	
SMC exclusion level 1 for specific requests is updated to exclude all virtual drives for non-labeled (NL) specific volume requests.	Chapter 4
Support for the Storage Management Component (SMC) software. The SMC replaces the HSC common allocation function.	<i>SMC Configuration and Administration Guide</i>
Support for SL8500 Near Continuous Operation (NCO).	<p><i>HSC Operator's Guide</i> Appendix C, HSC Support for Near Continuous Operation (NCO)</p> <p>Chapter 2, MODify command</p> <p><i>HSC Configuration Guide</i> Chapter 4, SLIACS Macro, FUTURLSM parameter</p> <p><i>HSC System Programmer's Guide</i> Chapter 2, Near Continuous Operation of the SL8500 Library</p>
Support for the Significant Event Notification (SEN) facility, which allows users or an external product to request notification about specific HSC and VTCS events.	<p><i>HSC System Programmer's Guide</i> Appendix D, Significant Event Notification Facility (SEN)</p> <p><i>HSC Operator's Guide</i> Chapter 2, OPTion SEN command</p>
<p>The HSC Support for the SL8500 Library appendix includes these new topics:</p> <ul style="list-style-type: none"> <li>• verifying that SL8500 components are operational before configuring the HSC</li> <li>• HSC requirements prior to powering down an SL8500.</li> </ul>	<i>HSC Operator's Guide</i> Appendix B, HSC Support for the SL8500 Library

<b>Enhancement/Modification</b>	<b>Publication(s)/ Primary Locations</b>
<p>The requirement has been removed for the SMC to be initialized before the HSC.</p>	<p><b><i>HSC System Programmer's Guide</i></b> Chapter 2, Initialization/Termination Functions</p> <p><b><i>HSC Configuration Guide</i></b> Appendix A, Library Configuration Checklist</p> <p>Appendix D, Procedure to Verify HSC 6.1 Functions Without Library Hardware</p>
<p>The SLILIBRY LIBGEN macro contains a new parameter, DRVHOST, which maps drive hosts in a client/server environment.</p> <p>Refer to the <i>SMC Configuration and Administration Guide</i> chapter titled "SMC and Sun StorageTek Library Management" for client/server configuration and command information.</p>	<p><b><i>HSC Configuration Guide</i></b> Chapter 4, SLILIBRY macro</p>
<p>The SET utility also includes a DRVHOST parameter, which sets the SLILIBRY DRVHOST parameter without rebuilding the CDS.</p>	<p><b><i>HSC System Programmer's Guide</i></b> Chapter 4, SET DRVHOST Utility</p>
<p>The Display DRives operator command has added the BYDrive and BYLoc parameters. BYDrive displays drives by host device address; BYLoc displays drives by location.</p>	<p><b><i>HSC Operator's Guide</i></b> Chapter 2, Display DRives command</p>
<p>The SLILIBRY macro DELDISP parameter has been replaced by the SMC MOUNTDEF command. Also, the esoteric specified in the&gt;NNLBDRV parameter is no longer used in either the HSC or SMC.</p> <p>Refer to the <i>SMC Configuration and Administration Guide</i> for more information.</p>	<p><b><i>HSC Configuration Guide</i></b> Chapter 4, SLILIBRY macro</p> <p><b><i>SMC Configuration and Administration Guide</i></b></p>
<p>The Defer, Fetch, Specvol, and Zeroscr parameters in the HSC ALLOC command have been replaced by the SMC ALLOCDEF command. These HSC parameters are still supported when an SMC 6.0 client is communicating with an HSC 6.1 server.</p> <p>Refer to the <i>SMC Configuration and Administration Guide</i> for more information.</p>	<p><b><i>HSC Operator's Guide</i></b> Chapter 2, Allocation (ALLOC) command and control statement</p> <p><b><i>SMC Configuration and Administration Guide</i></b></p>
<p>The MOUNTmsg and VOLWatch parameters in the HSC MNTD command have been replaced by the SMC MOUNTDEF command. These HSC parameters are still supported when an SMC 6.0 client is communicating with an HSC 6.1 server.</p> <p>Refer to the <i>SMC Configuration and Administration Guide</i> for more information.</p>	<p><b><i>HSC Operator's Guide</i></b> Chapter 2, MNTD (Mount/Dismount Options) command and control statement</p> <p><b><i>SMC Configuration and Administration Guide</i></b></p>
<p>The TAPEREQ control statement and the TREQDEF command/control statement have been removed from the HSC and are now processed by the SMC TAPEREQ and TREQDEF commands.</p> <p>Refer to the <i>SMC Configuration and Administration Guide</i> for more information.</p>	<p><b><i>HSC System Programmer's Guide</i></b> Chapter 3, TAPEREQ control statement, TREQDEF command/control statement</p> <p><b><i>SMC Configuration and Administration Guide</i></b></p>

<b>Enhancement/Modification</b>	<b>Publication(s)/ Primary Locations</b>
The UNITDEF command/control statement has been removed from the HSC. The HSC now recognizes library and virtual drive characteristics from the LMU and CDS definitions.	<i>HSC System Programmer's Guide</i> Chapter 3, UNITDEF command/control statement
The UNITATTR control statement has been removed from the HSC and is now processed by the SMC UNITATTR statement. UNITATTR is still supported to allow users to define non-library drives and to exclude drives from allocation (MODEL=IGNORE) when an SMC 6.0 client is communicating with an HSC 6.1 server.  Refer to the <i>SMC Configuration and Administration Guide</i> for more information.	<i>HSC System Programmer's Guide</i> Chapter 3, UNITATTR control statement  <i>SMC Configuration and Administration Guide</i>
The Display TREQDEF and Display UNITDEF commands are still supported, however, they only apply when an SMC 6.0 client is communicating with an HSC 6.1 server.	<i>HSC Operator's Guide</i> Chapter 2, Display TREQDEF and Display UNITDEF commands
The ENTER command has added the TLISM parameter, which allows you to specify the LSM to receive entered cartridges.	<i>HSC Operator's Guide</i> Chapter 2, ENTER command
The TRACE command has added component names for allocation volume lookup and XML interface.	<i>HSC Operator's Guide</i> Chapter 2, TRACE command
The LibraryStation UNITATTR LSDEF statement is no longer supported, and is ignored by LibraryStation.	<i>LibraryStation Configuration Guide</i> Chapter 10 Appendix B
LibraryStation Message changes, additions and deletions.	<i>LibraryStation Messages and Codes Guide</i> Chapter 2 Appendix B



## About this Guide

---

This guide describes how to install the Sun StorageTek™ Nearline Control Solution (NCS) product components for the Fujitsu MSP operating system. NCS product components include the following:

### **Sun StorageTek™ Storage Management Component (SMC)**

SMC is the interface between the MSP operating system and Sun StorageTek real and virtual tape hardware. SMC performs the allocation processing, message handling, and SMS processing for the NCS solution. It resides on the MSP host system with HSC, or on a remote system using the Sun StorageTek HTTP server to communicate with the HSC. SMC communicates with HSC to determine policies, volume locations, and drive ownership. The SMC is a **required** NCS component.

### **Sun StorageTek™ Host Software Component (HSC)**

Host Software Component controls the Automated Cartridge System (ACS). It runs as a subsystem on MSP. The library database records cell status, characteristics, and disposition of all cartridges stored in the library. For the purposes of this publication, **HSC** refers to the **MSP** implementation of the Sun StorageTek Host Software Component.

### **Sun StorageTek™ HTTP Server for MSP**

The Sun StorageTek HTTP Server for MSP optionally provides the middleware to allow communication between the SMC (client) and a remote HSC subsystem (server). It executes as a separate subsystem on the MSP host where the remote HSC subsystem resides.

### **Sun StorageTek™ LibraryStation**

LibraryStation provides a communications interface between HSC and a client system running an open systems host (either MSP or open systems), allowing network clients to access the library services of a Sun StorageTek Automated Cartridge System (ACS) through the MSP host system. LibraryStation can communicate with the SMC and the Sun StorageTek HTTP server can provide communication between MSP hosts. LibraryStation executes in the HSC address space on MSP.



**Note:** If you are using the Sun StorageTek™ Virtual Storage Manager (VSM) system in your NCS environment, refer to the *VTCS Installation and Configuration Guide* for installation and configuration considerations.

## Intended Audience

This publication is intended for those responsible for installing the NCS software products.

## About the Software

NCS Release 6.1 is supported by this guide.

## Organization of This Guide

This guide contains the following chapters and appendices:

- **Chapter 1, “Performing NCS Pre-installation Tasks”** describes the pre-installation tasks for the NCS product components.
- **Chapter 2, “Installing the NCS Functions”** describes the installation tasks used to install the SMC, HSC, and LibraryStation base functions in the same SMP PRJ.
- **Chapter 3, “Performing SMC Post-installation Tasks”** describes post-installation tasks for the SMC.
- **Chapter 4, “Performing Post-installation Tasks for the Sun StorageTek HTTP Server”** describes post-installation tasks for the Sun StorageTek HTTP Server for MSP.
- **Chapter 5, “Performing HSC Post-installation Tasks”** describes post-installation tasks for the HSC.
- **Chapter 6, “Performing LibraryStation Post-Installation Tasks”** describes post-installation tasks for the LibraryStation.
- **Appendix A, “NCS Samples, Source Code Modules, and Macros”** describes the samples, load modules, and macros included on the installation base tape.
- **Appendix B, “Installing Product Maintenance”** includes information used to install NCS maintenance.

An index is also included.



**Note:** If you are using the Sun StorageTek Virtual Storage Manager (VSM) system in your NCS environment, refer to the *VTCS Installation and Configuration Guide* for installation and configuration considerations.

## Related Publications

The following publications may be included in this package, depending on which NCS product components you ordered:

### Sun StorageTek™ Nearline Control Solution (NCS) - MSP Implementation

- *NCS Installation Guide*
- *NCS User Exit Guide*

### Sun StorageTek™ Storage Management Component (SMC) - MSP Implementation

- *SMC Configuration and Administration Guide*

### Sun StorageTek™ Host Software Component (HSC) - MSP Implementation

- *HSC Configuration Guide*
- *HSC Operator's Guide*
- *HSC System Programmer's Guide*
- *HSC Messages and Codes Guide*

### Sun StorageTek™ LibraryStation - MSP Implementation

- *LibraryStation Configuration Guide*
- *LibraryStation Operator and System Programmer's Guide*
- *LibraryStation Messages and Codes Guide*

## Contact Us

Sun welcomes your feedback.

Visit the Sun Documentation site at <http://docs.sun.com> and click on the FEEDBACK link at the bottom right of the screen to access the Opinion Lab feedback system.

## Conventions Used in this Guide

### Typographic

In the JCL examples in this guide and the sample JCL provided on the installation tape, some fields appear in lower case. You must update these fields to match your installation requirements.

### Symbols

The following symbols are used to highlight text in this guide:



**Note:** Information that may be of special interest to you. Notes are also used to point out exceptions to rules or procedures.



**Warning:** Information necessary to keep you from damaging your hardware or software.

## **Additional Information**

Sun Microsystems, Inc. (Sun) offers several methods for you to obtain additional information.

### **Sun's External Web Site**

Sun's external Web site provides marketing, product, event, corporate, and service information. The external Web site is accessible to anyone with a Web browser and an Internet connection.

