



Sun StorEdge™ Network FC Switch-8 and Switch-16 Installation and Configuration Guide

Sun StorEdge SAN 3.0 Release

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Adobe PostScript

Declaration of Conformity

Compliance Model Number: Compliance ID
Product Name: Sun StorEdge network FC switch-16

EMC

European Union

This equipment complies with the following requirements of the EMC Directive 89/336/EEC:

EN55022:1998/CISPR22:1997		Class A
EN55024:1998	EN61000-4-2	4 kV (Direct), 8 kV (Air)
	EN61000-4-3	3 V/m
	EN61000-4-4	1.0 kV AC Power Lines, 0.5 kV Signal and DC Power Lines
	EN61000-4-5	1 kV AC Line-Line and Outdoor Signal Lines 2 kV AC Line-Gnd, 0.5 kV DC Power Lines
	EN61000-4-6	3 V
	EN61000-4-8	1 A/m
	EN61000-4-11	Pass
EN61000-3-2:1995 w/Amendments 1, 2		Pass
EN61000-3-3:1995		Pass

Safety

This equipment complies with the following requirements of the Low Voltage Directive 73/23/EEC:

EC Type Examination Certificates:

EN60950:1992, 2nd Edition, Amendments 1, 2, 3, 4, 11	TUV Rheinland Certificate No. AL 99-03-33778
IEC 950:1991, 2nd Edition, Amendments 1, 2, 3, 4	
Evaluated to all CB Countries	CB Scheme Certificate No. DE 3-5207

Supplementary Information

This product was tested and complies with all the requirements for the CE Mark.

/S/

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Safety Agency Compliance Statements

Read this section before beginning any procedure. The following text provides safety precautions to follow when installing a Sun Microsystems product.

Safety Precautions

For your protection, observe the following safety precautions when setting up your equipment:

- Follow all cautions and instructions marked on the equipment.
- Ensure that the voltage and frequency of your power source match the voltage and frequency inscribed on the equipment's electrical rating label.
- Never push objects of any kind through openings in the equipment. Dangerous voltages may be present. Conductive foreign objects could produce a short circuit that could cause fire, electric shock, or damage to your equipment.

Symbols

The following symbols may appear in this book:



Caution – There is risk of personal injury and equipment damage. Follow the instructions.



Caution – Hot surface. Avoid contact. Surfaces are hot and may cause personal injury if touched.



Caution – Hazardous voltages are present. To reduce the risk of electric shock and danger to personal health, follow the instructions.



On – Applies AC power to the system.

Depending on the type of power switch your device has, one of the following symbols may be used:



Off - Removes AC power from the system.



Standby – The On/Standby switch is in the standby position.

Modifications to Equipment

Do not make mechanical or electrical modifications to the equipment. Sun Microsystems is not responsible for regulatory compliance of a modified Sun product.

Placement of a Sun Product



Caution – Do not block or cover the openings of your Sun product. Never place a Sun product near a radiator or heat register. Failure to follow these guidelines can cause overheating and affect the reliability of your Sun product.



Caution – The workplace-dependent noise level defined in DIN 45 635 Part 1000 must be 70Db(A) or less.

SELV Compliance

Safety status of I/O connections comply to SELV requirements.

Power Cord Connection



Caution – Sun products are designed to work with single-phase power systems having a grounded neutral conductor. To reduce the risk of electric shock, do not plug Sun products into any other type of power system. Contact your facilities manager or a qualified electrician if you are not sure what type of power is supplied to your building.



Caution – Not all power cords have the same current ratings. Household extension cords do not have overload protection and are not meant for use with computer systems. Do not use household extension cords with your Sun product.



Caution – Your Sun product is shipped with a grounding type (three-wire) power cord. To reduce the risk of electric shock, always plug the cord into a grounded power outlet.

The following caution applies only to devices with a Standby power switch:



Caution – The power switch of this product functions as a standby type device only. The power cord serves as the primary disconnect device for the system. Be sure to plug the power cord into a grounded power outlet that is nearby the system and is readily accessible. Do not connect the power cord when the power supply has been removed from the system chassis.

Lithium Battery



Caution – On Sun CPU boards, there is a lithium battery molded into the real-time clock, SGS No. MK48T59Y, MK48TXXB-XX, MK48T18-XXXPCZ, M48T59W-XXXPCZ, or MK48T08. Batteries are not customer replaceable parts. They may explode if mishandled. Do not dispose of the battery in fire. Do not disassemble it or attempt to recharge it.

Battery Pack



Caution – There is a sealed lead acid battery in Sun StorEdge network FC switch-16 units. Portable Energy Products No. TLC02V50. There is danger of explosion if the battery pack is mishandled or incorrectly replaced. Replace only with the same type of Sun Microsystems battery pack. Do not disassemble it or attempt to recharge it outside the system. Do not dispose of the battery in fire. Dispose of the battery properly in accordance with local regulations.

System Unit Cover

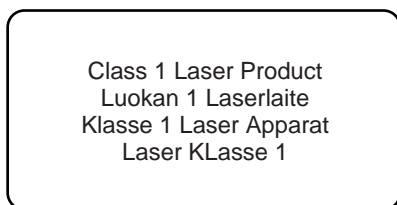
You must remove the cover of your Sun computer system unit to add cards, memory, or internal storage devices. Be sure to replace the top cover before powering on your computer system.



Caution – Do not operate Sun products without the top cover in place. Failure to take this precaution may result in personal injury and system damage.

Laser Compliance Notice

Sun products that use laser technology comply with Class 1 laser requirements.



CD-ROM



Caution – Use of controls, adjustments, or the performance of procedures other than those specified herein may result in hazardous radiation exposure.

Einhaltung sicherheitsbehördlicher Vorschriften

Auf dieser Seite werden Sicherheitsrichtlinien beschrieben, die bei der Installation von Sun-Produkten zu beachten sind.

Sicherheitsvorkehrungen

Treffen Sie zu Ihrem eigenen Schutz die folgenden Sicherheitsvorkehrungen, wenn Sie Ihr Gerät installieren:

- Beachten Sie alle auf den Geräten angebrachten Warnhinweise und Anweisungen.
- Vergewissern Sie sich, daß Spannung und Frequenz Ihrer Stromquelle mit der Spannung und Frequenz übereinstimmen, die auf dem Etikett mit den elektrischen Nennwerten des Geräts angegeben sind.
- Stecken Sie auf keinen Fall irgendwelche Gegenstände in Öffnungen in den Geräten. Leitfähige Gegenstände könnten aufgrund der möglicherweise vorliegenden gefährlichen Spannungen einen Kurzschluß verursachen, der einen Brand, Stromschlag oder Geräteschaden herbeiführen kann.

Symbole

Die Symbole in diesem Handbuch haben folgende Bedeutung:



Achtung – Gefahr von Verletzung und Geräteschaden. Befolgen Sie die Anweisungen.



Achtung – Hohe Temperatur. Nicht berühren, da Verletzungsgefahr durch heiße Oberfläche besteht.



Achtung – Gefährliche Spannungen. Anweisungen befolgen, um Stromschläge und Verletzungen zu vermeiden.



Ein – Setzt das System unter Wechselstrom.

Je nach Netzschaltertyp an Ihrem Gerät kann eines der folgenden Symbole benutzt werden:



Aus – Unterbricht die Wechselstromzufuhr zum Gerät.



Wartezustand (Stand-by-Position) - Der Ein-/Wartezustand-Schalter steht auf Wartezustand. Änderungen an Sun-Geräten.

Nehmen Sie keine mechanischen oder elektrischen Änderungen an den Geräten vor. Sun Microsystems, übernimmt bei einem Sun-Produkt, das geändert wurde, keine Verantwortung für die Einhaltung behördlicher Vorschriften

Aufstellung von Sun-Geräten



Achtung – Um den zuverlässigen Betrieb Ihres Sun-Geräts zu gewährleisten und es vor Überhitzung zu schützen, dürfen die Öffnungen im Gerät nicht blockiert oder verdeckt werden. Sun-Produkte sollten niemals in der Nähe von Heizkörpern oder Heizluftklappen aufgestellt werden.



Achtung – Der arbeitsplatzbezogene Schalldruckpegel nach DIN 45 635 Teil 1000 beträgt 70Db(A) oder weniger.

Einhaltung der SELV-Richtlinien

Die Sicherung der I/O-Verbindungen entspricht den Anforderungen der SELV-Spezifikation.

Anschluß des Netzkabels



Achtung – Sun-Produkte sind für den Betrieb an Einphasen-Stromnetzen mit geerdetem Nulleiter vorgesehen. Um die Stromschlaggefahr zu reduzieren, schließen Sie Sun-Produkte nicht an andere Stromquellen an. Ihr Betriebsleiter oder ein qualifizierter Elektriker kann Ihnen die Daten zur Stromversorgung in Ihrem Gebäude geben.



Achtung – Nicht alle Netzkabel haben die gleichen Nennwerte. Herkömmliche, im Haushalt verwendete Verlängerungskabel besitzen keinen Überlastungsschutz und sind daher für Computersysteme nicht geeignet.



Achtung – Ihr Sun-Gerät wird mit einem dreidadrigen Netzkabel für geerdete Netzsteckdosen geliefert. Um die Gefahr eines Stromschlags zu reduzieren, schließen Sie das Kabel nur an eine fachgerecht verlegte, geerdete Steckdose an.

Die folgende Warnung gilt nur für Geräte mit Wartezustand-Netzschalter:



Achtung – Der Ein/Aus-Schalter dieses Geräts schaltet nur auf Wartezustand (Stand-By-Modus). Um die Stromzufuhr zum Gerät vollständig zu unterbrechen, müssen Sie das Netzkabel von der Steckdose abziehen. Schließen Sie den Stecker des Netzkabels an eine in der Nähe befindliche, frei zugängliche, geerdete Netzsteckdose an. Schließen Sie das Netzkabel nicht an, wenn das Netzteil aus der Systemeinheit entfernt wurde.

Lithiumbatterie



Achtung – CPU-Karten von Sun verfügen über eine Echtzeituhr mit integrierter Lithiumbatterie (Teile-Nr. MK48T59Y, MK48TXXB-XX, MK48T18-XXXPCZ, M48T59W-XXXPCZ, oder MK48T08). Diese Batterie darf nur von einem qualifizierten Servicetechniker ausgewechselt werden, da sie bei falscher Handhabung explodieren kann. Werfen Sie die Batterie nicht ins Feuer. Versuchen Sie auf keinen Fall, die Batterie auszubauen oder wiederaufzuladen.

Batterien



Achtung – Die Geräte Sun StorEdge network FC switch-16 enthalten auslaufsichere Bleiakkumulatoren. Produkt-Nr. TLC02V50 für portable Stromversorgung. Werden bei der Behandlung oder beim Austausch der Batterie Fehler gemacht, besteht Explosionsgefahr. Batterie nur gegen Batterien gleichen Typs von Sun Microsystems austauschen. Nicht demontieren und nicht versuchen, die Batterie außerhalb des Geräts zu laden. Batterie nicht ins Feuer werfen. Ordnungsgemäß entsprechend den vor Ort geltenden Vorschriften entsorgen.

Gehäuseabdeckung

Sie müssen die obere Abdeckung Ihres Sun-Systems entfernen, um interne Komponenten wie Karten, Speicherchips oder Massenspeicher hinzuzufügen. Bringen Sie die obere Gehäuseabdeckung wieder an, bevor Sie Ihr System einschalten.



Achtung – Bei Betrieb des Systems ohne obere Abdeckung besteht die Gefahr von Stromschlag und Systemschäden.

Einhaltung der Richtlinien für Laser

Sun-Produkte, die mit Laser-Technologie arbeiten, entsprechen den Anforderungen der Laser Klasse 1.

Class 1 Laser Product
Luokan 1 Laserlaite
Klasse 1 Laser Apparat
Laser Klasse 1

CD-ROM



Warnung – Die Verwendung von anderen Steuerungen und Einstellungen oder die Durchführung von Prozeduren, die von den hier beschriebenen abweichen, können gefährliche Strahlungen zur Folge haben.

Conformité aux normes de sécurité

Ce texte traite des mesures de sécurité qu'il convient de prendre pour l'installation d'un produit Sun Microsystems.

Mesures de sécurité

Pour votre protection, veuillez prendre les précautions suivantes pendant l'installation du matériel :

- Suivre tous les avertissements et toutes les instructions inscrites sur le matériel.
- Vérifier que la tension et la fréquence de la source d'alimentation électrique correspondent à la tension et à la fréquence indiquées sur l'étiquette de classification de l'appareil.

- Ne jamais introduire d'objets quels qu'ils soient dans une des ouvertures de l'appareil. Vous pourriez vous trouver en présence de hautes tensions dangereuses. Tout objet conducteur introduit de la sorte pourrait produire un court-circuit qui entraînerait des flammes, des risques d'électrocution ou des dégâts matériels.

Symboles

Vous trouverez ci-dessous la signification des différents symboles utilisés :



Attention: – risques de blessures corporelles et de dégâts matériels. Veuillez suivre les instructions.



Attention: – surface à température élevée. Évitez le contact. La température des surfaces est élevée et leur contact peut provoquer des blessures corporelles.



Attention: – présence de tensions dangereuses. Pour éviter les risques d'électrocution et de danger pour la santé physique, veuillez suivre les instructions.



MARCHE – Votre système est sous tension (courant alternatif).

Un des symboles suivants sera peut-être utilisé en fonction du type d'interrupteur de votre système:



ARRET - Votre système est hors tension (courant alternatif).



VEILLEUSE – L'interrupteur Marche/ Veilleuse est en position « Veilleuse ».

Modification du matériel

Ne pas apporter de modification mécanique ou électrique au matériel. Sun Microsystems n'est pas responsable de la conformité réglementaire d'un produit Sun qui a été modifié.

Positionnement d'un produit Sun



Attention: – pour assurer le bon fonctionnement de votre produit Sun et pour l'empêcher de surchauffer, il convient de ne pas obstruer ni recouvrir les ouvertures prévues dans l'appareil. Un produit Sun ne doit jamais être placé à proximité d'un radiateur ou d'une source de chaleur.



Attention: – Le niveau de pression acoustique au poste de travail s'élève selon la norme DIN 45 635 section 1000, à 70 dB (A) ou moins.

Conformité SELV

Sécurité : les raccordements E/S sont conformes aux normes SELV.

Connexion du cordon d'alimentation.



Attention: – les produits Sun sont conçus pour fonctionner avec des alimentations monophasées munies d'un conducteur neutre mis à la terre. Pour écarter les risques d'électrocution, ne pas brancher de produit Sun dans un autre type d'alimentation secteur. En cas de doute quant au type d'alimentation électrique du local, veuillez vous adresser au directeur de l'exploitation ou à un électricien qualifié.



Attention: – tous les cordons d'alimentation n'ont pas forcément la même puissance nominale en matière de courant. Les rallonges d'usage domestique n'offrent pas de protection contre les surcharges et ne sont pas prévues pour les systèmes d'ordinateurs. Ne pas utiliser de rallonge d'usage domestique avec votre produit Sun.



Attention: – votre produit Sun a été livré équipé d'un cordon d'alimentation à trois fils (avec prise de terre). Pour écarter tout risque d'électrocution, branchez toujours ce cordon dans une prise mise à la terre.

L'avertissement suivant s'applique uniquement aux systèmes équipés d'un interrupteur VEILLEUSE:



Attention: – le commutateur d'alimentation de ce produit fonctionne comme un dispositif de mise en veille uniquement. C'est la prise d'alimentation qui sert à mettre le produit hors tension. Veuillez donc à installer le produit à proximité d'une prise murale facilement accessible. Ne connectez pas la prise d'alimentation lorsque le châssis du système n'est plus alimenté.

Batterie au lithium



Attention: – sur les cartes CPU Sun, une batterie au lithium (référence MK48T59Y, MK48TXXB-XX, MK48T18-XXXPCZ, M48T59W-XXXPCZ, ou MK48T08.) a été moulée dans l'horloge temps réel SGS. Les batteries ne sont pas des pièces remplaçables par le client. Elles risquent d'exploser en cas de mauvais traitement. Ne pas jeter la batterie au feu. Ne pas la démonter ni tenter de la recharger.

Bloc-batterie



Attention: – Les unités Sun StorEdge network FC switch-16 contiennent une batterie étanche au plomb (produits énergétiques portatifs n°TLC02V50). Il existe un risque d'explosion si ce bloc-batterie est manipulé de façon erronée ou mal mis en place. Ne remplacez ce bloc que par un bloc-batterie Sun Microsystems du même type. Ne le démontez pas et n'essayez pas de le recharger hors du système. Ne faites pas brûler la batterie mais mettez-la au rebut conformément aux réglementations locales en vigueur.

Couvercle

Pour ajouter des cartes, de la mémoire, ou des unités de stockage internes, vous devrez démonter le couvercle de l'unité système Sun. Ne pas oublier de remettre ce couvercle en place avant de mettre le système sous tension.



Attention: – il est dangereux de faire fonctionner un produit Sun sans le couvercle en place. Si l'on néglige cette précaution, on encourt des risques de blessures corporelles et de dégâts matériels.

Conformité aux certifications Laser

Les produits Sun qui font appel aux technologies lasers sont conformes aux normes de la classe 1 en la matière.

Class 1 Laser Product
Luokan 1 Laserlaitte
Klasse 1 Laser Apparat
Laser Klasse 1

CD-ROM



Attention: – L'utilisation de contrôles, de réglages ou de performances de procédures autre que celle spécifiée dans le présent document peut provoquer une exposition à des radiations dangereuses.

Normativas de seguridad

El siguiente texto incluye las medidas de seguridad que se deben seguir cuando se instale algún producto de Sun Microsystems.

Precauciones de seguridad

Para su protección observe las siguientes medidas de seguridad cuando manipule su equipo:

- Siga todas las avisos e instrucciones marcados en el equipo.
- Asegúrese de que el voltaje y la frecuencia de la red eléctrica concuerdan con las descritas en las etiquetas de especificaciones eléctricas del equipo.
- No introduzca nunca objetos de ningún tipo a través de los orificios del equipo. Pueden haber voltajes peligrosos. Los objetos extraños conductores de la electricidad pueden producir cortocircuitos que provoquen un incendio, descargas eléctricas o daños en el equipo.

Símbolos

En este libro aparecen los siguientes símbolos:



Precaución – Existe el riesgo de lesiones personales y daños al equipo. Siga las instrucciones.



Precaución – Superficie caliente. Evite el contacto. Las superficies están calientes y pueden causar daños personales si se tocan.



Precaución – Voltaje peligroso presente. Para reducir el riesgo de descarga y daños para la salud siga las instrucciones.



Encendido – Aplica la alimentación de CA al sistema.

Según el tipo de interruptor de encendido que su equipo tenga, es posible que se utilice uno de los siguientes símbolos:



Apagado - Elimina la alimentación de CA del sistema.



En espera – El interruptor de Encendido/En espera se ha colocado en la posición de En espera.

Modificaciones en el equipo

No realice modificaciones de tipo mecánico o eléctrico en el equipo. Sun Microsystems no se hace responsable del cumplimiento de las normativas de seguridad en los equipos Sun modificados.

Ubicación de un producto Sun



Precaución – Para asegurar la fiabilidad de funcionamiento de su producto Sun y para protegerlo de sobrecalentamientos no deben obstruirse o taparse las rejillas del equipo. Los productos Sun nunca deben situarse cerca de radiadores o de fuentes de calor.



Precaución – De acuerdo con la norma DIN 45 635, Parte 1000, se admite un nivel de presión acústica para puestos de trabajo máximo de 70Db(A).

Cumplimiento de la normativa SELV

El estado de la seguridad de las conexiones de entrada/salida cumple los requisitos de la normativa SELV.

Conexión del cable de alimentación eléctrica



Precaución – Los productos Sun están diseñados para trabajar en una red eléctrica monofásica con toma de tierra. Para reducir el riesgo de descarga eléctrica, no conecte los productos Sun a otro tipo de sistema de alimentación eléctrica. Póngase en contacto con el responsable de mantenimiento o con un electricista cualificado si no está seguro del sistema de alimentación eléctrica del que se dispone en su edificio.



Precaución – No todos los cables de alimentación eléctrica tienen la misma capacidad. Los cables de tipo doméstico no están provistos de protecciones contra sobrecargas y por tanto no son apropiados para su uso con computadores. No utilice alargadores de tipo doméstico para conectar sus productos Sun.



Precaución – Con el producto Sun se proporciona un cable de alimentación con toma de tierra. Para reducir el riesgo de descargas eléctricas conéctelo siempre a un enchufe con toma de tierra.

La siguiente advertencia se aplica solamente a equipos con un interruptor de encendido que tenga una posición "En espera":



Precaución – El interruptor de encendido de este producto funciona exclusivamente como un dispositivo de puesta en espera. El enchufe de la fuente de alimentación está diseñado para ser el elemento primario de desconexión del equipo. El equipo debe instalarse cerca del enchufe de forma que este último pueda ser fácil y rápidamente accesible. No conecte el cable de alimentación cuando se ha retirado la fuente de alimentación del chasis del sistema.

Batería de litio



Precaución – En las placas de CPU Sun hay una batería de litio insertada en el reloj de tiempo real, tipo SGS Núm. MK48T59Y, MK48TXXB-XX, MK48T18-XXXPCZ, M48T59W-XXXPCZ, o MK48T08. Las baterías no son elementos reemplazables por el propio cliente. Pueden explotar si se manipulan de forma errónea. No arroje las baterías al fuego. No las abra o intente recargarlas.

Paquete de pilas



Precaución – Las unidades Sun StorEdge network FC switch-16 contienen una pila de plomo sellada, Productos de energía portátil nº TLC02V50. Existe riesgo de estallido si el paquete de pilas se maneja sin cuidado o se sustituye de manera indebida. Las pilas sólo deben sustituirse por el mismo tipo de paquete de pilas de Sun Microsystems. No las desmonte ni intente recargarlas fuera del sistema. No arroje las pilas al fuego. Deséchelas siguiendo el método indicado por las disposiciones vigentes.

Tapa de la unidad del sistema

Debe quitar la tapa del sistema cuando sea necesario añadir tarjetas, memoria o dispositivos de almacenamiento internos. Asegúrese de cerrar la tapa superior antes de volver a encender el equipo.



Precaución – Es peligroso hacer funcionar los productos Sun sin la tapa superior colocada. El hecho de no tener en cuenta esta precaución puede ocasionar daños personales o perjudicar el funcionamiento del equipo.

Aviso de cumplimiento con requisitos de láser

Los productos Sun que utilizan la tecnología de láser cumplen con los requisitos de láser de Clase 1.

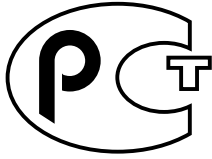
Class 1 Laser Product
Luokan 1 Laserlaite
Klasse 1 Laser Apparat
Laser Klasse 1

CD-ROM



Precaución – El manejo de los controles, los ajustes o la ejecución de procedimientos distintos a los aquí especificados pueden exponer al usuario a radiaciones peligrosas.

GOST-R Certification Mark



Nordic Lithium Battery Cautions

Norge



ADVARSEL - Litiumbatteri —
Ekspløsjonsfare. Ved utskifting benyttes kun
batteri som anbefalt av apparatfabrikanten.
Brukt batteri returneres apparatleverandøren.

Sverige



VARNING - Explosionsfara vid felaktigt
batteribyte. Använd samma batterityp eller
en ekvivalent typ som rekommenderas av
apparatillverkaren. Kassera använt batteri
enligt fabrikantens instruktion.

Danmark



ADVARSEL! - Litiumbatteri —
Ekspløsjonsfare ved fejlagtig håndtering.
Udskiftning må kun ske med batteri af samme
fabrikat og type. Levér det brugte batteri
tilbage til leverandøren.

Suomi



VAROITUS - Paristo voi räjähtää, jos se on
virheellisesti asennettu. Vaihda paristo
ainoastaan laitevalmistajan suosittelemaan
tyyppiin. Hävitä käytetty paristo valmistajan
ohjeiden mukaisesti.

Regulatory Compliance Statements

Your Sun product is marked to indicate its compliance class:

- Federal Communications Commission (FCC) — USA
- Industry Canada Equipment Standard for Digital Equipment (ICES-003) — Canada
- Voluntary Control Council for Interference (VCCI) — Japan
- Bureau of Standards Metrology and Inspection (BSMI) — Taiwan

Please read the appropriate section that corresponds to the marking on your Sun product before attempting to install the product.

FCC Class A Notice

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy, and if it is not installed and used in accordance with the instruction manual, it may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

Shielded Cables: Connections between the workstation and peripherals must be made using shielded cables to comply with FCC radio frequency emission limits. Networking connections can be made using unshielded twisted-pair (UTP) cables.

Modifications: Any modifications made to this device that are not approved by Sun Microsystems, Inc. may void the authority granted to the user by the FCC to operate this equipment.

FCC Class B Notice

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/television technician for help.

Shielded Cables: Connections between the workstation and peripherals must be made using shielded cables in order to maintain compliance with FCC radio frequency emission limits. Networking connections can be made using unshielded twisted pair (UTP) cables.

Modifications: Any modifications made to this device that are not approved by Sun Microsystems, Inc. may void the authority granted to the user by the FCC to operate this equipment.

ICES-003 Class A Notice - Avis NMB-003, Classe A

This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

ICES-003 Class B Notice - Avis NMB-003, Classe B

This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.


VCCI 基準について

クラス A VCCI 基準について

クラス A VCCI の表示があるワークステーションおよびオプション製品は、クラス A 情報技術装置です。これらの製品には、下記の項目が該当します。

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Preface

The *Sun StorEdge Network FC Switch-8 and Switch-16 Installation and Configuration Guide* describes how to set up the Sun StorEdge™ Network FC Switch-8 and Switch -16 hardware and configure it to the network. It provides information and pointers to additional documentation you may need for configuring, troubleshooting, and using the switch. The book is intended for technical users who have experience with storage systems.

Using UNIX Commands

This document may not contain information on basic UNIX® commands and procedures such as shutting down the system, booting the system, and configuring devices.

See one or more of the following for this information:

- *Solaris Handbook for Sun Peripherals*
- AnswerBook2™ online documentation for the Solaris™ operating environment
- Other software documentation that you received with your system

Typographic Conventions

TABLE P-1

Typeface	Meaning	Examples
AaBbCc123	The names of commands, files, and directories; on-screen computer output	Edit your <code>.login</code> file. Use <code>ls -a</code> to list all files. % You have mail.
AaBbCc123	What you type, when contrasted with on-screen computer output	% su Password:
<i>AaBbCc123</i>	Book titles, new words or terms, words to be emphasized	Read Chapter 6 in the <i>User's Guide</i> . These are called <i>class</i> options. You <i>must</i> be superuser to do this.
	Command-line variable; replace with a real name or value	To delete a file, type <code>rm filename</code> .

Shell Prompts

TABLE P-2

Shell	Prompt
C shell	<i>machine_name%</i>
C shell superuser	<i>machine_name#</i>
Bourne shell and Korn shell	\$
Bourne shell and Korn shell superuser	#

Related Documentation

Product	Application	Title	Part Number
SANbox	Installer/User's information	<i>SANbox-16STD Fibre Channel Switch Installer's/User's Manual</i>	875-3141-10
	Installer/User's information	<i>SANbox-8 Fibre Channel Switch Installer's/User's Manual</i>	875-3142-10
	Installer/User's Information	<i>SANbox 8/16 Switch Management User's Manual</i>	875-3060-10
	Installer/User's Information	<i>SANbox 8/16 Switch Management User's Manual</i>	875-3143-10
	Latest Information	<i>Sun StorEdge Network FC Switch-8 and Switch-16 Release Notes¹</i>	816-0842-10
	Software	<i>CDInsert</i>	
Arrays	Latest Information	<i>Sun StorEdge A5000 Product Notes¹</i>	805-1018-13
	Latest Information	<i>Sun StorEdge T3 Disk Tray Release1 Notes</i>	806-1497-12
	Late news - Best Practices	<i>Sun StorEdge A3x00/A3500 FC Best Practices Guide</i>	806-6419-10
	Latest Information	<i>Sun StorEdge A3500FC Release Notes¹</i>	805-7758-11
Other Components	Sun StorEdge T3 Array/ Switch	<i>Sun StorEdge T3Array to Sun StorEdge Network FC Switch Configuration Guide</i>	816-2096-10
	Traffic Management	<i>Sun StorEdge Traffic Manager Installation and Configuration Guide</i>	816-1420-10
	Hub information	<i>Sun StorEdge FC-100 Hub Installation and Service Manual</i>	805-0315-12

Product	Application	Title	Part Number
Storage Cabinet	Rackmount information Online	<i>Rackmount Placement Matrix</i>	805-4748-xx
Software	RAID software	<i>RAID Manager 6.22 User's Guide</i>	806-0478-10
manpage	cfgadm utility	<i>cfgadm_fp</i>	

1. Check for the latest updates at <http://sunsolve.sun.com>.

Accessing Sun Documentation Online

A broad selection of Sun system documentation is located at:
<http://www.sun.com/products-n-solutions/hardware/docs>

A complete set of Solaris documentation and many other titles are located at:
<http://docs.sun.com>

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`docfeedback@sun.com`

Please include the part number (816-0830-10) of your document in the subject line of your email.

Introduction

This guide provides instructions for installing and configuring Sun StorEdge Network FC Switch-8 and Switch-16, Sun StorEdge SAN 3.0 release, hardware and software components. Hardware components include Fibre Channel switches, Fibre Channel host adapters, and storage devices and enclosures. The software components include drivers bundled with the operating system, firmware for the switches, management tools for the switches and storage devices, volume managers, if needed, and other administration tools.

Before installing or configuring any SAN components, you need to plan how your site will use the SAN and identify your goals in implementing the SAN. There are numerous options at various steps in the installation and configuration process, and understanding the purpose of the SAN clarifies appropriate decisions for your site.

Many new features, benefits, and products are supported in this release of the SAN products, allowing larger, more complex and more supportable configurations.

This chapter provides a list of the configuration rules that you must follow to implement a SAN. Planning a SAN outside these rules results in an unsupported configuration that might not perform optimally or at all.

Hardware installation of new switches is covered in this guide. Hardware installation of host adapters and storage devices and enclosures is described in the documentation delivered with those products.

This guide also describes software installation, starting from an installation or upgrade of Solaris, and including firmware upgrades for any SAN component required. Installation of administration tools such as Veritas Volume Manager or Solstice Disk Suite, Stortools, and switch administration tools is also explained.

This guide expounds upon configuring the SAN, including initial configuration of a switch, identifying hosts and storage, managing multiple and cascaded switches, handling multiple paths to storage using Sun StorEdge Traffic Manager and working with volume managers. Additionally, this guide explains managing Fibre Channel

Fabrics and name services, configuring and changing zones on switches, converting to long device names used by Fabrics and Sun StorEdge Traffic Manager, and using on-demand device creation.

New Features, Benefits, and Products

This version of the Sun StorEdge SAN Product provides new features and benefits. It delivers a larger high-performing SAN, with native Fabric host connectivity, improved manageability, an integrated multipathing solution (Sun StorEdge Traffic Management software), and support for a variety of new hardware and software products.

New Device Names

One of the most noticeable new features that require additional planning is new, longer, device names. SANs and multipath storage devices require the devices to be addressed by device-specific static global identifiers, and not by physical port IDs, which are dynamic in nature and are different across different host's systems.

Traditionally, Solaris has named storage devices based on the controller, target ID and logical unit number (LUN) of the device. When large SANs with multiple paths to large storage arrays are constructed, this naming convention could lead to thousands of targets per controller and storage identified more than once by different controllers and targets. The new method incorporates the World Wide Name of the device into the device name used by the host.

The new names provide the benefit of uniquely identifying storage devices to the host. When using the Sun StorEdge Traffic Manager, a device with multiple connections to a host is known to that host by one name.

Note – This feature comes into play only if you use Sun StorEdge Traffic Manager or Fabric-attached storage devices.

Examples

Old device path:

```
/devices/pci@f,4000/pci@4/SUNW,q1c@4/fp@0,0/ssd@3,0
```

New device path:


```
/devices/pci@f,4000/pci@4/SUNW,qlc@4/fp@0,0/ssd@w50020f200000225,0.
```

Old symbolic device name:

```
/dev/dsk/c4t3d0s2
```

New symbolic designation:

```
/dev/dsk/c4t50020f200000225d0s2.
```

On-Demand Node Creation

The number of storage devices that can be attached to a host can grow to the thousands with the advent of SANs with native Fabric connectivity. Probing all these devices at boot time and creating device nodes can increase the boot time greatly. In addition, a host might not need access to all of the storage devices it can access.

The Sun StorEdge Network FC Switch-16, Version 3.0, no longer creates device nodes for every storage device attached. Instead, device nodes are created on demand by the administrator using the `cfgadm` utility. The device nodes, once created, are persistent across reboots. The `cfgadm` utility, which provides on-demand node creation, is described in greater detail in Chapter 9.

Fabric Connection of Hosts

Hosts can connect to switches in a Fabric topology, using F_Ports, allowing construction of scalable, high performing SANs.

Cascading of Switches

Switches can now be cascaded to increase the distance between ports available in a zone and across the entire SAN. Cascading of switches allows for distances of up to ten kilometers between ports, supporting highly available, disaster-tolerant configurations.

Higher Realized Bandwidth

Host connections to switch Fabric connections (F-Ports) and InterSwitch Links (ISLs) are full duplex connections. On a one gigabit Fibre Channel link, this can provide an aggregate two gigabits per second of bandwidth when I/Os are flowing in both directions.

Support of Multiple Protocols

The StorEdge Network product supports both SCSI (FCP) and IP(FCIP) over the Fibre Channel. This allows both storage and networking applications to work on the SAN and minimizes the need for multiple networks.

FCIP can be used in any supported topology and can be used for traditional IP applications and IP file access at the same time. Simultaneous SCSI and IP traffic in the same switch zone is not currently supported.

Support for More, Heterogeneous Storage Devices

Block, sequential, and file access protocols are supported with this product. A variety of SCSI devices can be attached to the SAN, such as block-storage disks, intelligent RAID controllers, sequential FC-tape devices, robotic tape libraries and SCSI enclosure services. File-access devices, such as Network Attached Storage (NAS) and NFS devices can be attached to the SAN, as well.

Support for New Hardware and Software

This version of the StorEdge Network provides support for new Fibre Channel host adapters, such as the Sun StorEdge PCI Dual Fibre Channel Network Adapter+ and CPCI Dual Fibre Channel Network Adapter. New software support includes Multiplexed I/O Sun StorEdge Traffic Manager, allowing management and load balancing across multiple paths between a host and storage device, the newest release of Sun's Solstice Disk Suite volume manager, SDS 4.2.1, and the StorEdge Network Data Replicator (SNDR).

Software Upgrade Only

Upgrading from previous versions of the Sun StorEdge Network FC product doesn't have to involve any new hardware. While new hardware is supported, none is required for this version of the product.

Building Blocks for More Complex Topologies

This version of the StorEdge Area Network introduces configurations with interconnected switches. While not all configurations are supported or permitted, cascaded switches allow more reliability, speed and larger SANs.

Configurations

This chapter contains information and instructions for configuring your Sun StorEdge Network FC Switch-8 or Switch-16 with one or more hosts and storage.

“Supported Hardware” on page 5

“Supported Configurations” on page 7

“Guidelines for Configuration” on page 15

“Configuration Examples” on page 16

“Setting the Loop ID” on page 32

The Switch

Either of the Sun StorEdge Network FC Switch-8 or Switch-16 units functions with a Sun StorEdge A3500 FC array, a Sun StorEdge A5200 array, a Sun StorEdge T3 array and STK 94840 FC Tape drives with Sun StorEdge L700/L180 Tape Libraries.

Supported Hardware

In a single switch configuration, the switch is connected to the host through a fiber-optic cable to a Sun StorEdge PCI Fibre Channel Network Adapter. The other ports of the switch are connected to storage devices through a fiber-optic cable.

In a cascaded configuration, two switches are connected together via InterSwitchLinks (ISL). A hard zone and a nameserver zone span both switches. All hosts connected to these zones must be on one switch, and all storage must be on the other. Cascaded switches are supported only for long distance, and long wave GBICS are required between switches.

Note – Only long wave Gigabit Interface Converters (LW GBIC) and cables are supported for connecting the cascading switches. You must use LW GBIC and corresponding LW fiber cable if you cascade more than 500 meters.

TABLE 2-1 Supported Hardware

Part Number	Description
540-4026	Sun StorEdge A3500FC FC-AL controller for Sun StorEdge A3500FC array (with Sun StorEdge D1000 tray)
540-4027	Sun StorEdge A3500FC FC-AL controller for Sun StorEdge A3000 array (with Sun StorEdge RSM tray) Sun StorEdge A5200 array Sun StorEdge T3 array
X6799A	Sun StorEdge PCI Single Fibre Channel Network Adapter
X6727A	Sun StorEdge PCI Dual Fibre Channel Network Adapter+
X6798A	Sun StorEdge CPCI Dual Fibre Channel Network Adapter
X6731A	Gigabit Interface Converter (GBIC)
X7637A	Long Wave (LW) GBIC
X978A	15m fiber optic cable
X6746A	Sun StorEdge Network FC Switch-8 and Switch-16
SG-XSW16-32P	Sun StorEdge Network FC Switch-16 Sun StorEdge L180 or L700 FC Tape Library

Supported Configurations

To support a high-availability environment, use these configurations to ensure switch redundancy. See the example diagrams in this chapter for more information on the supported configurations.

Hosts

- Sun Enterprise™ E220R, E250, E420R, and E450 server hosts
- Sun Enterprise E10000 server host
- Sun Enterprise E3000-E6000 server hosts
- Sun Enterprise E3500-E6500 server hosts
- Sun Enterprise F3800 server host (only with the Sun StorEdge CPCI Dual Fibre Channel Adapter)
- Sun Enterprise F4800 and F4810 server hosts
- Sun Enterprise F6800 server host

Note – Sun Enterprise F4800, F4810, and F6800 are supported with the Sun StorEdge PCI Single Fibre Channel Network Adapter and the Sun StorEdge PCI Dual Fibre Channel Network Adapter+ only.

Host/Operating Environment Rules

- All hosts in a zone must be running Solaris 8 Release 4/01 operating environment with all appropriate patches installed.
You can download the patches from the following web site:
<http://sunsolve.Sun.COM/pub-cgi/show.pl?target=patches/patch-access>
- Mixing PCI Dual Fibre Channel Network Adapter, PCI single Fibre Channel Network Adapter, and CPCI dual Fibre Channel Network Adapter HBAs in the same switch zone is supported.
- Mixing hosts from different Sun server families in the same zone is supported. You must be using PCI Dual Fibre Channel Network Adapters, PCI Single Fibre Channel Network Adapters, and CPCI Dual Fibre Channel Network Adapters.

Arrays

- Sun StorEdge A5200 array
- Sun StorEdge T3 array
- Sun StorEdge T3+ array
- Sun StorEdge A3500FC array

Supported Host Bus Adapters

- PCI Single Fibre Channel Network Adapter
- PCI Dual Fibre Channel Network Adapter+
- CPCI Dual Fibre Channel Network Adapter

FC Tape

- Sun StorEdge L180 Tape Library with STK 9840 tape drives
- Sun StorEdge L700 FC Tape Library with STK 9840 tape drives

Software/Drivers

For the most recent patches, go to <http://sunsolve.Sun.COM/>.

For a table of software drivers, refer to TABLE 3-1.

Array Storage Rules

The following tables specify the supported features of the Sun StorEdge A5200 array, the Sun StorEdge T3 array, and the Sun StorEdge A3500FC array

Sun StorEdge A5000 and A5100 arrays are not supported.

TABLE 2-2 Sun StorEdge A5200 Array

Feature	Supported
Cascading	No
Zone type	SL zone only
Maximum number of arrays per SL zone	3
Maximum initiators per SL zone	2
Maximum initiators per array	4 (2 per loop)
Split loop support	No

TABLE 2-3 Sun StorEdge T3 Array and T3+ Array

Feature	Supported
Cascading	Yes
Zone Type	nameserver zone ¹ , SL zone
Maximum number of arrays per zone	8
Maximum initiators per LUN	2
Maximum initiators per zone	2 ²

1. The host must be connected to the F-Port on the switch; Sun StorEdge T3 array must be connected to the TL port of the switch.
2. This implies 2 initiators (2 hosts) for simple arrays (T3WG), but 4 initiators (2 hosts) for a partner pair (T3ES). Each host has one path to each of the Sun StorEdge T3 arrays in the partner pair.