The URL for the Sun external Web site is: <http://www.sun.com>

The URL for Sun StorageTek™ brand-specific information is:  
<http://www.sun.com/storagetek>

### **Product Publications**

The Sun Documentation Web site provides online access to Sun product publications:

<http://docs.sun.com>

To order hardcopy versions of Sun publications, contact a Sun sales or marketing representative.

### **Partners Site**

The Sun Partners site is a web site for partners with a Sun Partner Agreement. This site provides information about products, services, customer support, upcoming events, training programs, and sales tools to support partners. Access to this site, beyond the Partners Login page, is restricted. On the Partners Login page, Sun employees and current partners who do not have access can request a login ID and password and prospective partners can apply to become Sun StorageTek resellers.

The URL for partners with a Sun Partner Agreement is:

<http://www.sun.com/partners/>

### **Customer Support**

Customer support is available 24 hours a day, seven days a week, to customers with Sun or StorageTek maintenance contracts and to Sun employees. The URL for Sun StorageTek™ support is:

<http://www.sun.com/storagetek/support>

## Customer-initiated Maintenance

Customer-initiated maintenance begins with a telephone call from you to Sun Microsystems StorageTek Support. You receive immediate attention from qualified Sun personnel, who record problem information and respond with the appropriate level of support.

To contact Sun Microsystems StorageTek Support about a problem:

1. Use the telephone and call:

**☎ 800.872.4786 (1.800.USA.4SUN)** (inside the United States)

**☎ 800.722.4786** (Canada)

For international locations, go to

<http://www.sun.com/service/contacting/solution.html>

for the appropriate telephone number.

2. Describe the problem to the call taker. The call taker will ask several questions and will either route your call to or dispatch a support representative.

If you have the following information when you place a service call, the process will be much easier:

Account name	_____
Site location number	_____
Contact name	_____
Telephone number	_____
Equipment model number	_____
Device address	_____
Device serial number (if known)	_____
Urgency of problem	_____
Fault Symptom Code (FSC)	_____
Problem description	_____ _____ _____ _____ _____

## Sun's Worldwide Offices

You may contact any of Sun's worldwide offices to discuss complete storage, service, and support solutions for your organization. You can find address and telephone number information on Sun's external Web site at:  
<http://www.sun.com/worldwide/>

# Chapter 1. Performing NCS Pre-installation Tasks

---

## Overview

This chapter describes the tasks required to create SMP target and distribution zones in preparation for NCS installation.

The following topics are included:

- Pre-installation notes
- Installation base tape contents
- NCS installation checklist
- Verifying NCS software and hardware requirements
- Verifying NCS virtual storage requirements
- Reviewing the NCS FMIDs
- Unloading the SMP JCL library
- Setting up the SMP environment
- Allocating the NCS target and distribution library data sets and required DDDEF entries
- Updating the SYSLIB concatenation

# NCS Pre-Installation Notes

## Installation Materials

Included in this package are materials for Release 6.1 of the Sun StorageTek Nearline Control Solution (NCS). These materials include the following:

- NCS 6.1 Installation Base Tape
- Accumulated PTF tape (if applicable), which contains all SMC, HSC, and LibraryStation PTFs since the base tape was created, or since the last Product Update Tape (PUT).
- PUT (if applicable), which contains SMC, HSC, and LibraryStation maintenance.



### Notes:

- Contact Sun StorageTek Software Support for information about additional PTFs that might be required before installing the NCS product components.
- If you are using HSC, the SMC software **must** be installed.
- If you are using the Sun StorageTek Virtual Storage Manager (VSM) system in your NCS environment, refer to the *VTCS Installation and Configuration Guide* for installation and configuration considerations.
- It is recommended that you use the MSP Linkage Editor when installing NCS products and maintenance. Failure to do so may result in link-editing errors.

## Migration and Coexistence Considerations

If you are migrating from a previous NCS software release, study the appropriate migration and coexistence guidelines:

- For HSC, see the “Migration and Coexistence” appendix in the *HSC Configuration Guide*.
- For LibraryStation, see the “Migration and Coexistence” appendix in the *LibraryStation Configuration Guide*.



## NCS Product License Keys

HSC and LibraryStation software requires a Sun license key for initialization. This license key is validated during initialization and immediately after midnight each day.

A single license key is required for initialization of HSC and LibraryStation software.

### Obtaining a License Key

To request your license key(s), visit the Sun StorageTek License Key Center at:

<http://www.sun.com/software/licensingcenter/storage.xml>

License keys are generally issued within 48 hours of receipt of the request.

### Activating a License Key

Once you receive your license key(s), use the HSC LKEYDEF operator command and LKEYINFO control statement to make it available to the license key validation service in HSC. The LKEYDEF command loads the LKEYINFO control statement, which contains your license key information.

Refer to the *HSC Configuration Guide* for more information about the HSC LKEYDEF command and LKEYINFO control statement.

## NCS Installation Base Tape Contents

NCS Release 6.1 (including SMC, HSC, the Sun StorageTek HTTP Server, and LibraryStation) is distributed on a single standard label tape with a volume serial number of OS6100.



**Note:** If you are using the Sun StorageTek Virtual Storage Manager (VSM) system in your NCS environment, refer to the *VTCS Installation and Configuration Guide* for installation and configuration considerations.

The following table lists the files included on this tape.

**Table 1. NCS Release 6.1 Installation Tape Contents**

File	Data Set Name	Description
1	SMPMCS	SMP control statements
2	SO@6100.F1	SO@6100 JCLIN
3	SO@6100.F2	SO@6100 samples
4	SO@6100.F3	SO@6100 source modules
5	SO@6100.F4	SO@6100 object modules
6	SMC6100.F1	SMC JCLIN
7	SMC6100.F2	SMC Samplib
8	SMC6100.F3	SMC Macro
9	SMC6100.F4	SMC Load Modules
10	SMX6100.F1	SMC CGI JCLIN
11	SMX6100.F2	SMC CGI Load Modules
12	SMZ6100.F1	SMC JCLIN
13	SMZ6100.F2	SMC Samplib
14	SMZ6100.F3	SMC User Exit Samplib
15	SMZ6100.F4	SMC Samplib
16	SMZ6100.F5	SMC Load Modules
17	SP@1000.F1	PortMapper JCLIN
18	SP@1000.F2	PortMapper Load Modules
19	SP@1000.F3	PortMapper Samplib
20	SSKY500.F1	HTTP JCLIN
21	SSKY500.F2	HTTP Samplib
22	SSKY500.F3	HTTP Load Modules

## NCS Installation Checklist

Use the following checklist to verify that you have completed all NCS installation tasks.



### Notes:

- If you are using HSC, the SMC software **must** be installed.
- Sample members beginning with “NCS” contain steps for **all** NCS products. If you are **not** installing all products, edit these members as directed in the comments to install only the desired products.
- Sample members specified for steps 5-13 are included in the SMP JCL library (see page 10).
- Region size in the sample NCS SMP JCL members is set to 5M. Verify that this region size is available on your system. If this size is not available, update the sample NCS SMP JCL members to change the region size to a suitable value.

Step	Description	Page	Sample Member Name	Notes
1	Verify NCS software and hardware requirements	6		
2	Verify NCS virtual storage requirements	8		
3	Review the NCS FMIDs	9		
4	Unload the SMP JCL Library	10		
5	Define and initialize the SMP PRJ	11	ALLOCCSI	
6	Allocate the NCS target and distribution library data sets and their required DDDEF entries	12	NCSDDDEF	
7	Update the SYSLIB concatenation	13	ALLSYSLB	
8	RECEIVE the desired NCS functions and communication functions	16	NCSRECV	
9	APPLY the desired NCS functions	16	NCSAPPLY	
10	ACCEPT the desired NCS functions	16	NCSACCPT	
11	If applicable, install product maintenance	17		
12	Proceed with the post-installation tasks described in Chapters 3-6 to complete your installation			

# Verifying NCS Software and Hardware Requirements

The following sections list NCS software and hardware requirements.

## NCS Software Requirements

This section lists the NCS software requirements.

### Operating System Requirements

- Fujitsu MSP/EX at PTF level C02061 or higher.
- MAF (Multiple Addressing Facility)  
Please contact your Fujitsu SE for the MAF feature code applicable to your CPU.

### Software Requirements

- SMC Release 6.1
- HSC Release 6.1
- LibraryStation Release 6.1

### Communications Software Requirements

#### Client to Server Connection (LibraryStation) Requirements

- VTAM-G/TISP V10L10

#### HSC Server System Communications Requirements

- VTAM-G/TISP V10L10
- LMU Microcode Release 1.5.x or higher is required for multiple-level host-to-host communications.

## NCS Hardware Requirements

NCS hardware requirements include the following:

Category	Supported Hardware
Processor	Fujitsu or Fujitsu-compatible processor running MSP
Sun StorageTek™ Library Storage Modules (LSMs)	<ul style="list-style-type: none"><li>• SL3000</li><li>• SL8500</li><li>• PowderHorn™ 9310</li><li>• TimberWolf™ 9740</li><li>• WofCreek™ 9360</li><li>• Standard 4410</li></ul>
Sun StorageTek™ transports and associated media	<ul style="list-style-type: none"><li>• T10000A/B</li><li>• T9940A/B</li><li>• T9840A/B/C/D</li><li>• TimberLine™ 9490EE</li><li>• TimberLine™ 9490</li><li>• 4490</li><li>• 4480</li><li>• SD3</li></ul>



### Notes:

- An ACS can contain mixed library transports and media.
- Refer to the *HSC Operator's Guide* for more information about HSC support for the SL8500 and SL3000 libraries.
- Refer to the *HSC Configuration Guide* for SL8500 and SL3000 configuration information.

## Verifying NCS Virtual Storage Requirements

The following sections describe NCS virtual storage requirements.

### Verifying MSP Virtual Storage Requirements for SMC

Virtual storage requirements for the SMC are defined as follows:

- In JES, approximately 2.8 MB of ECSA above the 16M line for load modules and data structures.
- There are no CSA requirements below the 16M line.



**Note:** The actual amount of ECSA varies slightly based on the size of the library and number of transports defined to MSP.

### Verifying MSP Virtual Storage Requirements for HSC

Virtual storage requirements for the HSC are defined as follows:

- Approximately 215K of ECSA above the 16M line for load modules and data structures.
- Approximately 20K of CSA below the 16M line for some load modules and data structures.
- An additional amount of ECSA above the line is dynamically acquired and released during operation of the HSC. The actual amount varies with the activity and size of the library, but would rarely, if ever, exceed an additional 10K.



**Notes:**

- The requirements listed above do not include storage space for Schedule Request Blocks.
- The actual amount of ECSA varies with the activity and size of the library, and the number of cartridge transports defined to MSP.
- You may need to increase the amount of CSA when installing maintenance tapes, software enhancements, or new releases of the HSC.
- Approximately 400 bytes of the below-the-line CSA storage is located in subpool 228 (FIXED).
- To relieve the below-the-line CSA constraint and save approximately 16K of below-the-line CSA, place the following modules in an LPALIB:
  - SLSSPARS
  - SLSWMRT

## Reviewing the NCS FMIDs

NCS 6.1 is packaged in standard SMP format, and is delivered as multiple function SYStem MODifications (SYSMODs). The following SMP FMIDs are included:

### **SMC6100**

The SMC6100 function contains the SMC load modules and samples.

### **SMX6100**

The SMX6100 function provides SMC-specific functions for the Sun StorageTek HTTP server.



**Note:** This FMID is dependent on the SMC6100 FMID, and therefore must be applied **after** the SMC6100 FMID.

### **SSKY5000**

The SSKY500 function contains the HTTP server load modules, distributed macros, and samples.

### **SO@6100**

The SO@6100 function contains the HSC load modules, distributed macros, and samples.

### **SC@6100**

The SC@6100 function contains the LibraryStation load modules and samples.



**Note:** If you are using the Sun StorageTek Virtual Storage Manager (VSM) system in your NCS environment, refer to the *VTCS Installation and Configuration Guide* for installation and configuration considerations.

## Unloading the SMP JCL Library

Use the JCL example below to unload the SMP JCL members from file 2 of the NCS installation base tape to your SMP JCL library. These sample JCL members contain installation and maintenance examples.



**Note:** In the JCL examples in this document and the sample JCL provided on the installation base tape, some fields appear in lower case. These fields must be updated to match your installation requirements.

```
//jobname JOB your jobcard parameters
//UNLOAD EXEC PGM=IEBCOPY
//INDD DD DSN=S0@6100.F1,DISP=SHR,
// UNIT=tape-unit,VOL=SER=OS6100,LABEL=(2,SL)
//OUTDD DD DSN=your.smpe.jcllib,DISP=(NEW,CATLG),
// UNIT=SYSALLDA,
// SPACE=(TRK,(5,1,4)),
// DCB=(RECFM=FB,LRECL=80,BLKSIZE=3120)
//SYSPRINT DD SYSOUT=*
//SYSIN DD *
C I=INDD,O=OUTDD
E M=S0@6100
/*
```

## Setting up the SMP Environment

This section describes how to set up the SMP environment for installation of the NCS base functions. If you are installing maintenance, see Appendix B, “Installing Product Maintenance” on page 51.

The NCS products are installed using SMP. The SMP installation process involves RECEIVING, APPLYING, and ACCEPTING functions to install the NCS product components into the correct SMP target and distribution zones.



**Note:** It is recommended that you SMP ACCEPT all NCS base product components.



## NCS SMP Requirements

SMP requirements for installing the NCS product components include the following:

- NCS **must** be installed with SMP. All installation instructions in this guide are based on SMP.
- It is recommended that you install all NCS Release 6.1 product components (SMC 6.1, HSC 6.1, and LibraryStation 6.1) together in a new SMP PRJ.
- Products from other vendors should **not** be installed in the same SMP PRJ as NCS.



**Warning:** If you install an NCS Release 6.1 product component in an SMP PRJ containing a previous release of that product, the previous release is deleted from the target and distribution zones. In addition, all SYSMODS for the previous release are deleted from the SMP PRJ.



**Note:** In this release of NCS 6.1, load modules for the tape management scratch interface routines (SLUDRCA1, SLUDRTL, SLUDRRMM, and SLUDRZAR) are delivered to allow installation to a separate set of target and distribution libraries, SLULINK. In NCS 6.1, these modules are shared by HSC and SMC.

## Defining and Initializing the SMP PRJ

You must define and initialize the SMP PRJ. An example is provided in member ALLOCCSI of your SMP JCL library. Follow the instructions included in the comments of the ALLOCCSI member and run the job to define and initialize the SMP PRJ.

Defining and initializing the SMP PRJ includes the following steps:

1. Define the required SMP data sets.
2. Define the PRJ that contains the SMP global, target, and distribution zones for this release.
3. Initialize the SMP PRJ.
4. Add zones, options, utilities, and DDDEF entries to the SMP PRJ.

## Allocating NCS Target and Distribution Library Data Sets and Required DDDEF Entries

For each product being installed, DDDEF entries are required for target and distribution libraries. You must allocate the NCS target and distribution library data sets shown in the following two tables, and add DDDEFs to the SMP PRJ prior to installing NCS. An example is provided in member NCSDDDEF of your SMP JCL library. The numbers listed for directory blocks and blocks are the minimum required for the product. The DDnames required for each DDDEF entry match the last qualifier of the data set name. For example, for data set ncs\_610.SMCLINK, the corresponding DDname is SMCLINK.

### Notes:

- The following tables include ncs\_610 as the high-level qualifier for data sets. You can change the high-level qualifiers to conform to the naming conventions defined for your installation.
- The SMP DSSPACE parameter, which specifies the amount of space to be allocated to temporary RELFILE data sets, must be set to at least 150,100,150.

**Table 2. NCS Target Library Data Sets**

Data Set Name	Product(s)	DSORG	RECFM	LRECL	BLKSIZE	Blocks	Directory Blocks
ncs_610.SKYICNS	HTTP Server	PO	VB	32754	32760	1/1	10
ncs_610.SKYLINK	HTTP Server	PO	U	-	32760	200/100	50
ncs_610.SLCLINK	LibraryStation	PO	U	-	32760	500/100	50
ncs_610.SLCSAMP	LibraryStation	PO	FB	80	23440	30/10	5
ncs_610.SLSLINK	HSC	PO	U	-	32760	300/30	100
ncs_610.SLSMAC	HSC	PO	FB	80	23440	100/50	50
ncs_610.SLSSAMP	HSC	PO	FB	80	23440	100/50	20
ncs_610.SLULINK	SMC, HSC	PO	U	-	32760	2/1	10
ncs_610.SMCLINK	SMC	PO	U	-	32760	500/50	30
ncs_610.SMCMAC	SMC	PO	FB	80	23440	20/10	5
ncs_610.SMCSAMP	SMC	PO	FB	80	23440	20/10	5
ncs_610.SMXLINK	HTTP Server	PO	U	-	32760	5/1	5
ncs_610.SSKYRTNS	HTTP Server	PO	U	-	32760	200/100	50
ncs_610.STKSAMP	HTTP Server	PO	FB	80	23440	1/1	1

**Table 3. NCS Distribution Library Data Sets**

Data Set Name	Product	DSORG	RECFM	LRECL	BLKSIZE	Blocks	Directory Blocks
ncs_610.ASKYICNS	HTTP Server	PO	VB	32754	32760	1/1	10
ncs_610.ASKYLINK	HTTP Server	PO	U	-	32760	200/100	50
ncs_610.ASKYRTNS	HTTP Server	PO	U	-	32760	200/100	50
ncs_610.ASKYSAMP	HTTP Server	PO	FB	80	23440	1/1	1
ncs_610.ASLCLINK	LibraryStation	PO	U	-	32760	500/100	50
ncs_610.ASLCSAMP	LibraryStation	PO	FB	80	23440	30/10	5
ncs_610.ASLSLINK	HSC	PO	U	-	32760	300/30	200
ncs_610.ASLSMAC	HSC	PO	FB	80	23440	100/50	20
ncs_610.ASLSSAMP	HSC	PO	FB	80	23440	100/50	20
ncs_610.ASLULINK	SMC, HSC	PO	U	-	32760	2/1	10
ncs_610.ASMCLINK	SMC	PO	U	-	32760	500/50	30
ncs_610.ASMCMAC	SMC	PO	FB	80	23440	20/10	5
ncs_610.ASMCSAMP	SMC	PO	FB	80	23440	20/10	5
ncs_610.ASMXLINK	HTTP Server	PO	U	-	32760	2/1	5

## Updating the SYSLIB Concatenation

Multiple tape management systems (for example TLMS and CA-1) are supported. Therefore, certain DDDEF entries must be added to the SMP PRJ, and the SYSLIB concatenation must be modified to include the appropriate macro libraries.

An example for adding the required DDDEF entries to the SMP PRJ and modifying the SYSLIB concatenation is provided in member ALLSYSLB of your SMP JCL library. Follow the instructions included in the prologue of ALLSYSLB and run the job to add the required DDDEF entries and modify the SYSLIB concatenation.



## Chapter 2. Installing the NCS Functions

---

### Overview

This chapter describes the tasks required to install the NCS base functions.

The following topics are included:

- Receiving the NCS base functions (SMP RECEIVE)
- Installing the NCS base functions (SMP APPLY and ACCEPT)
- Installing product maintenance

Before installing the NCS functions, verify that you have completed the pre-installation tasks described in Chapter 1, “Performing NCS Pre-installation Tasks” on page 1.

After completing the installation tasks described in this chapter, proceed with the post-installation tasks for each product being installed.

- **Chapter 3, “Performing SMC Post-installation Tasks”** describes post-installation tasks for the SMC.
- **Chapter 4, “Performing Post-installation Tasks for the Sun StorageTek HTTP Server”** describes required post-installation tasks for the Sun StorageTek HTTP server.
- **Chapter 5, “Performing HSC Post-installation Tasks”** describes required post-installation tasks for the HSC.
- **Chapter 6, “Performing LibraryStation Post-Installation Tasks”** describes post-installation tasks for the LibraryStation.



**Note:** If you are using the Sun StorageTek Virtual Storage Manager (VSM) system in your NCS environment, refer to the *VTCS Installation and Configuration Guide* for installation and configuration considerations.

## Receiving the NCS Base Functions and Communication Functions (SMP RECEIVE)

You must issue the SMP RECEIVE function to receive the functions you want to install into the target and distribution zones. You can use the NCSRECV sample member provided in your SMP JCL library to receive the functions. See “Reviewing the NCS FMIDs” on page 9 for a list of NCS SMP FMIDs.

Follow the instructions in the prologue of the NCSRECV sample member and run the job to receive the functions you wish to install.



**Note:** If you install an NCS 6.1 product component in an SMP PRJ containing a previous release of that product, the previous release is deleted from the target and distribution zones. In addition, all SYSMODS for the previous release are deleted from the SMP PRJ. If you choose to do this, it is recommended that you backup the NCS SMP PRJ prior to installing the NCS 6.1 product components.

## Installing the NCS Base Functions (SMP APPLY and ACCEPT)

The following sections describe the procedures for installing the NCS base functions into the appropriate target and distribution zone.

### Applying the NCS Base Functions (SMP APPLY)

You can use the NCSAPPLY sample provided in your SMP JCL library to install the NCS base functions into the appropriate target zone.

Follow the instructions in the prologue of the sample member and run the steps to install the functions into the target zone. The return code must be zero (0) for all steps executed in this job. If you receive a different return code, contact Sun StorageTek Software Support.



**Notes:**

- The SMX6100 FMID is dependent on the SMC6100 FMID, and therefore must be applied **after** the SMC6100 FMID.
- You can use the APPLY CHECK option as often as necessary to identify SMP processing problems before the actual APPLY process. All SMP detected problems must be resolved before the base functions can be successfully installed.

### Accepting the NCS Base Functions (SMP ACCEPT)

You can use the NCSACCPT sample provided in your SMP JCL library to accept the NCS base functions into the appropriate distribution zone.



**Note:** You can use the ACCEPT CHECK option as often as necessary to identify SMP processing problems before the actual ACCEPT process. All SMP detected problems must be resolved before the base functions can be successfully installed.