The Sun StorEdge T3 array and the Sun StorEdge T3+ array can be part of the same SL zone or nameserver zone.

TABLE 2-4 Sun StorEdge A3500FC array ¹

Feature	Supported
Cascading	No
Zone Type	SL zone only
Maximum number of arrays per SL zone	4
Maximum initiators per SL zone	2

1. The Sun StorEdge A3500 FC array is not supported on hosts that have Sun StorEdge Traffic Manager enabled or that have Fabric-connected host ports.

L180 and L700 FC Tape Libraries

Both the L180 and L700 FC Tape Libraries require STK 9840 FC tape drives.

You must upgrade to the most recent software for your L180 or L700 FC-Tape unit. See the release documentation that came with your tape library for more information.

FCIP (NFS/NAS and SNDR)

TABLE 2-5 FCIP (NFS/NAS and SNDR)

	Supported
Cascading	Fabric nameserver zone
Zone Type	Fabric nameserver zone (HBA as F-Port point-to-point)
Maximum device ports per zone	8 ^{1,2}

1. With the PCI dual Fibre Channel Network Adapter+, only physical port 2 can be used for FCIP.

2. With the CPCI Dual Fibre Channel Network Adapter, only physical port 1 can be used for FCIP.

Switches

For high availability, configure any two sets of switches in parallel:

- Sun StorEdge Network FC Switch-8
- Sun StorEdge Network FC Switch-16

Note – Make sure the switch chassis ID is not 0. You can change the chassis ID in the Switch Faceplate Display window. After changing the chassis ID, click the Apply button. For more information on the chassis ID, refer to the *SANbox-8/16 Switch Management User's Manual for Sun StorEdge Network FC switch 3.0*.

FC Tape Libraries

You can configure either the Sun StorEdge L180 or L700 Tape Library with a switch.

- The switch may be zoned to allow up to four hosts per zone
- You can configure a maximum of three Storage Tech (STK) 9840FC drives per zone
- A library may share a zone with up to three drives
- A single zone cannot have more than one tape library

Ports

TABLE 2-6 Switch Port Types

Port Type	Supported
SL-Ports	Private loop (Sun StorEdge A5200 array, Sun StorEdge A3500FC array, Sun StorEdge T3 array, L180 or L700 FC-Tape device)
TL-Ports	Translated loop (Sun StorEdge T3 array)
F-Ports	Point-to-Point Fabric (HBA)
T-Ports	Trunk ports for switch cascading (ISLs) configured initially in Fabric port mode

Zones

Zoning allows the user to divide the switch ports into zones for more efficient and secure communication among functionally grouped nodes. There are several types of zones. No port can be in all zone types simultaneously. F_Ports and TL_Ports have to be in nameserver zones, and SL zones have to be in SL zones. Nameserver zones and SL zones must also be in separate hard zones.

Hard Zones

Hard zones isolate ports through internal switch hardware; no communication across hard zone boundaries is possible. Hard zoning is desirable for security and resource dedication because it provides a way of isolating a set of ports from other ports within the Fabric.. Up to sixteen hard zones are possible within a Fabric. A particular port may be placed in only one hard zone (no overlapping hard zones). If hard zones are enabled, nameserver zones and SL zones do not communicate across defined hard zone boundaries. Nameserver zones and SL zones must also be in separate hard zones.

Nameserver Zones

Nameserver zones allow the division of the Fabric (one or more Switch chassis) into as many as 256 Fabric-wide zones; each Nameserver zone defines which ports or devices receive nameserver information. If hard zones are enabled, nameserver zones do not communicate across defined hard zone boundaries. Up to 16

nameserver zones are possible within one hard zone. Overlapping nameserver zones are not supported. In a hard zone containing F_Ports and TL_Ports, nameserver zones must be created if you need more than one zone.

SL Zones

SL zones on the switch allow the division of the Fabric into zones that define the ports that can communicate with each other. A particular port may be placed in only one SL zone (no overlapping SL zones). If hard zones are enabled, SL zones do not communicate across defined hard zone boundaries. In a hard zone consisting of SL ports, SL zones must be created if you need more than one zone.

The switch does not prevent the user from creating an SL zone spanning more than one switch; however, the current release of the Sun StorEdge FC switch requires the user not to extend the SL zone beyond one switch.

TABLE 2-7 Zones

Zone Type	Supported Behavior
Hard Zone	Supports Segmented Loop zones and nameserver zones ¹
Segmented Loop zone	SL ports only
Nameserver Zone	F-Ports, T-Ports, and TL-Ports

1. The Segmented Loop zone and the nameserver zones must not co-exist in the same hard zone.

Zoning Rules

- Only port-based zoning is supported.
- Zones are non-overlapping, except in cascading switches, in which ISL can be shared across nameserver zones that exist in the same hard zone.
- Nameserver zones and SL zones must be in separate hard zones.
- A minimum of one switch port per zone is supported.
You can have a maximum of 16 hard zones and 16 nameserver or SL zones on a 16-port switch. In a cascaded configuration (16-port to 16-port), you can configure a maximum of 16 hard zones and 30 nameserver or SL zones.

Cascading Rules

- Hub-to-switch connectivity is not supported
- Maximum of two switches cascaded in series

- Maximum cascading distance is ten kilometers
- In cascaded configurations, hosts cannot be connected to both switches in a single zone with storage connected, and storage cannot be connected to both switches in a single zone. In other words, a switch zone can have remote storage only or local storage only, but cannot mix the two.
- Switch-to-switch connection is supported for *distance* only
- Only LW GBICS are supported between switches
- Cascading is supported for nameserver zones only. These are used for Sun StorEdge T3 array and FCIP connectivity.
- A maximum of two switches can be connected for distance
- Both 8-port to 16-port and 16-port to 8-port switch connectivity is supported

Rules for Adding and Removing Devices While the Hosts are Online

You can add all initial and additional storage devices while the host is online, except the Sun StorEdge A3500 FC array, which requires rebooting the host on the first LUN addition.

In high availability configurations, where alternative methods to reconstruct the data exist, a device or path to the device can be removed. Host volume management or multi-pathing software handles this device removal. For non-available configurations, the user must ensure that no host application is configured to use the device.

In the case of a Fabric configuration (nameserver zone) the user must unconfigure the device on the host. This ensures that during the boot process the host does not attempt to probe this device to create device nodes.

For details on adding a storage device, refer to “Adding Storage Devices” on page 123. For details on removing a storage device, refer to “Removing Storage Devices” on page 124.

You can add or remove a host without shutting down the SAN.

Guidelines for Configuration

Switches

For high-availability applications, configure two sets of switches in parallel.

Zones and Arrays

See TABLE 2-7 for more information on Zones and TABLE 2-8 for more information on zones, arrays and initiators.

- Sun StorEdge T3 arrays support SL zones and nameserver zones (or zones in which a host has made a point-to-point Fabric connection to a switch and the Sun StorEdge T3 array is attached to a TL-port).
- Do not mix different arrays in the same zone. A single zone can contain only Sun StorEdge A3500FC arrays, or only Sun StorEdge A5200 arrays, or only Sun StorEdge T3 arrays.
- You may configure a minimum of one port per zone
For example, a 16-port switch can have a maximum of 16 zones
- Zones cannot overlap (for example, a particular port can only belong to one zone)

Zones and Storage

- You can dynamically add storage to an SL zone, using `luxadm` procedures for the Sun StorEdge A5200 array. See “Adding a Sun StorEdge A5200 Array” on page 123.
- Segmented Loop (SL) zones and nameserver zones (translated loop zones) must be in different hard zones on a switch.

TABLE 2-8 Arrays, Zones, and Initiators

Array	Maximum Arrays/Zone	Maximum Initiators/Zone
Sun StorEdge A3500FCarray	4	2
Sun StorEdge A5200 array	3	2 initiators per loop, or a maximum of four per array
Sun StorEdge T3 array	8 Sun StorEdge T3WG or 4 Sun StorEdge T3ES	2 for a single array, 4 for a partner pair

Configuration Examples

Single Host Connected to One Storage Array

FIGURE 2-1 shows one host connected through fiber-optic cables to one Sun StorEdge A3500FC controller module. Each controller module has two Fibre Channel ports.

FIGURE 2-2 shows one host connected through fiber-optic cables to one Sun StorEdge A5200 controller module. Each controller module has two Fibre Channel ports.

FIGURE 2-3 shows one host connected through fiber-optic cables to one Sun StorEdge T3 partner pair.

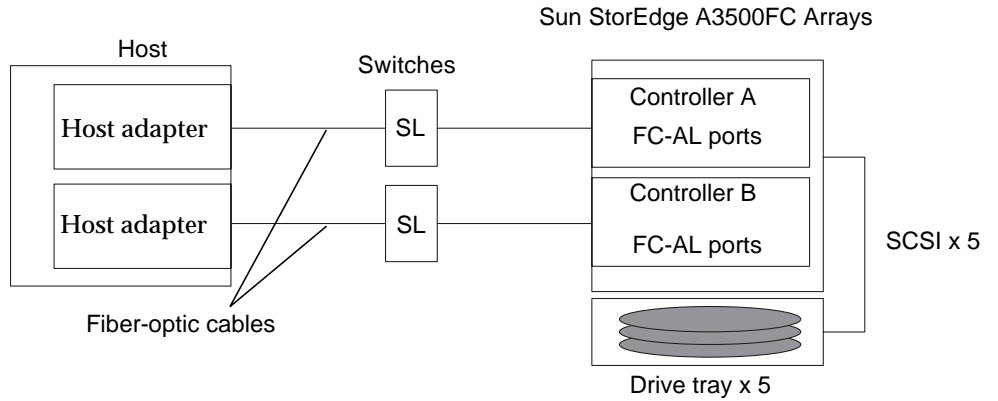


FIGURE 2-1 Single Host Connected to One Sun StorEdge A3500FC Controller Module

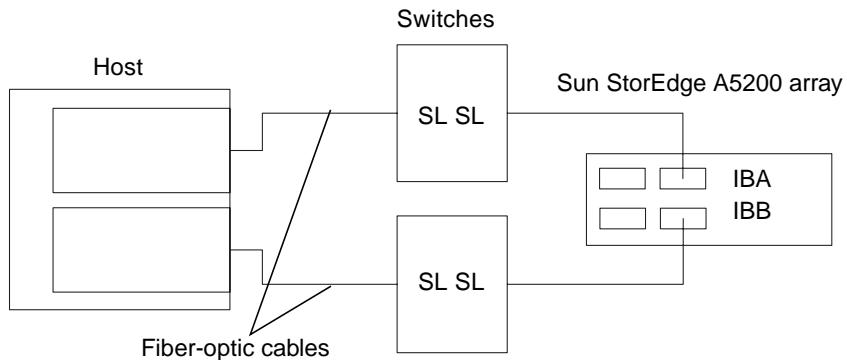


FIGURE 2-2 Single Host Connected to One Sun StorEdge A5200 Array

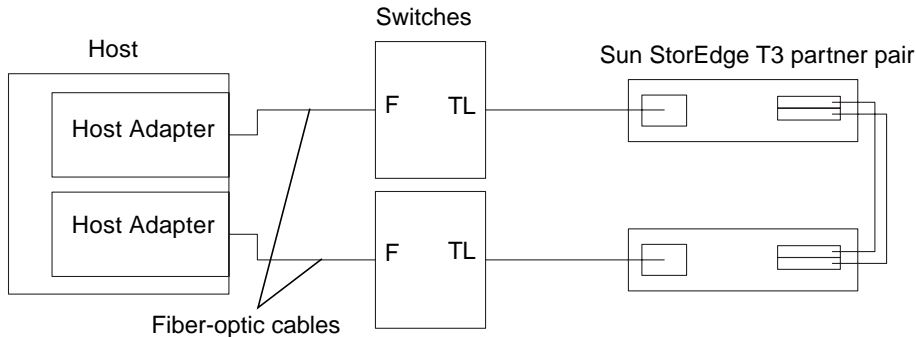


FIGURE 2-3 Single Host Connected to One Sun StorEdge T3 Partner Pair

Single Host Connected to Multiple Storage Arrays

FIGURE 2-4 shows one host connected through fiber-optic cables to Sun StorEdge A3500FC controller modules. You can connect controller modules in the same or separate cabinets.

FIGURE 2-5 shows one host connected to multiple Sun StorEdge A5200 arrays.

FIGURE 2-6 shows one host connected to Multiple Sun StorEdge A5200 arrays and a Single FC-Tape library.

FIGURE 2-7 shows a single host connected to multiple Sun StorEdge T3 partner pairs.

FIGURE 2-8 shows a single host connected to multiple Sun StorEdge T3 arrays and multiple Sun StorEdge A3500FC arrays.

FIGURE 2-9 shows a single host with cascading switches connected to a Sun StorEdge T3 array and a local storage Sun StorEdge A5200 array and Sun StorEdge T3 array.

Note – You can attach different types of storage devices to the same switch, as long as the storage devices are on different zones.

Each controller that is connected to a switch must have a unique loop ID. Whenever you add a second controller to a switch, make sure that the loop ID of the controller being connected is different from the loop ID of any other controller currently connected to the same switch. See “Setting the Loop ID” on page 32-34 for instructions about setting the loop ID.



Caution – Make sure that the controller module of the array is split between two switches. For example, connect controller A to switch 1 and controller B to switch 2.

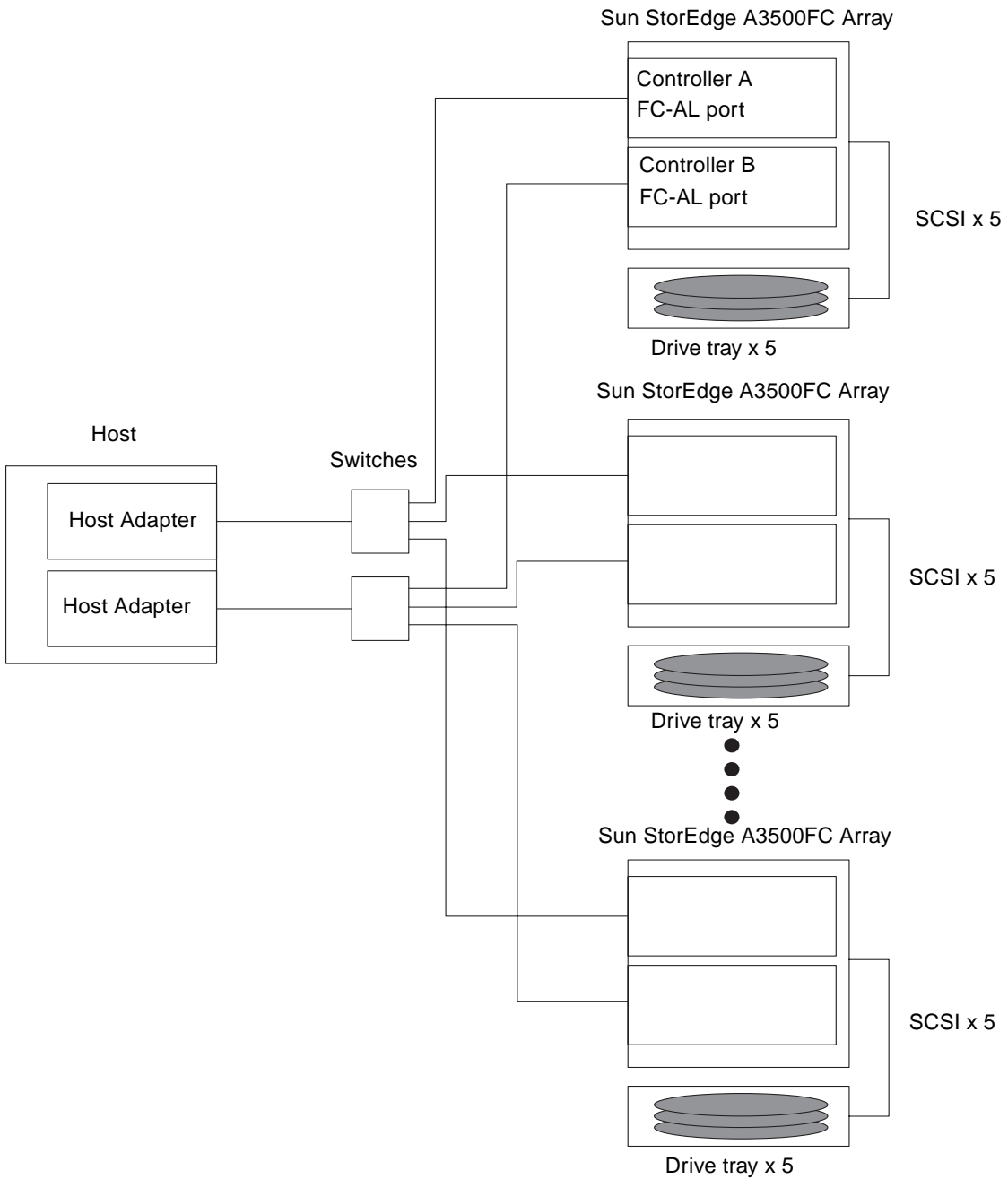


FIGURE 2-4 Single Host Connected to Multiple Sun StorEdge A3500FC Arrays, All SL Ports

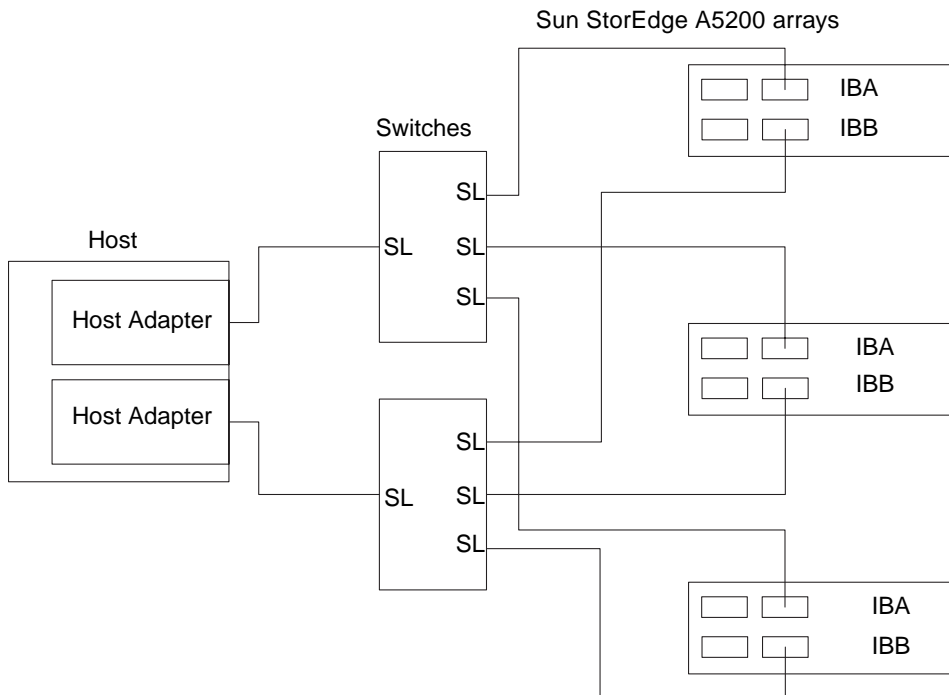


FIGURE 2-5 Single Host Connected to Multiple Sun StorEdge A5200 Arrays, All SL Ports

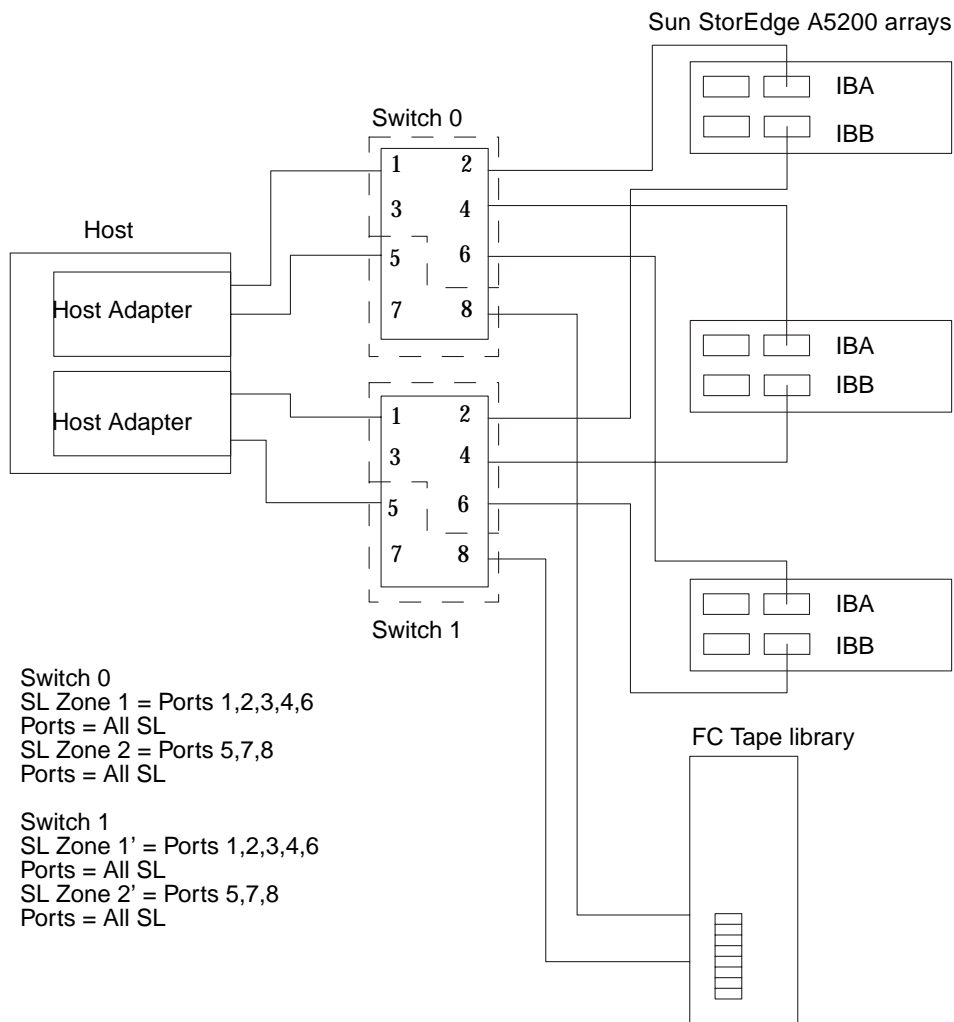


FIGURE 2-6 Single Host Connected to Multiple Sun StorEdge A5200 Arrays and a Single FC-Tape Library

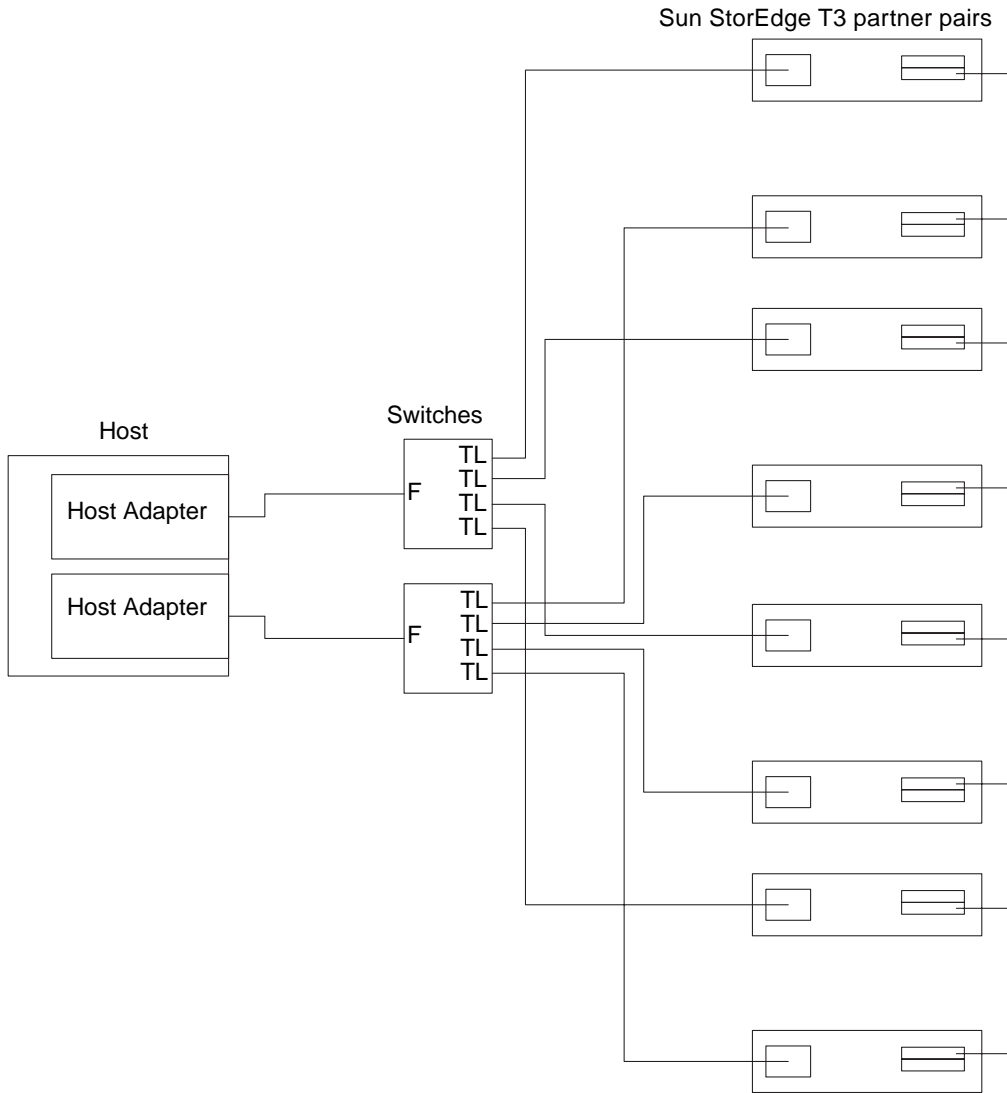
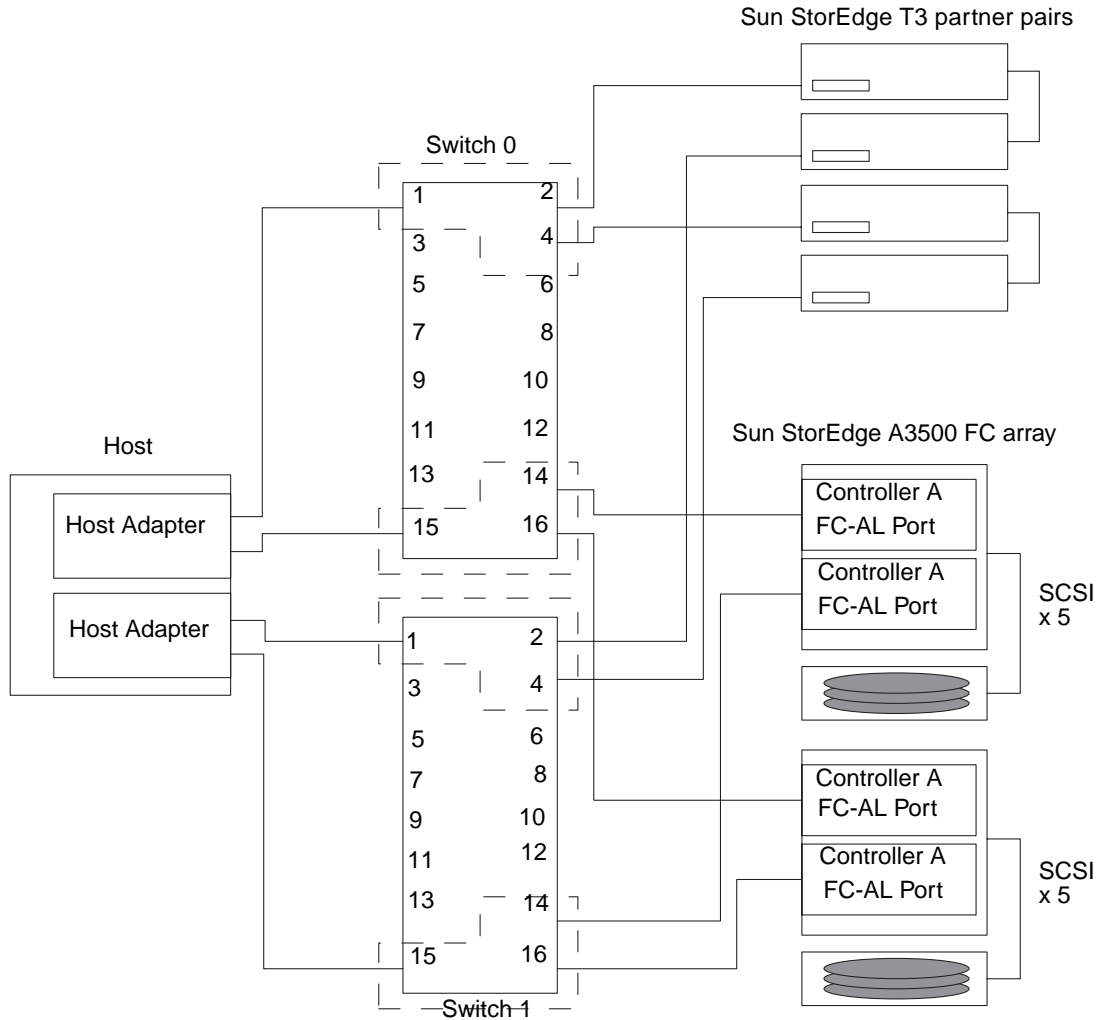


FIGURE 2-7 Single Host Connected to Multiple Sun StorEdge T3 Partner Pairs



Hard zone 1 = Ports 1-8
 Hard zone 2 = Ports 9-16
 Switch 0
 Nameserver Zone 1 = Ports 1,2,4
 Ports: 1 = F
 2 = TL
 4 = TL
 Segmented loop zone 1 = Ports 14,15,16
 Ports = All SL

Switch 1
 Nameserver zone 1' = Ports 1,2,4
 Ports: 1 = F
 2 = TL
 4 = TL
 Segmented loop zone 1' = Ports 14,15,16
 Ports = All SL

FIGURE 2-8 Single Host Connected to Multiple Sun StorEdge T3 Arrays and Multiple Sun StorEdge A3500FC Arrays

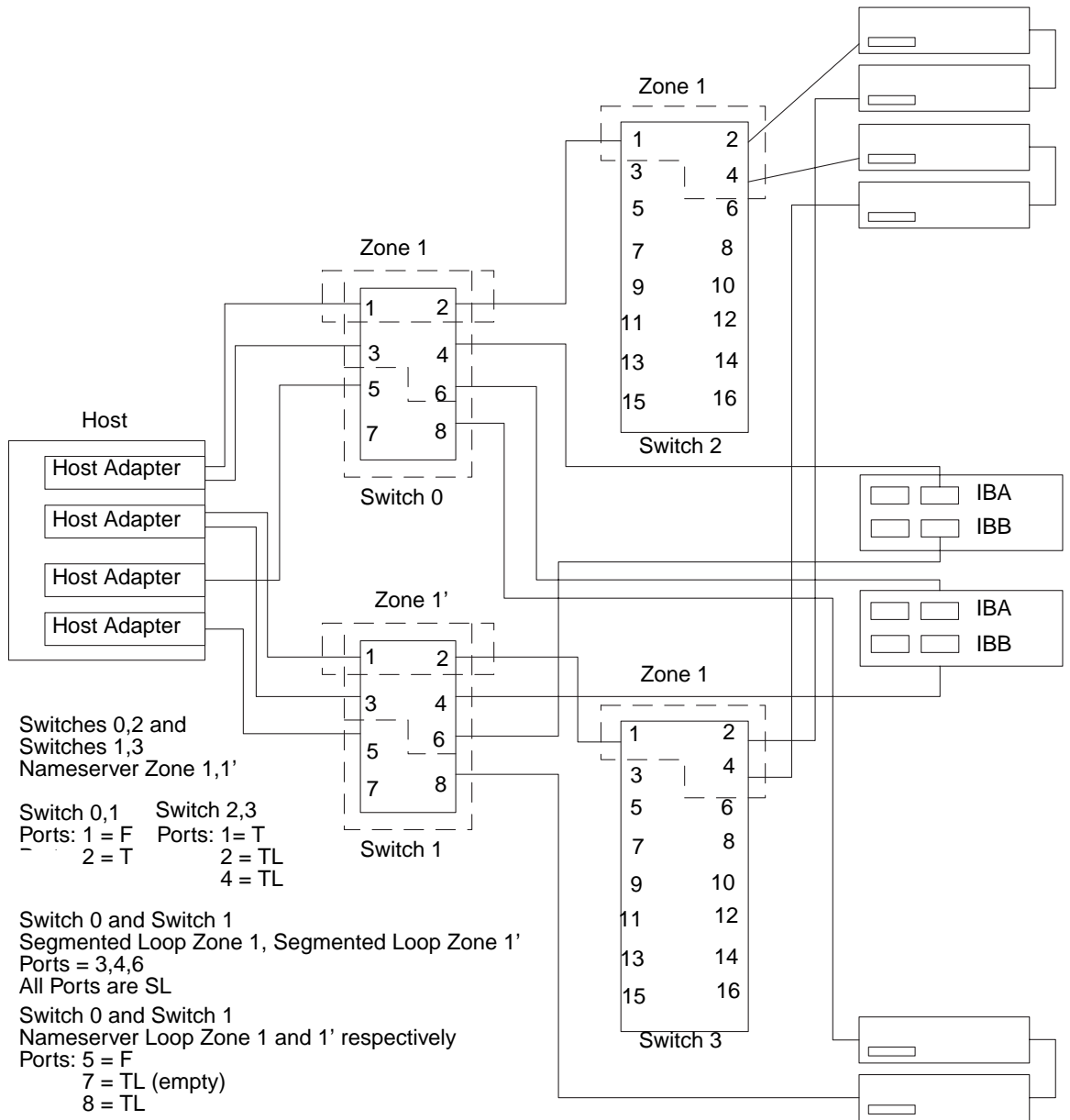


FIGURE 2-9 Single Host Cascading Switches Connected to Sun StorEdge T3 Array and Local Storage Sun StorEdge A5200 Array and Sun StorEdge T3 Array

Multihost

FIGURE 2-10 shows an example of a multihost configuration: two hosts connected through fiber-optic cables, using switches, to two Sun StorEdge A3500FC controller modules.

FIGURE 2-10 shows two hosts connect to a maximum of four Sun StorEdge A3500 FC arrays.

FIGURE 2-11 shows two hosts connected to three Sun StorEdge A5200 arrays.

FIGURE 2-12 shows two hosts connected to four Sun StorEdge T3 partner pairs.

FIGURE 2-13 shows two hosts connected to a Sun StorEdge T3 Partner Group in which each host maintains separate, non-shared storage.

FIGURE 2-14 shows a multihost configuration with cascading switches connected to an FC tape library, a Sun StorEdge T3 array, and a Sun StorEdge A5200 array.

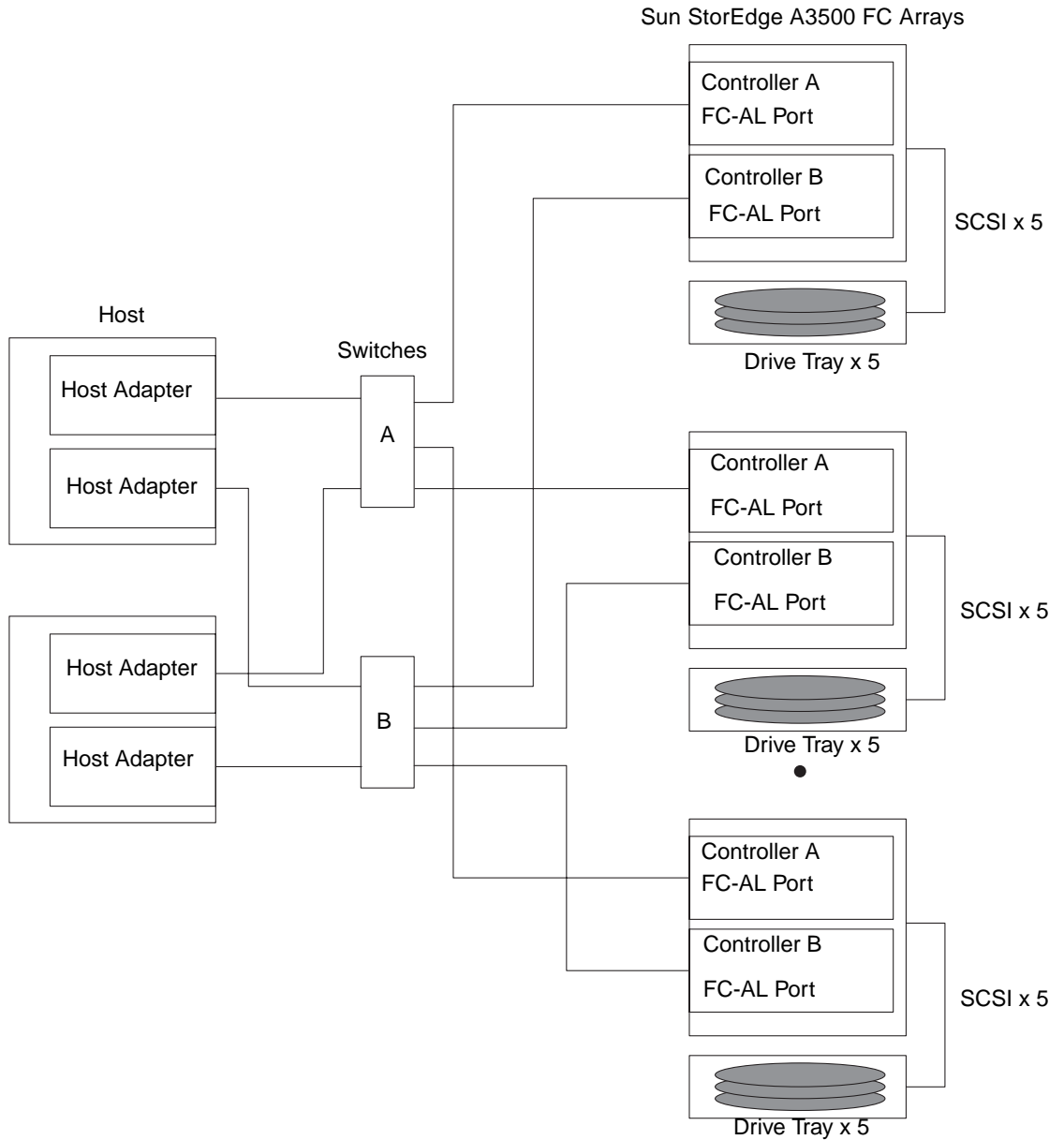


FIGURE 2-10 Two Hosts Connected to a Maximum of Four Sun StorEdge A3500FC Arrays All Ports SL

Note – You can attach different storage types to the same switch so long as the storage devices are on different zones.

Each controller that is connected to a switch must have a unique loop ID. Whenever you add a second controller to a switch, make sure that the loop ID of the controller being connected is different from the loop ID of any other controller currently connected to the same switch.

Refer to “Setting the Loop ID” on page 32 for instructions on setting the loop ID of a controller.



Caution – Ensure that the controller modules are not connected to the same switch.