## **Installing NCS Product Maintenance**

If you received an accumulated maintenance tape with the NCS installation base tape, install the product maintenance. Information for this task can be found in Appendix B, “Installing Product Maintenance” on page 51. After NCS product maintenance is installed, proceed with the post-installation tasks for the NCS products you have installed.





## Chapter 3. Performing SMC Post-installation Tasks

---

### Overview

This chapter describes post-installation tasks for the SMC. The following topics are included:

- Adding the SMC load library to the authorized program list
- Optionally, defining the SMC as an MSP Subsystem
- Copying or Moving the SMCBPREI Module to an MSP LNKLST Library
- Modifying the MSP Program Properties Table for SMC



**Note:** Before proceeding, verify that you have completed the installation tasks described in Chapters 1 and 2.

## Adding the SMC Load Library to the Authorized Program List

The SMC must run as an authorized program. You must add the SMC load library to the authorized program list on your system. You can authorize the SMC load library by adding the load library to the KAAAPFzz member of SYS1.PARMLIB. You can also authorize the SMC load library dynamically.

### Using KAAAPFzz to authorize the SMC Load Library

If you use the KAAAPFzz member of SYS1.PARMLIB to authorize the SMC load library, you must add the following entry to that list:

```
your.SMCLINK volser
```

This sample is contained in member KAAAPFzz of the SMC sample library. Before adding this sample to your authorized program list, edit the high level qualifier and volser with appropriate values for your system.

## Defining the SMC as an MSP Subsystem

The SMC executes as an MSP dynamic subsystem. In many installations, the SMC does not need to be added to the MSP subsystem name table. However, if any of the following conditions are true, you **must** add the SMC to the MSP subsystem name table (SYS1.PARMLIB member SUBSYSzz) as required.

- If you are running SMC and a tape management system on the same host, and the tape management system is also executing as an MSP dynamic subsystem, it is recommended that you add both the tape management system and the SMC to the subsystem name table to ensure the correct order of message processing. See “Tape Management System Interaction and the Subsystem Name Table” on page 21.
- If you are running SMC and the Unicenter CA-MIA product on the same host, it is recommended that you add both Unicenter CA-MIA and the SMC to the subsystem name table to ensure the correct order of EDL processing. See “Unicenter CA-MIA Interaction and the Subsystem Name Table” on page 22.
- If you are running SMC, a tape management system, and the Unicenter CA-MIA product on the same host, it is recommended that you add all three products to the subsystem name table. See “SMC, TMS, and Unicenter CA-MIA Interaction and the Subsystem Name Table” on page 22.
- If you wish to run the SMC under the master MSP subsystem (rather than under the primary Job Entry Subsystem), it is recommended that you add the SMC to the subsystem name table. See “Running SMC under MSTR and the Subsystem Name Table” on page 23.

In addition, the PROCLIB containing the SMC START procedure must be present in the PROCLIB concatenation for the master address space. This concatenation is defined in SYS1.PARMLIB(MSTJCLxx), under DD KDJPDSI.

## Copying or Moving the SMCBPREI Module to an MSP LNKLST Library

The SMC subsystem pre-initialization routine module (SMCBPREI), which resides in the SMCLINK library, must also reside in an MSP LNKLST library if you are running the SMC as a secondary MSP subsystem. You can copy or move the SMCBPREI module from SMCLINK to a LNKLST library.

The SMCBPREI pre-initialization routine module is functionally compatible between SMC releases. For future compatibility, however, it is recommended that you use the most current release of the SMCBPREI pre-initialization module.

### Tape Management System Interaction and the Subsystem Name Table

If you are running a tape management system, you must ensure that it processes MSP mount messages **before** the SMC. To do this, add both the tape management system and the SMC to the subsystem name table with the (TMS) entry preceding the SMC entry. The following example shows entries for CA-1 Release 5.1 and above, and SMC.

```
PRISUB SUBNAME=JES
SNDSUB SUBNAME=TMS
SNDSUB SUBNAME=SMCØ, PGM=SMCBPREI
```

In installations with tape management systems executing on the same host, it is recommended that you always add both the tape management system and the SMC to the subsystem name table.

The following table presents possible subsystem name definition scenarios for a tape management system and SMC when both are dynamic subsystems.

Is SMC defined in the subsystem name table?	Is TMS defined in the subsystem name table	Possible Issues
YES	YES	Supported and recommended. The TMS must precede the SMC in the table.
YES	NO	Not supported. The TMS cannot process MSP mount messages before the SMC.
NO	YES	Supported.
NO	NO	Supported but not recommended. You must ensure that the SMC is started after the TMS.

See “Notes on Subsystem Name Table Modifications for SMC” on page 23.

## Unicenter CA-MIA Interaction and the Subsystem Name Table

If you are running the Unicenter CA-MIA product, Computer Associates recommends that you add both SMC and Unicenter CA-MIA to the subsystem name table with the SMC entry preceding the entry for Unicenter CA-MIA. The following example shows entries for SMC and Unicenter CA-MIA.

```
PRISUB SUBNAME=JES
SNDSUB SUBNAME=SMCØ, PGM=SMCBPREI
SNDSUB SUBNAME=MIA
```

Unicenter CA-MIA compatibility also requires that the ALLOCDEF MIACOMPAT(ON) option be specified in SMC. Refer to the *SMC Configuration and Administration Guide* for information about the ALLOCDEF command.

See “Notes on Subsystem Name Table Modifications for SMC” on page 23.

## SMC, TMS, and Unicenter CA-MIA Interaction and the Subsystem Name Table

If you are running SMC, a tape management system, and Unicenter CA-MIA all on the same host, it is recommended that you add all three products to the subsystem name table in the order indicated in the following example:

```
PRISUB SUBNAME=JES
SNDSUB SUBNAME=TMS
SNDSUB SUBNAME=SMCØ, PGM=SMCBPREI
SNDSUB SUBNAME=MIA
```

Unicenter CA-MIA compatibility also requires that the ALLOCDEF MIACOMPAT(ON) option be specified in SMC. Refer to the *SMC Configuration and Administration Guide* for information about the ALLOCDEF command.

See “Notes on Subsystem Name Table Modifications for SMC” on page 23.

## Running SMC under MSTR and the Subsystem Name Table

If you wish to run the SMC under the MSTR subsystem rather than under the primary job entry subsystem, you must add the SMC to the subsystem name table to identify the subsystem name, as in the following example:

```
SNDSUB SUBNAME=SMCØ
```

This sample is contained in member SUBSYSZZ of the SMC sample library.

If the SMC subsystem is to execute under MSTR, you must also include the MSTR option on the PARM parameter in the SMC START procedure. Refer to the *SMC Configuration and Administration Guide* for information about creating the SMC START procedure.

An alternative to adding the SMC to the subsystem name table in order to execute under MSTR is to start the SMC subsystem with the SUB=MSTR parameter on the MSP start command. Refer to the *SMC Configuration and Administration Guide* for information about executing the SMC start procedure.

See “Notes on Subsystem Name Table Modifications for SMC” below.

### Notes on Subsystem Name Table Modifications for SMC

- The SUBNAME(name) parameter specifies a 1-4 character name that normally corresponds to the SMC START procedure name. If the SMC subsystem name you define via the SUBNAME(name) parameter does not match the SMC START procedure name, you must include the SYSS option on the PARM parameter in the START procedure. Refer to the *SMC Configuration and Administration Guide* for information about creating the SMC START procedure.
- You must perform an IPL of the MSP host system before changes to the subsystem name table take effect.
- If you have added the Unicenter CA-MIA subsystem name to the subsystem name table, one of the following must be done:
  - The started task that uses this subsystem **must** be present in the PROCLIB concatenation for the master address space. This concatenation is defined in SYS1.PARMLIB(MSTJCLxx), under DD KDJPSI.
  - The Start command for Unicenter CA-MIA must specify the SUB=JES2 parameter, i.e., S CAMIA, SUB=JES2.

## Modifying the MSP Program Properties Table for SMC

You must modify the MSP Program Properties Table (PPT) to include an entry for the SMC subsystem.



**Note:** The SMC must run in a low key (from 1-7). The examples in this section use key 3. Using keys 8-15 causes unpredictable results including SOC1 and SOC4 abends.

You must add the following entry to member PPTPRMzz of SYS1.PARMLIB. This sample entry is in member PPTPRMZZ of the SMC sample library included on the installation base tape. The PPT entry is defined as follows:

```
PPT PGM=SMCBINT,ATTR=(PRIV,NOSWAP),KEY=3
```



**Note:** After modifying the PPTPRMzz member, you must perform an IPL or dynamic update.

# Chapter 4. Performing Post-installation Tasks for the Sun StorageTek HTTP Server

---

## Overview

This chapter describes required post-installation tasks for the Sun StorageTek HTTP Server. The following topics are included:

- Adding the HTTP Server libraries to the authorized program list
- Customizing the HTTP Server START Procedure
- Customizing the HTTP Server Parameter File
- Starting the HTTP Server
- Stopping the HTTP Server
- Displaying HTTP Server Status
- Tracing the SMC in the HTTP Server



**Note:** Before proceeding, verify that you have completed the installation tasks described in Chapters 1 and 2.

The Sun StorageTek HTTP Server for MSP optionally provides the middleware to allow communication between the SMC (client) and a remote HSC subsystem (server).

The HTTP server executes as a separate subsystem on the MSP host where the remote HSC subsystem resides.



**Note:** The Sun StorageTek HTTP server is also packaged with the VTCS GUI product. However, for performance reasons, it is recommended that you do not use the same HTTP server for both SMC server programs and VTCS GUI programs. Instead, execute one HTTP server for the SMC server, and a separate HTTP server for the VTCS GUI. To execute multiple HTTP server subsystems on a single host, they must connect to different PORT numbers.

## Adding the HTTP Server Libraries to the Authorized Program List

The HTTP server, and supporting programs, must run as an authorized program. You must add the STK HTTP load library, the SMX load library, and the SSKYRTNS load library to the authorized program list on your system. You can authorize these libraries by adding them to the KAAAFpz member of SYS1.PARMLIB. You can also authorize these libraries dynamically.

### Using KAAAFpz to Authorize the HTTP Load Libraries

If you use the IEAAPFzz member of SYS1.PARMLIB to authorize the STK HTTP load library and the SMX load library, you must add the following entries to that list:

```
your.SMXLINK volser
your.STKLOAD volser
your.SSKYRTNS volser
```

This sample is included in member KAAAFZZ of the SMC sample library. Before adding this sample to your authorized program list, edit the high level qualifier and volser with appropriate values for your system.

## Customizing the HTTP Server START Procedure

To create the HTTP server START procedure, modify the SRVPROC member from the SMC sample library as described in the JCL comments and add the proc to the production PROCLIB.

Figure 1 provides a sample HTTP server START procedure.

```
//yourprocname PROC PRM=' '
//*
//SERVER EXEC PGM=SKYMAN,REGION=0M,PARM='&PRM',TIME=1440
//STEPLIB DD DISP=SHR,DSN=your.ncs.install.smx.smxlink
// DD DISP=SHR,DSN=your.ncs.install.ssky.stkload
//TISPAPPL DD DISP=SHR,DSN=your.appl.definition.for.http.server
//*
//SKYPRM DD DISP=SHR,DSN=your.parmlib(SRVPARAM)
//SKYSET DD SYSOUT=*
//SKYLOG DD SYSOUT=*
//SKYTRSN DD SYSOUT=*
//STDOUT DD SYSOUT=*
//STDERR DD SYSOUT=*
//SKYDUMP DD SYSOUT=*
//SYSPRINT DD SYSOUT=*
//SYSTEM DD SYSOUT=*
```

**Figure 1. Sample SMC START Procedure**



## Customizing the HTTP Server Parameter File

The HTTP server START procedure SRVPROC uses the sample parameter file SRVPARM from the SMC sample library. Refer to the following sections for more information and modify the values in SRVPARM for your site's needs.



**Note:** When using the HTTP server with the SMC, do **not** specify the security *file* or authuserfile *file* HTTP server parameters. These security parameters apply only when using the HTTP server with the VSM GUI. Using these parameters with the SMC causes authentication errors.

### Configuration Parameters

#### **gmtoffset** *offset*

specifies the system clock offset from GMT. This parameter is required if the system clock is not set to GMT. You can specify the offset in hours, minutes, and seconds. For example, 10 hours 30 minutes specifies ten and a half hours ahead of GMT.

#### **loglevel** *level*

specifies the logging message level. Valid values are error, warning and info. The default is warning.

If you specify info, informational, error, and warning messages are logged.  
If you specify error, only error messages are logged.

### Network Parameters

#### **servername** *name*

specifies the server name reported in responses. The default is the network host name.

#### **serverdomain** *domain*

specifies the server domain name reported in responses; for example, your company.com. The default is all blanks.

#### **serverbase** *hlq*

specifies the high level qualifier of the server data sets in the form *hlq*. This should match the hlq used during SMP installation. This parameter is required.

#### **port** *p*

specifies the IP network port the server listens on for connections. The default is port 80, the standard HTTP port.

## CGI Parameters

### **loadmodule SMCGXTR**

specify the SMC CGI module to be preloaded for performance.

### **cgionly yes**

indicates that the HTTP server instance is used only for communication from SMC to HSC and is not available for VSM GUI functions. The HTTP server's ability to retrieve files or directories is disabled.

### **requireapf yes**

overrides the default requirement of apf authorization no (default).

## Performance Considerations

The recommended MVS performance group is above batch but below TSO. If the server is extremely busy, reducing the maximum tasks for the HTTP server may improve performance. Use the following parameters to set the initial and maximum number of HTTP server tasks:

### **startservers 20**

sets initial tasks to 20.

### **maxclients 20**

sets the maximum number of tasks to 20.

## Starting the HTTP Server

To start the HTTP server, enter the following MSP operator command:

```
START SRVPROC
```

The server is active when the following message appears:

```
SKY003I HTTPD ready to accept requests
```

By default, when the server is started, it uses the SRVPARAM member in the SMC sample library.

## Stopping the HTTP Server

To stop the HTTP Server, enter either of the following MSP operator commands:

```
P SRVPROC  
F SRVPROC,SHUTDOWN
```

## Displaying HTTP Server Status

To display the status of the HTTP server, enter the following MSP operator command:

```
F SKYPROC,D S
```

The following shows a display status response:

```
SKY016I HTTP Server 1.0.0 started at Fri Jan 24 06:51:35 2005
requests received 85
tasks default: 20 active: 20 limit:40
SKY053I Current active worker tasks: 0
```

This response shows an idle system with the default number of worker tasks, which handle client connections, idle waiting for work. At times of peak demand, the server can dynamically start additional tasks up to the limit.

To display the server connections, enter the following MSP command:

```
F OWCH72,D C
```

The following shows a display connections response:

```
SKY031I Connections total: 114 max: 63/min
SKY032I Connection rates: 0/min 0/hour
SKY026I Task: 5 Requests: 1 Client: 199.117.186.54 : 36292
```

This response shows one client active whose IP address is 199.117.186.54 and using port 36292.

## Tracing the SMC in the HTTP Server

SMC requests in the HTTP server carry their trace settings, if any, from the SMC client. If the SMC TRace JOBname CGI command has been entered for a specific job on the client, the trace information for that request is written to the HTTP SKYLOG data set. Do not specify any TRace commands on the SMC client unless requested by Sun StorageTek Software Support.



# Chapter 5. Performing HSC Post-installation Tasks

---

## Overview

This chapter describes required post-installation tasks for the HSC. The following topics are included:

- Defining the HSC as an MSP subsystem
- Adding the HSC load library to the authorized program list
- Adding the HSC user exit library to the authorized program list
- Copying or moving the SLSBPRESI module to an MSP LINKLIST library
- Modifying the MSP program properties table for HSC
- Adding SMF parameters for the HSC
- Re-assembling the SLUCONDB (Scratch Conversion) Modules



### Notes:

- Before proceeding, verify that you have completed the installation tasks described in Chapters 1 and 2.
- Once installed, The HSC **requires** a license key in order to initialize. Refer to the *HSC Configuration Guide* for information about obtaining and configuring the HSC license key.

## Defining the HSC as an MSP Subsystem

HSC can either run under the master MSP subsystem, or as a secondary MSP subsystem.

- If you run HSC under the master MSP subsystem, you must add a line to your subsystem name table (SYS1.PARMLIB member IEFSSNxx) to identify the subsystem name. This is a one- to four-character name that corresponds to the procedure name for the HSC started task procedure.
- If you run HSC as a secondary MSP subsystem, you must add a line to your subsystem name table (SYS1.PARMLIB member IEFSSNxx) to identify the following:
  - The subsystem name. This is a one- to four-character name that corresponds to the procedure name for the HSC started task procedure.
  - The HSC subsystem initialization routine name, which must be SLSBPRES.

Assuming your HSC subsystem name is SLS0, the following lines correctly add HSC to your subsystem name table when running HSC under the master MSP subsystem, or as a secondary MSP subsystem. This sample entry is contained in member IEFSSNXX of the HSC sample library on the installation base tape.

```
SNDSUB SUBNAME=SLS0,PGM=SLSBPRES /* keyword format */
```

### Notes:

- If the HSC subsystem name you define in the subsystem name table does not match the HSC started task procedure name, you must include the SYSS option on the PARM parameter in the started task procedure. Refer to the *HSC Configuration Guide* for information about creating an HSC startup procedure.
- If you are not defining the HSC subsystem name dynamically, you must perform an IPL of the MSP host system before the HSC subsystem name entry takes effect.
- HSC no longer interacts with tape management systems in processing MSP messages. Therefore, the order of definition of the HSC subsystem and a tape management subsystem is irrelevant. However, the SMC subsystem definition, if specified, must follow the tape management system entry.
- Refer to the *OS IV/MSP System Parameter Reference Manual* for more information about defining subsystem names.

## Adding the HSC Load Library to the Authorized Program List

The HSC must run as an authorized program. You must add the HSC load library to the authorized program list on your system. You can authorize the HSC load library by adding the load library to the KAAAPFxx member of SYS1.PARMLIB. You can also authorize the HSC load library dynamically.

The following sections describe each of these methods.

### Using KAAAPFxx to authorize the HSC Load Library

If you use the KAAAPFxx member of SYS1.PARMLIB to authorize the HSC load library, you must add the following entry to that list:

```
your.SLSLINK volser
```

This sample is contained in member KAAAPFXX of the HSC sample library. Before adding this sample to your authorized program list, edit the high level qualifier and volser with appropriate values for your system.



**Note:** If the HSC load library resides on an SMS-managed volume, you do not need to specify a volume in the authorized library entry. In this case, specify nothing after the library name, to indicate that SMS is managing the library. If you specify the wrong volume, the library will not be authorized.

## Adding the HSC User Exit Library to the Authorized Program List

The HSC user exit library can either be the same as the HSC load library, or a separate library. If the HSC user exit library is a separate library, you must add the library to the authorized program list. For example:

```
SLS.SLSLINK    volser,  
SLS.USEREXIT.LOAD  volser
```

Before adding the library to the authorized program list, edit the high level qualifier and volser with appropriate values for your system.

## Copying or Moving the SLSBPRESI Module to an MSP LINKLIST Library

The HSC subsystem pre-initialization routine module (SLSBPRESI), which resides in the SLSLINK library, must also reside in an MSP LINKLIST library if you are running the HSC as a secondary MSP subsystem. You can copy or move the SLSBPRESI module from SLSLINK to a LINKLIST library.

The SLSBPRESI pre-initialization routine module is functionally compatible between HSC releases. For future compatibility, however, it is recommended you use the most current release of the SLSBPRESI pre-initialization module.

## Modifying the MSP Program Properties Table for HSC

You must modify the MSP Program Properties Table (PPT) to include an entry for the HSC subsystem.



**Note:** The HSC must run in a low key (from 1-7). The examples in this section use key 3. Using keys 8-15 causes unpredictable results including SOC1 and SOC4 abends.

You must add the following entry to member PPTPRM<sub>xx</sub> of SYS1.PARMLIB. This sample entry is in member PPTPRMXX of the HSC sample library on the installation base tape. The PPT entry is defined as follows:

```
PPT PGM=SLSBINIT,ATTR=(PRIV,NOSWAP),KEY=3
```



## Adding SMF Parameters for the HSC

You must add two lines to your System Management Facility (SMF) parameters in SYS1.PARMLIB member SMFPRMxx to identify the following:

- HSC subsystem name
- HSC recording interval (the smaller the number, the more often data is recorded)
- HSC recording interval (the smaller the number, the more often data is recorded)

Specified as `INTERVAL(hhmmss)`

A minimum of 15 minutes (001500) is strongly recommended to avoid impacts to library performance. For HSC systems that do **not** support VSM, an interval of one hour (010000) is recommended.

- HSC SMF record type
- HSC SMF record subtypes to be recorded (See “HSC SMF Record Subtypes” for a list of record subtypes that HSC can generate.)

Assuming your HSC subsystem name is SLS0, the following example shows the lines that add HSC to your SMF parameters.

```
SUBSYS(SLS0,INTERVAL(001500),TYPE(255))  
OPTION SUBtype(1,2,3,4,5,6,7,8)
```

This sample is contained in member SMFPRMXX of the HSC sample library on the installation base tape.

## HSC SMF Record Subtypes

The following table lists the SMF record subtypes that HSC can generate.

Subtype	Description
1	LSM operations statistics
2	Vary Station command
3	MODify LSM command
4	LMU read statistics
5	Cartridge eject
6	Cartridge enter
7	Cartridge move
8	VIEW command

If you do not specify the SUBTYPE parameter in your SMF options, HSC generates subtypes 1 through 6. You must code a SUBPARM parameter and include subtypes 7 and 8 to generate cartridge move and view records.

For more information about the SMF records, refer to the *HSC System Programmer's Guide*.

## Re-assembling the SLUCONDB (Scratch Conversion) Modules

Depending on your tape management system (TMS) and associated release level, you may need to re-assemble the SLUCONDB (Scratch Conversion) modules. This is also necessary if local modifications are made to certain modules.

Refer to the *HSC System Programmer's Guide* for more information about the Scratch Conversion (SLUCONDB) Utility and re-assembly requirements.

# Chapter 6. Performing LibraryStation Post-Installation Tasks

---

## Overview

This chapter describes post-installation tasks for LibraryStation. The following topics are included:

- Adding LibraryStation libraries to the authorized program list
- Optionally defining the Persistent Data File (PDF)



### Notes:

- Before proceeding, verify that you have completed the installation tasks described in Chapters 1 and 2.
- Once installed, The LibraryStation **requires** a license key in order to initialize. Refer to the *HSC Configuration Guide* for information about obtaining and configuring the LibraryStation license key.