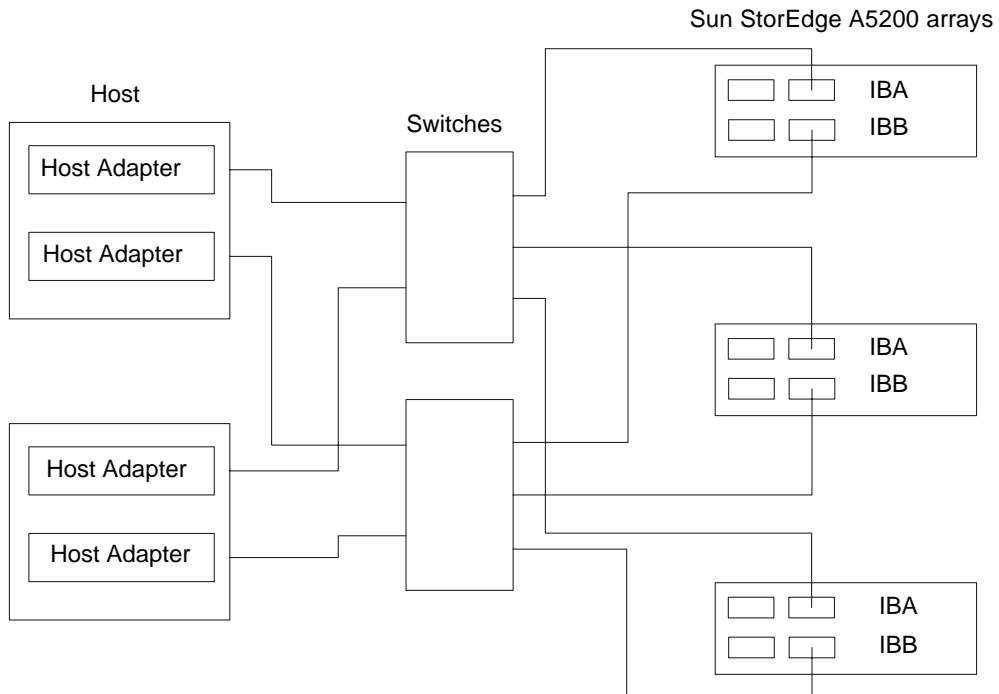


FIGURE 2-11 Two Hosts Connected to Three Sun StorEdge A5200 Arrays, All Ports SL

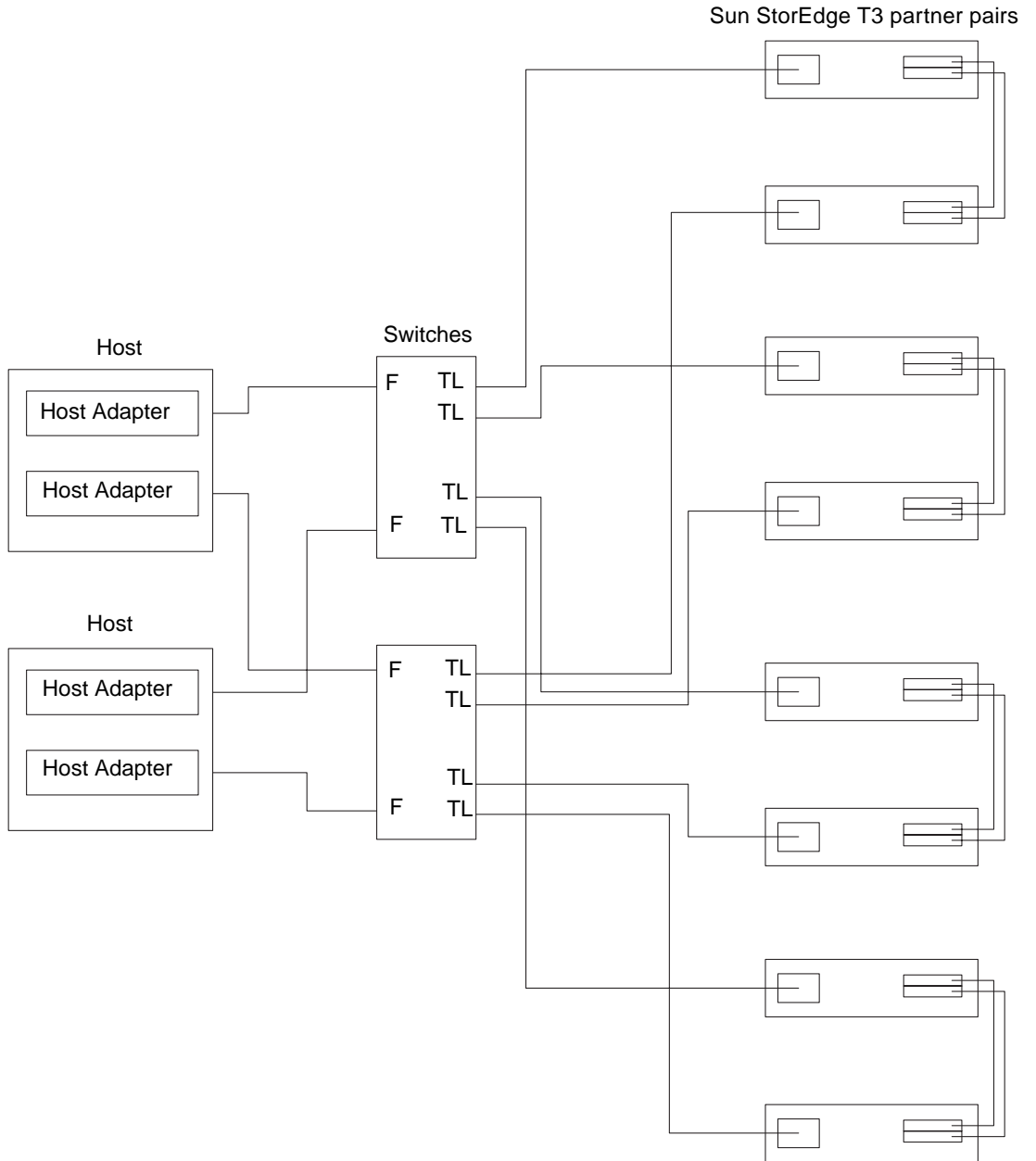


FIGURE 2-12 Two Hosts Connected to Four Sun StorEdge T3 Partner Pairs

Note – You must enable Sun StorEdge Traffic Manager software or use Veritas VxDMP 3.2 for failover across multiple hosts to work. Set the `mp_support` on the Sun StorEdge T3 to `mpxio`.

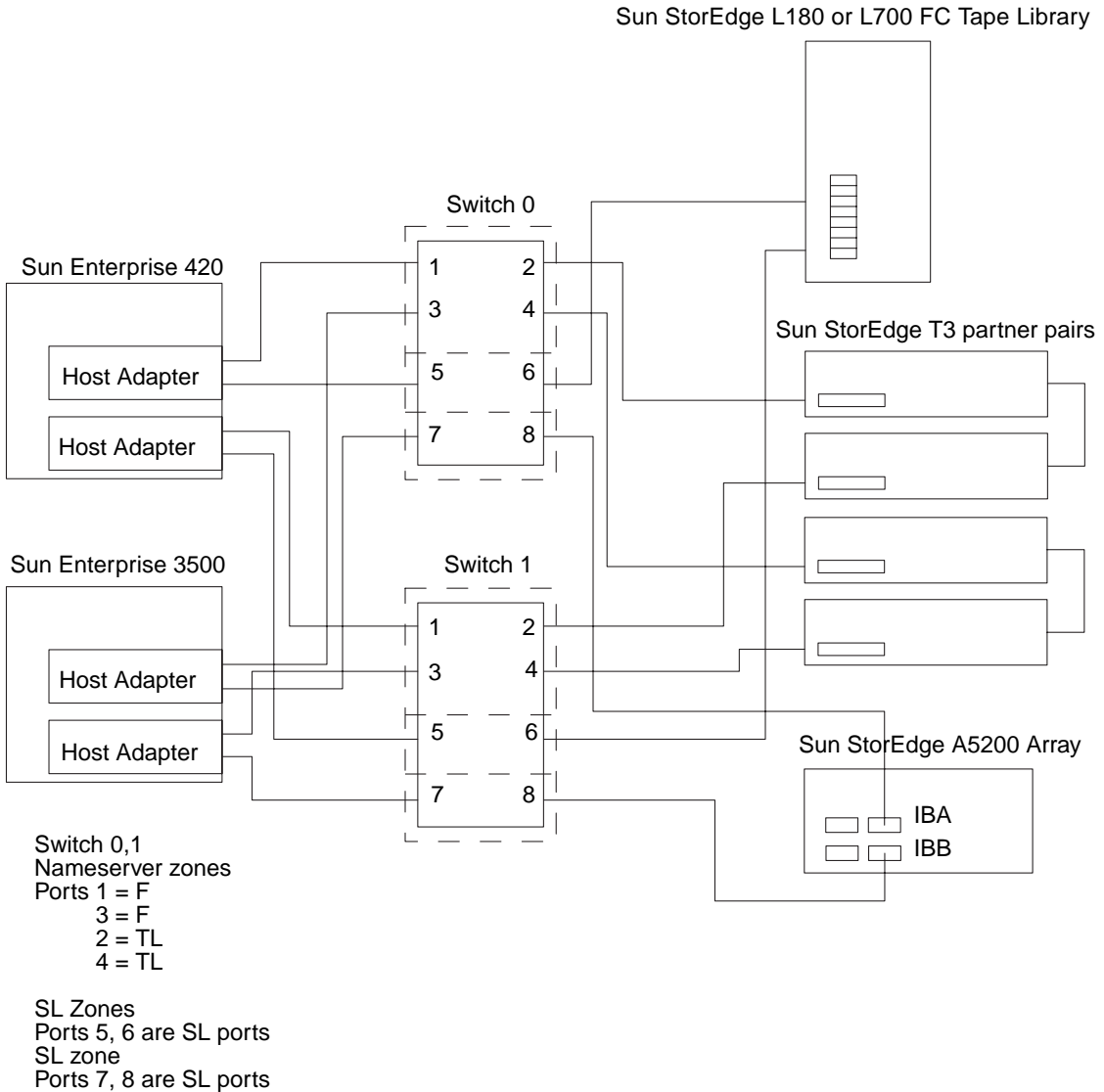


FIGURE 2-13 Two Hosts Connected to Sun StorEdge T3 Partner Group: Each Host with Separate Non-shared Storage

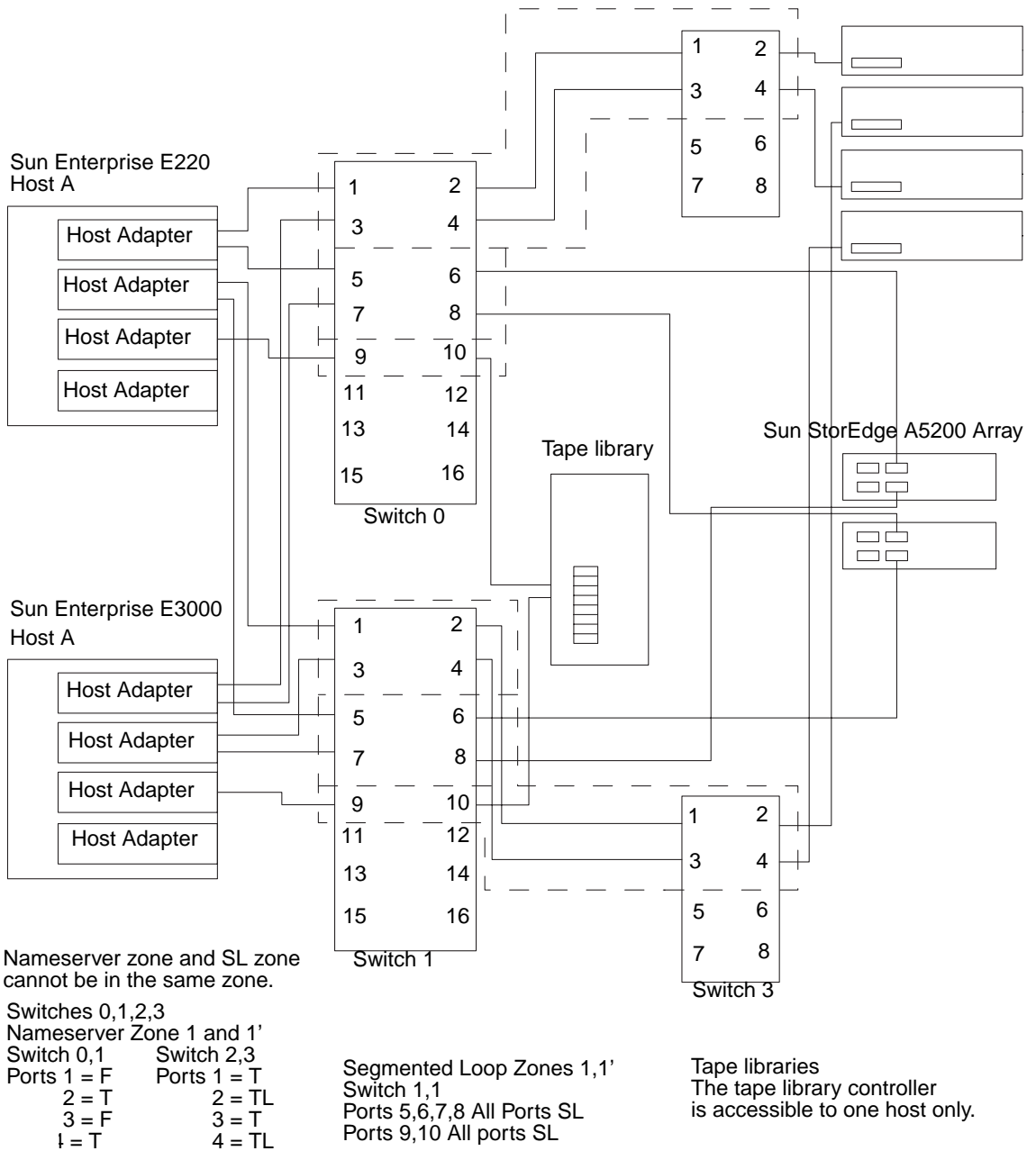


FIGURE 2-14 MultiHost with Cascading Switches Connected to FC-Tape, Sun StorEdge T3 Array, and Sun StorEdge A5200 Array

Note – You must enable Sun StorEdge Traffic Manager software or use Veritas VxDMP 3.2 for failover across multiple hosts to function. The `mp_support` on the Sun StorEdge T3 should be set to `mpxio`.

Setting the Loop ID

Setting the loop ID of the Sun StorEdge A3500 FC array is different from the procedure for the Sun StorEdge A5200 array and for the Sun StorEdge T3 array.

▼ To Set the Loop ID of a Sun StorEdge A3500 FC Controller

This section explains how to set the loop ID of a Sun StorEdge A3500 FC controller that is connected to a switch.

Tools and equipment needed:

- Needle-nose pliers
- Jumpers (supplied with the Sun StorEdge A3500/A3500FC unit)
- Antistatic wrist strap

Every device attached to a SCSI or FC-AL bus must have a unique controller module ID number in order to communicate. The factory default ID settings for controller A and B are ID 5 and ID 4, respectively.



Caution – Do not configure more than four controller modules on the same loop.

1. **Attach the antistatic wrist strap to your wrist and to the metal casing of the switch.**
2. **Locate the 16 pins on the rear of the FC-AL controller module** (FIGURE 2-15).
The eight pins on the right determine the host ID for controller 1 (A); the pins on the left determine the ID for controller 2 (B).
3. **Install the jumpers on the pins as shown in** FIGURE 2-15.
If necessary, use the needlenose pliers to remove the jumpers.

▼ To Verify the Loop ID of the Sun StorEdge A5200 and T3 Arrays

- **Make sure that each array on a single loop has a unique target ID.**

If two Sun StorEdge T3 arrays have the same target ID on the same FC-AL loop, the software does not recognize their presence.

Refer to the Sun StorEdge T3 documentation for information on verifying the loop ID. Refer to the Sun StorEdge A5200 documentation on verifying the loop ID for the Sun StorEdge A5200 array.

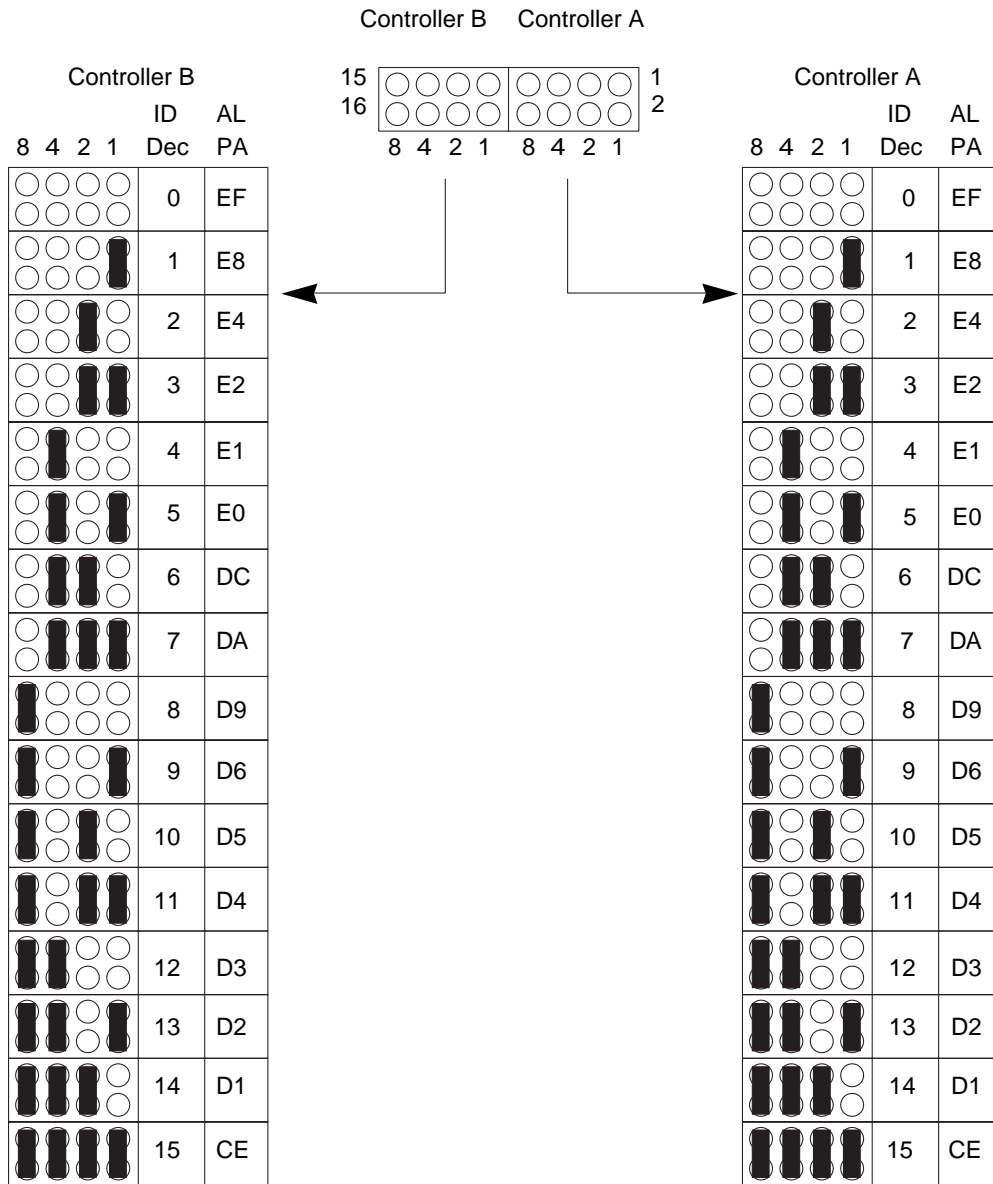


FIGURE 2-15 Sun StorEdge A3500 FC-AL ID Settings

Installation Overview

This chapter contains an overview of the tasks required for installing new Sun StorEdge Network FC Switch-8 and Switch-16 hardware and software. It also provides an overview of the tasks required to update the software for previously installed Sun StorEdge Network FC Switch-8 and Switch-16 SAN switches.

To install the software for a Sun StorEdge Network FC Switch-8 and Switch-16 Version 3.0 switch, refer to the instructions in Chapter 6 in this guide.

To upgrade software on a Sun StorEdge Network FC Switch-8 and Switch-16, Version 2.0/2.1, switch, refer to the instructions in Chapter 7 in this guide. After you have performed the upgrade to the Version 3.0 level, you can use the new features and functions in Version. 3.0.

“Software Components and Patches” on page 36

“Overview-Installing a New Switch” on page 37

“Overview for Software Installations” on page 38

“To Download Patches Using PatchPro Interactive” on page 39

“To Download Patches Using PatchPro Expert” on page 40

Refer to the Sun StorEdge Network FC Switch-8 and Switch-16 Release Notes, shipped with your system, for the most recent versions and patches.

Software Components and Patches

For the most recent updates to TABLE 3-1, refer to the *Sun StorEdge Network FC Switch-8 and Switch-16 Release Notes*.

TABLE 3-1 Minimum Software Component Versions and Patches

Non-Bundled Software	Minimum Version	Minimum Patch
Recommended and Security Patches - Solaris 8	04/01	108982-09 108984-08 109529-06
SAN Foundation Kit package		SUNWsan
SAN Foundation Kit patch		111847-01
Sun StorEdge Traffic Manager patch		111412-04
fctl/fp/fcp/usoc driver patch		111095-05
fcip driver patch		111096-03
/kernel/drv/qlc driver patch		111097-04
luxadm, liba5k and libg_fc patch		111413-04
/kernel/fs/specfs		111267-02
cfgadm fp plug-in 32-bit		SUNWcfpl
cfgadm fp plug-in 64-bit		SUNWcfplx
cfgadm fp plug-in for Library patch		111846-01
/kernel/drv/ses		110614-02
Raid Manager RM6	6.22.1	
Solstice Disk Suite™ 4.2.1	4.2.1	108693-06
Component Manager	2.2	
Sun StorEdge A5200 IB Firmware	1.09	
Switch Firmware	3.04.62	110696-03
SANsurfer Switch Manager™ (SUNWsmgr)	2.07.54 ¹	110696-03
Sun StorEdge PCI Single Fibre Channel Network Adapter Fcode x6799a	1.12	
Sun StorEdge PCI Dual Fibre Channel Network Adapter+ Fcode x6727a	1.12	
StorageTek™ 9840 Native FC	1.28.126	
Sun StorEdge T3 Firmware	1.17b	109115-09

TABLE 3-1 Minimum Software Component Versions and Patches (*Continued*)

Non-Bundled Software	Minimum Version	Minimum Patch
Sun StorEdge T3 18Gb disk Firmware		109115-09
VERITAS Volume Manager™	3.2	
VERITAS File System	3.4	
Instant Image™	3.0	
fast Write Cache™	3.0	
SNDR	3.0	
AP	2.3.1	110722-01 110432-01
StorTools™	4.1	
Sun StorEdge Network Storage Agent™	2.1	
VERITAS NetBackup™	3.4	110539-04
Solstice Backup™	6.0	
Sun Enterprise 3x00/4x00/5x00/6x00 Flash prom	3.2.28	103346-29
Sun Fire™ 3800/4800/4810/6800 Flash prom	5.11.6	111346-02
E450 Flash prom	3.22.0	106122-09
E250 Flash prom	3.22.0	106503-06
E420R Flash prom	3.29.0	109082-04

1. After patch 110696-03 is applied, the SANsurfer GUI windows display the package level as 2.08.30.

Overview-Installing a New Switch

The following provides the major steps for installing either the 8-port or 16-port switch hardware and software.

- 1. Select the area for the expansion cabinet onto which you plan to install the switch.**
Be sure to allow for the minimum airflow, temperature, and power restrictions. See the SANbox-16STD Fibre Channel Switch Installer's/User's Manual for instructions.
- 2. Verify the configuration for your system.**
Supported configurations are detailed in Chapter 2, "Configuration."

3. Install the GBICs.

See the Sun Switch Management Installer's/User's Manual for the 8-port switch, or the SANbox Segmented Loop Switch User's Manual for instructions.

4. Install the vent panel.

See "Installing the Vent Panel" on page 47.

5. Connect the cables and power cords.

See Chapter 2 for configuration information.

See also "Connecting the Cables" on page 50.

6. Configure the switch for the network.

See Chapter 5 for information on configuring the switch to the network.

7. Install the SANSurfer 3.0 application.

See "Installing the Sun StorEdge Network FC Switch 3.0 GUI" on page 61 for information on installing the GUI application.

8. Confirm the switch firmware and GUI revision level for your switch.

Refer to TABLE 3-1.

Overview for Software Installations

To install software in your Sun StorEdge Network FC Switch-8 and Switch-16 for the first time, see "PatchPro™ Interactive" on page 38 and "To Download Patches Using PatchPro Interactive" on page 39.

To upgrade your software to the Version 3.0 software, see "PatchPro Expert" on page 39 and "To Download Patches Using PatchPro Expert" on page 40.

PatchPro™ Interactive

Use PatchPro Interactive the first time you install Version 3.0 software. After the Sun StorEdge Network FC Switch-8 and Switch-16, Version 3.0, software has been installed, use PatchPro Expert to perform future upgrades to the latest software revision levels.

PatchPro Expert

PatchPro Expert analyzes the system configuration and currently installed patches with the latest patch revisions available on the <http://sunsolve.Sun.Com>. If new patch revisions are available on <http://sunsolve.Sun.Com>, it generates a list and allows you to download the patches. It also generates a list to indicate the order in which patches should be installed.

▼ To Download Patches Using PatchPro Interactive

PatchPro Interactive does not verify that the selected configuration is a valid configuration, nor does it interrogate your system to discover which patches may already be installed. PatchPro presents to the user all the patches (in install order) for the selected configuration. A `README.txt` file with the install order is supplied as part of the tar file. The patch installation order listed in the `README.txt` file may not coincide with those listed in this book. Follow the installation order defined in TABLE 6-2.

1. **For Sun StorEdge Network FC Switch-8 and Switch-16, Switch 3.0, go to <http://sunsolve.sun.com>.**
2. **Select Patches from the menu on the left side of the page.**
3. **From the same menu, select PatchPro.**
4. **From the same menu, select Storage Products.**
5. **Select the PatchPro Interactive link on the main page.**
6. **Select the pieces of hardware/software for analysis:**
 - a. **From the SAN Product Bundle section, select Network FC Switch and version 3.0.**

This will provide the driver and utility patches, Sun StorEdge Traffic Manager, the switch firmware and the switch GUI patch necessary to use and install the 3.0 software.
 - b. **From the software section, select the packages that you have installed or are planning to install before loading the patches.**

This selection provides you with patches to the packages, but it does not provide the package itself. You must obtain each package separately, and install each one on your host before you install the patches.
 - c. **Select the disk arrays that you plan to connect to your SAN switch.**

d. Under switches and HBAs, select the HBAs in your SAN.

You do not need to select the switches under this block because the switch GUI/firmware was captured when you selected the Network FC Switch, Version 3.0.

7. When your selections are complete, select Generate Patch List.

An ordered list of the patches required for your selections displays. You can choose which patches to download, or you can download them all in one tar file.

If the patch list contains any contract patches, provide your SunSolve User ID & password.

▼ To Download Patches Using PatchPro Expert

PatchPro Expert analyzes the system configuration and currently installed patches with the latest patch revisions available on <http://sunsolve.Sun.Com>. If newer patch revisions are available on <http://sunsolve.Sun.Com>, it generates a list and allows you to download the patches. It also generates a list to indicate the order in which patches should be installed. Follow the installation order outlined in TABLE 6-2.

- 1. Go to <http://sunsolve.sun.com>.**
- 2. Select Patches from the menu on the left side of the page.**
- 3. From the same menu select PatchPro.**
- 4. From the same menu select Storage Products.**
- 5. Select the PatchPro Expert link on the main page.**

This analyzes the currently installed patches on the system and generates the list of patches that need to be updated.

After you follow the instructions on the screen and select the hardware products attached to your system, an ordered list of the patches required for your system displays.

- 6. Download the patches.**

Hardware Installation

This chapter describes how to mount the switch in an expansion cabinet, install the vent panel, and connect the switch to your disk arrays. This chapter is arranged as follows:

- “Preparing for the Installation” on page 41
- “Attaching the Mounting Rails to the Expansion Cabinet” on page 42
- “Installing the Switch” on page 46
- “Installing the Vent Panel” on page 47
- “Connecting the Cables” on page 50

Preparing for the Installation

Before you begin installing the switch:

- Refer to the *Rackmount Placement Matrix*, available on the Sun Microsystems web site for hole positions in an expansion cabinet.
http://www.sun.com/products-n-solutions/hardware/docs/Network_Storage_Solutions/Cabinets_and_Enclosures/index.html
- If you currently have a hub installed in your expansion cabinet, you must remove it, and the mounting tray, prior to installing the switch and mounting rails. Refer to the hub removal instructions in the *Sun StorEdge FC-100 Hub Installation and Service Manual*, which is packaged with the hub.

Attaching the Mounting Rails to the Expansion Cabinet

The 8-port switch comes with a set of mounting rails that holds two switches. The 16-port switch comes with individual rails for each switch.

This section describes how to attach the mounting rails to an expansion cabinet for two-switch and four-switch configurations.

“To Attach Mounting Rails for Two 8-port Switches” on page 42

“To Attach Mounting Rails for Four 8- Port Switches” on page 44

Installing the Mounting Rails for 8-Port Switches

▼ To Attach Mounting Rails for Two 8-port Switches

- 1. Before you install the rails into the cabinet, loosely start two stopper screws into each mounting rail. (FIGURE 4-1).**
- 2. Working from the back of the cabinet, loosely start two screws into the cabinet rails. (FIGURE 4-1.)**

Refer to the *Rackmount Placement Matrix* for the locations of the screw holes of your configuration.

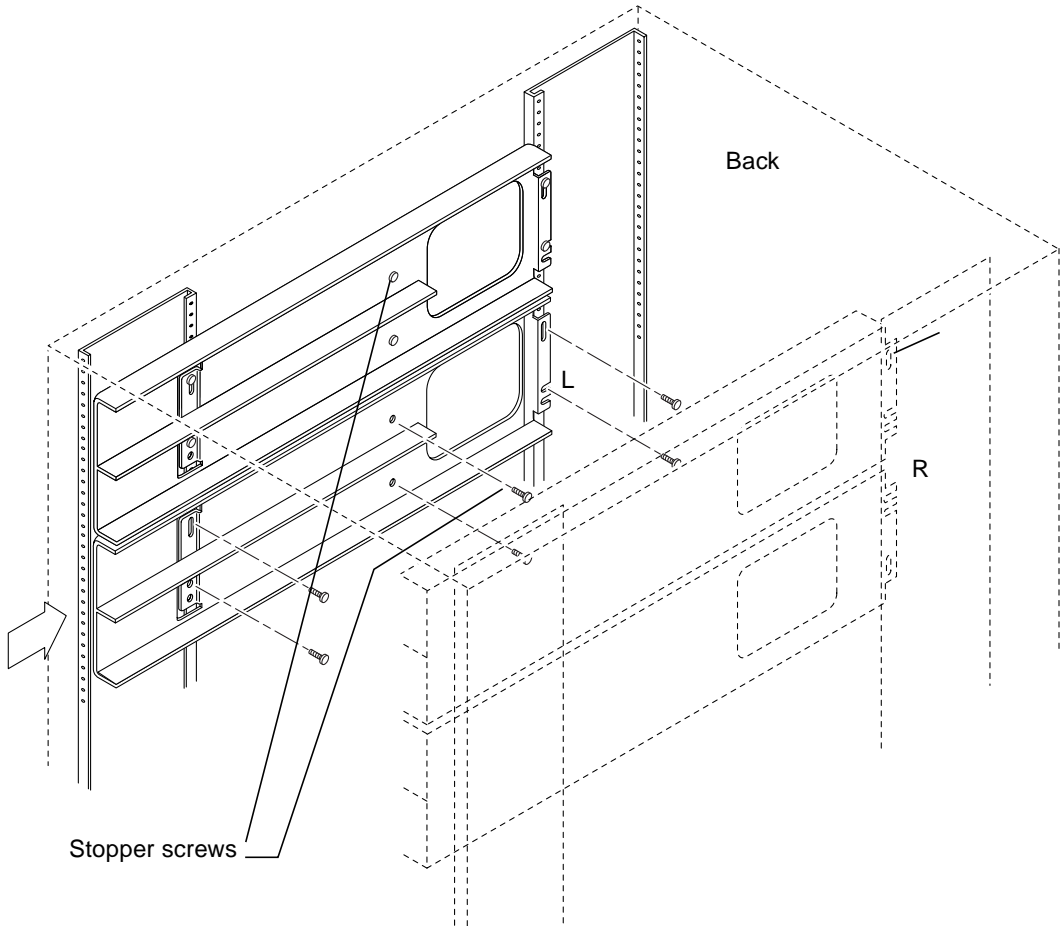


FIGURE 4-1 Attaching the Mounting Rails

3. Working from the front of the cabinet, install the mounting rails by sliding the keyhole slot in the rail onto the screw.

The rails for left and right are identical, but reversed, for the two sides. The large hole is oriented near the back for both rails.

Use the slot marked L for the left rail. Use the slot marked R for the right rail. (FIGURE 4-2)

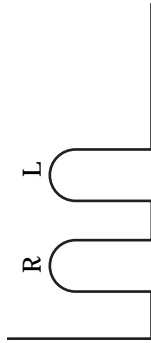


FIGURE 4-2 Detail of Rail Slots

4. Install three 10-32 screws on each rail.
5. Tighten the fourth screw.

▼ To Attach Mounting Rails for Four 8- Port Switches

1. Mount the first two switches.

See “To Attach Mounting Rails for Two 8-port Switches” on page 42.

2. Before you install the rails into the cabinet, loosely start two stopper screws into each rail (see FIGURE 4-2).
3. Working from the back of the cabinet, loosely start two screws for the mounting rails into the cabinet (see FIGURE 4-2).

Refer to the *Rackmount Placement Matrix* for the locations of the screw holes for your configuration.

4. Working from the front of the cabinet, install the mounting rails by sliding the slot in each rail onto the screw.

The large hole is oriented near the rear for both rails. Use the slot marked L for the left rail. Use the slot marked R for the right rail. (FIGURE 4-2)

▼ To Attach Mounting Rails for Two 16-Port Switches

Each 16-port switch comes with two identical mounting rails. There is no difference between the left rail and the right rail.

1. Before you install the rails into the cabinet, loosely start two stopper screws into each rail (see FIGURE 4-3).
2. Working from the rear of the cabinet, loosely start two screws into the cabinet for each mounting rail, one at each end (see FIGURE 4-3).

Refer to the online *Rackmount Placement Matrix* for the correct hole positions for your configuration.

Note – Install the screws into the cabinet holes before you place the rails.

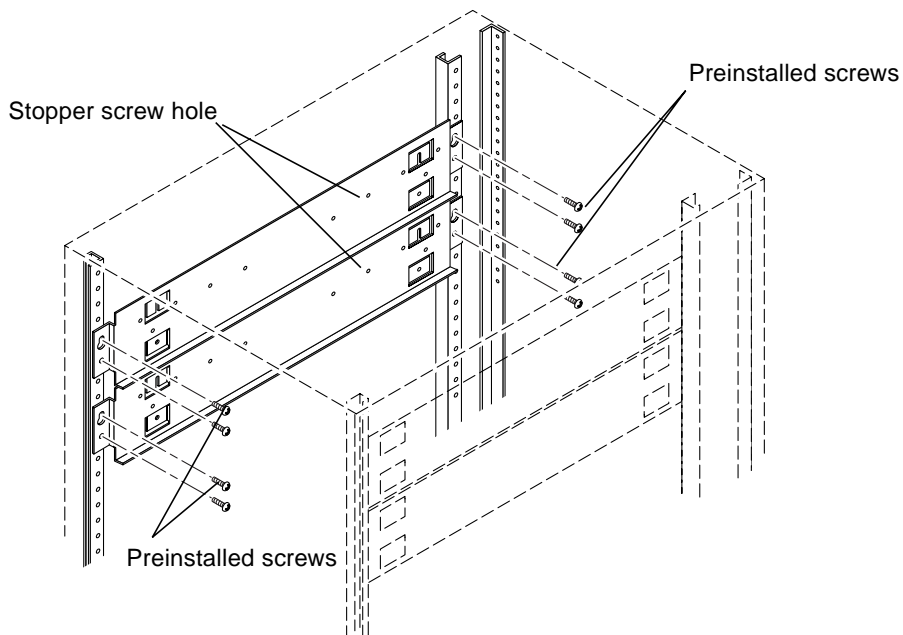


FIGURE 4-3 Attaching the Mounting Rails for a 16-port Switch

3. Working from the front of the cabinet, install the mounting rails by sliding the keyhole slot in the rail onto the screw.
In a two-switch configuration install the lower rail before you install the upper one.

4. **Insert the remaining screws through the mounting rail into the cabinet rail.**
Do not tighten any of the screws until you have them all loosely started.
5. **Tighten all the screws when all four screws in each bracket are in place.**
The order of tightening does not matter.

Installing the Switch

▼ To Install the 8-port or 16-port Switch into the Cabinet

1. **From the front of the cabinet, slide the first switch into the lowest of the mounting rails.**
The GigaBit Interface Converter (GBIC) side goes toward the back of the rack. The switch casing stops moving when it meets the stopper screw on the mounting rail.
2. **Insert the front lockdown screws (see FIGURE 4-4 for 8-port switch only).**
3. **Tighten the stopper screws.**

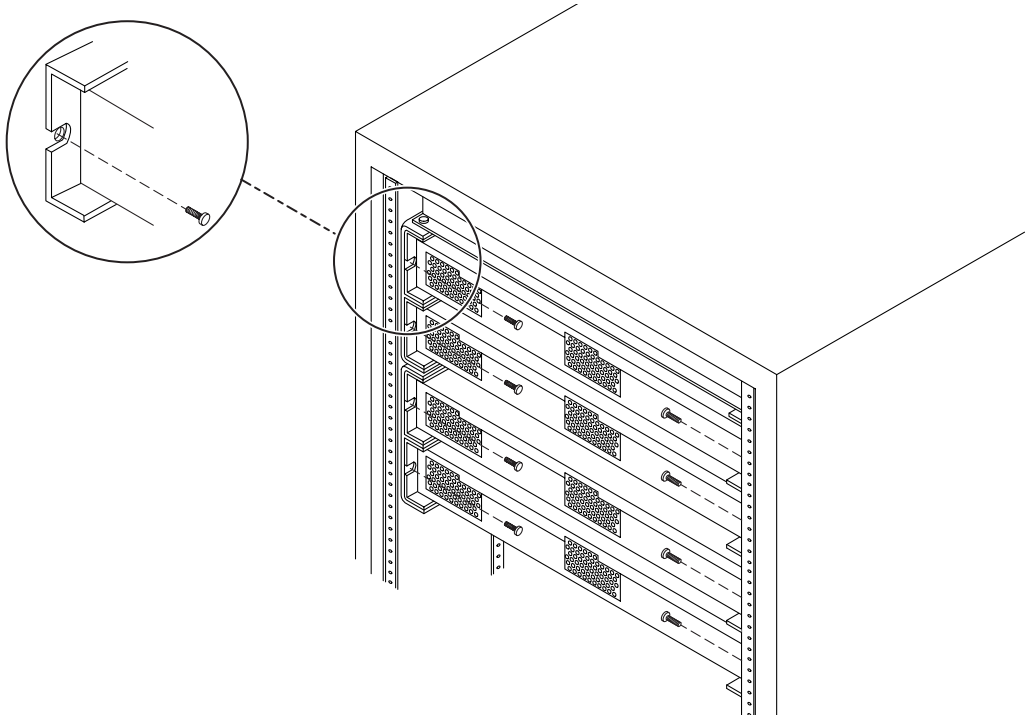


FIGURE 4-4 Installing Four 8-Port Switches Into the Mounting Rails

Installing the Vent Panel

This section describes how to install the vent panel on the switches in your configuration.

“To Install the Vent Panel on Two 8-Port Switches” on page 47

“To Install the Vent Panels on Four 8-Port Switches” on page 48

“To Install the Vent Panel on a 16-Port Switch” on page 49

▼ To Install the Vent Panel on Two 8-Port Switches

1. Mount the 1-U filler panel at the very top. Tighten the captive screws.

2. Mount the 1-U filler panel above the vent panel and below the existing 2-U filler panel.
3. Tighten the captive screws.

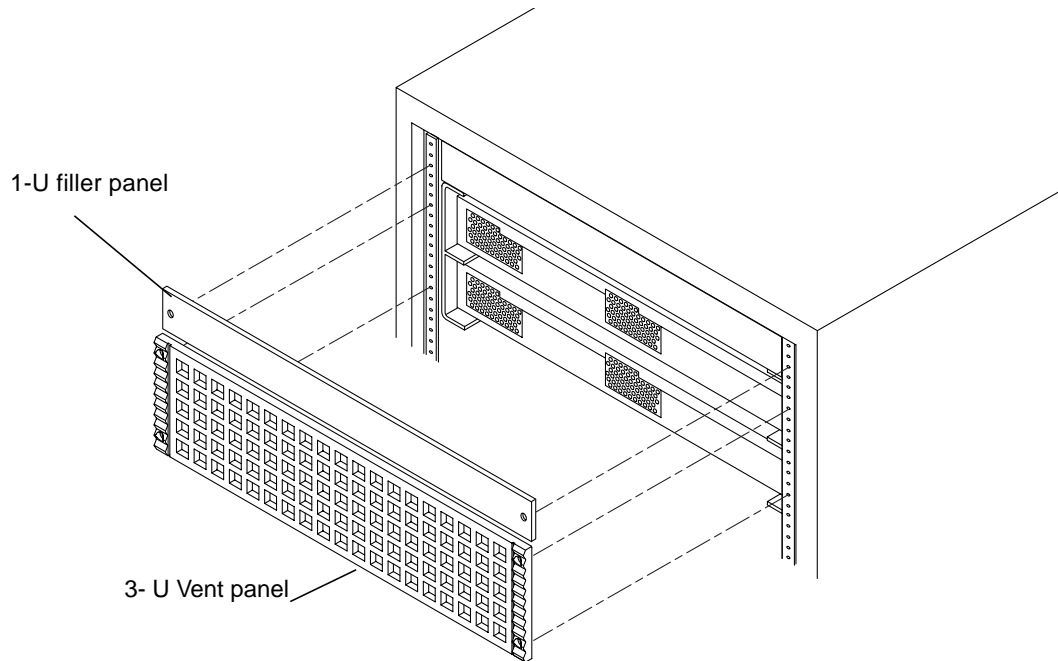


FIGURE 4-5 Installing the Vent Panel— Two 8-Port Switch Configuration

▼ To Install the Vent Panels on Four 8-Port Switches

1. Mount each of the two vent panels over the front of a set of two switches.
No filler panel is necessary.
2. Tighten the captive screws.

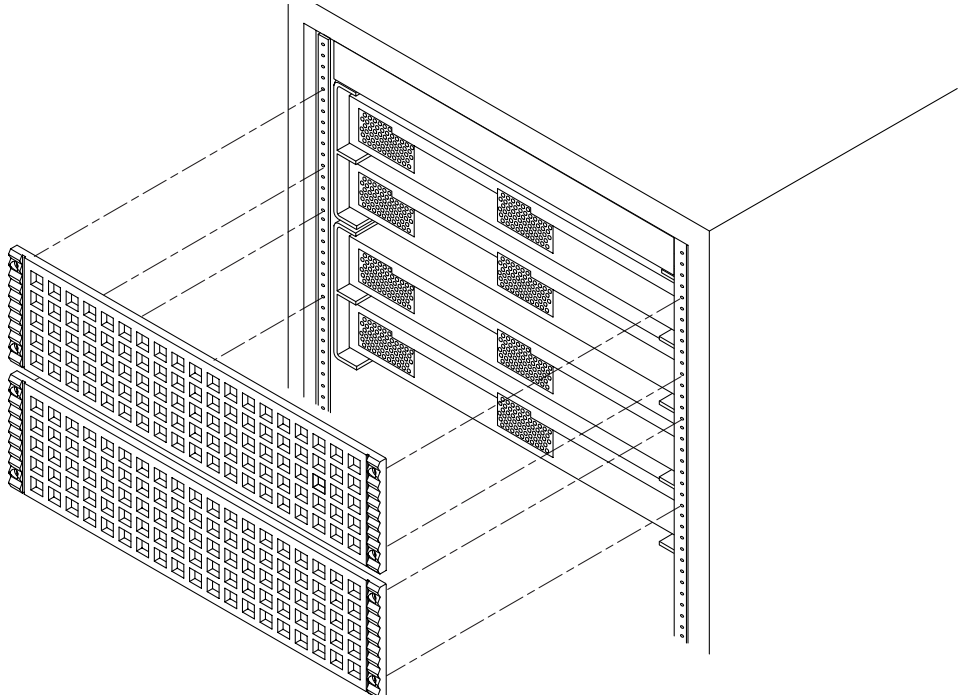


FIGURE 4-6 Installing the Vent Panel—Four 8-Port Switch Configuration

▼ To Install the Vent Panel on a 16-Port Switch

Each 16-port switch comes with its own vent panel.

- 1. Mount a vent panel over the front of each switch.**
No filler panel is necessary.
- 2. Tighten the captive screws.**

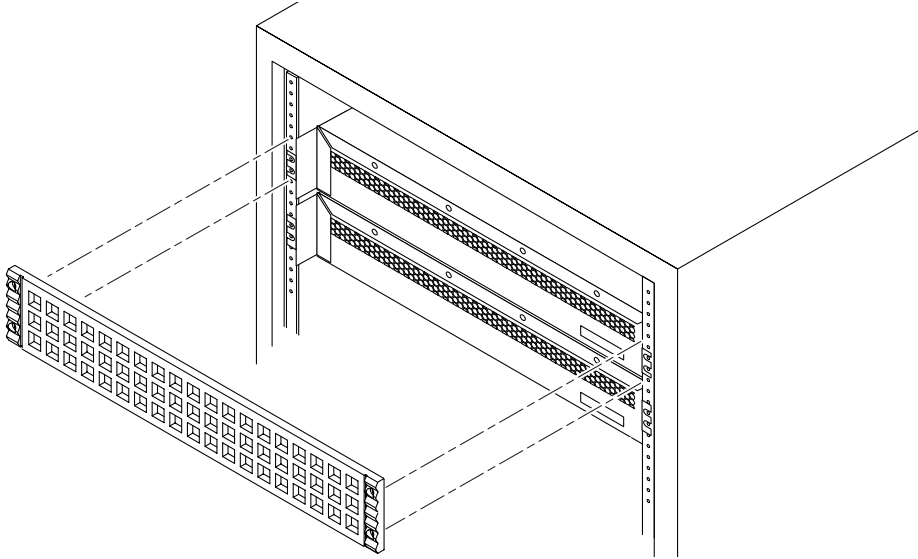


FIGURE 4-7 Installing the Vent Panel for a 16-Port Switch

Connecting the Cables

Some storage cabinets may have shorter and fewer power cords. In these cases, you must use the Y cable, provided with your switch, to increase the number of power connections and provide adequate power cord length. Install the Y cables only in the J8 or J12 connections of the power sequencer.

“To Connect the Cables to a Sun StorEdge T3 Array” on page 51

“To Connect the Cables to a Sun StorEdge A5200 Array” on page 52

“To Connect the Cables to a Sun StorEdge A3500FC Array” on page 52

“To Connect the Cables to a Sun StorEdge L180 or L700 FC Tape Library” on page 56

Sun StorEdge A5200 and T3 Arrays

▼ To Connect the Cables to a Sun StorEdge T3 Array

1. Power off the system.

For instructions about powering off the Sun StorEdge T3 Array, refer to the documentation that came with the array.

2. Unplug the power cord from both fan trays and from the J12 connections on both sequencers.

See FIGURE 4-8 for the J12 location.

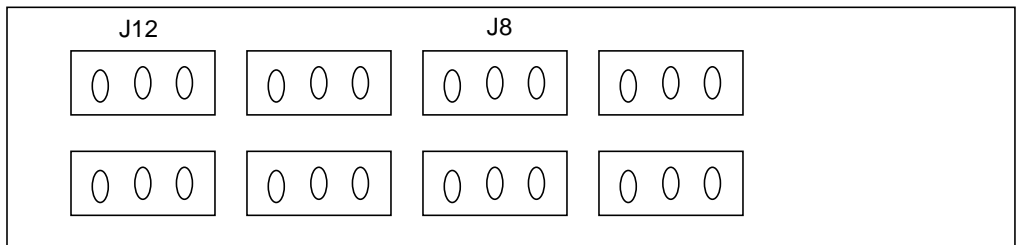


FIGURE 4-8 Power Sequencer

3. From the back of the cabinet, follow the route of the existing cables to the sides and up the rear of the cabinet, to the level of the switches.

The Y cable on the back sequencer routes up the right side. The Y cable on the front sequencer routes up the left side. Use tie wraps as necessary to secure the cables.

4. Connect the Y cable on the right side to the right side of the fan tray and the right side of number 8, T3.

5. Connect the Y cable on the left side to the left side of the fan tray and the left side of number 8, T3.

6. Connect the existing R8 cable to the lowest switch.

7. Connect the existing L8 cable to the highest switch.

▼ To Connect the Cables to a Sun StorEdge A5200 Array

If the existing power cords are too short, replace them with the Y cable.

1. Power off the system.

For instructions about powering off the Sun StorEdge A5200 Array, refer to the documentation that came with the array.

2. Remove the lower vented side panel from the right side.

3. Working from the back, push the lowest Sun StorEdge A5200 array about eight inches toward the front of the cabinet.

This provides access to the cables.

4. Disconnect the power cord from the J8 port on both sequencers.

See FIGURE 4-8 for J8 location.

5. Connect the Y cable to the J8 port on both sequencers.

6. Replace the side vent panel.

7. From the front, push the lowest Sun StorEdge A5200 array back into place.

8. Connect one end of the left Y cable to the lowest switch. Connect the other end to the next switch.

If there are four switches, connect one end of the right Y cable to the third switch. Connect the other end of the Y cable to the highest switch.

9. From the back of the cabinet, follow the route of the existing cables to the sides and up the rear of the cabinet, to the level of the switches.

The Y cable on the back sequencer routes up the right side. The Y cable on the front sequencer routes up the left side. Use tie wraps as necessary to secure the cables.

▼ To Connect the Cables to a Sun StorEdge A3500FC Array

When you have the switch(es), vent, and filler panels in place, you must connect and route the cables. If the existing power cords are too short, replace them with the Y cable before performing this procedure.

1. Working from the back, connect the power cord(s).

FIGURE 4-9 shows the 8-port switch power connector.

FIGURE 4-10 shows the 16-port switch power connector.

FIGURE 4-11 shows the power connections for two or four switches.

Allow the power cord to dangle temporarily.

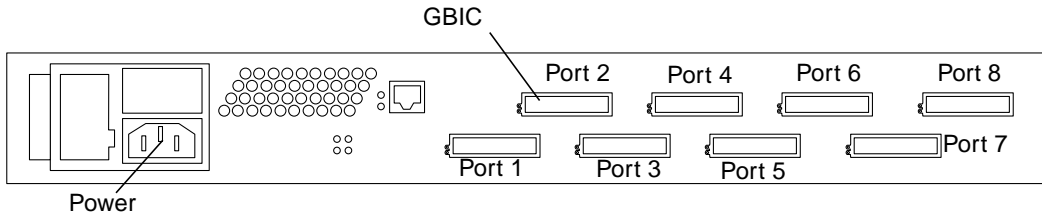


FIGURE 4-9 The 8-Port Switch Power Connector

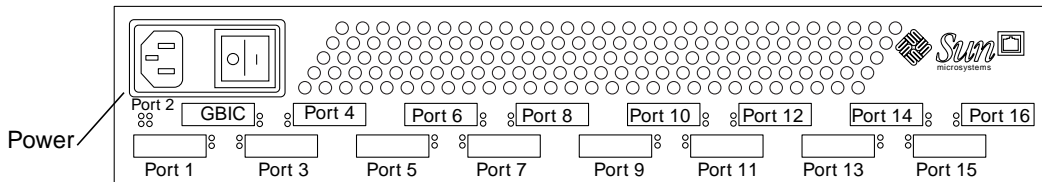


FIGURE 4-10 The 16-Port Switch Power Connector

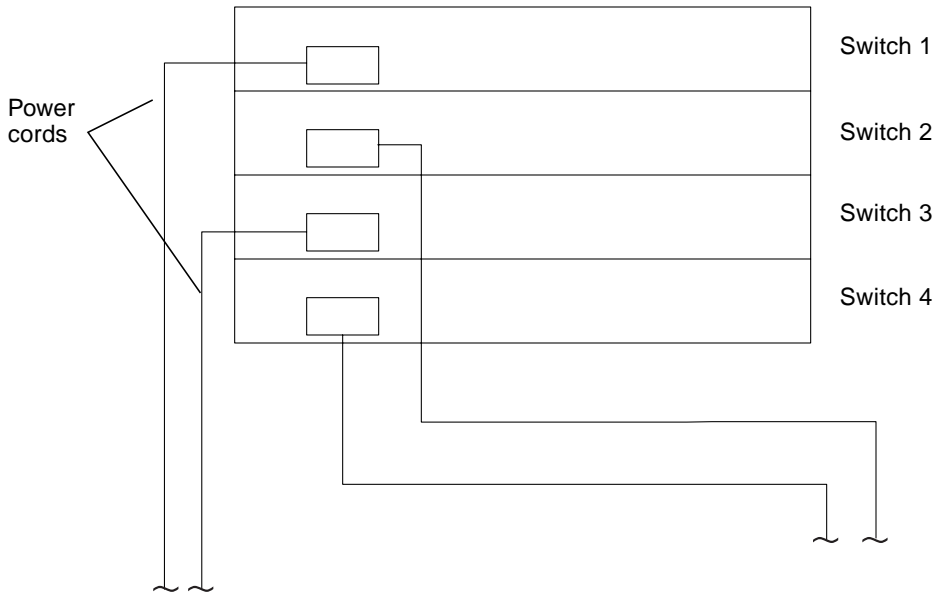


FIGURE 4-11 Power Connection for Two or Four Switches

2. Install the GBIC.

See the “Removal and Replacement Procedures” chapter of the *SANbox 8/16 Segmented Loop Switch User’s Manual* for instructions on installing a GBIC.

3. Use a tie wrap to secure the Fibre Channel cables, as shown in FIGURE 4-12 and FIGURE 4-13.

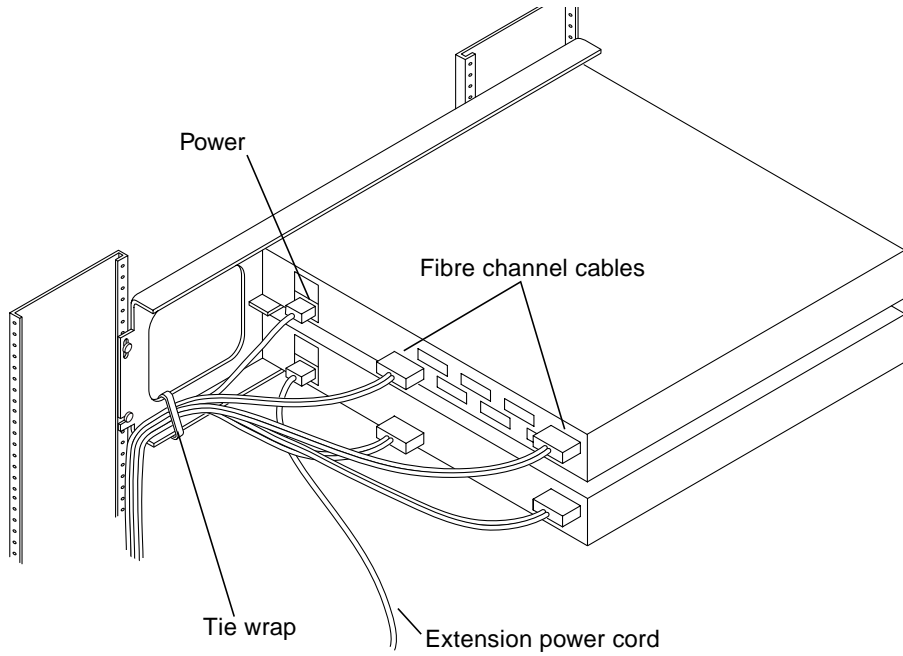


FIGURE 4-12 Cable Routing for the 8-Port Switch

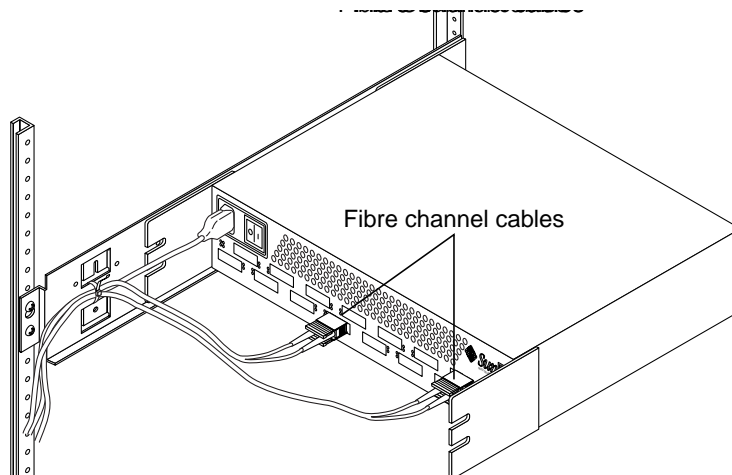


FIGURE 4-13 Cable Routing for the 16-Port Switch

Note – Connections to storage arrays are not shown in these figures.

▼ To Connect the Cables to a Sun StorEdge L180 or L700 FC Tape Library

1. Refer to the installation documentation that came with your tape library for instructions on cabling.
2. Comply with the rules for configuring an FC Tape Library with a Sun StorEdge FC Network Switch. See “FC Tape Libraries” on page 11.

Switch Activation

This chapter contains the procedures for bringing the new Sun StorEdge FC Switch 3.0 software onto the network. For more details about the switch, refer to *Switch Management User's Manual*.

“Configuring the Switch Ethernet Port” on page 57

“Installing the Sun StorEdge Network FC Switch 3.0 GUI” on page 61

“Setting the Stage Type” on page 66

Configuring the Switch Ethernet Port

The IP address of the switch is set to the default value of 10.0.0.1. You can change this default IP address using the Reverse Address Resolution Protocol (RARP), or the switch management GUI. This guide provides the procedures for changing the IP address using RARP only. To set the IP address using the GUI method, see Chapter 2 in the *Sun Switch Management User's Manual*.

Using RARP to Change the IP Address

You can use RARP to change the address when you first receive the switch or if you forget the address.

The Sun StorEdge FC Switch 3.0 RARP feature automatically downloads the assigned IP address to the switch. After you cable the switch and turn the power on, the IP address is automatically assigned.

You will need the following information to change the IP address:

- IP address _____ Contact the person who maintains your network for this information.
- MAC address _____ See FIGURE 5-1 and FIGURE 5-2 for the location of the MAC Address.
- Switch name _____ This is the assigned name of the switch you are installing.

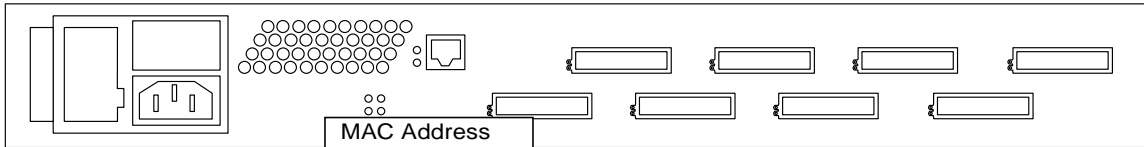


FIGURE 5-1 Sun StorEdge Network FC Switch-8 MAC Address Location

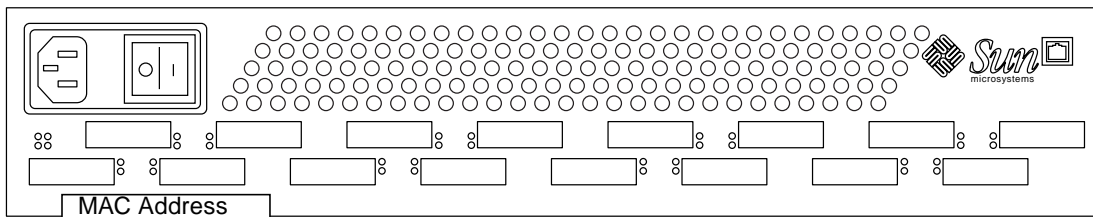


FIGURE 5-2 Sun StorEdge network FC switch-16 MAC Address Location

▼ To Set the Network IP Address Using RARP:

1. On a host connected to the same subnet as the switch, save your current configuration.
2. Check that the `/etc/ethers` file exists.
3. If you find the file, create the `/etc/ethers.SAV` backup file:

```
# ls /etc/ethers
```

```
# cp -p /etc/ethers /etc/ethers.SAV
```


4. Back up the affected management station configuration files:

```
# cp -p /etc/nsswitch.conf /etc/nsswitch.conf.SAV
# cp -p /etc/hosts /etc/hosts.SAV
```

5. On a host connected to the same subnet as the switch, edit the `/etc/ethers` file by adding the MAC address and switch name.

For example:

```
8:0:20:7d:93:7e switch-name
```

In this example:

- `8:0:20:7d:93:7e` is the MAC address
- `switch-name` is the name of the switch you are installing.

6. Edit the `/etc/hosts` file with the IP address and switch name.

For example:

```
192.129.122.111 switch-name
```

In this example, `192.129.122.111` is the assigned IP address.

7. Edit the `/etc/nsswitch.conf` file to reference the local system files.

To ensure that the Solaris software environment uses the changes made to `/etc/ethers` and `/etc/hosts` files, edit the `host` and `ethers` entries in the `/etc/nsswitch.conf` file so that the `files` parameter appears before the `[NOTFOUND=return]` statements.

```
hosts:      nis files [NOTFOUND=return]
ethers:     nis files [NOTFOUND=return]
```

8. Determine whether the RARP daemon is running by typing:

```
# ps -eaf | grep rarpd
```

9. If RARP is not running, start the RARP daemon in the Solaris software environment by typing:

```
# /usr/sbin/in.rarpd -ad
```

The IP address will now automatically download to the switch after you install the switch and power on the system.

Note – RARP might not work properly if you have connected the ethernet port of the FC switch to an Ethernet switch; this is due to the long time it might take for the Ethernet switch to transmit the RARP. In such a case you can use the management GUI to change the IP address. See the *Sun Switch Management User's Manual*.

10. Power off the switch and then power it back on.

11. Verify the switch IP address.

```
# ping <ip-address>
```

For example:

```
# ping 192.129.122.111
```

12. If the RARP daemon has started, return to the window in which the daemon was activated.

Perform the `Control-C` key sequence to stop the daemon operation.

Note – The IP address setting for the switch that you obtain using RARP is not a permanent setting until RARP is disabled.

▼ To Make the IP Address Setting Permanent

Refer to the SANsurfer Switch Management chapter of the *SANbox 8/16 Switch Management User's Manual*. See the Network Configuration Window section and the Static IP Address Radio Button for information on enabling / disabling RARP via the GUI.

Installing the Sun StorEdge Network FC Switch 3.0 GUI

The Sun StorEdge FC Switch 3.0 GUI application is supported on the JDK™ 1.3.02 . Refer to the CD documentation, 804-7880-10, packaged with the system, for installing the JDK.

▼ To View the SANsurfer Application Version

1. **Open the Help menu in the SANsurfer Graphical User Interface (GUI).**
2. **Select About SANsurfer.**

The SANsurfer application version number displays in the window.

Upgrading the GUI

If the Sun StorEdge FC Switch 2.0 (Version 2.07.50) or 2.1 (Version 2.07.54) GUI has been installed in the system, you must perform a package removal before you install the Sun StorEdge FC Switch 3.0 GUI.

Note – If you have the patch for the Sun StorEdge FC Switch 3.0, you can update your version using `patchadd`.

▼ To Remove the 2.0 GUI

1. In the root directory, type:

```
# pkgrm SUNWsmgr
```

The following message displays:

```
The following package is currently installed.
SUNWsmgr SANsurfer, Qlogic Fibre Channel Administration
(i86pc, sparc) 2.07
Do you want to remove this package?
```

2. Type:

```
# y [Yes]
```

The following message is displayed.

```
## Removing installed package instance <SUNWsmgr>
## Verifying package dependencies.
## Processing package information.
## Removing pathnames in class <none>
/usr/opt/SUNWsmgr/bin/esm_smgr
/usr/opt/SUNWsmgr/bin/Sun.jar
/usr/opt/SUNWsmgr/bin
/usr/opt/SUNWsmgr/app.dat
/usr/opt/SUNWsmgr <non-empt directory not removed>
## Updating system information.
Removal of <SUNWsmgr> was successful.
```

▼ To Install the 3.0 GUI Software

- Add the GUI package by typing^{1,2}:

```
# pkgadd -d SUNWsmgr
```

1. i18n support is not available in this release.

2. United States.ISO8859-15 locale is not supported in this release.

▼ To Install the 3.0 GUI Patch

If you have the 2.0 or 2.1 GUI already installed and you have the patch for the 3.0 GUI, you can upgrade the GUI with the 3.0 patch.

1. **If you want to preserve your current user administration and Fabric configurations, copy the current user administration file (`app.dat`) and Fabric information file (`default.fab`) to another file.**
2. **Type:**

```
# patchadd 110696-xx
```

▼ To Start the GUI Software

You can start the GUI in two ways:

- **Use the command line and type:**

```
/usr/opt/SUNWsmgr/bin/esm_smgr
```

- **Use Component Manager 2.2.**

- a. **Click the Launch button.**

See the Component Manager documentation that came with your software for more details on how to install and use Component Manager.

The login window appears.

If this is the first time this switch has been logged into, or if no `username` and `password` file have been created by a superuser, use the default username and password, which is `su` for each one. Otherwise, use the username and password assigned during a previous session.



b. Enter the switch IP address in the Fabric window of the GUI.

It may take a few seconds for the switch icon to become gray. You can click the Refresh button.

c. After the switch icon becomes gray, click the Sun logo.

Note – If the icon remains red, it is likely that the IP address is wrong, or that the switch cannot be accessed from that subnet, or the switch lacks power or an ethernet connection.

▼ To Verify and Load the Switch Firmware

You must have the correct firmware revision for the 3.0 version of the GUI in each switch of the Fabric. For cascaded switches, both switches must have the same firmware revision.

▼ To Verify the Firmware Revision Level of the switch(es):

Perform the following procedure for each switch.

- 1. Verify that the switches are not connected to each other.**
- 2. Connect one switch to the net.**
- 3. Launch the GUI and bring up the switch.**
See “To Start the GUI Software” on page 63.
- 4. Open the Topology View screen.**

The switch icon representing the connected switch displays in the right window pane.

5. Double-click the switch icon.

The Topology View screen is erased, and the Switch FacePlate Display screen displays.

6. Make a note of the firmware revision level.

The revision level appears on the second line of the text in the upper right corner of the Switch FacePlate Display screen.

▼ **To Load the Firmware Revision**

1. Locate the file containing the new firmware on the management station.

The default location is `/usr/opt/SUNWsmgr/flash`.

2. Choose Special>Update Flash.

The application displays a standard Open dialog box that allows you to browse to and then open the firmware revision binary file. When you select the firmware revision file, the switch checks the file for a valid checksum. Then, if the checksum is correct, the Flash load begins.

If the checksum is not correct, the application warns you.

3. Make sure you select the correct firmware file.

The firmware file for the 8-port switch is `m080304xx.fl.s`.

The firmware file for the 16-port switch is `m160304xx.fl.s`.

Select the filename with the highest `xx` number.

The application displays information about the progress of the firmware update:

- File: The name of the firmware binary file
- Position: Number of bytes downloaded
- Total: The total number of bytes in the file
- Complete: The percentage of the file sent to the chassis

When the firmware update is complete, the application displays a dialog box that states that the flash load is complete and asks whether to Reset Immediately.

4. If you want to Reset, click Yes.

Remember that a Reset operation disrupts the operation of the switch.

5. If you do not want to Reset until traffic is removed from the switch, click No.

You can perform the Reset later by choosing Special>Reset in any of the Chassis FacePlate windows.

Setting the Stage Type

After installing the GUI, you can leave the stage type to SL zoning (segmented loop) or change it to FLS-IO Transfer (IOT) mode.

SL zones enable you to divide the SL ports into multiple zones that define which ports will communicate with each other. Communications occur only between ports in the defined SL zone.

The default state type is SL zoning. IOT mode allows F-port, T-port, and TL-port configuration. Only switches in IOT mode can be cascaded together.

▼ To Change SL Zoning to FLS-IO Transfer (IOT)

- 1. In the Fabric window, enter the IP address of the switch in the IP Address Field.**

SANsurfer finds the switch and a gray Sun icon is displayed in the status box.

If a red Sun icon is displayed in the Status box, SANsurfer did not find the switch.

If the red Sun icon appears, check the following:

- a. Does the switch have power?**
- b. Is the Ethernet cable plugged into the switch?**
- c. Is the IP address on the switch the same as the IP address in the IP Address Field in SANsurfer?**
- d. Do you have access to the switch from your subnet?**

- 2. When the gray Sun icon appears, select it.**

The Topology window opens.

- 3. In the Topology window, select Special.**

- 4. From the Special menu, select Change Stage Type.**

Changing the stage type is a disruptive event. When the stage type on one switch changes, all the switches in the Fabric change to the same stage type, and each switch resets.

- 5. When the prompt appears to continue, choose Yes.**

After the reset, the display returns to the Fabric window.

Installing a New SAN

This chapter contains the following topics that describe how to install a new SAN system:

- “Required Software Components” on page 67
 - “Downloading Patches and Packages” on page 69
 - “Verifying Successful Patch Downloads” on page 69
 - “Installing the Software” on page 70
-

Required Software Components

The following software components might be required for your particular SAN system. Refer to the documentation for each individual product to insure proper installation.

Software Components

- Sun StorEdge Traffic Manager

This is available as a patch which can be installed on Solaris 8 release 4/01 or later. It should be installed with the latest revision of Sun StorEdge Network Foundation Software.

- Sun StorEdge Network Foundation

This software is included with the Solaris upgrades for the FC switch product. It includes the drivers to support switches, management tools and storage devices.

- Solstice DiskSuite

Solstice DiskSuite is an unbundled software product that is delivered with Solaris software. Solstice DiskSuite provides host-based storage management, such as mirroring and striping of disks, which provides greater reliability and volume size. Solstice DiskSuite 4.2.1 also implements RAID 5.

- VERITAS Volume Manager

VERITAS Volume Manager is a separately installed software product that provides host-based storage management, such as disk labeling, mirroring, striping, and RAID 5.

- SANsurfer Switch Manager

SANsurfer Switch Manager is software supplied with the switch. This software provides management capabilities such as maintaining zones, setting port attributes, setting up cascaded switches, and setting broadcast zones for IP support.

- StorTools

StorTools is a separately installed software product. It provides a system-level “tree” view of storage devices connected by way of a SAN or direct attachment. StorTools software provides field replaceable unit (FRU) diagnostics and an expert-mode diagnostic utility.

- Sun StorEdge Component Manager

Component Manager provides a web-based front end for SANsurfer Switch Manager, Sun StorEdge T3 array management and diagnostics, device discovery, enclosure monitoring and log viewing.

- `cfgadm` plugin for Fabric on-demand node creation

This component is delivered with the Solaris upgrades for the FC switch product. It is used to discover SAN-attached devices, in addition to creating and deleting nodes for these devices. These features are implemented through the `cfgadm` framework. See the `cfgadm_fp(1M)` man page for additional information.

- `luxadm` and `libg_fc/liba5k`

These components are enhanced to support the SAN-attached devices. They provide persistent switch-attached device configuration across reboots, probe SAN-attached devices that are available on a host, and provide information on various devices.

- Network Storage Agent

Network Storage Agent is a separately installed software product. It is a lightweight, remote, monitoring agent designed to track storage product reliability, availability and serviceability. Network Storage Agent also provides revision and patch level checking as well as log file monitoring.

Downloading Patches and Packages

You can download the required software components from the following web sites listed in TABLE 6-1.

TABLE 6-1 Software Download Sites

Software	Downloading Web Site
packages and documentation	http://www.sun.com/storage/san/
patches	http://sunsolve.sun.com

Note – You can also get all the patches and packages for your configuration from the SunSolve web site. If you use PatchPro to generate a patch list, a README.txt file with the installation order is included. Follow the installation order defined in TABLE 6-2. For instructions about how to get patches using PatchPro, refer to “To Download Patches Using PatchPro Interactive” on page 39.

Verifying Successful Patch Downloads

Refer to TABLE 3-1 “Minimum Software Component Versions and Patches” for the list of required software versions, packages, and patches.

▼ To Verify Successful Patch Downloads

1. Use one of the following three utilities to obtain the checksum value of the patch you downloaded:

CODE EXAMPLE 6-1 Solaris /usr/5bin/sum Utility

```
% /usr/5bin/sum 108982-09.zip
2010 880 108982-09.zip
% /usr/5bin/sum -r 108982-09.zip
63160      880 108982-09.zip
```

Note – The directory `/usr/ucb` has another version of the `sum` utility. Use `/usr/5bin/sum`.

CODE EXAMPLE 6-2 Example of GNU `md5sum` Utility

```
% md5sum 108982-09.zip
1297fcd385f618c726489c6c7f57c900 108982-09.zip
```

Download the GNU `md5sum` utility from <http://www.sunfreeware.com> or from <http://sunsolve.sun.com/md5/md5.tar.z>.

2. Compare the checksum value that is displayed to the patch checksum value given at the Checksum File link

<http://sunsolve.Sun.COM>

If the values are identical, the patches were properly downloaded.

Note – The checksum file at <http://sunsolve.Sun.COM> is approximately 614 KBytes.

Installing the Software

TABLE 6-2 lists the required software installation sequence.

TABLE 6-2 Software Installation Sequence

Patch or Package	Software
Solaris 8	Solaris 8 4/01
8_Recommended	Solaris 8 Recommended and Security patch cluster
SUNWsan	Sun StorEdge SAN Foundation Kit
SUNWcfpl	cfgadm plug-in 32-bit package
SUNWcfplx	cfgadm plug-in 64-bit package
111847-01	SAN Foundation Kit patch
110614-02 ¹	ses driver patch
108982-09 ¹	fctl/fp/fcp/usoc driver patch

TABLE 6-2 Software Installation Sequence (*Continued*)

Patch or Package	Software
108984-08 ¹	/kernel/drv/qlc driver patch
109529-06	luxadm, liba5k and libg_fc patch
111412-05	Sun StorEdge Traffic Manager patch
111413-04	luxadm/liba5k and libg_fc patch
111095-05	fcip/fp/fctl/usoc drivers patch
111096-03	fcip driver patch
111097-04	qlc driver patch
111267-02 ¹	/kernel/fs/specfs patch
111846-01	cfgadm plug-in library patch
SUNWvtsst	Sun StorTools package
SUNWrasag	Network Storage Agent package
SUNWsmgr	SANsurfer Switch Manager package
110696-03	Sun StorEdge Network Fibre Channel 3.0: SANsurfer Administration Patch

1. Patch may have been included with the operating system.

Note – The Sun StorEdge SAN Foundation Kit, SUNWsan patch 111847-01 and the SANsurfer Switch Manager, SUNW smgr patch 110696-03 are required only if you are upgrading from SAN release 2.0 to SAN release 3.0.

▼ To Install the Software

- 1. Install Solaris 8 4/01.**
- 2. Install the latest Solaris 8 Recommended Security patch cluster.**
See the README file for patch installation instructions and notes.
- 3. Install SUNWsan package.**

```
# pkgadd -d pkg-location SUNWsan
```

4. Install `cfgadm` plug-in library packages `SUNWcfpl` and `SUNWcfplx`.

```
# pkgadd -d pkg-location SUNWcfpl
# pkgadd -d pkg-location SUNWcfplx
```

5. Install the SAN Foundation Kit `SUNWsan` patch 111847-xx.

If you installed the Sun SAN release 3.0, do not install this patch.

a. To find out if this patch has been installed, type:

```
# showrev -p | grep 111847
```

If the patch has been installed the system returns:

```
Patch: 111847-01 Obsoletes: Requires: Incompatibles: Packages:
SUNWsan
```

b. If you need to install patch 111847-xx, use the `patchadd` command.

```
# patchadd patch-location/111847-01
```

6. Install `ses` driver patch 110614-xx.

```
# patchadd patch-location/110614-02
```

7. Install Solaris driver patches.

The two patches may have been included in your operating system. Use the `showrev` command to see if they have already been installed (see Step a on page 72), and the `patchadd` command to add them.

```
# patchadd patch-location/108982-09
# patchadd patch-location/108984-08
```

8. Install luxadm/libg_fc/liba5k patch 109529-xx.

Patch 109529-06 may have been included with your operating system. Use the showrev command to see if it has been included.

```
# patchadd patch-location/109529-06
```

9. Install Network Storage Traffic Manager patch 111412-xx.

```
# patchadd patch-location/111412-04
```

10. Install luxadm/libg_fc/liba5k patch 111413-xx.

11. Install fcp/fp/fctl/usoc drivers patch 111095-xx.

```
# patchadd patch-location/111095-05
```

12. Install fcip driver patch 111096-03.

```
# patchadd patch-location/111096-03
```

13. Install qlc driver patch 111097-xx.

```
# patchadd patch-location/111097-04
```

14. Install specfs patch 111267-xx.

Patch 111267-02 may have been installed with your operating system. Use the showrev command to see if has already been installed

```
# patchadd patch-location/111267-02
```

15. Install cfgadm plug-in library patches 111846-xx.

```
# patchadd patch-location/111846-01
```

16. Update MANPATH to access `cfgadm_fp(1M)` man page.

For `sh` or `ksh`, type:

```
# MANPATH=/opt/SUNWsan/man:$MANPATH;export MANPATH
```

For `csh`, type:

```
% setenv MANPATH /opt/SUNWsan/man:$MANPATH
```

17. Install StorTools package `SUNWvtsst`.

If you plan to use your system as a SAN Management host, install Step 17, Step 18, and Step 19.

```
# pkgadd -d pkg-location SUNWvtsst
```

18. Install Network Storage Agent package `SUNWrasag`.

```
# pkgadd -d pkg-location SUNWrasag
```

19. Install Sun StorEdge Network FC Switch Manager package `SUNWsmgr`

Not all installations require the `SUNWsmgr` package. Install it only on the SAN Management host..

```
# pkgadd -d pkg-location/SUNWsmgr
```

20. Reboot the system.

For a sample installation session, see Appendix D.

For each of the storage devices, upgrade the software, firmware, or configuration. The components should be upgraded to the revision levels outlined in Table 3-1 “Minimum Software Component Versions and Patches” on page 36 in chapter 3.

After the above steps, you can leverage additional features provided by Sun StorEdge FC network switch-8 and switch-16, version 3.0. You can configure the SAN for:

- Sun StorEdge Traffic Manager functionality
- Solstice DiskSuite functionality
- FCIP functionality
- additional fabric zones

- name server zones
- additional initiators per zone
- host fabric connectivity
- cascaded switch configurations

Upgrading the SAN

This chapter contains the following topics regarding how to upgrade your SAN system to the latest version:

- “Downloading Patches and Packages” on page 77
- “Verifying Upgrade Compliance” on page 77
- “To Upgrade Software” on page 78

Downloading Patches and Packages

See TABLE 6-1 on page 69 for all the locations of patches and packages for download. Download all patches and packages to the host prior to beginning the upgrade procedure.

Verifying Upgrade Compliance

Before starting the upgrade, insure that your system is stable and that all required software and patches are accessible. For more information on required software, see Chapter 3, TABLE 3-1, “Minimum Software Component Versions and Patches” on page 36.

For instructions about how to get patches using PatchPro, refer to “Overview for Software Installations” on page 38.

▼ To Upgrade Software

If you have multiple hosts on your SAN, you can upgrade them simultaneously or one at a time without affecting your SAN environment. Hosts that are not being upgraded will not be affected during the upgrade. You can upgrade the host software one host at a time or several hosts in parallel.



Caution – Your system will be unavailable to users and the SAN during the upgrade procedure.

The order in which the SAN components should be upgraded is as follows:

- 1. Familiarize yourself with the required software components, versions and patches.**

See Chapter 3, TABLE 3-1, “Minimum Software Component Versions and Patches” on page 38.

- 2. Back up all data.**

Volume Management

Solstice DiskSuite

If you are using Solstice DiskSuite as your volume manager, refer to the "*Solstice DiskSuite 4.2.1 Reference Guide*," part number 806-3204, available at <http://docs.sun.com>. It contains instructions for upgrading your operating system.