## Adding LibraryStation Libraries to the Authorized Program List

The LibraryStation must run as an authorized program. You must add the LibraryStation load libraries to the authorized program list on your system. The LibraryStation load libraries must exist in the authorized program list (APF) authorized library SLCLINK.

You can authorize the LibraryStation load libraries by adding the load libraries to the KAAAPFxx member of SYS1.PARMLIB. You can also authorize the LibraryStation load libraries dynamically.

The following sections describe each of these methods.

### Using KAAAPFxx to authorize the LibraryStation Load Libraries

If you use the KAAAPFxx member of SYS1.PARMLIB to authorize the LibraryStation load libraries, you must add the following entries to that list:

```
your.SLCLINK volser
```

This sample is contained in member KAAAPFxx of the LibraryStation sample library. Before adding this sample to your authorized program list, edit the high level qualifier and volser with appropriate values for your system.

## Defining the Persistent Data File (Optional)



### Warning:

- If you are migrating from a previous release of LibraryStation, you must delete the existing PDF and define a new PDF for the new release.
- You must define a Persistent Data File (PDF) if LibraryStation is servicing heterogeneous clients (i.e., non-MVS clients). If LibraryStation is servicing MVS clients in a SCMP environment, **do not** define the PDF. The PDF is not supported for SCMP environments. Refer to the *LibraryStation Configuration Guide* for more information about the PDF.
- If you are running multiple LibraryStations, Refer to the *LibraryStation Configuration Guide* for special information regarding the PDF.

LibraryStation software includes a Database Manager (DBM) that is initialized during LibraryStation initialization. The DBM manages several persistent data objects that are not maintained by the HSC, including resource locks and drive status. Data objects managed by the DBM are stored in one or more VSAM files. These files are collectively referred to as the PDF. The PDF contains volume records, drive records, and lockid records. You must define the PDF when LibraryStation is servicing heterogeneous clients. Use IDCAMS to define data sets for the PDF. The following figure shows the IDCAMS statements used to define the PDF. The JCL to define data sets for the PDF is contained in member SLGDBCR of the LibraryStation sample library.

```

//SLGDBCR JOB  job card info
/**
/** NOTE: A minimum of 1 Meg of virtual storage is needed
/**       for this job (i.e., use REGION=1M on the job card)
/**
//CREATEDB EXEC PGM=IDCAMS
//SYSPRINT DD SYSOUT=*
//INPUT    DD *
000000000000 DB INITIALIZATION RECORD
//SYSIN    DD *
  DELETE (cluster_name) CLUSTER
  DEFINE CLUSTER (
    NAME(cluster_name)           _
    VOLUMES(volser)              _
    RECORDS(nr,2*nr)              _
    RECORDSIZE(30 100)           _
    KEYS(12 0)                    _
    UNIQUE )
  REPRO INFILE(INPUT)            _
        OUTDATASET(cluster_name)
  DEFINE ALTERNATEINDEX (
    NAME(alternate_index_name)   _
    RELATE(cluster_name)         _
    KEYS(10 2)                   _
    RECORDS(nr,2*nr)              _
    RECORDSIZE(27 27)            _
    VOLUMES(volser)              _
    UNIQUEKEY                     _
    UNIQUE                         _
    UPGRADE )
  DEFINE PATH (
    NAME(path_name)              _
    PATHENTRY(alternate_index_name))
  BLDINDEX
    INDATASET (cluster_name)
    OUTDATASET (alternate_index_name)
  LISTCAT ENTRIES (
    cluster_name
    alternate_index_name
    path_name) ALL
/**

```

You must supply or modify the following information:

- PDF Data set names
- Volume location of the PDF
- Record keyword values

## PDF Data Set Names

You must supply names for the data sets listed in the following table:

**Table 4. PDF Data Set Names**

NAME Keyword	Description
CLUSTER	The name for the SLSPDF base cluster ( <i>cluster_name</i> ), such as LSTAT.PDF.
ALTERNATEINDEX	The name for the SLSPDFX alternate index ( <i>alternate_index_name</i> ), such as LSTAT.PDFAIX.
PATH	The name for the path to SLSPDFX ( <i>path_name</i> ), such as LSTAT.PDFPATH.



**Note:** There is no predefined naming convention for data set names. You can use the same prefix for all three data sets and provide a unique file type for each name.

## Volume Location

A single PDF is defined for LibraryStation, and the host system where LibraryStation is initialized must have access to the DASD volume where the PDF is located. Therefore, in a multiple host environment where more than one host is capable of initializing LibraryStation, the PDF must be located on shared DASD that is accessible to each initializing host.

The volume where the PDF is to be allocated can be any available DASD. You identify the DASD by its volser (*volser*).

## Values for Record Keywords

The PDF record space calculation (*nr*) (shown below) is based on the maximum number of volumes (*nv*) that all client systems can have locked at one time, and the total number of tape cartridge drives that will be used by the network clients (*nd*).

$$\text{number of records } (nr) = (nv + nd) * 1.1$$

The secondary PDF space allocation is calculated as twice the number of records ( $2*nr$ ).

Setting primary records to 2000 and secondary records to 4000 should be adequate for most LibraryStation installations. However, if you want to verify the records for your specific installation, use the allocation formula with your site's number of volumes and network client data.

# Appendix A. NCS Samples, Source Code Modules, and Macros

---

## Overview

This appendix lists the sample installation JCL members used to install the NCS product components. It also lists the samples, load modules, and macros included with SMC, HSC, and LibraryStation.



**Note:** If you are using the Sun StorageTek Virtual Storage Manager (VSM) system in your NCS environment, refer to the *VTCS Installation and Configuration Guide* for VTCS samples.

## Sample Installation JCL

The following table lists the sample installation JCL members included in File 2 of the NCS installation base tape:

**Table 5. Sample Installation JCL Members**

<b>Member Name</b>	<b>Description</b>
ALLOCCSI	Sample JCL for defining and initializing the SMP PRJ
ALLSYSLB	Sample JCL for adding required DDDEF entries and modifying the SYSLIB concatenation
MAINTACF	Sample JCL for SMP/E ACCEPT of maintenance in a mass mode for specific NCS FMIDs
MAINTACS	Sample JCL for SMP ACCEPT of maintenance for specific SYSMODs
MAINTAPF	Sample JCL for SMP APPLY of maintenance in mass mode for specific NCS FMIDs
MAINTAPS	Sample JCL for SMP APPLY of maintenance for specific SYSMODs
MAINTRCF	Sample JCL for SMP RECEIVE of maintenance for a specific NCS FMID
MAINTRCP	Sample JCL for SMP RECEIVE of maintenance for an NCS Product Update Tape (PUT)
MAINTRCS	Sample JCL for SMP RECEIVE of maintenance for specific SYSMODs
NCSACCPT	Sample JCL for SMP ACCEPT of the SMC, HSC, LibraryStation, and VTCS functions
NCSAPPLY	Sample JCL for SMP APPLY of the SMC, HSC, LibraryStation, and VTCS functions
NCSDDEF	Sample JCL for adding required DDDEF entries for all NCS product components
NCSRECV	Sample JCL for SMP RECEIVE of the SMC, HSC, LibraryStation, and VTCS functions



## SMC Base Samples and Macros

The following tables list the SMC samples and macros contained on the NCS installation tape:

**Table 6. SMC Samples**

Member Name	Description
GTFEXTR	Sample extract for SMC trace of a single job
GTFPARMS	Sample GTF parameters for SMC trace
GTFPROC	Sample GTF startup JCL
KAAAFPZZ	Sample SMC APF list entries
SUBSYSZZ	Sample SMC subsystem name table entry
PROGZZ	Sample SMC APF list entries
PPTPRMZZ	Sample MSP Program Properties Table (PPT) entry for SMC
SMCCMDS	Sample command file for the SMCCMDS DD statement
SMCJRSLA	Sample JCL for assembling SMCERSLV
SMCJRSLV	Sample JCL for running UCLIN for SMCERSLV
SMCJTYP1	Sample JCL to SMP install the SMC Type 1 modifications
SMCJUX09	Sample JCL to SMP install the SMC IATUX09 user modification
SMCJUX71	Sample JCL to SMP install the SMC IATUX71 user modification
SMCPARMS	Sample parameter file for SMCPARMS DD statement
SMCPROC	Sample startup JCL
SMCUIICM	Sample IATIICM Type 1 modification
SMCUIIP1	Sample IATIIP1 Type 1 modification
SMCUMDAL	Sample IATMDAL Type 1 modification
SMCUMDFE	Sample IATMDFE Type 1 modification
SRVPARMS	Sample Sun StorageTek HTTP server parms
SRVPROC	Sample Sun StorageTek HTTP server PROC
UX01HSC1	Sample HSC format message intercept user exit
UX02HSC1	Sample HSC format JES scratch allocation user exit
UX08HSC1	Sample HSC format JES specific allocation esoteric subs user exit
UX09HSC1	Sample HSC format JES defer allocation user exit
UX10HSC1	Sample HSC format JES GDG/UNITAFF separation user exit

**Table 7. SMC Macros**

<b>Member Name</b>	<b>Description</b>
SMCEHOOK	SMC Type 1 modification macro
SLSUX01P	HSC format User Exit 01 parameter list
SLSUX02P	HSC format User Exit 02 parameter list
SLSUX04P	HSC format User Exit 04 parameter list
SLSUX08P	HSC format User Exit 08 parameter list
SLSUX09P	HSC format User Exit 09 parameter list
SLSUX10P	HSC format User Exit 10 parameter list
SLSUX11P	HSC format User Exit 11 parameter list
SLSUX12P	HSC format User Exit 12 parameter list
SLSUX13P	HSC format User Exit 13 parameter list

## HSC Samples, Source Code Modules, and Macros

The following tables list the HSC samples, source code modules, and macros contained on the NCS installation tape:

**Table 8. HSC Samples**

Member Name	Description
CVRLTR	Sample JCL to print the PUT cover letter from a PUT tape
GTFLMU	Sample MSP 2.X PARMLIB member to trace LMU requests
IEAAPFXX	Sample HSC APF list entries
IEFSSNXX	Sample HSC subsystem name table entry
JCLACTV	Sample JCL to report on library performance
JCLAUDT	Sample JCL to audit library hardware
JCLBKUP	Sample JCL to backup the control data set
JCLCRT	Sample JCL to create the control data set
JCLEJCT	Sample JCL to eject cartridges from an ACS
JCLEXRS	Sample JCL to exercise an installation
JCLINIT	Sample JCL to initialize cartridges via the ACS
JCLOFLD	Sample JCL to offload control data set journals
JCLPROC	Sample HSC startup JCL
JCLRSTR	Sample to restore the control data set
JCLSCRD	Sample JCL for Scratch Redistribution Utility
JCLSCUP	Sample JCL for Scratch Update Utility
JCLTINIT	Sample JCL to initialize ACS cartridges using TMSTPNIT
JCLVOLR	Sample JCL to report on the volumes in the library
JCLVRFY	Sample JCL to verify an installation's LIBGEN
LIBGENnn	Sample LIBGEN source for INSTALL GUIDE examples
LIBGNJCL	Sample JCL to assemble and link a LIBGEN source file
MPFUSERX	Sample MPF user exit to retain TMS007 messages on MSP console
SASTYPEX	Sample SAS source for SMF subtypes 1, 4, and 7
SCHEDXX	Sample MSP Program Properties Table (PPT) entry for HSC
SENDEL	Sample SEN macro interface program
SENDISA	Sample SEN macro interface program
SENENA	Sample SEN macro interface program