Veritas Volume Manager

If you are using Veritas Volume Manager, refer to the *Veritas Volume Manager Installation Guide* for special instructions about upgrading your system. There are several steps that need to be followed prior to your system upgrade.

- 1. Upgrade the Solaris Operating System.**

To take advantage of full Fabric support for your SAN, you must upgrade to at least Solaris 8 4/01. For information on how to upgrade your systems, refer to *Solaris 8 Installation Supplement*, part number 806-5182, available at <http://docs.sun.com>.

Sun StorEdge SAN 3.0

The packages on your system that were previously used should be available. To verify their availability, use the `pkginfo` command.

pkg_name is the name of the package you need to obtain the information on.

```
# pkginfo -l pkg_name
```

1. Upgrade your SUNWsan package to StorEdge SAN 3.0.

Before you start, check your system to see if it has been installed, and if it is already up to date. Use the `pkginfo` command to see if it has been installed.

```
# pkginfo SUNWsan
```

The system returns:

```
system    SUNWsan    SAN Foundation Kit
```

The output indicates that the SUNWsan package has already been installed. If your system has the SUNWsan package installed, use the `showrev` command to see if it is up-to-date.

```
# showrev -p | grep 111847
```

The system returns:

```
Patch: 111847-01 Obsoletes: Requires: Incompatibles: Packages:  
SUNWsan
```

The `showrev` results line indicates that the SUNWsan package is already up to date. If patch 111847-xx has not been installed, install it using the `patchadd` command.

```
# patchadd patch-location/111847-01
```

2. If your system does not have the SUNWsan package installed, install the new SUNWsan package from your StorEdge SAN 3.0 software.

```
# pkgadd -d pkg-location SUNWsan
```

cfgadm Plug-in Library Packages

1. **Install** `cfgadm` **plug-in library packages** `SUNWcfpl` **and** `SUNWcfplx`.

```
# pkgadd -d pkg-location SUNWcfpl
# pkgadd -d pkg-location SUNWcfplx pkgadd -d pkg-location SUNWcfplx
```

Software Installation

1. **Follow Step 6 through Step 16 on page 72 and page 74 of Chapter 6.**

SAN Management Software

If this system is being used as a SAN Management host, follow the steps in this section. If the system is not being used as a SAN Management host, go to “Switch Firmware” on page 83.

1. Upgrade StorTools package SUNWvtsst.

Check your SAN Management host to find the version of the StorTools™ installed.

```
# pkginfo -l SUNWvtsst
```

The system returns:

```
PKGINST: SUNWvtsst
NAME: StorTools Diagnostic Package
CATEGORY: Diagnostics
ARCH: sparc
VERSION: 4.1
BASEDIR: /opt
VENDOR: Sun Microsystems Computer Corporation
DESC: StorTools Diagnostic Package
PSTAMP: Built by buildst@diag240.Central.Sun.COM on 09/12/
0115:02:23
INSTDATE: Oct 14 2001 17:26
STATUS: completely installed
FILES: 370 installed pathnames
7 shared pathnames
24 directories
262 executables
151764 blocks used (approx)
```

If your SAN Management host is not running the version outlined in TABLE 6-2 on page 70, remove the existing package and install the latest version. Remove the old package with the `pkgrm` command.

```
# pkgrm SUNWvtsst
```

2. Install the new version using the `pkgadd` command. Follow the installation instructions provided in the documentation that came with this package.

```
# pkgadd -d pkg-location SUNWvtsst
```

Network Storage Agent

1. Upgrade the Network Storage Agent package, SUNWrasag.

Check the version of the NetworkStorage Agent on your SAN Management host.

```
# pkginfo -l SUNWrasag
```

The system returns:

```
PKGINST: SUNWrasag
NAME: Network Storage Agent
CATEGORY: system
ARCH: sparc
VERSION: 2.1
BASEDIR: /opt/SUNWrasag
VENDOR: Sun Microsystems Computer Corporation
PSTAMP: ccadieux on 08/08/00 10:34:24
INSDATE: Oct 14 2001 17:52
STATUS: completely installed
FILES: 811 installed pathnames
96 directories
146 executables
20332 blocks used (approx)
```

2. Refer to TABLE 6-2 on page 70 for the version information. If you need to upgrade to a newer version, remove the outdated package using the `pkgrm` command.

```
# pkgrm SUNWrasag
```

3. Install the new version using the `pkgadd` command. Follow the installation instructions provided in the documentation that came with this package.

```
# pkgadd -d pkg-location SUNWrasag
```


Sun StorEdge Network FC Switch Manager

1. Upgrade Sun StorEdge Network FC Switch Manager package, `SUNWsmgr`.

SANsurfer Switch Manager SAN release 3.0 can manage both 2.0 and 3.0 versions of the Sun StorEdge FC Network switch. Earlier versions of SANsurfer Switch Manager are not supported and may cause improper switch operation when used for managing SAN 3.0, Sun StorEdge™ Network FC Switch.

Installing other host software, such as Sun StorEdge Component Manager, before upgrading the SANsurfer Switch Manager insures that the host software will be compatible with the new SANsurfer Switch Manager.

2. Before you start, check your system to see if it has been installed, and if it is already up to date. Use the `pkginfo` command to see if it has been installed.

```
# pkginfo SUNWsmgr
system          SUNWsmgr          SANsurfer, QLogic Fibre Channel
Administration
```

The output indicates that the `SUNWsmgr` package has already been installed. If your system has the `SUNWsmgr` package installed, use the `showrev` command to see if it is up to date.

```
# showrev -p | grep 110696
Patch: 110696-03 Obsoletes: Requires: Incompatibles: Packages:
SUNWsmgr
```

The `showrev` results line indicates that the `SUNWsmgr` package is already up to date. If the patch 110696-xx has not been installed, install it using the `patchadd` command.

```
# patchadd patch-location/110696-03
```

3. If your system does not have the `SUNWsmgr` package installed install the new `SUNWsmgr` package from your StorEdge SAN 3.0 software.

```
# pkgadd -d pkg-location SUNWsmgr
```

Switch Firmware

4. Upgrade the switch firmware on all SAN switches.

a. Stop Network Storage Agent Monitoring on all hosts connected to this switch.

This insures that unnecessary events and notifications are not generated, when the switch is reset after the firmware upgrade.

b. Use the newly installed SANsurfer Switch Manager to upgrade the switch firmware.

Refer to the switch documentation for this upgrade procedure. Upload the appropriate switch firmware to the switch and reset it upon completion.

c. Restart the Network Storage Agent Monitoring on the appropriate hosts connected to this switch.

5. Upgrade the storage firmware and configuration.

For each storage device, upgrade the software, firmware, or configuration. The components should be upgraded to the revision levels outlined in TABLE 3-1, "Minimum Software Component Versions and Patches" on page 36 in Chapter 3.

6. Reboot the system.

For a sample installation session, see Appendix D.

7. For each of the storage devices, upgrade the software, firmware, or configuration.

The components should be upgraded to the revision levels outlined in TABLE 3-1, "Minimum Software Component Versions and Patches" on page 36 in Chapter 3.

You can leverage additional features provided by Sun StorEdge FC network switch-8 and switch-16, version 3.0. You can configure the SAN for:

- Sun StorEdge™ Traffic Manager functionality
- Solstice DiskSuite functionality
- FCIP functionality
- additional fabric zones
- name server zones
- additional initiators per zone
- host fabric connectivity
- cascaded switch configurations

Configuring the SAN

This chapter contains the following topics regarding how to configure your SAN system. For more detailed information on managing multiple switches and managing switch zones, see the *SANbox 8/16 Switch Management User's Manual*.

- “Managing Multiple Switches” on page 85
- “Managing Switch Zones” on page 88
- “Creating On-Demand Device Nodes on Hosts for Fabric Configurations” on page 89

Managing Multiple Switches

For additional information, see the *SANbox-8/16 Switch Management User's Manual*. The SANsurfer Switch Manager only displays one switch in the Fabric window display. You must perform several operations to manage multiple Fabrics (switches).

This section contains the following topics about multiple switches:

- “To Save a Switch IP Configuration to Disk” on page 86
- “To Save a Subsequent Switch IP Configuration to Disk” on page 86
- “To Recall a Switch IP Configuration” on page 86
- “To Delete a Switch Configuration” on page 87
- “Managing Cascaded Switches” on page 87

▼ To Save a Switch IP Configuration to Disk

1. In the Fabric window, type the switch IP address in the IP Address field.
2. Click File and select Save As.
 - a. Type the Fabric name of the switch.
 - b. Click OK.

The Fabric is saved to disk.

▼ To Save a Subsequent Switch IP Configuration to Disk

1. Click the gray Sun icon to highlight the Fabric fields.
2. Click Delete.

The current Fabric field line disappears.
3. Select the IP Address field and type the new switch IP address.
4. Click File and select Save As.
 - a. Type the Fabric name of the switch.
 - b. Click OK.

The new switch Fabric is saved to disk.

▼ To Recall a Switch IP Configuration

1. Click File.
2. Click Open Fabrics.

The Fabrics with a .fab extension are displayed.
3. Select the Fabric you want to recall, and then Click OK.

The new Selected Fabric has been added.

▼ To Delete a Switch Configuration

1. Click **File**.
2. Click **Delete Fabrics File**.
3. Select the Fabric you want to delete.
4. Click **OK**.

The Fabric is deleted.

Managing Cascaded Switches

A *cascaded configuration* is managed through the Ethernet connection to one of the switches. For redundancy, connect the Ethernet of both switches. Switch management is done through the Ethernet and Inter Switch Links (ISL) which provides connection to the second switch.

To identify one switch in a rack, use the beacon toggle (see page 2-20 of the *SANbox 8/16 Switch Management User's Manual*). For additional information on cascading rules, see "Cascading Rules" on page 13.

This section contains the following topics:

- "Zoning" on page 87
- "Adding an Inter-Switch Link" on page 87

Zoning

The zoning process for cascaded switches is the same as the zoning process for a single switch. In the current release of the FC switch, SL zoning is supported within one switch only; that is, in a cascaded configuration there can be SL zones, and each SL zone must only reside in one switch. Name server zones span both switches.

Adding an Inter-Switch Link

To cascade two switches together, the system must meet the following conditions:

- Both switches must be in IO/T mode. To change the stage type, refer to the Topology window in Chapter 2 of the *SANbox 8/16 Switch Management User's Manual*.
- The two switches must have unique chassis IDs. To change the chassis ID, refer to the SAN Surfer Switch Manager software.
- The ports to be connected must be set to F_port or FL_port. After you add the ISL, each port will self-discover and configure itself as a T_port (trunk port).

Managing Switch Zones

With the exception of the following clarifications regarding compatibility with the Sun StorEdge FC Network switch-8 and switch-16 rules, refer to pages 2-60 to 2-70 of the *SANbox-8/16 Switch Management User's Manual* for instructions about managing switch zones.

- “Broadcast Zones” on page 88
- “SL Zones and Name Server Zones” on page 88
- “To Create a Name Server Zone Across Cascading Switches” on page 88

Broadcast Zones

Broadcast zones are not part of Sun StorEdge FC Network switch-8 and switch-16, Disregard the definition of a broadcast zone and its rules (refer to pages 2-60 and 2-62 of the *SANbox-8/16 Switch Management User's Manual*).

SL Zones and Name Server Zones

The following items supersede the contents of the *SANbox-8/16 Switch Management User's Manual*:

- Item 5 of Name Server Zones Rules on page 2-62 describes a switch that allows a port or device to belong to one or more name server or SL zones. This release of the FC switch product does not support overlapped zone features.
- In addition to the Name Server Zone rules and SL Zone rules listed on page 2-63, this release of the FC switch prohibits SL zones and name server zones from being in the same hard zone.

▼ To Create a Name Server Zone Across Cascading Switches

- 1. Create a hard zone spanning both switches.**
- 2. Create the name server zone within that hard zone.**

Include at least two ISLs within one hard zone. This will provide better availability and performance.

Creating On-Demand Device Nodes on Hosts for Fabric Configurations

In SL zones, hosts and storage devices connect in private loop topology, and devices are available by default when devices are added to an SL zone. With the Sun StorEdge Traffic Manager software enabled, the Solaris host configures the devices as Sun StorEdge Traffic Manager devices.

The discussion of on-demand node creation in these sections applies to Fabric devices such as an array connected to a host through a switch (a host port connected to an F_port and an array connected to a TL_port).

This section contains the following topics:

- “Creating Device Nodes Without the Sun StorEdge Traffic Manager Software Enabled” on page 89
- “Creating Device Nodes With the Sun StorEdge Traffic Manager Software Enabled” on page 99

Creating Device Nodes Without the Sun StorEdge Traffic Manager Software Enabled

This section describes Fabric device configuration tasks on a host that does not have the Sun StorEdge Traffic Manager software enabled.

The procedures in this section use specific devices as examples to illustrate how to use the `cfgadm(1M)` command to discover and configure Fabric devices.

The devices attached to the Fabric-connected host port are not configured by default, thus those devices are not available to the Solaris host. Use the `cfgadm(1M)` `configure` and `unconfigure` commands to manage device node creation for Fabric devices. See the `cfgadm_fp(1M)` man page for additional information.

The procedures in this section illustrate how to discover Fabric devices which are visible on a host and to configure and make them available to a Solaris host.

The device information that you supply, and is displayed with the `cfgadm(1M)` command, depends on your system configuration.

This section contains the following procedures:

- “To Discover Fabric Devices Visible on a Host” on page 90
- “To Configure a Fabric Device” on page 91
- “To Unconfigure a Fabric Device” on page 94

- “To Configure All Fabric Devices on a Fabric-Connected Host Port” on page 95
- “To Unconfigure All Fabric Devices on a Fabric-Connected Host Port” on page 97

▼ To Discover Fabric Devices Visible on a Host

Fibre channel host ports `c0` and `c1`, and the devices attached to them, provide an example of discovering Fabric devices. This procedure also shows the device configuration information that can be displayed with the `cfgadm(1M)` command.

Note – If the proper `cfgadm` support for fibre channel devices is not installed, fibre channel devices do not display in the `cfgadm(1M)` command output. In the next examples, only fp attachment point IDs (Ap_Ids) are listed. The attachment points displayed on your system depend on your system configuration.

1. Become superuser.
2. Display information about the attachment points on the system.

```
# cfgadm -l
Ap_Id          Type          Receptacle  Occupant    Condition
c0             fc-fabric    connected   unconfigured unknown
c1             fc-private   connected   configured  unknown
```

In this example, `c0` represents a Fabric-connected host port, and `c1` represents a private, loop-connected host port. Use the `cfgadm(1M)` command to manage the device configuration on Fabric-connected host ports.

By default, the device configuration on private, loop-connected host ports is handled by a Solaris host.

3. Display the information about the host ports and their attached devices.

```
# cfgadm -al
Ap_Id          Type          Receptacle  Occupant    Condition
c0             fc-fabric    connected   unconfigured unknown
c0::50020f2300006077 disk         connected   unconfigured unknown
c0::50020f23000063a9 disk         connected   unconfigured unknown
c0::50020f2300005f24 disk         connected   unconfigured unknown
c0::50020f2300006107 disk         connected   unconfigured unknown
c1             fc-private   connected   configured  unknown
c1::220203708b69c32b disk         connected   configured  unknown
c1::220203708ba7d832 disk         connected   configured  unknown
c1::220203708b8d45f2 disk         connected   configured  unknown
c1::220203708b9b20b2 disk         connected   configured  unknown
```

Note – The `cfgadm -l` commands displays information about fibre channel host ports. Use the `cfgadm -al` command to also display information about fibre channel devices. The lines that include a port World Wide Name in the attachment point ID field associated with `c0` represent a Fabric device. Use the `cfgadm configure` and `unconfigure` commands to manage those devices be made available on Solaris host. The attachment points with port WWN under `c1` represent private-loop devices that are configured through the `c1` host port.

▼ To Configure a Fabric Device

This procedure describes how to configure a Fabric device that is attached to the Fabric-connected host port `c0`.

1. **Become superuser.**
2. **Identify the device to be configured.**

Only the devices on a Fabric-connected host port can be configured.

```
# cfgadm -al
Ap_Id          Type          Receptacle  Occupant    Condition
c0             fc-fabric     connected   unconfigured unknown
c0::50020f2300006077 disk         connected   unconfigured unknown
c0::50020f23000063a9 disk         connected   unconfigured unknown
c0::50020f2300005f24 disk         connected   unconfigured unknown
c0::50020f2300006107 disk         connected   unconfigured unknown
c1             fc-private    connected   configured  unknown
c1::220203708b69c32b disk         connected   configured  unknown
c1::220203708ba7d832 disk         connected   configured  unknown
c1::220203708b8d45f2 disk         connected   configured  unknown
c1::220203708b9b20b2 disk         connected   configured  unknown
```

3. **Configure the Fabric device.**

```
# cfgadm -c configure c0::50020f2300006077
```

4. Verify that the selected Fabric device is configured.

```
# cfgadm -al
Ap_Id                Type          Receptacle  Occupant    Condition
c0                   fc-fabric    connected   configured  unknown
c0::50020f2300006077 disk         connected   configured  unknown
c0::50020f23000063a9 disk         connected   unconfigured unknown
c0::50020f2300005f24 disk         connected   unconfigured unknown
c0::50020f2300006107 disk         connected   unconfigured unknown
c1                   fc-private   connected   configured  unknown
c1::220203708b69c32b disk         connected   configured  unknown
c1::220203708ba7d832 disk         connected   configured  unknown
c1::220203708b8d45f2 disk         connected   configured  unknown
c1::220203708b9b20b2 disk         connected   configured  unknown
```

Notice that the Occupant column of both `c0` and `c0::50020f2300006077` displays as `configured`, indicating that the `c0` port has a configured occupants and that the `c0::50020f2300006077` device is configured.

The device is available on a Solaris host. CODE EXAMPLE 8-1 is an example of the `luxadm(1M)` output. Notice that two devices,

```
/dev/rdsk/c0t50020F2300006077d0s2
```

and

```
/dev/rdsk/c0t50020F2300006077d1s2,
```

are configured for the device represented by `c0::50020f2300006077`. This indicates that the physical device represented by `c0::50020f2300006077` has two LUNs configured.

CODE EXAMPLE 8-1

```
# luxadm display 50020f2300006077
DEVICE PROPERTIES for disk: 50020f2300006077
Status(Port A):      O.K.
Vendor:              SUN
Product ID:          T300
WWN(Node):           50020f2000006077
WWN(Port A):         50020f2300006077
Revision:            0117
Serial Num:          Unsupported
Unformatted capacity: 558448.000 MBytes
Write Cache:         Enabled
Read Cache:          Enabled
Minimum prefetch:    0x0
```

CODE EXAMPLE 8-1 (Continued)

```
Maximum prefetch: 0x0
Device Type:      Disk device
Path(s):
/dev/rdisk/c0t50020F2300006077d1s2

/devices/pci@1f,2000/pci@1/SUNW,qlc@4/fp@0,0/
ssd@w50020f2300006077,1:c,raw

DEVICE PROPERTIES for disk: 50020f2300006077
Status(Port B):  O.K.
Vendor:          SUN
Product ID:     T300
WWN(Node):      50020f2000006077
WWN(Port B):    50020f2300006077
Revision:       0117
Serial Num:     Unsupported
Unformatted capacity: 558448.000 MBytes
Write Cache:    Enabled
Read Cache:     Enabled
  Minimum prefetch: 0x0
  Maximum prefetch: 0x0
Device Type:    Disk device
Path(s):
/dev/rdisk/c0t50020F2300006077d0s2
/devices/pci@1f,2000/pci@1/SUNW,qlc@4/fp@0,0/
ssd@w50020f2300006077,0:c,raw
```

▼ To Unconfigure a Fabric Device

This procedure describes how to unconfigure a Fabric device that is attached to the Fabric-connected host port c0.

1. **Become superuser.**
2. **Identify the device to be unconfigured.**

Only the devices on a Fabric-connected host port can be unconfigured.

```
# cfgadm -al
Ap_Id          Type          Receptacle  Occupant    Condition
c0             fc-fabric    connected   configured  unknown
c0::50020f2300006077 disk         connected   configured  unknown
c0::50020f23000063a9 disk         connected   configured  unknown
c0::50020f2300005f24 disk         connected   configured  unknown
c0::50020f2300006107 disk         connected   configured  unknown
c1             fc-private   connected   configured  unknown
c1::220203708b69c32b disk         connected   configured  unknown
c1::220203708ba7d832 disk         connected   configured  unknown
c1::220203708b8d45f2 disk         connected   configured  unknown
c1::220203708b9b20b2 disk         connected   configured  unknown
```

3. **Unconfigure the Fabric device.**

Note – Before you unconfigure a Fabric device, stop all activity to the device and unmount any filesystems on the Fabric device. If the device is under any volume manager's control, see the documentation for your volume manager for maintaining the Fabric device.

```
# cfgadm -c unconfigure c0::50020f2300006077
```

4. Verify that the selected Fabric device is unconfigured.

```
# cfgadm -al
```

Ap_Id	Type	Receptacle	Occupant	Condition
c0	fc-fabric	connected	configured	unknown
c0::50020f2300006077	disk	connected	unconfigured	unknown
c0::50020f23000063a9	disk	connected	configured	unknown
c0::50020f2300005f24	disk	connected	configured	unknown
c0::50020f2300006107	disk	connected	configured	unknown
c1	fc-private	connected	configured	unknown
c1::220203708b69c32b	disk	connected	configured	unknown
c1::220203708ba7d832	disk	connected	configured	unknown
c1::220203708b8d45f2	disk	connected	configured	unknown
c1::220203708b9b20b2	disk	connected	configured	unknown

▼ To Configure All Fabric Devices on a Fabric-Connected Host Port

This procedure describes how to configure all unconfigured Fabric devices that are attached to the Fabric-connected host port.

1. Become superuser.
2. Identify the device to be configured.

```
# cfgadm -al
```

Ap_Id	Type	Receptacle	Occupant	Condition
c0	fc-fabric	connected	unconfigured	unknown
c0::50020f2300006077	disk	connected	unconfigured	unknown
c0::50020f23000063a9	disk	connected	unconfigured	unknown
c0::50020f2300005f24	disk	connected	unconfigured	unknown
c0::50020f2300006107	disk	connected	unconfigured	unknown
c1	fc-private	connected	configured	unknown
c1::220203708b69c32b	disk	connected	configured	unknown
c1::220203708ba7d832	disk	connected	configured	unknown
c1::220203708b8d45f2	disk	connected	configured	unknown
c1::220203708b9b20b2	disk	connected	configured	unknown

3. Configure all of the unconfigured devices on the selected port.

Note – Stop all device activity to each Fabric device on the selected port and unmount any filesystems on each Fabric device. If the device is under any volume manager’s control, see the documentation for your volume manager for maintaining the Fabric device.

```
# cfgadm -c configure c0
```

Note – This operation repeats the configuration operation of an individual device for all the devices on c0, and may be time consuming if the number of devices on c0 is large.

4. Verify that all devices on c0 are configured.

```
# cfgadm -al
```

Ap_Id	Type	Receptacle	Occupant	Condition
c0	fc-fabric	connected	configured	unknown
c0::50020f2300006077	disk	connected	configured	unknown
c0::50020f23000063a9	disk	connected	configured	unknown
c0::50020f2300005f24	disk	connected	configured	unknown
c0::50020f2300006107	disk	connected	configured	unknown
c1	fc-private	connected	configured	unknown
c1::220203708b69c32b	disk	connected	configured	unknown
c1::220203708ba7d832	disk	connected	configured	unknown
c1::220203708b8d45f2	disk	connected	configured	unknown
c1::220203708b9b20b2	disk	connected	configured	unknown

▼ To Unconfigure All Fabric Devices on a Fabric-Connected Host Port

This procedure describes how to unconfigure all configured Fabric devices that are attached to a Fabric-connected host port.

1. **Become superuser.**
2. **Identify the Fabric devices to be unconfigured.**

Only the devices on a Fabric-connected host port can be unconfigured.

```
# cfgadm -al
Ap_Id                Type                Receptacle  Occupant  Condition
c0                   fc-fabric          connected   configured unknown
c0::50020f2300006077 disk                connected   configured unknown
c0::50020f23000063a9 disk                connected   configured unknown
c0::50020f2300005f24 disk                connected   configured unknown
c0::50020f2300006107 disk                connected   configured unknown
c1                   fc-private         connected   configured unknown
c1::220203708b69c32b disk                connected   configured unknown
c1::220203708ba7d832 disk                connected   configured unknown
c1::220203708b8d45f2 disk                connected   configured unknown
c1::220203708b9b20b2 disk                connected   configured unknown
```

3. **Unconfigure all of the configured Fabric devices on a selected port.**

```
# cfgadm -c unconfigure c0
```

Note – This operation repeats the `unconfigure` operation of an individual device for all the devices on `c0`, and it can be time consuming if the number of devices on `c0` is large.

4. Verify that all the devices on c0 are unconfigured.

```
# cfgadm -al
Ap_Id                Type                Receptacle  Occupant  Condition
c0                   fc-fabric          connected   unconfigured unknown
c0::50020f2300006077 disk                connected   unconfigured unknown
c0::50020f23000063a9 disk                connected   unconfigured unknown
c0::50020f2300005f24 disk                connected   unconfigured unknown
c0::50020f2300006107 disk                connected   unconfigured unknown
c1                   fc-private         connected   configured  unknown
c1::220203708b69c32b disk                connected   configured  unknown
c1::220203708ba7d832 disk                connected   configured  unknown
c1::220203708b8d45f2 disk                connected   configured  unknown
c1::220203708b9b20b2 disk                connected   configured  unknown
```

Notice that the Occupant column of c0 and all the Fabric devices attached to it are displayed as unconfigured.

Creating Device Nodes With the Sun StorEdge Traffic Manager Software Enabled

This section describes how to perform Fabric device configuration steps on a host that has the Sun StorEdge Traffic Manager software enabled. For details on enabling Sun StorEdge Traffic Manager software, refer to “Managing Sun StorEdge Traffic Manager with a Volume Manager” on page 117.

The devices that are attached to Fabric-connected HBA port are not configured by default. These devices are thus not available to the Solaris host when a host port is initially connected to a Fabric. The procedures in this section illustrate steps to discover Fabric devices that are visible on a host and to configure them to make them available to the Solaris host as Sun StorEdge Traffic Manager devices.

The device information that you supply, and is displayed with the `cfgadm (1M)` command, depends on your system configuration. (For more information on the `cfgadm` command, see the `cfgadm_fp (1M)` and `cfgadm (1M)` man pages.)

This section contains the following procedures:

- “To Discover Fabric Devices Visible to a Host” on page 99
- “To Configure a Fabric-Connected Device as a Sun StorEdge Traffic Manager Device” on page 101
- “To Unconfigure a Fabric Device Associated With Sun StorEdge Traffic Manager Devices” on page 104
- “To Unconfigure a Path to Multipathed Sun StorEdge Traffic Manager Devices” on page 106
- “To Configure All Fabric-Connected Devices on a Sun StorEdge Traffic Manager Enabled Host Port” on page 109
- “To Unconfigure All Fabric-Connected Devices on Sun StorEdge Traffic Manager Enabled Ports” on page 114

▼ To Discover Fabric Devices Visible to a Host

This example shows fibre channel host ports `c0`, `c1`, and `c2` and the devices attached to them. It illustrates Fabric device discovery and device configuration using the `cfgadm (1M)` command.

Note – If the proper `cfgadm` support for fibre channel device is not installed, fibre channel devices will not be displayed in the `cfgadm (1M)` command output. In the following examples, only `fp` attachment points are listed. The attachment points displayed on your system depend on your system configuration.

1. Become superuser.

2. Display information about the attachment points on the system.

```
# cfgadm -l
Ap_Id          Type          Receptacle  Occupant    Condition
c0             fc-fabric    connected   unconfigured unknown
c1             fc-private   connected   configured  unknown
c2             fc-fabric    connected   unconfigured unknown
```

An attachment point id (Ap_Id) on a Fabric-connected host port is a path to a Sun StorEdge Traffic Manager device. In this example, c0 and c2 represent Fabric-connected host ports and c1 represents a private, loop-connected host port. Use the `cfgadm (1M)` command to manage the device configuration on Fabric-connected host ports.

The device configuration on private, loop-connected host ports is handled by a Solaris host by default.

3. Display information about host ports and their attached devices on the system.

```
# cfgadm -al
Ap_Id          Type          Receptacle  Occupant    Condition
c0             fc-fabric    connected   unconfigured unknown
c0::50020f2300006077 disk          connected   unconfigured unknown
c0::50020f23000063a9 disk          connected   unconfigured unknown
c1             fc-private   connected   configured  unknown
c1::220203708b69c32b disk          connected   configured  unknown
c1::220203708ba7d832 disk          connected   configured  unknown
c1::220203708b8d45f2 disk          connected   configured  unknown
c1::220203708b9b20b2 disk          connected   configured  unknown
c2             fc-fabric    connected   unconfigured unknown
c2::50020f2300005f24 disk          connected   unconfigured unknown
c2::50020f2300006107 disk          connected   unconfigured unknown
```

Note – The `cfgadm -l` command displays information about fibre channel host ports. Use the `cfgadm -al` command to also display information about fibre channel devices. The attachment point IDs with that output include: port World Wide Names associated with c0, and Fabric devices, which have c2 attachment point IDs. Those devices should be managed by the `cfgadm configure` and `unconfigure` commands to be made available on a Solaris host. The attachment point IDs with port WWN under c1 represent private, loop-devices that are configured by default.

In the previous example, host ports `c0` and `c2` are connected to the two ports of a Sun StorEdge T3 enterprise array, which has two port WWNs associated with it: attachment point IDs `50020f2300006077` and `50020f2300006107`.

▼ To Configure a Fabric-Connected Device as a Sun StorEdge Traffic Manager Device

This example uses Fabric-connected host ports `c0` and `c2` to configure Fabric devices as Sun StorEdge Traffic Manager devices on a host that has the Sun StorEdge Traffic Manager software enabled.

Note that whether a Solaris host has the Sun StorEdge Traffic Manager software enabled or not, the configure operation for Fabric devices is identical, but the result of the operation is different. When the Sun StorEdge Traffic Manager software is enabled, the Solaris host creates device node and path information that includes Sun StorEdge Traffic Manager information.

1. Become superuser.
2. Identify the port WWN of the device to be configured as a Sun StorEdge Traffic Manager device.

Only the devices on a Fabric-connected host port can be configured through the `cfgadm configure` command.

CODE EXAMPLE 8-2

```
# cfgadm -al
```

Ap_Id	Type	Receptacle	Occupant	Condition
<code>c0</code>	<code>fc-fabric</code>	<code>connected</code>	<code>unconfigured</code>	<code>unknown</code>
<code>c0::50020f2300006077</code>	<code>disk</code>	<code>connected</code>	<code>unconfigured</code>	<code>unknown</code>
<code>c0::50020f23000063a9</code>	<code>disk</code>	<code>connected</code>	<code>unconfigured</code>	<code>unknown</code>
<code>c1</code>	<code>fc-private</code>	<code>connected</code>	<code>configured</code>	<code>unknown</code>
<code>c1::220203708b69c32b</code>	<code>disk</code>	<code>connected</code>	<code>configured</code>	<code>unknown</code>
<code>c1::220203708ba7d832</code>	<code>disk</code>	<code>connected</code>	<code>configured</code>	<code>unknown</code>
<code>c1::220203708b8d45f2</code>	<code>disk</code>	<code>connected</code>	<code>configured</code>	<code>unknown</code>
<code>c1::220203708b9b20b2</code>	<code>disk</code>	<code>connected</code>	<code>configured</code>	<code>unknown</code>
<code>c2</code>	<code>fc-fabric</code>	<code>connected</code>	<code>unconfigured</code>	<code>unknown</code>
<code>c2::50020f2300005f24</code>	<code>disk</code>	<code>connected</code>	<code>unconfigured</code>	<code>unknown</code>
<code>c2::50020f2300006107</code>	<code>disk</code>	<code>connected</code>	<code>unconfigured</code>	<code>unknown</code>

In CODE EXAMPLE 8-2, the `c0::50020f2300006077` and `c2::50020f2300006107` attachment point IDs (Ap_IDs) represent the same device with different port WWNs, such as a Sun StorEdge T3 enterprise array. The `c0` and `c2` host ports are ports that are enabled for use by the Sun StorEdge Traffic Manager software.

3. Configure Fabric devices and create Sun StorEdge Traffic Manager devices.

```
# cfgadm -c configure c0::50020f2300006077 c2::50020f2300006107
```

4. Verify that the selected devices are configured.

```
# cfgadm -al
Ap_Id                Type                Receptacle  Occupant  Condition
c0                   fc-fabric          connected   configured unknown
c0::50020f2300006077 disk                connected   configured unknown
c0::50020f23000063a9 disk                connected   unconfigured unknown
c1                   fc-private         connected   configured unknown
c1::220203708b69c32b disk                connected   configured unknown
c1::220203708ba7d832 disk                connected   configured unknown
c1::220203708b8d45f2 disk                connected   configured unknown
c1::220203708b9b20b2 disk                connected   configured unknown
c2                   fc-fabric          connected   configured unknown
c2::50020f2300005f24 disk                connected   unconfigured unknown
c2::50020f2300006107 disk                connected   configured unknown
```

Notice that the Occupant column of both `c0` and `c0::50020f2300006077` specifies `configured`, indicating that the `c0` port has configured occupants and that the `c0::50020f2300006077` device is configured. The same change has been made on `c2` and `c2::50020f2300006107`.

After the `cfgadm -c configure` command completes without an error, the Sun StorEdge Traffic Manager devices are created on the Solaris host. CODE EXAMPLE 8-3 shows output for a Sun StorEdge T3 enterprise array. Notice that two Sun StorEdge Traffic Manager devices,

```
/dev/rdisk/c6t60020F20000061073AC8B52D000B74A3d0s2
```

and

```
/dev/rdisk/c6t60020F20000061073AC8B4C50004ED3Ad0s2,
```

are created for the device represented by `c0::50020f2300006077` and `c2::50020f2300006107`. This indicates that the physical device represented by `c0::50020f2300006077` and `c2::50020f2300006107` has two LUNs configured.

CODE EXAMPLE 8-3

```
# luxadm display 50020f2300006077
DEVICE PROPERTIES for disk: 50020f2300006077
Status(Port A):      O.K.
Status(Port B):      O.K.
```

CODE EXAMPLE 8-3 (Continued)

```
Vendor:                SUN
Product ID:           T300
WWN(Node):            50020f2000006077
WWN(Port A):          50020f2300006077
WWN(Port B):          50020f2300006107
Revision:             0117
Serial Num:           Unsupported
Unformatted capacity: 558448.000 MBytes
Write Cache:          Enabled
Read Cache:           Enabled
  Minimum prefetch:   0x0
  Maximum prefetch:   0x0
Device Type:          Disk device
Path(s):
/dev/rdsk/c6t60020F20000061073AC8B52D000B74A3d0s2
/devices/scsi_vhci/ssd@g60020f20000061073ac8b52d000b74a3:c,raw
Controller             /devices/pci@1f,2000/pci@1/SUNW,qlc@4/fp@0,0
  Device Address       50020f2300006107,1
  Class                secondary
  State                STANDBY
Controller             /devices/pci@1f,2000/pci@1/SUNW,qlc@5/fp@0,0
  Device Address       50020f2300006077,1
  Class                primary
  State                ONLINE

DEVICE PROPERTIES for disk: 50020f2300006077
Status(Port A):        O.K.
Status(Port B):        O.K.
Vendor:                SUN
Product ID:           T300
WWN(Node):            50020f2000006107
WWN(Port A):          50020f2300006107
WWN(Port B):          50020f2300006077
Revision:             0117
Serial Num:           Unsupported
Unformatted capacity: 558448.000 MBytes
Write Cache:          Enabled
Read Cache:           Enabled
  Minimum prefetch:   0x0
  Maximum prefetch:   0x0
Device Type:          Disk device
Path(s):
/dev/rdsk/c6t60020F20000061073AC8B4C50004ED3Ad0s2
```

CODE EXAMPLE 8-3 (Continued)

```
/devices/scsi_vhci/ssd@g60020f20000061073ac8b4c50004ed3a:c,raw
Controller          /devices/pci@1f,2000/pci@1/SUNW,qlc@4/fp@0,0
  Device Address    50020f2300006107,0
  Class             primary
  State             ONLINE
Controller          /devices/pci@1f,2000/pci@1/SUNW,qlc@5/fp@0,0
  Device Address    50020f2300006077,0
  Class             secondary
  State             STANDBY
```

Note – The `luxadm (1M)` output on `50020f2300006107` will show the same information as the previous display.

▼ To Unconfigure a Fabric Device Associated With Sun StorEdge Traffic Manager Devices

This example shows a Fabric-connected host ports `c0` and `c2` to illustrate how to unconfigure Fabric devices associated with Sun StorEdge Traffic Manager devices.

Note – Whether Sun StorEdge Traffic Manager is enabled or not, the unconfigure operation for Fabric devices is identical but the result of the operation is different. When the Sun Storage Traffic Manager software is enabled, the Solaris host creates device node and path information that includes Sun StorEdge Traffic Manager information.

1. **Become superuser.**
2. **Identify the port WWN of the Fabric device to be unconfigured.**

You can obtain port WWNs of Sun StorEdge T3 arrays by using the Sun StorEdge Component Manager software.

Only the devices on a Fabric-connected host port can be unconfigured through the `cfgadm unconfigure` command.

```
# cfgadm -al
Ap_Id          Type          Receptacle  Occupant    Condition
c0             fc-fabric    connected   configured  unknown
c0::50020f2300006077 disk         connected   configured  unknown
c0::50020f23000063a9 disk         connected   configured  unknown
c1             fc-private   connected   configured  unknown
c1::220203708b69c32b disk         connected   configured  unknown
c1::220203708ba7d832 disk         connected   configured  unknown
c1::220203708b8d45f2 disk         connected   configured  unknown
c1::220203708b9b20b2 disk         connected   configured  unknown
c2             fc-fabric    connected   configured  unknown
c2::50020f2300005f24 disk         connected   configured  unknown
c2::50020f2300006107 disk         connected   configured  unknown
```

In this example, the `c0::50020f2300006077` and `c2::50020f2300006107` attachment point IDs represent different port WWNs for the same device associated with a Sun StorEdge Traffic Manager device.

3. Unconfigure the Fabric device associated with the Sun StorEdge Traffic Manager device.

Note – Stop all device activity to each Fabric device on the selected port and unmount any filesystems on each Fabric device. If the device is under any volume manager’s control, see the documentation for your volume manager for maintaining the Fabric device.

```
# cfgadm -c unconfigure c0::50020f2300006077 c2::50020f2300006107
```

4. Verify that the selected devices are unconfigured.

CODE EXAMPLE 8-4

```
# cfgadm -al
Ap_Id                Type          Receptacle  Occupant    Condition
c0                   fc-fabric     connected   configured  unknown
c0::50020f2300006077 disk          connected   unconfigured unknown
c0::50020f23000063a9 disk          connected   configured  unknown
c1                   fc-private    connected   configured  unknown
c1::220203708b69c32b disk          connected   configured  unknown
c1::220203708ba7d832 disk          connected   configured  unknown
c1::220203708b8d45f2 disk          connected   configured  unknown
c1::220203708b9b20b2 disk          connected   configured  unknown
c2                   fc-fabric     connected   configured  unknown
c2::50020f2300005f24 disk          connected   configured  unknown
c2::50020f2300006107 disk          connected   unconfigured unknown
```

5. Notice that **c0::50020f2300006077** and **c2::50020f2300006107** are unconfigured. The Occupant column of c0 and c2 still displays them as configured because they have other configured occupants.

The Sun StorEdge Traffic Manager devices associated with those two attachment point IDs are no longer available to the Solaris host. In CODE EXAMPLE 8-4, the two Sun StorEdge Traffic Manager devices,

```
/dev/rdisk/c6t60020F20000061073AC8B52D000B74A3d0s2
```

and

```
/dev/rdisk/c6t60020F20000061073AC8B4C50004ED3Ad0s2,
```

would be removed from the host.

▼ To Unconfigure a Path to Multipathed Sun StorEdge Traffic Manager Devices

In “To Unconfigure a Fabric Device Associated With Sun StorEdge Traffic Manager Devices” on page 104, a Sun StorEdge T3 enterprise array is connected to the Solaris host by way of two attachment point IDs, **c0::50020f2300006077** and **c2::50020f2300006107**. For the Sun StorEdge Traffic Manager enabled host, each attachment point ID is associated with the path to a Sun StorEdge Traffic Manager device that represent the physical Sun StorEdge T3 enterprise array.

1. **Become superuser.**
2. **Identify the attachment point ID of the Sun StorEdge Traffic Manager device to be unconfigured.**

An attachment point id (Ap_Id) on a Fabric-connected host port is a path to a Sun StorEdge Traffic Manager device. Only the devices on a Fabric-connected host port can be unconfigured through the `cfgadm unconfigure` command.

CODE EXAMPLE 8-5

```
# cfgadm -al
Ap_Id                Type           Receptacle    Occupant    Condition
c0                   fc-fabric     connected     configured  unknown
c0::50020f2300006077 disk          connected     configured  unknown
c0::50020f23000063a9 disk          connected     configured  unknown
c1                   fc-private    connected     configured  unknown
c1::220203708b69c32b disk          connected     configured  unknown
c1::220203708ba7d832 disk          connected     configured  unknown
c1::220203708b8d45f2 disk          connected     configured  unknown
c1::220203708b9b20b2 disk          connected     configured  unknown
c2                   fc-fabric     connected     configured  unknown
c2::50020f2300005f24 disk          connected     configured  unknown
c2::50020f2300006107 disk          connected     configured  unknown
```

In CODE EXAMPLE 8-5, `c0::50020f2300006077` and `c2::50020f2300006107` attachment point IDs represent different port WWNs for the same device such as a Sun StorEdge T3 enterprise array.

3. Unconfigure the attachment point ID associated with Sun StorEdge Traffic Manager device.

Note – If the attachment point ID represents the last configured path to the Sun StorEdge Traffic Manager device, stop all activity to it and unmount any filesystems on it. If the device is under any volume manager’s control, see the documentation for your volume manager for maintaining the Fabric device.

```
# cfgadm -c unconfigure c2::50020f2300006107
```

4. Verify that the selected device is unconfigured.

```
# cfgadm -al
Ap_Id                Type                Receptacle  Occupant  Condition
c0                   fc-fabric          connected   configured unknown
c0::50020f2300006077 disk                connected   configured unknown
c0::50020f23000063a9 disk                connected   configured unknown
c1                   fc-private         connected   configured unknown
c1::220203708b69c32b disk                connected   configured unknown
c1::220203708ba7d832 disk                connected   configured unknown
c1::220203708b8d45f2 disk                connected   configured unknown
c1::220203708b9b20b2 disk                connected   configured unknown
c2                   fc-fabric          connected   configured unknown
c2::50020f2300005f24 disk                connected   configured unknown
c2::50020f2300006107 disk                connected   unconfigured unknown
```

The Sun StorEdge Traffic Manager devices associated with that attachment point ID are still available to a Solaris host through the path represented by `c0::50020f2300006077`.

CODE EXAMPLE 8-6 shows example output you would see for the Sun StorEdge Traffic Manager device if you use the `luxadm(1M)` command after performing this procedure. Notice that only the path represented by `c0::50020f2300006077` is displayed for Sun StorEdge Traffic Manager devices

```
/dev/rdisk/c6t60020F20000061073AC8B52D000B74A3d0s2
```

and

```
/dev/rdisk/c6t60020F20000061073AC8B4C50004ED3Ad0s2.
```

CODE EXAMPLE 8-6

```
# luxadm display 50020f2300006077
DEVICE PROPERTIES for disk: 50020f2300006077
  Status(Port A):      O.K.
  Vendor:              SUN
  Product ID:         T300
  WWN(Node):          50020f2000006077
  WWN(Port A):        50020f2300006077
  Revision:           0117
  Serial Num:         Unsupported
  Unformatted capacity: 558448.000 MBytes
  Write Cache:        Enabled
  Read Cache:         Enabled
  Minimum prefetch:   0x0
```

CODE EXAMPLE 8-6 (Continued)

```
Maximum prefetch: 0x0
Device Type:      Disk device
Path(s):
/dev/rdsk/c6t60020F20000061073AC8B52D000B74A3d0s2
/devices/scsi_vhci/ssd@g60020f20000061073ac8b52d000b74a3:c,raw
Controller       /devices/pci@1f,2000/pci@1/SUNW,qlc@5/fp@0,0
  Device Address  50020f2300006077,1
  Class           primary
  State           ONLINE

DEVICE PROPERTIES for disk: 50020f2300006077
Status(Port B):  O.K.
Vendor:          SUN
Product ID:     T300
WWN(Node):      50020f2000006077
WWN(Port B):    50020f2300006077
Revision:       0117
Serial Num:     Unsupported
Unformatted capacity: 558448.000 MBytes
Write Cache:    Enabled
Read Cache:     Enabled
  Minimum prefetch: 0x0
  Maximum prefetch: 0x0
Device Type:    Disk device
Path(s):
/dev/rdsk/c6t60020F20000061073AC8B4C50004ED3Ad0s2
/devices/scsi_vhci/ssd@g60020f20000061073ac8b4c50004ed3a:c,raw
Controller     /devices/pci@1f,2000/pci@1/SUNW,qlc@5/fp@0,0
  Device Address 50020f2300006077,0
  Class          secondary
  State          ONLINE
```

▼ **To Configure All Fabric-Connected Devices on a Sun StorEdge Traffic Manager Enabled Host Port**

In this example, an attachment point id (Ap_Id) on a Fabric-connected host port is a path to a Sun StorEdge Traffic Manager device. Configuring an attachment point ID on a Sun StorEdge Traffic Manager device has already been configured through another attachment point ID will result in an additional path to the previously configured device; but, a new Solaris device is not created in this case. Note that a new Solaris device is not created in this case. A Solaris device is created only the first time an attachment point ID to a corresponding Sun StorEdge Traffic Manager device is configured.

1. Become superuser.

2. Identify a Fabric-connected host port to be configured.

```
# cfgadm -al
Ap_Id          Type          Receptacle  Occupant    Condition
c0             fc-fabric    connected   configured  unknown
c0::50020f2300006077 disk         connected   configured  unknown
c0::50020f23000063a9 disk         connected   configured  unknown
c1             fc-private   connected   configured  unknown
c1::220203708b69c32b disk         connected   configured  unknown
c1::220203708ba7d832 disk         connected   configured  unknown
c1::220203708b8d45f2 disk         connected   configured  unknown
c1::220203708b9b20b2 disk         connected   configured  unknown
c2             fc-fabric    connected   unconfigured unknown
c2::50020f2300005f24 disk         connected   unconfigured unknown
c2::50020f2300006107 disk         connected   unconfigured unknown
```

Devices represented by attachment point IDs `c0::50020f2300006077` and `c2::50020f2300006107` are two paths to the same physical device, with `c0::50020f2300006077` already being configured. The `luxadm display` in CODE EXAMPLE 8-7 shows the Solaris device associated with this path. One path is configured.

CODE EXAMPLE 8-7

```
# luxadm display 50020f2300006077
DEVICE PROPERTIES for disk: 50020f2300006077
Status(Port A):      O.K.
Vendor:              SUN
Product ID:          T300
WWN(Node):           50020f2000006077
WWN(Port A):         50020f2300006077
Revision:            0117
Serial Num:          Unsupported
Unformatted capacity: 558448.000 MBytes
Write Cache:         Enabled
Read Cache:          Enabled
  Minimum prefetch:  0x0
  Maximum prefetch:  0x0
Device Type:         Disk device
Path(s):
/dev/rdsk/c6t60020F20000061073AC8B52D000B74A3d0s2
/devices/scsi_vhci/ssd@g60020f20000061073ac8b52d000b74a3:c,raw
Controller           /devices/pci@1f,2000/pci@1/SUNW,qlc@5/fp@0,0
```

CODE EXAMPLE 8-7 (Continued)

```
Device Address      50020f2300006077,1
Class               primary
State               ONLINE

DEVICE PROPERTIES for disk: 50020f2300006077
Status(Port B):    O.K.
Vendor:            SUN
Product ID:        T300
WWN(Node):         50020f2000006077
WWN(Port B):       50020f2300006077
Revision:          0117
Serial Num:        Unsupported
Unformatted capacity: 558448.000 MBytes
Write Cache:       Enabled
Read Cache:        Enabled
  Minimum prefetch: 0x0
  Maximum prefetch: 0x0
Device Type:       Disk device
Path(s):
/dev/rdisk/c6t60020F20000061073AC8B4C50004ED3Ad0s2
/devices/scsi_vhci/ssd@g60020f20000061073ac8b4c50004ed3a:c,raw
Controller         /devices/pci@1f,2000/pci@1/SUNW,qlc@5/fp@0,0
  Device Address    50020f2300006077,0
  Class             secondary
  State             ONLINE
```

3. Configure all of the unconfigured devices on the selected port.

```
# cfgadm -c configure c2
```

Note – This operation repeats the configuration operation of an individual device for all the devices on *c2*, and it can be time-consuming if the number of devices on *c2* is large.

4. Verify that all devices on c2 are configured.

```
# cfgadm -al
Ap_Id                Type                Receptacle  Occupant  Condition
c0                   fc-fabric          connected   configured unknown
c0::50020f2300006077 disk                connected   configured unknown
c0::50020f23000063a9 disk                connected   configured unknown
c1                   fc-private         connected   configured unknown
c1::220203708b69c32b disk                connected   configured unknown
c1::220203708ba7d832 disk                connected   configured unknown
c1::220203708b8d45f2 disk                connected   configured unknown
c1::220203708b9b20b2 disk                connected   configured unknown
c2                   fc-fabric          connected   configured unknown
c2::50020f2300005f24 disk                connected   configured unknown
c2::50020f2300006107 disk                connected   configured unknown
```

Notice that the Occupant column of both c2 and all of the devices under c2 as configured.

Compare the luxadm output in CODE EXAMPLE 8-8 with that in CODE EXAMPLE 8-7 on page 110. Notice the addition of a new path to the Sun StorEdge Traffic Manager device.

CODE EXAMPLE 8-8

```
# luxadm display 50020f2300006077
DEVICE PROPERTIES for disk: 50020f2300006077
Status(Port A):      O.K.
Status(Port B):      O.K.
Vendor:              SUN
Product ID:          T300
WWN(Node):           50020f2000006077
WWN(Port A):         50020f2300006077
WWN(Port B):         50020f2300006107
Revision:            0117
Serial Num:          Unsupported
Unformatted capacity: 558448.000 MBytes
Write Cache:         Enabled
Read Cache:          Enabled
  Minimum prefetch:  0x0
  Maximum prefetch:  0x0
Device Type:         Disk device
Path(s):
/dev/rdisk/c6t60020F20000061073AC8B52D000B74A3d0s2
/devices/scsi_vhci/ssd@g60020f20000061073ac8b52d000b74a3:c,raw
```

CODE EXAMPLE 8-8 (Continued)

```
Controller          /devices/pci@1f,2000/pci@1/SUNW,qlc@4/fp@0,0
  Device Address    50020f2300006107,1
  Class             secondary
  State             STANDBY
Controller          /devices/pci@1f,2000/pci@1/SUNW,qlc@5/fp@0,0
  Device Address    50020f2300006077,1
  Class             primary
  State             ONLINE

DEVICE PROPERTIES for disk: 50020f2300006077
Status(Port A):     O.K.
Status(Port B):     O.K.
Vendor:             SUN
Product ID:         T300
WWN(Node):          50020f2000006107
WWN(Port A):        50020f2300006107
WWN(Port B):        50020f2300006077
Revision:           0117
Serial Num:         Unsupported
Unformatted capacity: 558448.000 MBytes
Write Cache:        Enabled
Read Cache:         Enabled
  Minimum prefetch: 0x0
  Maximum prefetch: 0x0
Device Type:        Disk device
Path(s):
/dev/rdisk/c6t60020F20000061073AC8B4C50004ED3Ad0s2
/devices/scsi_vhci/ssd@g60020f20000061073ac8b4c50004ed3a:c,raw
Controller          /devices/pci@1f,2000/pci@1/SUNW,qlc@4/fp@0,0
  Device Address    50020f2300006107,0
  Class             primary
  State             ONLINE
Controller          /devices/pci@1f,2000/pci@1/SUNW,qlc@5/fp@0,0
  Device Address    50020f2300006077,0
  Class             secondary
  State             STANDBY
```

▼ To Unconfigure All Fabric-Connected Devices on Sun StorEdge Traffic Manager Enabled Ports

Note – Whether Sun StorEdge Traffic Manager is enabled or not, the unconfigure operation for Fabric devices is identical, but the result of the operation is different. When Sun StorEdge Traffic Manager is enabled, Solaris removes Sun StorEdge Traffic Manager related path or device node information.

An attachment point id (Ap_Id) on a Fabric-connected host port is a path to a Sun StorEdge Traffic Manager device.

When a Sun StorEdge Traffic Manager device has multiple attachment point IDs connected to it, the device is still available to the Solaris host after you unconfigure the attachment point ID. When no additional paths remain after you unconfigure the last attachment point ID, the Sun StorEdge Manager device is unavailable to the Solaris host.

1. **Become superuser.**
2. **Identify the device to be unconfigured.**

Only the devices on a Fabric-connected host port can be unconfigured.

```
# cfgadm -al
Ap_Id                Type           Receptacle  Occupant    Condition
c0                   fc-fabric     connected   configured  unknown
c0::50020f2300006077 disk           connected   configured  unknown
c0::50020f23000063a9 disk           connected   configured  unknown
c1                   fc-private    connected   configured  unknown
c1::220203708b69c32b disk           connected   configured  unknown
c1::220203708ba7d832 disk           connected   configured  unknown
c1::220203708b8d45f2 disk           connected   configured  unknown
c1::220203708b9b20b2 disk           connected   configured  unknown
c2                   fc-fabric     connected   configured  unknown
c2::50020f23000005f24 disk           connected   configured  unknown
c2::50020f2300006107 disk           connected   configured  unknown
```

3. **Unconfigure all of the configured devices on a selected port.**

```
# cfgadm -c unconfigure c2
```

Note – This operation repeats the `unconfigure` command of an individual device for all the all devices on `c2`, and it can be time consuming if the number of devices on `c2` is large

4. Verify that all of the devices on `c2` are unconfigured.

```
# cfgadm -al
```

Ap_Id	Type	Receptacle	Occupant	Condition
c0	fc-fabric	connected	configured	unknown
c0::50020f2300006077	disk	connected	configured	unknown
c0::50020f23000063a9	disk	connected	configured	unknown
c1	fc-private	connected	configured	unknown
c1::220203708b69c32b	disk	connected	configured	unknown
c1::220203708ba7d832	disk	connected	configured	unknown
c1::220203708b8d45f2	disk	connected	configured	unknown
c1::220203708b9b20b2	disk	connected	configured	unknown
c2	fc-fabric	connected	unconfigured	unknown
c2::50020f2300005f24	disk	connected	unconfigured	unknown
c2::50020f2300006107	disk	connected	unconfigured	unknown

Notice that the Occupant column of `c2` and all the devices attached to it are listed as unconfigured.

Managing the SAN

This chapter explains how to manage the SAN system. For information about managing device-node creation on SANs, see “Creating On-Demand Device Nodes on Hosts for Fabric Configurations” on page 89. The scope of this chapter is limited to the operations required from the perspective of the Solaris operating environment. It does *not* cover other aspects such as device availability and device-specific management. If devices are managed by other software, such as a volume manager, please refer to the respective product documentation for additional instructions.

This chapter contains the following topics:

- “Managing Sun StorEdge Traffic Manager with a Volume Manager” on page 117
- “Managing Switch Zones” on page 119
- “Rezoning Hosts and Arrays” on page 119
- “Adding Storage Devices” on page 123
- “Removing Storage Devices” on page 124
- “Managing Fabric Devices Through Dynamic Reconfiguration” on page 126
- “Managing IP Networks Over Fibre Channel Networks” on page 127
- “Managing IP Networks in a SAN” on page 128

Managing Sun StorEdge Traffic Manager with a Volume Manager

This section contains the following topics:

- “Managing Without a Volume Manager” on page 118
- “Managing With VxVM/VxDMP” on page 118
- “Managing With the Solstice DiskSuite Software” on page 118

Managing Without a Volume Manager

You can use the Sun StorEdge Traffic Manager software to manage multiple paths to a device.

1. **Install the drivers.**
2. **Enable the Sun StorEdge Traffic Manager software system-wide by setting the `mpxio-disable` field in the `/kernel/drv/scsi_vhci.conf` file to “no”.**
Additional explanation of this file is provided in the *Sun StorEdge Traffic Manager Installation and Configuration Guide*.
3. **Configure each Fibre Channel host adapter on the system to either use or not use this feature.**

You do this by setting the `mpxio-disable` flag in the `.conf` file for each adapter (for example, `/kernel/drv/qlc.conf`) to “no” or “yes”.

This procedure is described in detail in the *Sun StorEdge Traffic Manager Installation and Configuration Guide*.

Managing With VxVM/VxDMP

You can manage the Sun StorEdge Traffic Manager software with VxVM versions 3.2 and later using the same techniques you would use on a system without VxVM, as described in the previous section.

The Sun StorEdge Traffic Manager software does not support VxVM versions previous to version 3.2.

Managing With the Solstice DiskSuite Software

If you are using the Solstice DiskSuite software as your volume manager, you must unconfigure it and then reconfigure it after you have enabled the Sun StorEdge Traffic Manager software. The Sun StorEdge Traffic Manager software renames the storage devices that Solstice DiskSuite uses. This process is not difficult, and it is described in the *Sun StorEdge Traffic Manager Installation and Configuration Guide*.



Caution – This process can result in data loss if done incorrectly.

Managing Switch Zones

For the following topics, see the *SANBox-8/16 Switch Management User's Manual: Sun StorEdge Network FC Switch 3.0*:

- Adding a zone
- Removing a zone
- Removing a port from a zone
- Adding an additional inter-switch link
- Adding a host to an existing zone or switch
- Verifying the results
- Verifying the software patch revision
- Verifying the software package revision
- Verifying the firmware revision

Rezoning Hosts and Arrays

This section contains the following topics:

- “Rezoning and Reassigning a Sun StorEdge A5200 Arrays from Host A to Host B” on page 119
- “Rezoning and Reassigning Sun StorEdge A3500FC LUNs from Host A to Host B” on page 121
- “Rezoning and Reassigning Sun StorEdge T3 Arrays from Host A to Host B” on page 122

Rezoning and Reassigning a Sun StorEdge A5200 Arrays from Host A to Host B

Rezoning to reassign a storage device from host A and to host B causes host A to lose all access to the storage device. To rezone a Sun StorEdge A5200 array from one host to another host, perform the following two procedures:

- “To Rezone a Sun StorEdge A5200 Array from Host A” on page 120
- “To Rezone a Sun StorEdge A5200 Array to Host B” on page 120

▼ To Rezone a Sun StorEdge A5200 Array from Host A

1. **Stop all disk activity to the StorEdge A5200 array.**
2. **Unmount any file systems currently using disks in Sun StorEdge A5200 array.**
3. **Deport any VM disk groups.**
4. **Run `luxadm remove` command to remove the Sun StorEdge A5200 array from host A.**

The system is now ready for rezoning. You can reassign the Sun StorEdge A5200 array from Host A to Host B.

▼ To Rezone a Sun StorEdge A5200 Array to Host B

1. **Run `luxadm insert` command to add the Sun StorEdge A5200 array on host B.**
2. **Import any Volume Manager disk groups.**
3. **Mount any existing file systems available on the Sun StorEdge A5200 disks or disk groups.**

Rezoning and Reassigning Sun StorEdge A3500FC LUNs from Host A to Host B

Rezoning to remove a storage device from host A and add it to host B causes host A to lose all access to the storage device. To rezone a Sun StorEdge A3500FC array from one host to another host, perform the following two procedures:

- “To Rezone a Sun StorEdge A3500FC Array From Host A” on page 121
- “To Rezone a Sun StorEdge A3500FC Array to Host B” on page 121

▼ To Rezone a Sun StorEdge A3500FC Array From Host A

1. Stop all LUN activity to the Sun StorEdge A3500FC array.
2. Stop Raid Manager 6.22.

```
# /etc/init.d/rdacctrl stop
```

3. Unmount any file systems currently using the Sun StorEdge A3500FC array.
4. Deport any Volume Manager disk groups.
The system is ready for rezoning. You can reassign the Sun StorEdge A3500FC LUNs from host A to host B.
5. Run the `/etc/init.d/rdacctrl config` command.
6. If necessary, run the `/etc/init.d/rdacctrl start` command.

▼ To Rezone a Sun StorEdge A3500FC Array to Host B

1. If Raid Manager 6.22 is installed, run the `hot_add` command.
If Raid Manager 6.22 has not been installed, do the following:
 - a. Install Raid Manager 6.22 software

b. Run the following commands:

```
# /etc/init.d/rdacctrl stop
# /etc/init.d/rdacctrl config
# /etc/init.d/rdacctrl start
```

2. Import any Volume Manager disk groups.

3. Mount any Volume Manager volumes in the `/etc/vfstab` file.

You may need to run the `fsck` command.

Rezoning and Reassigning Sun StorEdge T3 Arrays from Host A to Host B

Rezoning to remove a storage device from host A and add it to host B causes host A to lose all access to the storage device. To rezone a Sun StorEdge T3 array from one host to another host, perform the following two procedures:

- “To Rezone Sun StorEdge T3 Array from Host A” on page 122
- “To Rezone a Sun StorEdge T3 Array to Host B” on page 123

▼ To Rezone Sun StorEdge T3 Array from Host A

1. Stop all LUN activity to the Sun StorEdge T3 array.

2. Unmount any file systems currently using Sun StorEdge T3 array LUNs.

3. Deport any VM disk groups.

4. If necessary, unconfigure paths to the Sun StorEdge T3 array using the `cfgadm -c unconfigure` command.

Perform this step if the Sun StorEdge T3 array is connected in a name server zone and is accessed by a host port connected to a switch F-port. For additional information, refer to “Creating On-Demand Device Nodes on Hosts for Fabric Configurations” on page 89 of Chapter 8.

The system is now ready for rezoning. You can reassign the Sun StorEdge T3 array from host A to host B.

▼ To Rezone a Sun StorEdge T3 Array to Host B

1. **If necessary, configure all paths to the Sun StorEdge T3 array using the `cfgadm -c configure` command.**

This will create device nodes. Perform this step if the Sun StorEdge T3 array is connected in a name server zone and is accessed by a host port connected to a switch F-port. For additional information, refer to “Creating On-Demand Device Nodes on Hosts for Fabric Configurations” on page 89 of Chapter 8

2. **Import any Volume Manager disk groups.**
3. **Mount any existing file systems available on the Sun StorEdge T3 LUNs or disk groups.**

Adding Storage Devices

This section contains the following topics:

- “Adding a Sun StorEdge A5200 Array” on page 123
- “Adding a Sun StorEdge T3 Workgroup or Enterprise Array” on page 124
- “Adding a Sun StorEdge A3500FC Array” on page 124
- “Adding a FC-Tape Drive” on page 124

Adding a Sun StorEdge A5200 Array

You can only add Sun StorEdge A5200 arrays to a SL zone.

Use the `luxadm insert_device` command to hot swap a new disk drive, enclosure, or chain of enclosures. If you specify more than one enclosure, you can perform concurrent hot swapping on multiple buses.

The `insert_device` command interactively guides you through the hot swapping of one or more devices. For further information, see the `luxadm (1M)` man page.

In the disk array, the `insert_device` command performs the following functions:

- Sends notice when the device can be safely inserted
- Requests confirmation that the list is as expected
- Creates the logical device names for the new devices
- Displays the logical path name for the devices

Adding a Sun StorEdge T3 Workgroup or Enterprise Array

The following applies to when the Sun StorEdge T3 array is connected as a Fabric device (an array to a switch TL_port and a host port to a switch F_port). If Sun StorEdge Traffic Manager is enabled, refer to “To Configure a Fabric-Connected Device as a Sun StorEdge Traffic Manager Device” on page 101. If Sun StorEdge Traffic Manager is not enabled, refer to “To Configure a Fabric Device” on page 91.

Adding a Sun StorEdge A3500FC Array

Use the `boot -r` command after installing RAID Manager 6.22.1 and the first Sun StorEdge A3500FC array.

You can add additional Sun StorEdge A3500FC arrays without rebooting, but you must run the `/usr/lib/osa/bin/hot_add` command.

Adding a FC-Tape Drive

See the following documentation for additional information:

- For the L180:
 - *L180 Operator's Manual*
 - *L180 Installation Manual*
 - *L180 Information Manual*
 - *L180 Assurance Guide*
- For the L700
 - *L700 Operator's Guide*
 - *L700 Service Manual*
 - *L700 Systems Assurance Manual*

Removing Storage Devices

This section contains the following topics:

- “Removing a Sun StorEdge A5200 Array” on page 125
- “Removing a Sun StorEdge T3 Array Workgroup or Enterprise Configuration” on page 125
- “To Remove a Sun StorEdge A3500FC Array” on page 125

- “Removing a FC-Tape Drive” on page 126

Removing a Sun StorEdge A5200 Array

Use the `luxadm remove_device` command to hot remove a disk drive, enclosure, or chain of enclosures. This command interactively guides you through the hot removal of one or more devices.

In the Sun StorEdge A5200 disk array, the `remove_device` command of the `luxadm` command performs the following functions:

- Checks whether the device is busy and, if so, warns you
- Takes the device offline (this fails if the disk is open)
- Sends notice when device can be safely removed.
- Indicates which device to remove by a blinking activity LED on the enclosure
- Requests confirmation that the list is as expected
- Removes the logical device names for the device that was removed

For additional information, see the `luxadm (1M)` man page.

Removing a Sun StorEdge T3 Array Workgroup or Enterprise Configuration

When a Sun StorEdge T3 array is connected to a Fabric device (an array to a switch TL_port and a host port to a switch F port) and:

- If the Sun StorEdge Traffic Manager software is enabled, refer to “To Unconfigure a Fabric Device Associated With Sun StorEdge Traffic Manager Devices” on page 104.
- If the Sun StorEdge Traffic Manager software is not enabled, refer to “To Unconfigure a Fabric Device” on page 94.

▼ To Remove a Sun StorEdge A3500FC Array

1. **Launch RAID Manager.**
2. **Click the Status icon.**
3. **Select the RAID module for removal from the pull-down menu.**
4. **Click Select from the Module menu.**
5. **Verify the module for removal is highlighted.**

6. Click remove.

For additional information, see the *Sun StorEdge RAID Manager 6.22 User's Guide*.

Removing a FC-Tape Drive

See the following documentation for additional information:

- For the L180:
 - *L180 Operator's Manual*
 - *L180 Installation Manual*
 - *L180 Information Manual*
 - *L180 Assurance Guide*
- For the L700:
 - *L700 Operator's Guide*
 - *L700 Service Manual*
 - *L700 Systems Assurance Manual*

Managing Fabric Devices Through Dynamic Reconfiguration

Devices configured through a Fabric-connected host port are not persistently configured through dynamic reconfiguration (DR) operations. When you remove a system component on which Fabric-connected host ports reside, and then add that system component back to a host through DR operations, the previously-configured Fabric devices on those host ports are not automatically reconfigured.

In order to maintain persistent Fabric device configuration through DR, Fabric devices needs to be reconfigured through on-demand node creation in addition to DR operations.

Before removing a system component through DR operations, you should unconfigure the Fabric devices that were configured through host ports on the system component through on-demand node creation.

- If the Sun StorEdge Traffic Manager software is enabled, refer to “To Unconfigure a Fabric Device Associated With Sun StorEdge Traffic Manager Devices” on page 104.
- If the Sun StorEdge Traffic Manager software is not enabled, refer to “To Unconfigure a Fabric Device” on page 94.

If the same Fabric devices are intact during DR operations and need to be reconfigured on the host, reconfigure them through an on-demand node creation after you add the system component and it is available to the host.

- If Sun StorEdge Traffic Manager is enabled, refer to “To Configure a Fabric-Connected Device as a Sun StorEdge Traffic Manager Device” on page 101.
- If Sun StorEdge Traffic Manager is not enabled, refer to “To Configure a Fabric Device” on page 91.

The following procedure gives the sequence of operations for a Sun Enterprise 10000 server board with a Fabric connection.

1. Unconfigure the Fabric devices on Fabric-connected host ports on the board to be detached.

2. Start the DR detach operations for the board.

See the *Sun Enterprise 1000 DR Configuration Guide*.

3. Start the DR attach operations when the board is ready.

See the *Sun Enterprise 1000 DR Configuration Guide*.

4. Configure any Fabric devices on the attached boards.

Refer to “Creating On-Demand Device Nodes on Hosts for Fabric Configurations” on page 89. On the newly attached board, the devices could be the same or completely new devices.

Managing IP Networks Over Fibre Channel Networks

The configuration rules for FCIP are explained in TABLE 2-5.

The following restrictions apply:

- Use only physical port 2 for FCIP, if you are using a PCI dual Fibre channel network adapter.
- Use only physical port 1 for FCIP, if you are using a CPCI dual Fibre channel network adapter.
- Promiscuous mode is not supported. The `snoop (1M)` utility cannot be used.
- Multicasting is supported over broadcasting
- Assign it to a subnet different from that of the Ethernets on the same system.
- Unplumb all the FCIP streams on this host before performing a dynamic reconfiguration (DR) operation.

Managing IP Networks in a SAN

This section contains the following topics:

- “Installation” on page 128
- “Configuration” on page 131
- “Invocation” on page 131
- “Usage” on page 132

Installation

The FCIP depends on the instance of fp. If multiple HBAs are present, plumb manually after identifying the fp instance on which IP should be plumbed. The following two procedures determine fp instances.

- “To Determine All FP Instances to Which IP Can Be Plumbed” on page 128
- “To Determine an FP Instance for a Known HBA Port Physical Device Path” on page 129

▼ To Determine All FP Instances to Which IP Can Be Plumbed

1. **Become root.**
2. **Determine fp instances.**

```
# prtconf -v | grep fp

fp (driver not attached)
fp, instance #0
fp (driver not attached)
fp, instance #1
fp (driver not attached)
fp, instance #2
fp (driver not attached)
fp, instance #3
```

There are four instances (0-3) of fp present in the system.

3. Manually plumb fp instances.

Use the `ifconfig interface plumb` command.

```
# ifconfig fcip0 plumb
```

If no error message is displayed, manual plumbing has succeeded. Repeat this step for the other fp instances identified in Step 2.

▼ To Determine an FP Instance for a Known HBA Port Physical Device Path

1. Determine the HBA PCI adapter slot and the I/O board PCI slot.

You will need this information to perform the calculation in Step 2.

For example, assume you have a Sun StorEdge 3500 array with a HBA card located in the PCI adapter slot 5 and the PCI adapter is in slot 1 of the I/O board.

2. Determine fp instance number.

a. Use an editor to search for the fp driver binding name in the `/etc/path_to_inst` file.

Entries will have “fp” on the line.

b. Narrow search by using the I/O board and slot information from Step 1.

i. Multiply the PCI adapter slot number by 2.

Using the Sun StorEdge 3500 array with a HBA in PCI adapter slot 5, you would multiply 5 with 2 and get 10.

ii. Add the PCI adapter I/O board slot number to the number derived in Step i.

Using the Sun StorEdge 3500 array with a HBA in PCI adapter slot 5 and PCI slot 1 of the I/O board, you would add 1 to 10 for a sum of 11.

iii. Convert the number derived in Step ii to hexadecimal.

The number 11 converts to b in hexadecimal.

iv. Search for the “fp” entry with `pci@hex` where hex is the number you derived in Step iv.

CODE EXAMPLE 9-1 shows a single Fibre channel network adapter device path; TABLE 9-1 defines its significance. The instance number for this device path is 7.

CODE EXAMPLE 9-1 PCI Single Fibre Channel Network Adapter Device Path

```
"/pci@b,2000/SUNW,qlc@2/fp@0,0" 7 "fp"
```

TABLE 9-1 PCI Single Fibre Channel Network Adapter /etc/path_to_inst Device Path Entry

Entry Item	Entry Value
Physical Name	"pci@b,2000/SUNW,qlc@2/fp@0.0"
Instance Number	7
Driver Binding Name	"fp"

3. Manually plumb the fp instance.

Use the `ifconfig interface plumb` command. In this example, *interface* would be `fcip7`.

```
# ifconfig fcip7 plumb
```

If no error message is displayed, manual plumbing has succeeded. Repeat this step for the other fp instances identified in Step 2.

Other /etc/path_to_inst Device Path Entries

The above procedure uses a PCI single fibre channel network adapter device path entry from the `/etc/path_to_inst` file. CODE EXAMPLE 9-2 shows a device path entry for a CPCI dual fibre channel network adapter. CODE EXAMPLE 9-3 shows a device path entry for a PCI dual fibre channel network adapter.

CODE EXAMPLE 9-2 CPCI Dual Fibre Channel Network Adapter Device Path

```
"/ssm@0,0/pci@19,700000/pci@2/SUNW,qlc@4/fp@0,0" 6 "fp"
```

CODE EXAMPLE 9-3 PCI Dual Fibre Channel Network Adapter Device Path

```
"/pci@1f,4000/pci@4/SUNW,qlc@5/fp@0,0" 3 "fp"
```


Configuration

Each network interface should have an `/etc/hostname.interface` file defining the name of the IP address associated with it. For example, an FCIP network *interface fcip0* will have a file named `/etc/hostname.fcip0`.

1. **Manually create a `/etc/hostname.interface` file with a text editor so it contains a single line that identifies the host name or interface IP address.**
2. **Use a text editor to make any additional entries to the `/etc/inet/hosts` file.**

The Solaris installation program creates the `/etc/inet/hosts` file with minimum entries. You must manually make additional entries with a text editor. (Refer to the `hosts(4)` man page for additional information).

The `/etc/inet/hosts` file contains the hosts database. This file contains the host names and the primary network interface IP addresses, other network interfaces attached to the machine, and any other network interface that the machine should know about.

CODE EXAMPLE 9-4 sun1 machine `/etc/inet/hosts`

```
127.0.0.1    localhost    loghost
192.9.200.70 sun1        #This is the local host name
192.9.201.10 fcip0      #Interface to network 192.9.201.10
```

3. **Edit the `/etc/nsswitch.conf` file so all the uncommented entries will have the word “files” before any other name service.**

The `/etc/nsswitch.conf` specifies which name service to use for a particular machine.

CODE EXAMPLE 9-5 sun1 machine `/etc/nsswitch.conf` File

```
hosts:      files nis
```

Invocation

After installation, FCIP has to be started manually using `ifconfig`. On subsequent reboots, the FCIP network interface starts automatically.

▼ To Start a Network Interface Manually

1. Use the `ifconfig` command with the appropriate interface.

For example, to enable an FCIP interface associated with `fp` instance 0 and an IP address of `192.9.201.10`, you would use the following command:

```
# ifconfig fcip0 plumb 192.9.201.10 netmask 255.255.255.0
```

The `ifconfig` command is described in more detail in the `ifconfig (1M)` manpage. Ask your network administrator for an appropriate IP address and netmask information.

2. Use the command `ifconfig -a` to verify the network is up.

The output of `ifconfig -a` should look like this:

```
lo0: flags=1000849<UP,LOOPBACK,RUNNING,MULTICAST,IPv4> mtu 8232
index 1
inet 127.0.0.1 netmask ff000000
fcip0:
flags=1001843<UP,BROADCAST,RUNNING,MULTICAST,MULTI_BCAST,IPv4>
mtu 1500 index 2
inet 192.9.201.10 netmask ffffffff broadcast 192.9.201.255
ether 0:e0:8b:1:3c:f7
hme0: flags=1000843<UP,BROADCAST,RUNNING,MULTICAST,IPv4> mtu 1500
index
3
inet 192.9.200.70 netmask ffffffff broadcast 192.9.200.255
ether 8:0:20:fc:e9:49
```

Usage

Any standard network commands can be used after FCIP is attached. There will not be any usage differences when these commands (`telnet`, `ping`, or `ftp`) are used in an Ethernet setup or FC network setup.

Troubleshooting Tools and Resources

This chapter contains information and procedures for correcting faults in initial configuration and subsequent faults.

Additional information and resources are available at <http://www.sun.com/service/support/sunsolve/index.html>.

The website contains information on software versions and provides necessary patches for customers.

Diagnostics

This section describes tools and resources essential for troubleshooting a Sun StorEdge Network FC Switch-8 and Switch-16 Version 3.0 switch. Use this information as well as information found in the appropriate hardware specific manuals to determine the problem and the service required.

▼ To Identify the Problem:

Check one or a combination of resources. Make sure you capture the information you gather for a service call, if you need one.

Host Based Files:

- `/var/adm/messages`
- `/etc/raid/rmlog.log` (for A3500FC, if applicable)
- Sun StorEdge T3 Array `syslog` (can be forwarded to the host)

- SANsurfer `Webgui.log` (found in `$HOME/.Webgui`)

Component Based Resources:

- Raid Manager 6.22 GUI
- SANsurfer Switch GUI
- command line `luxadm` output (see the manpage `luxadm (1M)` for usage)
- command line `cfgadm (1M)` command listing (see `cfgadm_fp(1M)` and `cfgadm(1M)` manpages)
- Sun StorEdge T3 Array `syslog`
- LED indicators on the affected component (refer to the hardware service manual for the product in question or call your Sun Service representative)
- Sun Explorer Data Collector utility

You can use the results of the Sun Explorer Data Collector utility to capture most of the host based information, as well as other system configuration information. For more details and to download this tool refer to <http://sunsolve.sun.com> and select the Explorer Data Collector link. The output from this tool is essential if you need a service call.

After you have gathered relevant information, a service action can be generated and Service Personnel dispatched on site for parts replacement if necessary. Contact Sun Service for the appropriate service steps.

Storage Software

You can achieve the best troubleshooting results with a combination of the resources listed above, as well as by using the Network Storage Agent software and Stortools.

- Network Storage Agent is an online monitoring and reporting utility that is used to track the status of SAN components. At a basic level, Network Storage Agent monitors the health of the SAN and generates alerts or events when problems are detected. You can also use it to check patch/firmware revision levels. You can configure it to email or page the administrator in the event of problem detection.
- Stortools is an offline diagnostic tool used for troubleshooting and fault isolation. After alerts or events are generated by Network Storage Agent, Stortools (via Stortools Functional and Expert testing modes) helps isolate the suspect component and assists in verifying the correct operation of the new Field Replaceable Unit (FRU).

Use both Network Storage Agent and Stortools for system installation verification and testing at the time of initial system install.

Network Storage Agent can help in patch and firmware maintenance and to display a topology view of the entire SAN.

You can use Stortools to capture a snapshot of the system configuration, as well as to assist in component and system-wide testing and verification.

See TABLE 6-1 for download URLs for StorTools and Network Storage Agent packages and documentation.

Common Problems

General Tips For Troubleshooting

In all cases:

- Verify that all patches and firmware are the most recent ones available. See “Minimum Software Component Versions and Patches” on page 36.
- Verify all ports are logged in with solid green light on the switch port.
- Check the array and switch cables and power cord for secure attachment.
 - Re-seat the cables if necessary.
- Become familiar with `luxadm` and `cfgadm` outputs while the system is in a known *good* state. Check the outputs during a problem.
- Configure Network Storage Agent to monitor SAN devices and email Administrator if a problem occurs.
- Monitor the SANsurfer GUI for error counters. Large number of errors in a short time can indicate a problem link. Network Storage Agent also monitors error counters.

Problems and Corrective Measures—General Storage

Problem

You cannot see storage in `format` output.

Corrective Measures

- Using the SANsurfer GUI, verify that the zoning is correct.
- Using the SANsurfer GUI, check that the port configuration is correct.

Fabric Mode

- Sun Storage T3 is configured on TL_Port
- HBA is configured on F_Port (point-to-point only)

Segmented Loop Mode (private loop)

- Storage is configured on SL-Ports
- HBA is configured on SL-Ports
- HBA and storage are configured in the same SL-Zone
- Make sure Sun StorEdge T3 or Sun StorEdge A3500FC LUNs are properly initialized and mounted.
- Check the `cfgadm` listing for Fabric-connected ports (only for the Sun StorEdge T3 Array in Fabric mode).
- Are Fabric-connected Sun StorEdge T3 arrays listed as configured and in normal condition?