**Table 8. HSC Samples (Continued)**

<b>Member Name</b>	<b>Description</b>
SENQRST	Sample SEN macro interface program
SLS0	Sample HSC startup procedure
SLSSYS00	Sample HSC startup parameter file
SLSSYS12	Sample HSC PARMLIB member (release 1.2)
SLSSYS20	Sample HSC PARMLIB member (release 2.0)
SLSUX05	Default programmatic interface (PGMI) user exit
SLSUX06	Default database insert/delete user exit
SLSUX14	Default volume access user exit
SLSUX15	Default command authority user exit
SMFPRMxx	Sample PARMLIB definitions for HSC SMF record subtypes
SPGxxxxx	Sample JCL from the System Programmer's Guide
STKINDEX	Index of HSC samples
STKTSTxx	Sample IVP programs
SWSJCRDB	Sample to configure VTCS information in a CDS
SWSJMVCR	Sample to generate an MVC report
SWSJVTVR	Sample to generate a VTV report
UX01SAM1	Sample HSC User Exit 01 to process mount messages
UX03SAM2	Sample HSC User Exit 03 to define scratch subpools with names
UX06SAM1	Sample HSC User Exit 06 interface to a tape management system
UX15SAM1	Sample HSC User Exit 15 to ensure command security

**Table 9. HSC Source Code Modules**

<b>Member Name</b>	<b>Description</b>
SLUCONDB	Source code for Scratch Conversion Utility
SLUDRCA1	Source code for Scratch Conversion Utility CA-1 (TMS) database READ routine
SLUDRTLM	Source code for Scratch Conversion Utility CA-TLMS (TLMS) database READ routine
SLUDRRMM	Source code for Scratch Conversion Utility DFSMSrmm database READ routine

**Table 10. HSC Macros**

<b>Member Name</b>	<b>Description</b>
ACSRQ	format a parameter list for an ACS request
SLIACS	LIBGEN SLIACS macro
SLIALIST	LIBGEN SLIALIST macro
SLICOV	Global configuration constants & variables
SLIDLIST	LIBGEN SLIDLIST macro
SLIDRIVS	LIBGEN SLIDRIVS macro
SLIENDGN	LIBGEN SLIENDGN macro
SLIERMSG	LIBGEN error message macro
SLILBACS	LIBGEN ACS area
SLILBALS	LIBGEN ACLIST area
SLILBDLS	LIBGEN DRIVELST area
SLILBDRV	LIBGEN DRIVES area
SLILBEND	LIBGEN ENDGEN area
SLILBLIB	LIBGEN LIBRARY area
SLILBLSM	LIBGEN LSM area
SLILBREC	LIBGEN RECOVERY area
SLILBSTA	LIBGEN STATION area
SLILCV	Installation LCT constants - variables
SLILIBRY	LIBGEN LIBRARY macro
SLILSM	LIBGEN LSM macro
SLIPTPCK	LIBGEN SLIPTPCK macro
SLIRCVRY	LIBGEN RECOVERY macro
SLISTATN	LIBGEN STATION macro
SLSDILLT	LIBGEN LOCATION type
SLSDVAR	Distributed volume attribute record length
SLSSBLOG	INIT/TERM LOGREC record
SLSSBLOS	LSM operations statistics data area
SLSSCAPJ	CAP SMF EJECT record
SLSSCAPN	CAP SMF ENTER record
SLSSDJLR	Database journalling LOGREC map

**Table 10. HSC Macros (Continued)**

<b>Member Name</b>	<b>Description</b>
SLSSFHDR	SMF record header
SLSSHLG1	Host communications LOGREC format 1
SLSSLHDR	LOGREC record header map
SLSSLLG1	LMU driver LOGREC format ONE
SLSSLLG2	LMU driver LOGREC format two
SLSSLLG3	LMU driver LOGREC format three
SLSSLLG4	LMU driver LOGREC format four
SLSSLLG5	LMU driver LOGREC format five
SLSSLLG6	LMU driver LOGREC format six
SLSSLSB	LMU ATHS statistics buffer
SLSSMF07	HSC format 7 SMF record
SLSSMF08	HSC format 8 SMF record
SLSSMF09	HSC format 9 SMF record
SLSSMF10	HSC format 10 SMF record
SLSSMF11	HSC format 11 SMF record
SLSSMF12	HSC format 12 SMF record
SLSSMF13	HSC format 13 SMF record
SLSSMF14	HSC format 14 SMF record
SLSSMF15	HSC format 15 SMF record
SLSSMF16	HSC format 16 SMF record
SLSSMF17	HSC format 17 SMF record
SLSSMF18	HSC format 18 SMF record
SLSSMF19	HSC format 19 SMF record
SLSSMF20	HSC format 20 SMF record
SLSSMF21	HSC format 21 SMF record
SLSSMF22	HSC format 22 SMF record
SLSSMF23	HSC format 23 SMF record
SLSSMF24	HSC format 24 SMF record
SLSSMF25	HSC format 25 SMF record
SLSSMF26	HSC format 26 SMF record

**Table 10. HSC Macros (Continued)**

<b>Member Name</b>	<b>Description</b>
SLSSMF27	HSC format 27 SMF record
SLSSMF28	HSC format 28 SMF record
SLSSMF29	HSC format 29 SMF record
SLSSMF30	HSC FORMAT 30 SMF record
SLSSMLSM	Modify LSM SMF record subtype map
SLSSPSWI	Primary/shadow switch LOGREC record
SLSSRL00	Recovery ERDS record 0
SLSSRL01	Recovery ERDS record 1
SLSSVLG1	VOL/CELL force unselect record
SLSSVSTA	VARY station SMF record subtype map
SLSUREQ	Batch API request processor
SLSSUREQM	Batch API interface mapping macro
SLSUX03P	HSC User Exit 03 parameter list
SLSUX05P	HSC User Exit 05 parameter list
SLSUX06P	HSC User Exit 06 parameter list
SLSUX14P	HSC User Exit 14 parameter list
SLSUX15P	HSC User Exit 15 parameter list
SLSXB2X	Translate 8 bits to a hex byte
SLSXREQ	Issue an ACS request
SLSXREQM	ACS user interface mapping macro
SLXSSEN	HSC Significant Event Notification (SEN) request
SLXSSENM	Significant Event Notification (SEN) request parm list map
SLUVADAT	Flat file ACS/LSM information DSECT
SLUVCDAT	Flat file static configuration data DSECT
SLUVDDAT	QCDS drive information DSECT
SLUVHDAT	Flat file host information DSECT
SLUVIDAT	Flat file CDS information DSECT
SLUVM DAT	Flat file MVC data DSECT
SLUVPDAT	QCDS CAP information DSECT
SLUVSDAT	Flat file ACS station address DSECT

**Table 10. HSC Macros (Continued)**

<b>Member Name</b>	<b>Description</b>
SLUVTDAT	Flat file VTV data DSECT
SLUVVDAT	Flat file volume data DSECT
SLX	HSC external interface reply
SWSPGMIA	VTCS PGMI interface area
SWSUIO	VTCS UIO I/O request

## **LibraryStation Samples and Source Code Modules**

The following tables list the LibraryStation samples, source code modules, and macros contained on the NCS installation tape:

**Table 11. LibraryStation Samples**

<b>Member Name</b>	<b>Description</b>
SLGPROC	Sample LibraryStation startup JCL
SLGAPFXX	Sample LibraryStation APF list entries
SLGDBCR	Sample JCL for defining the LibraryStation PDF
SLGPRGXX	Sample LibraryStation APF list entries

**Table 12. LibraryStation Source Code Modules**

<b>Member Name</b>	<b>Description</b>
SLGDJCL	Sample JCL for running the SLGDIAG Installation Verification Program (IVP)
SLGDEXEC	Sample REXX exec for running the SLGDIAG IVP



# Appendix B. Installing Product Maintenance

---

## Overview

This appendix contains instructions for installing NCS maintenance.

Before attempting to install maintenance, contact Sun Microsystems StorageTek Support for information about the latest corrective service available for your NCS products.

See “Customer Support” on page xviii and “Customer-initiated Maintenance” on page xix for information about contacting Sun Microsystems for assistance.



**Note:** Use the MSP Linkage Editor when installing NCS products and maintenance. Failure to do so may result in link-editing errors.

## Maintenance Installation Data Sets

NCS maintenance is installed with SMP. Thus, the SMP target and distribution libraries used for installation of the NCS base products are required. See page 12 for more information about these libraries.

## Maintenance Tape Descriptions

Product Update Tape (PUT) maintenance is distributed on a **standard label** tape. The volume serial number can be found on the cover letter included with the tape.

PTF maintenance is distributed on a **nonlabeled** tape (e.g., an All PTFs tape).

## SMP Sample JCL

Sample JCL members for installing NCS maintenance were unloaded during the installation process. See page 10 for more information. These JCL samples can be used to process maintenance in mass mode, or by individual SYSMOD.

### SMP RECEIVE an Accumulated PTF Tape

Sample members MAINTRCF and MAINTRCS provide sample JCL to perform an SMP RECEIVE for maintenance on an accumulated PTF tape. Choose one of the following methods:

- Use MAINTRCF to SMP RECEIVE maintenance by specific FMID.
- Use MAINTRCS to SMP RECEIVE maintenance by specific SYSMOD.

Read the instructions commented in the JCL for necessary modifications.

### SMP RECEIVE a PUT

Sample member MAINTRCP provides sample JCL to perform an SMP RECEIVE for maintenance on a Product Update Tape (PUT).

Read the instructions commented in the JCL for necessary modifications.

### SMP APPLY JCL

Sample members MAINTAPF and MAINTAPS provide sample JCL used to perform an SMP APPLY for maintenance. Choose one of the following methods:

- MAINTAPF to SMP APPLY maintenance by specific FMID.
- MAINTAPS to SMP APPLY maintenance by specific SYSMOD.

Read the instructions commented in the JCL for necessary modifications and procedures for performing an SMP APPLY CHECK followed by an actual SMP APPLY.



**Note:** You must specify the ASSEM option to the SMP statements in the sample JCL if HSC SAMPLIB members that require tape management macros to assemble correctly are included in the APPLY (i.e., SLUCONDB, SLUDRCA1, SLUDRRMM, or SLUDRTLTM).

## SMP ACCEPT JCL



**Note:** Performing an SMP ACCEPT for maintenance is **optional**.

Sample members MAINTACF and MAINTACS provide sample JCL to perform an SMP ACCEPT for maintenance. Choose one of the following methods:

- Use MAINTACF to SMP ACCEPT maintenance by specific FMID.
- Use MAINTACS to SMP ACCEPT maintenance by specific SYSMOD.

Read the instructions commented in the JCL for necessary modifications and procedures for performing an SMP ACCEPT CHECK followed by an actual SMP ACCEPT.