Refer to the `cfgadm_fp(1M)` man page for information on configuring and checking conditions).

- Check `/var/adm/messages` for any errors reported during configuration.
- Run `devfsadm -C`. This removes stale device nodes, which belong to removed devices.
- Check Network Storage Agent for messages or events.
- Run Stortools Functional or Expert Tests to verify or isolate suspect links.

If the problem persists, contact your Sun Service representative

Problems and Corrective Measures—Sun StorEdge Traffic Manager

Problem

You cannot see Sun StorEdge Traffic Manager devices with the software installed.

Corrective Measures

- Check that the `/kernel/drv/scsi_vhci.conf` configuration is correct.
- Make sure `mpxio-disable=no` is set.
- Check `/var/adm/messages` for errors.
- For Sun StorEdge T3 Array installations, make sure the `sys mp_support` setting is set to `mpxio`.

If the problem persists, contact your Sun Service representative.

Problem

Failing a path (to secondary or to primary) does not succeed using Sun StorEdge Traffic Manager.

Corrective Measures

- Check the `luxadm` display output on the disk/LUN to verify that the secondary path is `STANDBY`.
If the path is not `STANDBY`, it cannot be used as a failover path.

CODE EXAMPLE 10-1 Output for Sun StorEdge T3 Array

```
# luxadm display /dev/rdisk/
c6t60020F20000003C53B4AE50C0005A95Dd0s2
  DEVICE PROPERTIES for disk: /dev/rdisk/
c6t60020F20000003C53B4AE50C0005A95Dd0s2
  Status(Port A):      O.K.
  Status(Port B):      O.K.
  Vendor:              SUN
  Product ID:          T300
  WWN(Node):           50020f20000003d5
  WWN(Port A):         50020f23000003d5
  WWN(Port B):         50020f23000003c5
  Revision:            0117
  Serial Num:          Unsupported
  Unformatted capacity: 68294.000 MBytes
  Write Cache:         Enabled
  Read Cache:          Enabled
    Minimum prefetch:  0x0
    Maximum prefetch:  0x0
  Device Type:         Disk device
  Path(s):
    /dev/rdisk/c6t60020F20000003C53B4AE50C0005A95Dd0s2
    /devices/scsi_vhci/
  ssd@g60020f20000003c53b4ae50c0005a95d:c,raw
    Controller          /devices/pci@6,4000/SUNW,qlc@2/fp@0,0
    Device Address      50020f23000003d5,2
    Class               primary
    State               ONLINE
    Controller          /devices/pci@6,4000/SUNW,qlc@3/fp@0,0
    Device Address      50020f23000003c5,2
    Class               secondary
    State               STANDBY
```


CODE EXAMPLE 10-2 Output for Sun StorEdge A5200 Array:

```
# luxadm display /dev/rdisk/c6t200000203719F802d0s2
DEVICE PROPERTIES for disk: /dev/rdisk/c6t200000203719F802d0s2
  Status(Port A):      O.K.
  Status(Port B):      O.K.
  Vendor:              SEAGATE
  Product ID:          ST39103FCSUN9.0G
  WWN(Node):           200000203719f802
  WWN(Port A):         210000203719f802
  WWN(Port B):         220000203719f802
  Revision:            034A
  Serial Num:          LS4705570000
  Unformatted capacity: 8637.338 MBytes
  Read Cache:          Enabled
    Minimum prefetch:  0x0
    Maximum prefetch:  0xffff
  Location:            In the enclosure named: DPL4
  Device Type:         Disk device
  Path(s):
    /dev/rdisk/c6t200000203719F802d0s2
    /devices/scsi_vhci/ssd@g200000203719f802:c,raw
  Controller           /devices/pci@6,2000/pci@1/SUNW,qlc@4/
fp@0,0
  Device Address       210000203719f802,0
  Class                 primary
  State                 ONLINE
  Controller           /devices/pci@6,2000/pci@1/SUNW,qlc@5/
fp@0,0
  Device Address       220000203719f802,0
  Class                 primary
  State                 ONLINE
```

Note – Sun StorEdge Traffic Manager is not supported for use with the Sun StorEdge A3500FC array.

In the previous code examples, Path Class indicates either primary or secondary. Primary path is used for I/O operations. The secondary path is not used for active I/O unless a failover happens. The Sun StorEdge T3 array has both a primary and secondary path class. The Sun StorEdge A5200 array has two primary paths, if it is dual connected. Both primary paths are used for active I/O.

Path State indicates ONLINE, STANDBY, or OFFLINE. Active I/O travels down ONLINE paths only. STANDBY paths indicate paths that are waiting for I/O in the event of a failover operation. OFFLINE paths indicate no I/O can travel down the

path and that the path is not available for a failover operation. Both paths of a dual connected Sun StorEdge A5200 array are ONLINE. Only one path of a Sun StorEdge T3 array is ONLINE; the other path is STANDBY.

- Check that the `cfgadm` listing to verify `Ap_Ids`, representing Fabric-connected Sun StorEdge T3 Array paths, are configured and in the normal condition.
- Check `/var/adm/messages` or Network Storage Agent for any related errors
- Check the SANsurfer GUI for error counters.

If the problem persists, contact your Sun Service representative.

Problems and Corrective Measures—Error Messages

Problem

ONLINE/OFFLINE messages appear in `/var/adm/messages` or on the console.

Corrective Measures

- Check the SANsurfer GUI port details for increasing error counters.
- Run Stortools to test HBA status (`qlctest`).
- Check Network Storage Agent for messages or events.

If the problem persists, contact your Sun Service representative.

Problems and Corrective Measures—Switch

Problem

You cannot connect to a switch with the SANsurfer GUI.

Corrective Measures

- Verify that the switch is powered on and has an Ethernet cable connected to it.
- Make sure the switch is not in Force Prom Mode.

- If necessary, set Force Prom Mode to force the switch to IP address 10.0.0.1.
Connect to the switch in this mode and reset the desired IP address.
Set back to normal mode and reset the switch.
Try reconnecting. (See the switch hardware manuals listed in “Related Documentation” on page xxix, for more details).

If the problem persists, contact your Sun Service representative.

Software Architecture

This appendix contains a block diagram of the software architecture for the Sun StorEdge Network FC Switch-8 and Switch-16, version 3.0 software update. See FIGURE A-1 on the next page.

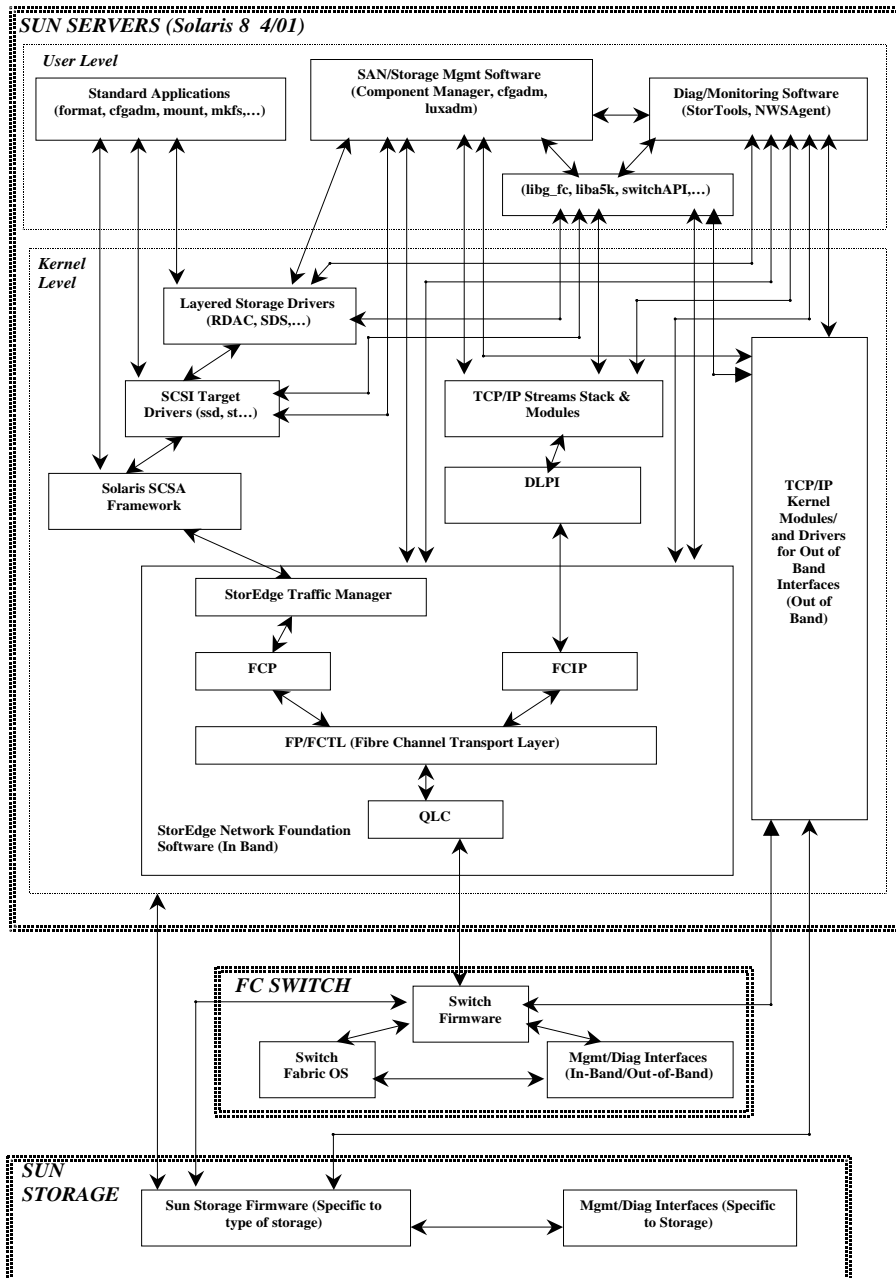


FIGURE A-1 Software Architecture Block Diagram

Error Messages

cfgadm Error Messages

TABLE B-1 cfgadm Utility Messages

Error Message	Corrective Action
cfgfadm: Insufficient condition	An <code>Ap_Id</code> provided for the configure operation is not in a normal condition. Refer to <code>cfgadm_fp(1M)</code> for related information on host port and Fabric device conditions.
cfgadm: Configuration operation not supported	An <code>Ap_Id</code> provided for the configure operation does not have a Fabric related topology. Refer to <code>cfgadm_fp(1M)</code> for the configure and unconfigure operations on Fabric devices.
cfgadm: Library error: failed to get port topology: host port	The operation to get Fibre Channel topology on the host port failed. Check the condition field of the host port from the <code>cfgadm</code> listing and diagnose the Fibre connection of the host port.

Error Message	Corrective Action
cfgadm: Library error: Failed to get Fabric device list	The operation to get Fibre Channel device list on a host port failed. Check the condition field of the host port from the <code>cfgadm</code> listing and diagnose the Fiber connection of the host port.
cfgadm: Library error: failed to create device node: <code>errno text</code>	The configure operation failed on the device node with error specified in <code>errno text</code> . Check the condition field of the device from the <code>cfgadm -la</code> listing and diagnose the Fabric connection of the device.
cfgadm: Library error: failed to offline: device path <pre> Resource Information ----- /dev/dsk/c1t0d0s0 mounted filesystem "/file-system"</pre>	Unmount the file system listed in the error message and try the <code>cfgadm</code> operation again.

Fabric Display Error Messages

TABLE B-2 Fabric Display Messages

Error Message	Corrective Action
Save Operation Failed. Enter IP address and try again.	Verify network connection ¹ to Fabric and retry.
Fabric appears to be offline. Hit REFRESH to verify connection.	Verify network connection ¹ to Fabric and retry.

1. Verify network connection to Fabric:

Check that the correct IP address for the Fabric is entered in the Fabric Display. If the address is incorrect, then enter the correct IP address for the network switch in the Fabric.

Verify that the gateway address is correctly configured on the workstation. If the gateway is incorrect, then configure the correct gateway.

Verify that the Fabric is accessible through the network. For example, ping the switch and verify that responses are not being dropped. If the Fabric is not accessible, then diagnose network the problem, or try to access the Fabric from a different workstation.

Try to access the Fabric from a workstation on the same subnetwork as the Fabric. If the Fabric is manageable on the same subnetwork, but is not manageable through a network gateway, then examine the network configuration (gateway address, subnet mask, etc.) on the network switch to verify that it is correct.

Examine the switch itself. Verify that the switch is powered on, and that the heartbeat LED is blinking normally. If the heartbeat indicates an error, then contact customer support.

Faceplate Display Error Messages

TABLE B-3 Faceplate Display Messages

Error Message	Corrective Action
Fabric ID must be < 16 and chassis ID must be < 64. Both must be >= 0. Correct these values and APPLY again.	Correct values and apply again. (NOTE: The Fabric ID is fixed; only the chassis ID needs to be verified.)
Chassis ID cannot conflict with an existing chassis in the Fabric. Correct these values and APPLY again.	Choose a chassis ID which is not already assigned to the other switch in the Fabric and apply again.
Not a valid Flash file for this switch! Download aborted.	Verify that the flash file exists and has read permission, that the file is not corrupted, and that it is the correct type of flash (8 or 16 port) for this switch, then retry. (NOTE: only 8-port flash can be loaded onto an 8-port switch, and 16-port flash onto a 16-port switch.)
Error opening destination file for writing. Operation cancelled!	Verify permissions on file and retry.
You cannot reset the switch while a flash load is in progress.	Wait for flash load to complete and retry.
An error has occurred while changing switch configuration parameters. Please verify your configuration.	The switch responds that it is not in the correct state to apply the configuration changes (cf. SANbox-8 Fibre Channel Switch Installer's/User's Manual). Place the switch into the correct state, then retry.
An error was received while changing the port configurations. Please verify your configuration.	The switch responds that it is not in the correct state to apply the configuration changes (cf. SANbox-8 Fibre Channel Switch Installer's/User's Manual). Place the switch into the correct state, then retry.
Switch is not responding to requests. Verify network connection and hit REFRESH.	Verify network connection ¹ to Fabric and Fibre Channel links to switch, then retry.
The switch has stopped responding or has returned a check condition. Check your network connection to the switch. Retry the flash download.	Verify network connection ¹ to Fabric and retry.
You cannot transition an existing T-Port to an SL or TL Port.	Verify this is the correct action, then set ports offline, apply changes, and set ports online again.
Network configuration is only available to switches with active Ethernet connections.	Network configuration changes can only be applied to the switch with the network connection, not to the cascaded switch in the Fabric.

Fabric has more than one Switch: Configuration operation cannot be applied.	Default configuration cannot be restored on a switch in a cascaded Fabric: remove all inter-switch links or set links offline, then retry.
Switch has reported communications errors. Your changes will most likely not take effect. Try anyway?	Verify network connection ¹ to Fabric and retry.
You cannot transition an existing T-Port to an SL or TL Port.	Verify this is the correct action, then set ports offline, apply changes, and set ports online again.
Network configuration is only available to switches with active Ethernet connections.	Network configuration changes can only be applied to the switch with the network connection, not to the cascaded switch in the Fabric.
Fabric has more than one Switch: Configuration operation cannot be applied.	Default configuration cannot be restored on a switch in a cascaded Fabric: remove all inter-switch links or set links offline, then retry.
Switch has reported communications errors. Your changes will most likely not take effect. Try anyway?	Verify network connection ¹ to Fabric and retry.
Switch has reported communications errors. Your changes will most likely not take effect. Try anyway?	Verify network connection ¹ to Fabric and retry.
No reply from the Switch ...	Verify network connection ¹ to Fabric.

1. Verify network connection to Fabric:

Check that the correct IP address for the Fabric is entered in the Fabric Display. If the address is incorrect, then enter the correct IP address for the network switch in the Fabric.

Verify that the gateway address is correctly configured on the workstation. If the gateway is incorrect, then configure the correct gateway.

Verify that the Fabric is accessible through the network. For example, ping the switch and verify that responses are not being dropped. If the Fabric is not accessible, then diagnose network the problem, or try to access the Fabric from a different workstation.

Try to access the Fabric from a workstation on the same subnetwork as the Fabric. If the Fabric is manageable on the same subnetwork, but is not manageable through a network gateway, then examine the network configuration (gateway address, subnet mask, etc.) on the network switch to verify that it is correct..

Examine the switch itself. Verify that the switch is powered on, and that the heartbeat LED is blinking normal ly. If the heartbeat indicates an error, then contact customer support.

Help Error Messages

TABLE B-4 Help Messages

Error Message	Corrective Action
Could not find help.txt file in archive. Java Archive may be corrupt.	The SUNWsmgr package was not installed correctly, or has become corrupted: re-install the SUNWsmgr package.

Application Error Messages

TABLE B-5 Application Messages

Error Message	Corrective Action
User Login Failed.	Enter correct login ID and password and retry.
Failed reading Fabric from file ...	Verify that Fabric file exists and has correct permissions.
Error encountered while accessing selected configuration file.	Verify that configuration file exists and has correct permissions.
This function is not available to guest user.	Login as admin or superuser and retry.
This function only available to super user.	Login as superuser and retry.
Invalid ip Address: ...	Enter a correct IP address and retry.
Could not save topology to switch ...	Verify network connection ¹ to Fabric and retry.

1. Verify network connection to Fabric:

Check that the correct IP address for the Fabric is entered in the Fabric Display. If the address is incorrect, then enter the correct IP address for the network switch in the Fabric.

Verify that the gateway address is correctly configured on the workstation. If the gateway is incorrect, then configure the correct gateway.

Verify that the Fabric is accessible through the network. For example, ping the switch and verify that responses are not being dropped. If the Fabric is not accessible, then diagnose network the problem, or try to access the Fabric from a different workstation.

Try to access the Fabric from a workstation on the same subnetwork as the Fabric. If the Fabric is manageable on the same subnetwork, but is not manageable through a network gateway, then examine the network configuration (gateway address, subnet mask, etc.) on the network switch to verify that it is correct..

Examine the switch itself. Verify that the switch is powered on, and that the heartbeat LED is blinking normal ly. If the heartbeat indicates an error, then contact customer support.

Network Configuration Error Messages

TABLE B-6 Network Configuration Messages

Error Message	Corrective Action
Invalid gateway address entered. Changes not applied.	Enter a valid gateway address and apply again.

Port Display Error Messages

TABLE B-7 Port Display Messages

Error Message	Corrective Action
Reset Failed!	Verify network connection ¹ to Fabric and retry.
Invalid testing argument entered. Test cancelled.	An incorrect value was entered. Retry the test with correct values.
Testing times must be a positive number (in seconds).	Retry the test with a test time larger than zero.
Invalid frame size. Must be value between (36 <= size <= 2148) bytes.	Retry the test with a frame size between 36 and 2148 bytes..
Testing pattern should be a hex pattern not exceeding 4 bytes.	Retry the test with a test pattern at most 4 bytes long, entered in hexadecimal format.

1. Verify network connection to Fabric:

Check that the correct IP address for the Fabric is entered in the Fabric Display. If the address is incorrect, then enter the correct IP address for the network switch in the Fabric.

Verify that the gateway address is correctly configured on the workstation. If the gateway is incorrect, then configure the correct gateway.

Verify that the Fabric is accessible through the network. For example, ping the switch and verify that responses are not being dropped. If the Fabric is not accessible, then diagnose network the problem, or try to access the Fabric from a different workstation.

Try to access the Fabric from a workstation on the same subnetwork as the Fabric. If the Fabric is manageable on the same subnetwork, but is not manageable through a network gateway, then examine the network configuration (gateway address, subnet mask, etc.) on the network switch to verify that it is correct..

Examine the switch itself. Verify that the switch is powered on, and that the heartbeat LED is blinking normally. If the heartbeat indicates an error, then contact customer support.

Topology Display Error Messages

TABLE B-8 Topology Display Messages

Error Message	Corrective Action
Source IP switch cannot be deleted.	SANsurfer does not allow the user to delete the switch with the network connection; only the cascaded switch may be deleted.
The GUI has detected a loss in Ethernet connectivity to the sourceIP switch in the Fabric. Check your Ethernet connections. Click OK to return to FABRIC list window.	Verify network connection ¹ to Fabric.
Guest user not allowed to change the Fabric configuration.	Login as admin or superuser and retry.
Flash Download was unsuccessful.	Either the flash file has been corrupted, or the network connection is unreliable. Verify that the correct flash file was selected, and verify the network connection ¹ to the Fabric, then retry.
Error encountered while saving the Fabric configuration. Operation cancelled.	Verify network connection ¹ to Fabric and retry.
The device appears to be offline. Please verify it is connected properly.	Verify Fibre Channel links to switch and retry.
Your Fabric contains conflicting Name Server zoning methods. You must select the zoning methodology for this Fabric.	The cascaded switches are configured with different Nameserver zoning methods (Port-based or WWN-based). From the Topology Display, select the Special->Select Zoning Method menu item to configure the zoning method for the Fabric.
... appears to be no longer in the Fabric. Configuration changes may have been lost.	Verify network connection ¹ to Fabric and Fibre Channel links to switch, then retry.
The GUI has detected a loss in Ethernet connectivity to the sourceIP switch in the Fabric. Check your Ethernet connections. Click OK to return to FABRIC list window.	Verify network connection ¹ to Fabric and retry.

1. Verify network connection to Fabric:

Check that the correct IP address for the Fabric is entered in the Fabric Display. If the address is incorrect, then enter the correct IP address for the network switch in the Fabric.

Verify that the gateway address is correctly configured on the workstation. If the gateway is incorrect, then configure the correct gateway.

Verify that the Fabric is accessible through the network. For example, ping the switch and verify that responses are not being dropped. If the Fabric is not accessible, then diagnose network the problem, or try to access the Fabric from a different workstation.

Try to access the Fabric from a workstation on the same subnetwork as the Fabric. If the Fabric is manageable on the same subnetwork, but is not manageable through a network gateway, then examine the network configuration (gateway address, subnet mask, etc.) on the network switch to verify that it is correct..

Examine the switch itself. Verify that the switch is powered on, and that the heartbeat LED is blinking normal ly. If the heartbeat indicates an error, then contact customer support.

User Administration Error Messages

TABLE B-9 User Administration Messages

Error Message	Corrective Action
Can't delete LAST SUPER USER.	Do not try to delete the last superuser
Duplicate user names are not allowed.	Enter a unique user name and retry.
Invalid value entered!	Verify that all values entered are valid and retry.
Invalid value entered! Enter a date newer than 01/01/1970.	Enter a date later than 01/01/1970 and retry.
The password expiration date you have entered is a date prior to the current date.	This is a warning message only. An account with a password expiration earlier than the current date will be inactive until the expiration date is changed to a future date.
The account expiration date you have entered is a date prior to the current date.	This is a warning message only. An account with an account expiration earlier than the current date will be inactive until the expiration date is changed to a future date.
Last Super User privileges can't be changed.	Do not edit privileges of last superuser
An error occurred while accessing the users file.	Either SANsurfer was not installed correctly, or it has become corrupted. Reinstall SANsurfer.

Zoning Error Messages

TABLE B-10 Zoning Messages

Error Message	Corrective Action
Unable to make zoning changes. IP connection to Fabric entry switch is down.	Verify network connection ¹ to Fabric and retry.
Zone can't be deleted because it is currently in-use.	Remove all members from zone before deleting zone. (NOTE: A hard zone must be empty before it can be deleted. Remove all members from the zone, add them to other zones.

Attempt to clear zones on switch [...] failed. REFRESH and try again.	Verify network connection ¹ to Fabric and Fibre Channel links to switch, then retry.
Zoning file operation failed!	Verify network connection ¹ to Fabric and Fibre Channel links to switch, then retry.
The file specified was either an invalid file or the file was not found.	Verify that file exists and is a valid file, then retry.
A switch has failed to respond during the zoning operation. Zoning operation failed.	Verify network connection ¹ to Fabric and Fibre Channel links to switch, then retry.
Switch was unable to apply Hard Zone zone modifications. Check zoning rules.	Verify that either: 1) all ports are being removed from all hard zones; or that 2) all ports are being configured into some numbered hard zone. If this does not correct the problem, refer to the SANbox-8/16 Switch Management User's Manual for the hard zone configuration rules.
Switch was unable to apply Broadcast zone modifications. Check zoning rules.	Verify that each broadcast zone is contained within a single hard zone, and that no broadcast zone contains SL ports from more than a single SL zone. If this does not correct the problem, refer to the SANbox-8/16 Switch Management User's Manual for the broadcast zone configuration rules.
Switch was unable to apply Name Server zone modifications. Check zoning rules.	Refer to the SANbox-8/16 Switch Management User's Manual for the name server zone configuration rules.
Switch was unable to apply Segmented Loop modifications. Check SL zoning rules. NOTE: Only 32 ports can occupy a SL cluster. You may need to reduce the size of your SL cluster.	Verify that no SL zone contains more than 32 ports. If this does not correct the problem, refer to the SANbox-8/16 Switch Management User's Manual for the SL zone configuration rules.

1. Verify network connection to Fabric:

Check that the correct IP address for the Fabric is entered in the Fabric Display. If the address is incorrect, then enter the correct IP address for the network switch in the Fabric.

Verify that the gateway address is correctly configured on the workstation. If the gateway is incorrect, then configure the correct gateway.

Verify that the Fabric is accessible through the network. For example, ping the switch and verify that responses are not being dropped. If the Fabric is not accessible, then diagnose network the problem, or try to access the Fabric from a different workstation.

Try to access the Fabric from a workstation on the same subnetwork as the Fabric. If the Fabric is manageable on the same subnetwork, but is not manageable through a network gateway, then examine the network configuration (gateway address, subnet mask, etc.) on the network switch to verify that it is correct..

Examine the switch itself. Verify that the switch is powered on, and that the heartbeat LED is blinking normal ly. If the heartbeat indicates an error, then contact customer support.

Frequently Asked Questions

This chapter contains answers to questions encountered when configuring the SAN.

After installing all required software I connected T3 to a switch TL port and a host to a switch F port. But the Sun StorEdge T3 array is not available from the Solaris host.

The Fabric devices must be configured through on-demand node creation to be available on the Solaris host. Refer to the `cfadm_fp(1M)` manpage and “Creating On-Demand Device Nodes on Hosts for Fabric Configurations” on page 89.

The `cfgadm` listing shows that a Fabric host port is in the failed condition and the Fabric device(s) under the host port are in the failing condition, but the devices are still available on the Solaris host.

The Solaris internal state of the host port has prevented the host port from being able to detect the presence of a Fabric connection, but the device(s) under this port are normally available to the Solaris host. Refer to the `cfgadm_fp(1M)` manpage for information about the failing condition reported in the `cfgadm` listing.

All references are to the *SANbox-8/16 Switch Management User's Manual*.

What do I do if SANSurfer does not start?

The path may be incorrect or the package may not be installed.

What do I do if I lose my super user password?

Reinstall the SANSurfer.

Note – The default `username` is `su`, and the default password is `su`.

i. Type:

```
# pkgrm SUNWsmgr
```

Follow the instructions displayed.

ii. Type:

```
# pkgadd -d <path to the SUNWsmgr package>
```

Follow the instructions displayed.

Note – If patches have been installed on top of the `SUNWsmgr` package, you must reinstall those patches.

What do I do if the Fabric Icon is not present in the Fabric Window?

The Fabric Icon is not present when the GUI is installed for the first time. Verify that the `default.fab` file is not empty and that the user is assigned to a non-empty Fabric file in the Admin window.

Each managed Fabric has a name and an Ethernet connection to a Switch chassis through which the Fabric is managed: the Fabric Management Switch. SANsurfer chooses one Ethernet connection at a time to use. The Fabric window is the first window displayed after entering the application.

The application loads the `default.fab` file (or the file assigned to a user; see "User Administration Window" on page 2-72 for assigning alternate files), which contains an entry for the managed Fabric if the Fabric was saved in a previous session. If this is the first time the application is being accessed, there is no defined Fabric. The `default.fab` file does not contain a Fabric unless a Fabric has been defined and saved to the `default.fab` file by a user.

Use the Network Configuration Window to assign the IP Address to this Switch chassis. The Fabric window can also be used to record Port, Switch chassis, and Fabric statistics through the use of the `type` and `mode` fields.

Note – Only one Fabric can be displayed on the Fabric table. To create a new Fabric, an existing Fabric must be deleted in the Fabric window. You can save the Fabric you want to delete in a new `.fab` file through the File pull down menu.

Refer to Section 2-11, "Fabric Window."

What do I do if the SANsurfer is unable to recognize the switch through which its Ethernet is connected to another sub-network?

Make sure the Gateway and Mask fields in the Network Configuration Window are set correctly.

Note – The Default Switch is shipped with
Switch IP address: 10.0.0.1
Mask: 255.0.0.0
Gateway: 0.0.0.0

Contact your system administrator regarding the correct Gateway and Mask address. In most standard networks, only the last byte of the IP address is used for the sub network. In that case, your Mask would be 255.255.255.0.

What do I do if the Fabric icon is red in the Fabric window?

If the icon remains red after the IP address is entered, verify that the following conditions exist:

- a. The switch has power applied and is turned on.
- b. The Ethernet cable is attached to the switch.
- c. The IP address entered in the table is the same as the IP address of the switch.

What does it mean if the Fabric Icon displays PROM?

It is an indication of POST failure or a Flash Checksum Error, or it may be an indication that the switch was previously in Force PROM mode. The icon with the word “PROM” displayed in the Status field is not an indication of normal operation. It is only visible as a result of Power-On- Self-Test (POST) failure or when the switch has been placed in the Force PROM mode.

When a Switch chassis has a Flash Checksum error as a result of a POST diagnostic or if the chassis was placed into Force PROM mode via its Test switch, the Switch chassis goes into PROM Mode and uses its default IP Address to communicate through its Ethernet port. This requires connection of an Ethernet crossover cable directly to the Switch chassis and use of the default IP Address to connect to it. When you communicate with this Switch, designate an IP Address of 10.0.0.1. When SANsurfer connects to this Switch, it will find that it is in PROM Mode and display the PROM Icon.

When a Switch is in PROM mode, there is a very limited number of things that can be done to it. New control code can be loaded into Flash memory or give the Switch a new IP Address.

For details on what can be done while in the force PROM mode, refer to *SANbox-16 Fibre Channel Switch Installer's/User's Manual (875-3142-10)* or *SANbox-8 Fibre Channel Switch Installer's/User's Manual (875-3141-10)*. Refer to Section 2-14 for information on the PROM Icon.

How do I verify the Switch Ethernet Connection through SANsurfer?

The window shows the active Ethernet connection on the Fabric Management Switch. If the application loses its ability to communicate with the Ethernet connection, it displays the Ethernet connection in Red.

Select the Ethernet connection. The Ethernet Connection turns Blue when selected and the Ethernet information displays at the left side of the window. Double-click the Ethernet Connection to go to the Network Configuration window.

Refer to (2-18 section on “Ethernet Connection”)

How can I find out which switch SANsurfer is connected to?

Use the Toggle Beacon menu item.

The Special Menu in Topology window contains the following sub menu:

- **Toggle Beacon**

Causes the Heartbeat LED on the selected chassis to blink at a very rapid rate. The application displays a small blinking beacon icon.

The Toggle Beacon is useful when you want to locate a particular physical chassis installed at a location which contains multiple switches. When you toggle the beacon to On, a small red blinking icon appears to the right side of the switch icon. The physical Heartbeat LED on the selected chassis changes from the normal blink rate to a very fast rate. The Heartbeat LED will continue to operate in this state until it is changed back. The blink rate does not automatically change back when the application is exited. When the beacon icon is blinking, selecting the toggle beacon command removes the small red blinking icon on the topology window and returns the physical LED on the selected chassis to the normal heartbeat pattern. If no switch is selected, the Fabric management switch is selected by default.

Refer to Section 2-20, “Special->Beacon” and Section 2-36, “Special->Toggle Beacon”.

How do I replace a non-functional switch in the Fabric?

Perform an archive/restore of the Fabric.

For the archive/restore function to modify the replacement switch properly, the archive file must have been created prior to the switch failure. This procedure assumes that the failed switch is *not* the Fabric Management Switch. If the failed switch is the Fabric Management Switch, access the Fabric from an alternate Ethernet connection within the Fabric to reconfigure the replacement switch. If an alternate Fabric Ethernet entry point is not available, or if this is a single switch Fabric, you must connect the management station directly to the new switch with the crossover Ethernet cable.

You must also configure the Fabric window to access the switch using RARP or the default IP address (10.0.0.1). Refer to “Configuring the Switch Ethernet Port” on page 1-5 for more information on configuring the Fabric window.

Note – If the restore file used on the current Fabric is not the information that was created from this Fabric, the IP information that is restored to this Fabric will be that of switches used to create the archive file in use in another Fabric. Using an archive file from another Fabric might result in duplicate IP information.

Note that a replacement switch must be an exact replacement of the switch being removed. A 16-port switch must replace a 16-port switch, and an 8-port switch must replace an 8-port switch.

▼ To Replace a Switch

1. **At the failed switch:**
 - a. **Turn off the power and disconnect the AC cord(s).**
 - b. **Note port locations and remove the interconnection cables and GBICs.**
 - c. **Remove the failed switch.**
2. **At the replacement switch:**
 - a. **Mount the switch in the location where the failed switch was removed.**
 - b. **Install the GBICs and cables removed from the failed switch in the same port locations.**
 - c. **Attach the AC cord(s) and turn on one (if more than one present) power supply.**
3. **Open the Topology window for the Fabric. The failed switch and the replacement switch both appear on the topology screen.**
4. **On the tool bar, press the Delete button. The Fabric now shows only usable switches.**
5. **Select Special>Restore Fabric.**
6. **Select the file which was created with the desired Fabric archive. A dialog box opens.**
7. **Using the drop-down list of Fabric switches for the unassigned switch, select the switch which was replaced.**
8. **Click OK, and at the prompt, allow reprogramming of the Switch.**
9. **Reset the replacement switch.**
10. **The replacement switch has now been assigned the parameters which had been in place for the failed switch.**

Refer to Section 2-23, “Performing an Archive/Restore of a Fabric.”

How do I identify Duplicate Chassis IDs in a Fabric?

If a Chassis ID of a switch has the same value as another switch in the Fabric, only one of the two switches appears in the Topology window and the Logged-in LED on the connection port(s) between the switches blinks rapidly.

What do I do if a Port is in an *unknown* mode:

Press the Refresh button.

Refer to Section 2-48, second NOTE.

How do I confirm a T-Port connection Failure?

The Topology window shows a line between chassis to represent at least one T_Port Link between chassis. If the application loses its ability to find a T_Port Link, it displays that T_Port Link in Red.

Select a T_Port Link. The application changes the color of the line to Blue when the link is selected. The information at the left side of the window displays detailed T_Port Link information for the selected link.

What do I do if Loading a Flash File (.fls) fails?

Note – Flash files use a naming scheme to represent the switch type to which they apply. Files starting with M08 pertain to 8-port switches. M16 files pertain to 16-port switches.

In the event that the Flash load fails, a dialog box asks whether to try again. The Switch remains operable until a Reset occurs (assuming that the Switch was operating before an attempt to load new Flash code). Trying multiple times to load new Flash code does not upset the operation of the Switch as long as the Switch is not Reset. If a Switch Reset occurs, the Switch tries to use the new Flash code and discovers that it is bad. The Switch then displays a Heartbeat error code of three blinks indicating a Flash Checksum error. The Switch is still able to load new Flash code, but it is not operable until the new code is successfully loaded and the Switch is again Reset. When the Flash load is successful, Reset the Switch to put the new Flash code into operation.

What do I do if Loading a zoning template file fails?

Template file extensions differ depending on the stage type of the switches in the Fabric. If the switches are SL Private Loop stage types, the extension is .tp1. If switches are IO/T stage types, the extension is .tp2.

Make sure to load the correct template file.

What do I do if a Port is not appearing in the Zoning Window?

Criteria for Displaying a Port

The application polls each switch to determine the ports that have a device attached to them. If a port is configured and has a GBIC installed, it is shown as inactive unless the device responds to contact made with it.

Port modes are determined at the time the zoning window is entered. Port connection changes made while in the zoning window require returning to the faceplate window or the topology window and pressing the Refresh button on the tool bar. Re-entering the zoning window displays the current port modes.

Why are my zones unintentionally merging in the Fabric?

Zone indexes are universal across Fabric.

In an instance when two Fabrics are to be connected and both Fabrics have zones defined, when the Fabrics are connected, zones with the same name become a single zone with that name. If the devices within the zones with the same name should *not* be zoned together:

- 1. Define the zone in one Fabric as a new zone that does not exist in the other Fabric.**
- 2. Remove the ports zoned to the previous zone but do not remove the zone itself.**

When a zone is deleted, the subsequent zones are renumbered so they remain in sequential order.

For example, if Fabric A is using zones 1 and 2, and Fabric B is using zones 1, 2, and 3, connecting the two Fabrics results in zones 1, 2, and 3. Assuming that combining zone 1 from each Fabric is acceptable but combining zone 2 is not, do the following:

- 1. Go to the Fabric Zoning window for the Fabric with the most defined zones.**
In this example it is Fabric B has the most defined zones.
Select the zone type to be changed.
- 2. Select the Zone Index for zone 2 (the zone that can't be combined with zone 2 of Fabric A).**
- 3. Record the ports attached to this zone.**
- 4. Remove all assigned ports.**
- 5. Click on the Add Zone button. Observe that zone 4 is created.**
- 6. Add the ports that were designated as part of zone 2.**

7. Click the Apply button to save the changes.

The new Fabric contains four zones for this zone type. When the two Fabrics are connected, the result contains zone 1 from both Fabrics combined in zone 1, zone 2 contains the ports defined for the original Fabric A, zone 3 contains the original ports defined for zone 3 of Fabric B, and zone 4 contains the ports defined in the original zone 2 of Fabric B.

After installing the HBA in F-Port mode on port-1, the devices on TL ports cannot be seen.

Make sure the switch chassis ID is not 0. The chassis ID can be checked and changed from the Switch Faceplate Display window. After changing the chassis ID, click the Apply button. For more information on chassis ID, refer to the *SANbox-8/16 Switch Management User's Manual for Sun StorEdge Network FC Switch 3.0*.

Sample Installation Session

CODE EXAMPLE D-1 contains output from an installation session using minimum patch levels available at the time of publication.