## Separate HELD HSC PTFs

Examine the output from the APPLY in the previous section to identify those PTFs that failed to be applied due to HOLDSYSTEM exception data. Examine the cover letters for those PTFs to determine if the PTFs are applicable to your environment. Generally, HSC SYSMODS with HOLDSYSTEM fall into two categories:

- SYSMODS that update the tape management system scratch conversion modules (SLUDRCA1, SLUDRTL, and SLUDRRMM).
- Those SYSMODS that have dependencies beyond control of the HSC SMP environment. For example, certain HSC PTFs may require a particular MSP PTF to be applied or you may need to update an automated operations package.

From the examination of the SYSMODS that were not applied due to HOLDSYSTEM exception data, create four lists of PTFs as follows:

### list 1

Tape management system PTFs for a tape management system that is not installed at your site.

### list 2

Tape management system PTFs where the tape management system is installed at your site and modification of the source is necessary.

### list 3

Non-tape management system PTFs that cannot be applied because your site does not comply with the conditions defined in the PTF cover letters.

### list 4

All other PTFs held for HOLDSYSTEM exception data. These are held PTFs that are applicable to your installation. Included are tape management system PTFs where the tape management system is installed at your site and you don't need to modify the source code.

## APPLY Applicable HSC HOLDSYSTEM SYSMODS

Use the following JCL to SMP APPLY applicable HOLDSYSTEM SYSMODS:

```
//jobname JOB .....  
//S1      EXEC smpe-proc  
//SMPCNTL DD *  
    APPLY SELECT(ptf1,ptf2,.....,ptfn)  
           EXCLUDE(ptf1,ptf2,.....,ptfn)  
  
           BYPASS(HOLDSYSTEM)  
/*
```



**Note:** The EXCLUDEd PTFs should consist of all PTFs in List 1, List 2, and List 3 (see “Separate HELD HSC PTFs” on page 53).

## ACCEPT Tape Management SYSMODS Without an ASSEMBLE

```
/jobname JOB .....  
//S1      EXEC smpe-proc  
//SMPCNTL DD *  
    ACCEPT SELECT (ptf1,ptf2,.....,ptfn)  
           EXCLUDE(ptf1,ptf2,.....,ptfn)  
  
           BYPASS(HOLDSYSTEM).  
/*
```

The EXCLUDE list should specify only the PTFs in List 3 (see “Separate HELD HSC PTFs” on page 53). This ACCEPT installs all HSC SYSMODS held for HOLDSYSTEM exception data where the PTFs are for:

- A tape management system installed at your site where you have determined that the HSC tape management components require modification.
- A tape management system that is not installed at your site.



**Note:** ACCEPTing the PTFs for Tape Management Systems (TMS) that are not installed at your site is desirable because:

- ACCEPTing these PTFs ensures that all TMS maintenance is current. This is important if you decide to change tape management systems. ACCEPTing these PTFs may also satisfy IFREQs.
- There is a separate HSC module for each tape management system. Maintenance for one TMS will not affect other tape management systems.
- You should have no problem ACCEPTing these PTFs because the ASSEM option is not specified.

This ACCEPT does not generate an assembly for the HSC tape management system source modules because the ASSEM option is not specified. The SAMPLIB data set is updated with new source versions. If required, you can now modify the source and reassemble the relevant module(s). See the note above.

After running the APPLY step for HOLDSYSTEM SYSMODS and the ACCEPT step for tape management SYSMODS without an ASSEMBLE, the only held PTFs that are not applied should be those you determined cannot be applied because you do not comply with their specific requirements (see “Separate HELD HSC PTFs” on page 53).



# Index

---

## A

- About xv
- allocating
  - NCS
    - distribution library data sets 12
    - target library data sets 12
- APF (authorized program list)
  - adding HSC libraries 33
  - adding HSC user exit library 33
  - adding HTTP server libraries 26
  - adding LibraryStation libraries 38
  - adding SMC libraries 20
- audience for this guide xvi
- authorized program list (APF)
  - adding HSC libraries 33
  - adding HSC user exit library 33
  - adding HTTP server libraries 26
  - adding LibraryStation libraries 38
  - adding SMC libraries 20

## C

- checklist, NCS 5
- coexistence, NCS software 2
- consolidated software inventory (CSI)
  - defining for NCS 11
- contacting Sun StorageTek Support xix
- conventions, guide xvii
- customer support xviii
- customer-initiated maintenance (CIM) xix

## D

- distribution data sets, allocating for NCS 12

## E

- examples
  - SMC START Procedure 26

## F

- FMIDs, NCS 9

## G

- guide
  - audience definition xvi
  - conventions xvii
  - organization xvi
  - related publications xvii

## H

- hardware requirements, NCS 7
- help, technical support xviii
- HSC
  - adding libraries to authorized program list (APF) 33
  - adding System Management Facility (SMF) parameters 35
  - adding user exit library to APF 33
  - defined xv
  - defining as an MSP subsystem 32
  - macros 47
  - modifying MSP Program Properties Table (PPT) 34
  - samples 45
  - source code modules 46
  - virtual storage requirements 8
- HTTP server
  - adding libraries to the authorized program list (APF) 26
  - configuration parameters 27
  - customizing parameter file 27
  - customizing START procedure 26
  - displaying status 29
  - network parameters 27
  - START procedure 26
  - starting and stopping 28
- HTTP Server for OS/390 and z/OS
  - CGI parameters 28

## I

- installation materials 2

## J

JCL, maintenance installation 52

## L

LibraryStation

- adding libraries to authorized program list (APF) 38

- defined xv

- defining Persistent Data File (PDF) 38

- samples 50

- source code modules 50

license keys 3

## M

maintenance 17, 51

migration and coexistence considerations 2

migration, NCS software 2

MSP LINKLIST

- copying SLSBPRESI module 34

- copying SMCBPRESI module 21

- moving SLSBPRESI module 34

- moving SMCBPRESI module 21

## N

NCS

- defining and initializing the PRJ 11

- FMIDs 9

- functions

  - SMP ACCEPT base 16

  - SMP APPLY base 16

  - SMP RECEIVE 16

- hardware requirements 7

- initializing PRJ 11

- installation base tape contents 4

- installation checklist 5

- installation materials 2

- license keys 3

- maintenance 17

- migration and coexistence considerations 2

- SMP environment 10

- software components xv

- software requirements 6

- target and distribution library data sets 12

- virtual storage requirements 8

## O

organization of this guide xvi

## P

partners web site, SUN xviii

PDF (Persistent Data File), defining for LibraryStation 38

PPT (Program Properties Table)

- modifying for HSC 34

- modifying for SMC 24

pre-installation tasks, NCS 1

PRJ 11

- initializing for NCS 11

Program Properties Table (PPT)

- modifying for HSC 34

- modifying for SMC 24

PTFs, installing 17

publications, related xvii

PUTs, installing 17

## S

SLSBPRESI module, copying or moving to MSP LINKLIST 34

SLUCONDB, re-assembling for HSC 36

SMC

- adding libraries to authorized program list (APF) 20

- defined xv

- defining as an MSP subsystem 20

- macros 44

- modifying the MSP Program Properties Table 24

- samples 43

- virtual storage requirements 8

SMCBPRESI module, copying or moving to MSP LINKLIST 21

SMF (System Management Facility) parameters, adding 35

SMP

- ACCEPT

  - NCS base functions 16

- APPLY

  - NCS base functions 16

- environment 10

- JCL library, unloading 10

- RECEIVE NCS functions 16

software requirements

- NCS 6

subsystem name table

- notes on modifying 23

- running SMC under MSTR 23

- SMC, TMS and Unicenter CA-MIA 22

- TMS interaction 21

- Unicenter CA-MIA 22

support, technical xviii

SYSLIB, updating for NCS 13

System Management Facility (SMF) parameters, adding 35

## T

Tape Management System (TMS), defining 20



target library data sets, allocating 12

technical support xviii

troubleshooting xviii

## V

virtual storage requirements

HSC 8

SMC 8

VSM (Virtual Storage Manager), support xv, xvi, 2, 4, 9, 15,  
25

## W

web site, SUN xviii

worldwide offices, SUN xx









Sun Microsystems, Inc. 4150 Network Circle, Santa Clara, CA 95054 USA Phone 1-650-960-1300 or 1-800-555-9SUN Web [sun.com](http://sun.com)



ARGENTINA: 5411-4317-5636 • AUSTRALIA: 1-800-550-786 • AUSTRIA: 43-1-601-26-0 • BALKANS: 301-6188-111 • BELGIUM: 32-2-704 89 83 • BRAZIL: 55-11-51872100 • BRUNEI: 65-216-8333 • CANADA: 1-800-422-8020 (GENERAL); 416-964-2001 (LEARNING MANAGEMENT SYSTEM SALES, TORONTO) • CHILE: 562-372-4500 • COLOMBIA: 571-629-2323  
CZECH REPUBLIC: 420 2 33009311 • DENMARK: 45 4556 5040 • EGYPT: 00 202 570 9442 • FINLAND: 358-9-525-551 • FRANCE: 33-1-41-33-17-17 • GERMANY: 49-89-460-08-2788 • GREECE: 30-01-6188101 • HONG KONG: 852-2877-7077 • HUNGARY: 361-202-4415 • INDIA: 91-80-229-8989 • INDONESIA: 65-216-8333 • IRELAND: 353-1-668-4377  
ISRAEL: 972-9-9710500 • ITALY: 39-02-9259511 • JAPAN: 81-3-5779-1820 • KOREA: 82-2-3453-6602 • MALAYSIA: 603-2116-1887 • MIDDLE EAST: 00 9714 3366333 • MEXICO: 525-261-0344 • NETHERLANDS: 31-33-4515200 • NEW ZEALAND: 0800-786-338 • NORTH WEST AFRICA: 00 9714 3366333 • NORWAY: FROM NORWAY: 47-22023950, TO NORWAY: 47-23369650 • PAKISTAN: 00-9714-3366333 • PEOPLE'S REPUBLIC OF CHINA: 8610-6803-5588 • PHILIPPINES: 632-885-7867 • POLAND: 48-22-8747848 • PORTUGAL: 351-21-413-4000 • RUSSIA: 7-095-935-8411 • SAUDI ARABIA: 00 9714 3366333 • SINGAPORE: 65-216-8300 • SOUTH AFRICA: 27-11-256-6300 • SPAIN: 34-902-210-412 • SRI LANKA: 65-2168333 • SWEDEN: 46-8-631 22 00 • SWITZERLAND: 41-1-908-90-50 (GERMAN) 41-22-999-0444 (FRENCH) • TAIWAN: 886-2-25185735 • THAILAND: 662-344-6855 • TURKEY: 90 212 335 22 00 • UNITED KINGDOM: 44-1276-416-520 • UNITED STATES: 1-800-422-8020 • VENEZUELA: 582-905-3800 • VIETNAM: 65-216-8333 • WORLDWIDE HEADQUARTERS: 1-650-960-1300

**SUN™** THE NETWORK IS THE COMPUTER ©2006 Sun Microsystems, Inc. All rights reserved. Sun, Sun Microsystems, and the Sun logo are trademarks or registered trademarks of Sun Microsystems, Inc. in the United States and other countries.