CODE EXAMPLE D-1

```
# pkgadd -d /download SUNWsan

Processing package instance <SUNWsan> from </download>

SAN Foundation Kit
(sparc) 1.0
Copyright 2001 Sun Microsystems, Inc. All rights reserved.
Using </> as the package base directory.
## Processing package information.
## Processing system information.
    1 package pathname is already properly installed.
## Verifying disk space requirements.
## Checking for conflicts with packages already installed.

The following files are already installed on the system and are
being
used by another package:
    /etc/init.d <attribute change only>
    /etc/rc3.d <attribute change only>
    /opt <attribute change only>

Do you want to install these conflicting files [y,n,?,q] y
## Checking for setuid/setgid programs.

This package contains scripts which will be executed with super-
user
```

CODE EXAMPLE D-1

```
permission during the process of installing this package.

Do you want to continue with the installation of <SUNWsan> [y,n,?]
y

Installing SAN Foundation Kit as <SUNWsan>

## Installing part 1 of 1.
/opt/SUNWsan/bin/san_recover
/opt/SUNWsan/man/sman1m/luxadm.1m
/opt/SUNWsan/man/sman7d/scsi_vhci.7d
[ verifying class <none> ]
Modifying /opt/SUNWsan/etc/san_drivers
Modifying /opt/SUNWsan/etc/san_os
Modifying /opt/SUNWsan/patches/patchconf
[ verifying class <build> ]
[ verifying class <initd> ]
/etc/rc3.d/S50san_driverchk <linked pathname>
## Executing postinstall script.

Installation of <SUNWsan> was successful.

# patchadd /download/111847-01

Checking installed patches...
Verifying sufficient filesystem capacity (dry run method)...
Installing patch packages...

Patch number 111847-01 has been successfully installed.
See /var/sadm/patch/111847-01/log for details

Patch packages installed:
  SUNWsan

# patchadd /download/108982-09

Checking installed patches...
Verifying sufficient filesystem capacity (dry run method)...
Installing patch packages...

Patch number 108982-09 has been successfully installed.
See /var/sadm/patch/108982-09/log for details
```

CODE EXAMPLE D-1

```
Patch packages installed:
  SUNWcsu
  SUNWcsxu
  SUNWfcp
  SUNWfcpx
  SUNWfctl
  SUNWfctlx
  SUNWhea
  SUNWusoc
  SUNWusocx

# patchadd /download/108984-08

Checking installed patches...
Verifying sufficient filesystem capacity (dry run method)...
Installing patch packages...

Patch number 108984-08 has been successfully installed.
See /var/sadm/patch/108984-08/log for details

Patch packages installed:
  SUNWcsr
  SUNWcsu
  SUNWcsxu
  SUNWhea
  SUNWqlc
  SUNWqlcx

# patchadd /download/111412-04

Checking installed patches...
Executing prepatch script...
Verifying sufficient filesystem capacity (dry run method)...
Installing patch packages...

Patch number 111412-04 has been successfully installed.
See /var/sadm/patch/111412-04/log for details
Executing postpatch script...
Reboot client to install driver.

Patch packages installed:
  SUNWcsu
```

CODE EXAMPLE D-1

```
SUNWcsxu  
SUNWhea  
SUNWmdi  
SUNWmdix
```

```
# patchadd /download/111095-05
```

```
Checking installed patches...  
Executing prepatch script...  
Verifying sufficient filesystem capacity (dry run method)...  
Installing patch packages...
```

```
Patch number 111095-05 has been successfully installed.  
See /var/sadm/patch/111095-05/log for details  
Executing postpatch script...
```

```
Patch packages installed:
```

```
SUNWcsu  
SUNWcsxu  
SUNWfcp  
SUNWfcpx  
SUNWfctl  
SUNWfctlx  
SUNWhea  
SUNWusoc  
SUNWusocx
```

```
# patchhad /download/111096-03
```

```
Checking installed patches...  
Executing prepatch script...  
Verifying sufficient filesystem capacity (dry run method)...  
Installing patch packages...
```

```
Patch number 111096-03 has been successfully installed.  
See /var/sadm/patch/111096-03/log for details  
Executing postpatch script...
```

```
Patch packages installed:
```

```
SUNWcsr  
SUNWcsu
```

CODE EXAMPLE D-1

```
SUNWcsxu
SUNWfcip
SUNWfcipx
SUNWhea

# patchadd /download/111097-04

Checking installed patches...
Executing prepatch script...
Verifying sufficient filesystem capacity (dry run method)...
Installing patch packages...

Patch number 111097-04 has been successfully installed.
See /var/sadm/patch/111097-04/log for details
Executing postpatch script...

Patch packages installed:
  SUNWcsr
  SUNWcsu
  SUNWcsxu
  SUNWhea
  SUNWqlc
  SUNWqlcx

# patchadd /download/109529-06

Checking installed patches...
Verifying sufficient filesystem capacity (dry run method)...
Installing patch packages...

Patch number 109529-06 has been successfully installed.
See /var/sadm/patch/109529-06/log for details

Patch packages installed:
  SUNWluxop
  SUNWluxox

# patchadd /download/111413-04

Checking installed patches...
Executing prepatch script...
Verifying sufficient filesystem capacity (dry run method)...
Installing patch packages...
```

CODE EXAMPLE D-1

```
Patch number 111413-03 has been successfully installed.
See /var/sadm/patch/111413-03/log for details
Executing postpatch script...

Patch packages installed:
  SUNWluxop
  SUNWluxox

# pkgadd -d /download SUNWcfpl

Processing package instance <SUNWcfpl> from </home/htk/tpatch>

fp cfgadm plug-in library
(sparc) 11.8.0,REV=2001.07.14.21.42
Copyright 2001 Sun Microsystems, Inc. All rights reserved.
## Processing package information.
## Processing system information.
## Verifying package dependencies.
## Verifying disk space requirements.
## Checking for conflicts with packages already installed.
## Checking for setuid/setgid programs.

This package contains scripts which will be executed with super-
user
permission during the process of installing this package.

Do you want to continue with the installation of <SUNWcfpl> [y,n,?]
y

Installing fp cfgadm plug-in library as <SUNWcfpl>

## Installing part 1 of 1.

Installation of <SUNWcfpl> was successful.

# pkgadd -d /download SUNWcfplx

Processing package instance <SUNWcfplx> from </home/htk/tpatch>

fp cfgadm plug-in library (64-bit)
(sparc) 11.8.0,REV=2001.07.14.21.42
Copyright 2001 Sun Microsystems, Inc. All rights reserved.
```

CODE EXAMPLE D-1

```
## Processing package information.
## Processing system information.
## Verifying package dependencies.
## Verifying disk space requirements.
## Checking for conflicts with packages already installed.
## Checking for setuid/setgid programs.

Installing fp cfgadm plug-in library (64-bit) as <SUNWcfplx>

## Installing part 1 of 1.

Installation of <SUNWcfplx> was successful.

# patchadd /download/111846-01

Checking installed patches...
Verifying sufficient filesystem capacity (dry run method)...
Installing patch packages...

Patch number 111846-01 has been successfully installed.
See /var/sadm/patch/111846-01/log for details

Patch packages installed:
  SUNWcfpl
  SUNWcfplx

# patchadd /download/111267-02

Checking installed patches...
Verifying sufficient filesystem capacity (dry run method)...
Installing patch packages...

Patch number 111267-02 has been successfully installed.
See /var/sadm/patch/111267-02/log for details

Patch packages installed:
  SUNWcarx
  SUNWcsr
  SUNWhea

# patchadd /download/110614-02

Checking installed patches...
```

CODE EXAMPLE D-1

```
Verifying sufficient filesystem capacity (dry run method)...
Installing patch packages...

Patch number 110614-02 has been successfully installed.
See /var/sadm/patch/110614-02/log for details

Patch packages installed:
  SUNWses
  SUNWsesx

# pkgadd -d /download SUNWvtsst

Processing package instance <SUNWvtsst> from </download>

StorTools Diagnostic Package Prototype
(sparc) 4.1

Using </opt> as the package base directory.
## Processing package information.
## Processing system information.
   7 package pathnames are already properly installed.
## Verifying package dependencies.
## Verifying disk space requirements.
## Checking for conflicts with packages already installed.
## Checking for setuid/setgid programs.

This package contains scripts which will be executed with super-
user
permission during the process of installing this package.

Do you want to continue with the installation of <SUNWvtsst>
[y,n,?] y

Installing StorTools Diagnostic Package Prototype as <SUNWvtsst>

## Executing preinstall script.
## Installing part 1 of 1.
/etc/fcswitch.example
/opt/SUNWvtsst/README
/opt/SUNWvtsst/bin/.customtest
/opt/SUNWvtsst/bin/.customtest_OtherDevices
/opt/SUNWvtsst/bin/.sunvts_sec
/opt/SUNWvtsst/bin/.sunvts_sec_gss
```


CODE EXAMPLE D-1

```
/opt/SUNWvtsst/bin/.version
/opt/SUNWvtsst/bin/a3500fctest
/opt/SUNWvtsst/bin/a5ksestest
/opt/SUNWvtsst/bin/a5ktest
/opt/SUNWvtsst/bin/afb_checksum.data
/opt/SUNWvtsst/bin/afb_texture.im24
/opt/SUNWvtsst/bin/cg6
/opt/SUNWvtsst/bin/check_snapshot
/opt/SUNWvtsst/bin/clear_all_status_bits
/opt/SUNWvtsst/bin/dex
/opt/SUNWvtsst/bin/discman
/opt/SUNWvtsst/bin/dispatcher
/opt/SUNWvtsst/bin/fcdisktest
/opt/SUNWvtsst/bin/fctapetest
/opt/SUNWvtsst/bin/fru_list
/opt/SUNWvtsst/bin/ifptest
/opt/SUNWvtsst/bin/lbf
/opt/SUNWvtsst/bin/lib <symbolic link>
/opt/SUNWvtsst/bin/modules/a35fc_disk
/opt/SUNWvtsst/bin/modules/a5k_disk
/opt/SUNWvtsst/bin/modules/a5k_isolation
/opt/SUNWvtsst/bin/modules/check_device_state
/opt/SUNWvtsst/bin/modules/check_st_init
/opt/SUNWvtsst/bin/modules/clear_path_status_bits
/opt/SUNWvtsst/bin/modules/dev_eport_ready
/opt/SUNWvtsst/bin/modules/dex
/opt/SUNWvtsst/bin/modules/dport_ready
/opt/SUNWvtsst/bin/modules/fc_disk
/opt/SUNWvtsst/bin/modules/fc_tape
/opt/SUNWvtsst/bin/modules/hba_eport_ready
/opt/SUNWvtsst/bin/modules/hba_ready
/opt/SUNWvtsst/bin/modules/ifp_core
/opt/SUNWvtsst/bin/modules/iptport_ready
/opt/SUNWvtsst/bin/modules/is_a5k_device_installed
/opt/SUNWvtsst/bin/modules/is_a5k_device_online
/opt/SUNWvtsst/bin/modules/is_dev_daisy_chained
/opt/SUNWvtsst/bin/modules/is_disk_a3500fc
/opt/SUNWvtsst/bin/modules/is_disk_a5k
/opt/SUNWvtsst/bin/modules/is_disk_fc
/opt/SUNWvtsst/bin/modules/is_disk_t3
/opt/SUNWvtsst/bin/modules/is_eport
/opt/SUNWvtsst/bin/modules/is_hba_ifp
/opt/SUNWvtsst/bin/modules/is_hba_online
```

CODE EXAMPLE D-1

```
/opt/SUNWvtsst/bin/modules/is_hba_qlc
/opt/SUNWvtsst/bin/modules/is_hba_socal
/opt/SUNWvtsst/bin/modules/is_hub_config
/opt/SUNWvtsst/bin/modules/is_switched
/opt/SUNWvtsst/bin/modules/is_tape_fc
/opt/SUNWvtsst/bin/modules/isolate_a5k_by_scsi
/opt/SUNWvtsst/bin/modules/lbf_loop_test
/opt/SUNWvtsst/bin/modules/lw_insert_dev_eport_fiber
/opt/SUNWvtsst/bin/modules/lw_insert_dev_eport_loopback
/opt/SUNWvtsst/bin/modules/lw_insert_dev_fiber
/opt/SUNWvtsst/bin/modules/lw_insert_dport_fiber
/opt/SUNWvtsst/bin/modules/lw_insert_dport_loopback
/opt/SUNWvtsst/bin/modules/lw_insert_hba_eport_fiber
/opt/SUNWvtsst/bin/modules/lw_insert_hba_eport_loopback
/opt/SUNWvtsst/bin/modules/lw_insert_hba_loopback
/opt/SUNWvtsst/bin/modules/lw_insert_iport_fiber
/opt/SUNWvtsst/bin/modules/lw_insert_iport_loopback
/opt/SUNWvtsst/bin/modules/lw_remove_dev_eport_fiber
/opt/SUNWvtsst/bin/modules/lw_remove_dev_eport_loopback
/opt/SUNWvtsst/bin/modules/lw_remove_dport_fiber
/opt/SUNWvtsst/bin/modules/lw_remove_dport_loopback
/opt/SUNWvtsst/bin/modules/lw_remove_hba_eport_fiber
/opt/SUNWvtsst/bin/modules/lw_remove_hba_eport_loopback
/opt/SUNWvtsst/bin/modules/lw_remove_hba_fiber
/opt/SUNWvtsst/bin/modules/lw_remove_hba_loopback
/opt/SUNWvtsst/bin/modules/lw_remove_iport_fiber
/opt/SUNWvtsst/bin/modules/lw_remove_iport_loopback
/opt/SUNWvtsst/bin/modules/lw_replace_dev_eport_fiber
/opt/SUNWvtsst/bin/modules/lw_replace_dev_eport_gbic
/opt/SUNWvtsst/bin/modules/lw_replace_dev_fiber
/opt/SUNWvtsst/bin/modules/lw_replace_dev_gbic
/opt/SUNWvtsst/bin/modules/lw_replace_dev_mia
/opt/SUNWvtsst/bin/modules/lw_replace_device
/opt/SUNWvtsst/bin/modules/lw_replace_dport_fiber
/opt/SUNWvtsst/bin/modules/lw_replace_dport_gbic
/opt/SUNWvtsst/bin/modules/lw_replace_hba_eport_fiber
/opt/SUNWvtsst/bin/modules/lw_replace_hba_eport_gbic
/opt/SUNWvtsst/bin/modules/lw_replace_hba_gbic
/opt/SUNWvtsst/bin/modules/lw_replace_iport_fiber
/opt/SUNWvtsst/bin/modules/lw_replace_iport_gbic
/opt/SUNWvtsst/bin/modules/lw_restore_dev_eport_fiber
/opt/SUNWvtsst/bin/modules/lw_restore_dev_eport_gbic
/opt/SUNWvtsst/bin/modules/lw_restore_dev_fiber
```

CODE EXAMPLE D-1

```
/opt/SUNWvtsst/bin/modules/lw_restore_dev_gbic
/opt/SUNWvtsst/bin/modules/lw_restore_dev_mia
/opt/SUNWvtsst/bin/modules/lw_restore_device
/opt/SUNWvtsst/bin/modules/lw_restore_dport_fiber
/opt/SUNWvtsst/bin/modules/lw_restore_dport_gbic
/opt/SUNWvtsst/bin/modules/lw_restore_hba_eport_fiber
/opt/SUNWvtsst/bin/modules/lw_restore_hba_eport_gbic
/opt/SUNWvtsst/bin/modules/lw_restore_hba_fiber
/opt/SUNWvtsst/bin/modules/lw_restore_hba_gbic
/opt/SUNWvtsst/bin/modules/lw_restore_iport_fiber
/opt/SUNWvtsst/bin/modules/lw_restore_iport_gbic
/opt/SUNWvtsst/bin/modules/lw_retry_test
/opt/SUNWvtsst/bin/modules/qlc_core
/opt/SUNWvtsst/bin/modules/qlc_ext_loop
/opt/SUNWvtsst/bin/modules/qlc_int_loop
/opt/SUNWvtsst/bin/modules/socal_core
/opt/SUNWvtsst/bin/modules/socal_ext_loop
/opt/SUNWvtsst/bin/modules/socal_int_loop
/opt/SUNWvtsst/bin/modules/stress_test
/opt/SUNWvtsst/bin/modules/switch_dev_eport
/opt/SUNWvtsst/bin/modules/switch_dport
/opt/SUNWvtsst/bin/modules/switch_hba_eport
/opt/SUNWvtsst/bin/modules/switch_iport
/opt/SUNWvtsst/bin/modules/t3_disk
/opt/SUNWvtsst/bin/modules/wr_dev_buffer_test
/opt/SUNWvtsst/bin/pm/compare_ss.arm.pm
/opt/SUNWvtsst/bin/pm/compare_ss.gray.pm
/opt/SUNWvtsst/bin/pm/compare_ss.pm
/opt/SUNWvtsst/bin/pm/create_ss.arm.pm
/opt/SUNWvtsst/bin/pm/create_ss.gray.pm
/opt/SUNWvtsst/bin/pm/create_ss.pm
/opt/SUNWvtsst/bin/pm/exit.arm.pm
/opt/SUNWvtsst/bin/pm/exit.pm
/opt/SUNWvtsst/bin/pm/fail_icon.l.bm
/opt/SUNWvtsst/bin/pm/fail_icon.l.pm
/opt/SUNWvtsst/bin/pm/host.arm.pm
/opt/SUNWvtsst/bin/pm/host.gray.pm
/opt/SUNWvtsst/bin/pm/host.pm
/opt/SUNWvtsst/bin/pm/log.arm.pm
/opt/SUNWvtsst/bin/pm/log.gray.pm
/opt/SUNWvtsst/bin/pm/log.pm
/opt/SUNWvtsst/bin/pm/pass_icon.l.bm
/opt/SUNWvtsst/bin/pm/pass_icon.l.pm
```

CODE EXAMPLE D-1

```
/opt/SUNWvtsst/bin/pm/perf.arm.pm
/opt/SUNWvtsst/bin/pm/perf.gray.pm
/opt/SUNWvtsst/bin/pm/perf.pm
/opt/SUNWvtsst/bin/pm/reset.arm.pm
/opt/SUNWvtsst/bin/pm/reset.gray.pm
/opt/SUNWvtsst/bin/pm/reset.pm
/opt/SUNWvtsst/bin/pm/start.arm.pm
/opt/SUNWvtsst/bin/pm/start.gray.pm
/opt/SUNWvtsst/bin/pm/start.pm
/opt/SUNWvtsst/bin/pm/stop.arm.pm
/opt/SUNWvtsst/bin/pm/stop.gray.pm
/opt/SUNWvtsst/bin/pm/stop.pm
/opt/SUNWvtsst/bin/qlctest
/opt/SUNWvtsst/bin/socaltest
/opt/SUNWvtsst/bin/sparcv9/.customtest
/opt/SUNWvtsst/bin/sparcv9/.customtest_OtherDevices
/opt/SUNWvtsst/bin/sparcv9/.sunvts_sec <symbolic link>
/opt/SUNWvtsst/bin/sparcv9/.sunvts_sec_gss <symbolic link>
/opt/SUNWvtsst/bin/sparcv9/.version <symbolic link>
/opt/SUNWvtsst/bin/sparcv9/a3500fctest
/opt/SUNWvtsst/bin/sparcv9/a5ksestest
/opt/SUNWvtsst/bin/sparcv9/a5ktest
/opt/SUNWvtsst/bin/sparcv9/cg6 <symbolic link>
/opt/SUNWvtsst/bin/sparcv9/check_snapshot
/opt/SUNWvtsst/bin/sparcv9/clear_all_status_bits
/opt/SUNWvtsst/bin/sparcv9/discman
/opt/SUNWvtsst/bin/sparcv9/dispatcher
/opt/SUNWvtsst/bin/sparcv9/fcdisktest
/opt/SUNWvtsst/bin/sparcv9/fctapetest
/opt/SUNWvtsst/bin/sparcv9/fru_list <symbolic link>
/opt/SUNWvtsst/bin/sparcv9/ifptest
/opt/SUNWvtsst/bin/sparcv9/modules/a35fc_disk
/opt/SUNWvtsst/bin/sparcv9/modules/a5k_disk
/opt/SUNWvtsst/bin/sparcv9/modules/a5k_isolation
/opt/SUNWvtsst/bin/sparcv9/modules/check_device_state
/opt/SUNWvtsst/bin/sparcv9/modules/check_st_init
/opt/SUNWvtsst/bin/sparcv9/modules/clear_path_status_bits
/opt/SUNWvtsst/bin/sparcv9/modules/dev_eport_ready
/opt/SUNWvtsst/bin/sparcv9/modules/dex
/opt/SUNWvtsst/bin/sparcv9/modules/dport_ready
/opt/SUNWvtsst/bin/sparcv9/modules/fc_disk
/opt/SUNWvtsst/bin/sparcv9/modules/fc_tape
/opt/SUNWvtsst/bin/sparcv9/modules/hba_eport_ready
```

CODE EXAMPLE D-1

```
/opt/SUNWvtsst/bin/sparcv9/modules/hba_ready
/opt/SUNWvtsst/bin/sparcv9/modules/ifp_core
/opt/SUNWvtsst/bin/sparcv9/modules/iport_ready
/opt/SUNWvtsst/bin/sparcv9/modules/is_a5k_device_installed
/opt/SUNWvtsst/bin/sparcv9/modules/is_a5k_device_online
/opt/SUNWvtsst/bin/sparcv9/modules/is_dev_daisy_chained
/opt/SUNWvtsst/bin/sparcv9/modules/is_disk_a3500fc
/opt/SUNWvtsst/bin/sparcv9/modules/is_disk_a5k
/opt/SUNWvtsst/bin/sparcv9/modules/is_disk_fc
/opt/SUNWvtsst/bin/sparcv9/modules/is_disk_t3
/opt/SUNWvtsst/bin/sparcv9/modules/is_eport
/opt/SUNWvtsst/bin/sparcv9/modules/is_hba_ifp
/opt/SUNWvtsst/bin/sparcv9/modules/is_hba_online
/opt/SUNWvtsst/bin/sparcv9/modules/is_hba_qlc
/opt/SUNWvtsst/bin/sparcv9/modules/is_hba_socal
/opt/SUNWvtsst/bin/sparcv9/modules/is_hub_config
/opt/SUNWvtsst/bin/sparcv9/modules/is_switched
/opt/SUNWvtsst/bin/sparcv9/modules/is_tape_fc
/opt/SUNWvtsst/bin/sparcv9/modules/isolate_a5k_by_scsi
/opt/SUNWvtsst/bin/sparcv9/modules/lbf_loop_test
/opt/SUNWvtsst/bin/sparcv9/modules/lw_insert_dev_eport_fiber
/opt/SUNWvtsst/bin/sparcv9/modules/lw_insert_dev_eport_loopback
/opt/SUNWvtsst/bin/sparcv9/modules/lw_insert_dev_fiber
/opt/SUNWvtsst/bin/sparcv9/modules/lw_insert_dport_fiber
/opt/SUNWvtsst/bin/sparcv9/modules/lw_insert_dport_loopback
/opt/SUNWvtsst/bin/sparcv9/modules/lw_insert_hba_eport_fiber
/opt/SUNWvtsst/bin/sparcv9/modules/lw_insert_hba_eport_loopback
/opt/SUNWvtsst/bin/sparcv9/modules/lw_insert_hba_loopback
/opt/SUNWvtsst/bin/sparcv9/modules/lw_insert_iport_fiber
/opt/SUNWvtsst/bin/sparcv9/modules/lw_insert_iport_loopback
/opt/SUNWvtsst/bin/sparcv9/modules/lw_remove_dev_eport_fiber
/opt/SUNWvtsst/bin/sparcv9/modules/lw_remove_dev_eport_loopback
/opt/SUNWvtsst/bin/sparcv9/modules/lw_remove_dport_fiber
/opt/SUNWvtsst/bin/sparcv9/modules/lw_remove_dport_loopback
/opt/SUNWvtsst/bin/sparcv9/modules/lw_remove_hba_eport_fiber
/opt/SUNWvtsst/bin/sparcv9/modules/lw_remove_hba_eport_loopback
/opt/SUNWvtsst/bin/sparcv9/modules/lw_remove_hba_fiber
/opt/SUNWvtsst/bin/sparcv9/modules/lw_remove_hba_loopback
/opt/SUNWvtsst/bin/sparcv9/modules/lw_remove_iport_fiber
/opt/SUNWvtsst/bin/sparcv9/modules/lw_remove_iport_loopback
/opt/SUNWvtsst/bin/sparcv9/modules/lw_replace_dev_eport_fiber
/opt/SUNWvtsst/bin/sparcv9/modules/lw_replace_dev_eport_gbic
/opt/SUNWvtsst/bin/sparcv9/modules/lw_replace_dev_fiber
```

CODE EXAMPLE D-1

```
/opt/SUNWvtsst/bin/sparcv9/modules/lw_replace_dev_gbic
/opt/SUNWvtsst/bin/sparcv9/modules/lw_replace_dev_mia
/opt/SUNWvtsst/bin/sparcv9/modules/lw_replace_device
/opt/SUNWvtsst/bin/sparcv9/modules/lw_replace_dport_fiber
/opt/SUNWvtsst/bin/sparcv9/modules/lw_replace_dport_gbic
/opt/SUNWvtsst/bin/sparcv9/modules/lw_replace_hba_eport_fiber
/opt/SUNWvtsst/bin/sparcv9/modules/lw_replace_hba_eport_gbic
/opt/SUNWvtsst/bin/sparcv9/modules/lw_replace_hba_gbic
/opt/SUNWvtsst/bin/sparcv9/modules/lw_replace_iport_fiber
/opt/SUNWvtsst/bin/sparcv9/modules/lw_replace_iport_gbic
/opt/SUNWvtsst/bin/sparcv9/modules/lw_restore_dev_eport_fiber
/opt/SUNWvtsst/bin/sparcv9/modules/lw_restore_dev_eport_gbic
/opt/SUNWvtsst/bin/sparcv9/modules/lw_restore_dev_fiber
/opt/SUNWvtsst/bin/sparcv9/modules/lw_restore_dev_gbic
/opt/SUNWvtsst/bin/sparcv9/modules/lw_restore_dev_mia
/opt/SUNWvtsst/bin/sparcv9/modules/lw_restore_device
/opt/SUNWvtsst/bin/sparcv9/modules/lw_restore_dport_fiber
/opt/SUNWvtsst/bin/sparcv9/modules/lw_restore_dport_gbic
/opt/SUNWvtsst/bin/sparcv9/modules/lw_restore_hba_eport_fiber
/opt/SUNWvtsst/bin/sparcv9/modules/lw_restore_hba_eport_gbic
/opt/SUNWvtsst/bin/sparcv9/modules/lw_restore_hba_fiber
/opt/SUNWvtsst/bin/sparcv9/modules/lw_restore_hba_gbic
/opt/SUNWvtsst/bin/sparcv9/modules/lw_restore_iport_fiber
/opt/SUNWvtsst/bin/sparcv9/modules/lw_restore_iport_gbic
/opt/SUNWvtsst/bin/sparcv9/modules/lw_retry_test
/opt/SUNWvtsst/bin/sparcv9/modules/qlc_core
/opt/SUNWvtsst/bin/sparcv9/modules/qlc_ext_loop
/opt/SUNWvtsst/bin/sparcv9/modules/qlc_int_loop
/opt/SUNWvtsst/bin/sparcv9/modules/socal_core
/opt/SUNWvtsst/bin/sparcv9/modules/socal_ext_loop
/opt/SUNWvtsst/bin/sparcv9/modules/socal_int_loop
/opt/SUNWvtsst/bin/sparcv9/modules/stress_test
/opt/SUNWvtsst/bin/sparcv9/modules/switch_dev_eport
/opt/SUNWvtsst/bin/sparcv9/modules/switch_dport
/opt/SUNWvtsst/bin/sparcv9/modules/switch_hba_eport
/opt/SUNWvtsst/bin/sparcv9/modules/switch_iport
/opt/SUNWvtsst/bin/sparcv9/modules/t3_disk
/opt/SUNWvtsst/bin/sparcv9/modules/wr_dev_buffer_test
/opt/SUNWvtsst/bin/sparcv9/qlctest
/opt/SUNWvtsst/bin/sparcv9/socaltest
/opt/SUNWvtsst/bin/sparcv9/stddiscover
/opt/SUNWvtsst/bin/sparcv9/stexpert
/opt/SUNWvtsst/bin/sparcv9/stexpert.rb
```

CODE EXAMPLE D-1

```
/opt/SUNWvtsst/bin/sparcv9/stexpert.td
/opt/SUNWvtsst/bin/sparcv9/sunlink <symbolic link>
/opt/SUNWvtsst/bin/sparcv9/switchtest
/opt/SUNWvtsst/bin/sparcv9/t3test
/opt/SUNWvtsst/bin/sparcv9/take_snapshot
/opt/SUNWvtsst/bin/sparcv9/vts_cmd <symbolic link>
/opt/SUNWvtsst/bin/sparcv9/vtsinfo.a
/opt/SUNWvtsst/bin/sparcv9/vtsinfo.so
/opt/SUNWvtsst/bin/sparcv9/vtsk
/opt/SUNWvtsst/bin/stdiscover
/opt/SUNWvtsst/bin/stexpert
/opt/SUNWvtsst/bin/stexpert.rb
/opt/SUNWvtsst/bin/stexpert.td
/opt/SUNWvtsst/bin/stortools
/opt/SUNWvtsst/bin/sunlink
/opt/SUNWvtsst/bin/switchtest
/opt/SUNWvtsst/bin/t3test
/opt/SUNWvtsst/bin/take_snapshot
/opt/SUNWvtsst/bin/test_name
/opt/SUNWvtsst/bin/testadd
/opt/SUNWvtsst/bin/testrm
/opt/SUNWvtsst/bin/vts_cmd
/opt/SUNWvtsst/bin/vtsinfo.a
/opt/SUNWvtsst/bin/vtsinfo.so
/opt/SUNWvtsst/bin/vtsk
/opt/SUNWvtsst/bin/vtsprobe
/opt/SUNWvtsst/bin/vtstty
/opt/SUNWvtsst/bin/vtsui
/opt/SUNWvtsst/docs/ReleaseNotes
/opt/SUNWvtsst/docs/StorTools.pdf
/opt/SUNWvtsst/lib/Vtsui
/opt/SUNWvtsst/lib/cfd/configd4u1
/opt/SUNWvtsst/lib/cfd/configdWG
/opt/SUNWvtsst/lib/locale/C/LC_MESSAGES/a3500fctest.msg
/opt/SUNWvtsst/lib/locale/C/LC_MESSAGES/a5ksestest.msg
/opt/SUNWvtsst/lib/locale/C/LC_MESSAGES/a5ktest.msg
/opt/SUNWvtsst/lib/locale/C/LC_MESSAGES/discman.cat
/opt/SUNWvtsst/lib/locale/C/LC_MESSAGES/fcdisktest.msg
/opt/SUNWvtsst/lib/locale/C/LC_MESSAGES/fctapetest.msg
/opt/SUNWvtsst/lib/locale/C/LC_MESSAGES/ifptest.msg
/opt/SUNWvtsst/lib/locale/C/LC_MESSAGES/libtest.msg
/opt/SUNWvtsst/lib/locale/C/LC_MESSAGES/libutil.msg
/opt/SUNWvtsst/lib/locale/C/LC_MESSAGES/probeutil.msg
```

CODE EXAMPLE D-1

```
/opt/SUNWvtsst/lib/locale/C/LC_MESSAGES/qlctest.msg
/opt/SUNWvtsst/lib/locale/C/LC_MESSAGES/socaltest.msg
/opt/SUNWvtsst/lib/locale/C/LC_MESSAGES/stexpert.cat
/opt/SUNWvtsst/lib/locale/C/LC_MESSAGES/sunlink.msg
/opt/SUNWvtsst/lib/locale/C/LC_MESSAGES/switchtest.msg
/opt/SUNWvtsst/lib/locale/C/LC_MESSAGES/t3test.msg
/opt/SUNWvtsst/lib/locale/C/LC_MESSAGES/vtsk.msg
/opt/SUNWvtsst/lib/locale/C/LC_MESSAGES/vtstty.help
/opt/SUNWvtsst/lib/locale/C/LC_MESSAGES/vtstty.msg
/opt/SUNWvtsst/lib/locale/C/LC_MESSAGES/vtsui.msg
/opt/SUNWvtsst/lib/vts_configd.ksh
/opt/SUNWvtsst/man/man1m/a3500fctest.1m
/opt/SUNWvtsst/man/man1m/a5ksestest.1m
/opt/SUNWvtsst/man/man1m/a5ktest.1m
/opt/SUNWvtsst/man/man1m/dex.1m
/opt/SUNWvtsst/man/man1m/discman.1m
/opt/SUNWvtsst/man/man1m/fcdisktest.1m
/opt/SUNWvtsst/man/man1m/fctapetest.1m
/opt/SUNWvtsst/man/man1m/ifptest.1m
/opt/SUNWvtsst/man/man1m/lbf.1m
/opt/SUNWvtsst/man/man1m/qlctest.1m
/opt/SUNWvtsst/man/man1m/socaltest.1m
/opt/SUNWvtsst/man/man1m/stexpert.1m
/opt/SUNWvtsst/man/man1m/stortools.1m
/opt/SUNWvtsst/man/man1m/switchtest.1m
/opt/SUNWvtsst/man/man1m/t3test.1m
/usr/lib/libexptools.so
/usr/lib/libfcald.so
/usr/lib/libsanbox.so
/usr/lib/libtools.so
/usr/lib/libtools2.so
/usr/lib/sparcv9/libexptools.so
/usr/lib/sparcv9/libfcald.so
/usr/lib/sparcv9/libsanbox.so
/usr/lib/sparcv9/libtools.so
/usr/lib/sparcv9/libtools2.so
/var/opt/SUNWvtsst/logs/config.txt
[ verifying class <none> ]
## Executing postinstall script.

Installation of <SUNWvtsst> was successful.
```


CODE EXAMPLE D-1

```
# pkgadd -d /download SUNWrasag

Processing package instance <SUNWrasag> from </download>

Network Storage Agent
(sparc) 2.1r1

The selected base directory </opt/SUNWrasag> must exist before
installation is attempted.

Do you want this directory created now [y,n,?,q] y
Using </opt/SUNWrasag> as the package base directory.
## Processing package information.
## Processing system information.
## Verifying disk space requirements.
## Checking for conflicts with packages already installed.
## Checking for setuid/setgid programs.

This package contains scripts which will be executed with super-
user
permission during the process of installing this package.

Do you want to continue with the installation of <SUNWrasag>
[y,n,?] y

Installing Network Storage Agent as <SUNWrasag>

## Installing part 1 of 1.
/opt/SUNWrasag/CHANGES
/opt/SUNWrasag/README
/opt/SUNWrasag/StarterKit/TAPEAgent.pm
/opt/SUNWrasag/StarterKit/WHATAgent.pm
/opt/SUNWrasag/System/DeviceState.map
/opt/SUNWrasag/System/DocSequence
/opt/SUNWrasag/System/EventSequence
/opt/SUNWrasag/System/Events.list
/opt/SUNWrasag/System/Events_1.1.mof
/opt/SUNWrasag/System/NETCONNECT
/opt/SUNWrasag/System/Probable_Causes
/opt/SUNWrasag/System/Recommended_Actions
/opt/SUNWrasag/System/SW_Thresholds
```

CODE EXAMPLE D-1

```
/opt/SUNWrasag/System/Storage_1.1.mof
/opt/SUNWrasag/System/System1.0.tar.Z
/opt/SUNWrasag/System/checksum
/opt/SUNWrasag/System/config
/opt/SUNWrasag/System/config-matrix
/opt/SUNWrasag/System/cron_started
/opt/SUNWrasag/System/event_sequence
/opt/SUNWrasag/System/last_config
/opt/SUNWrasag/System/mpxio
/opt/SUNWrasag/System/password
/opt/SUNWrasag/System/prototype
/opt/SUNWrasag/System/rules
/opt/SUNWrasag/System/sequence
/opt/SUNWrasag/bin/c2s
/opt/SUNWrasag/bin/cdmenu
/opt/SUNWrasag/bin/checkAgent
/opt/SUNWrasag/bin/checkcron
/opt/SUNWrasag/bin/clearcache
/opt/SUNWrasag/bin/crontabs.txt
/opt/SUNWrasag/bin/d2t
/opt/SUNWrasag/bin/dexRW
/opt/SUNWrasag/bin/discman.sample
/opt/SUNWrasag/bin/disk_inquiry
/opt/SUNWrasag/bin/disklist
/opt/SUNWrasag/bin/disks
/opt/SUNWrasag/bin/display
/opt/SUNWrasag/bin/dump.pl
/opt/SUNWrasag/bin/dump_kstat
/opt/SUNWrasag/bin/email_store.pl
/opt/SUNWrasag/bin/err
/opt/SUNWrasag/bin/fix_perl_path
/opt/SUNWrasag/bin/getWWN
/opt/SUNWrasag/bin/grep
/opt/SUNWrasag/bin/httpget
/opt/SUNWrasag/bin/install_discman
/opt/SUNWrasag/bin/lib/libsnmp-0.4.2.0.2.so
/opt/SUNWrasag/bin/locale.pl
/opt/SUNWrasag/bin/look
/opt/SUNWrasag/bin/luxdisc
/opt/SUNWrasag/bin/mapdev
/opt/SUNWrasag/bin/merge
/opt/SUNWrasag/bin/mess.sample
/opt/SUNWrasag/bin/mess_sum
```

CODE EXAMPLE D-1

```
/opt/SUNWrasag/bin/myread
/opt/SUNWrasag/bin/pcicomp
/opt/SUNWrasag/bin/pcidump
/opt/SUNWrasag/bin/perf
/opt/SUNWrasag/bin/prototype
/opt/SUNWrasag/bin/ptopo
/opt/SUNWrasag/bin/ras_install
/opt/SUNWrasag/bin/rasagent
/opt/SUNWrasag/bin/rasagent.sh
/opt/SUNWrasag/bin/rashstart
/opt/SUNWrasag/bin/rashttp
/opt/SUNWrasag/bin/rasstat
/opt/SUNWrasag/bin/rawdump
/opt/SUNWrasag/bin/readToc
/opt/SUNWrasag/bin/readmess
/opt/SUNWrasag/bin/reset
/opt/SUNWrasag/bin/rgrep
/opt/SUNWrasag/bin/saf.pl
/opt/SUNWrasag/bin/sandbox
/opt/SUNWrasag/bin/save_password
/opt/SUNWrasag/bin/seek
/opt/SUNWrasag/bin/seek.pl
/opt/SUNWrasag/bin/sendtosupport
/opt/SUNWrasag/bin/set_sum
/opt/SUNWrasag/bin/shortdiscman
/opt/SUNWrasag/bin/show_devs
/opt/SUNWrasag/bin/snmpget
/opt/SUNWrasag/bin/snmpwalk
/opt/SUNWrasag/bin/storconfig
/opt/SUNWrasag/bin/storstat
/opt/SUNWrasag/bin/storstat.old
/opt/SUNWrasag/bin/swap.sh
/opt/SUNWrasag/bin/t.pl
/opt/SUNWrasag/bin/t3wnn
/opt/SUNWrasag/bin/tar.pl
/opt/SUNWrasag/bin/test_ip
/opt/SUNWrasag/bin/testconfig
/opt/SUNWrasag/bin/testhttp.pl
/opt/SUNWrasag/bin/testlux
/opt/SUNWrasag/bin/testrasd
/opt/SUNWrasag/bin/testrasd.pl
/opt/SUNWrasag/bin/testt3
/opt/SUNWrasag/bin/wget.pl
```

CODE EXAMPLE D-1

```
/opt/SUNWrasag/bin/writeNetConnect
/opt/SUNWrasag/discman/bin/discman
/opt/SUNWrasag/discman/bin/sparcv9/discman
/opt/SUNWrasag/discman/bin/sparcv9/stddiscover
/opt/SUNWrasag/discman/bin/stddiscover
/opt/SUNWrasag/discman/discman.cat
/opt/SUNWrasag/discman/lib/libfcald.so
/opt/SUNWrasag/discman/lib/libsanbox.so
/opt/SUNWrasag/discman/lib/sparcv9/libfcald.so
/opt/SUNWrasag/discman/lib/sparcv9/libsanbox.so
/opt/SUNWrasag/docs/InstallInstruct.pdf
/opt/SUNWrasag/docs/ReleaseNotes.txt
/opt/SUNWrasag/docs/UserGuide.pdf
/opt/SUNWrasag/docs/samples
/opt/SUNWrasag/htdocs/Chart2/Graph.class
/opt/SUNWrasag/htdocs/Chart2/IMapArea.class
/opt/SUNWrasag/htdocs/Chart2/Jg40.html
/opt/SUNWrasag/htdocs/Chart2/RasGraph2$SymItem.class
/opt/SUNWrasag/htdocs/Chart2/RasGraph2.class
/opt/SUNWrasag/htdocs/Chart2/RasGraph2.java
/opt/SUNWrasag/htdocs/Chart2/Screen.class
/opt/SUNWrasag/htdocs/Chart2/Value2.class
/opt/SUNWrasag/htdocs/Chart2/WS_FTP.LOG
/opt/SUNWrasag/htdocs/Chart2/fPoint.class
/opt/SUNWrasag/htdocs/Chart2/rasapplet.jar
/opt/SUNWrasag/htdocs/FC_gifs/fcloop01.gif
/opt/SUNWrasag/htdocs/FC_gifs/fcloop01.txt
/opt/SUNWrasag/htdocs/FC_gifs/topo01.jpg
/opt/SUNWrasag/htdocs/FC_gifs/topo01.txt
/opt/SUNWrasag/htdocs/FC_gifs/verify01.jpg
/opt/SUNWrasag/htdocs/FC_gifs/verify01.txt
/opt/SUNWrasag/htdocs/Topo/a5k.gif
/opt/SUNWrasag/htdocs/Topo/dgea.html
/opt/SUNWrasag/htdocs/Topo/g0.gif
/opt/SUNWrasag/htdocs/Topo/g1.gif
/opt/SUNWrasag/htdocs/Topo/g2.gif
/opt/SUNWrasag/htdocs/Topo/g3.gif
/opt/SUNWrasag/htdocs/Topo/hba.gif
/opt/SUNWrasag/htdocs/Topo/host.gif
/opt/SUNWrasag/htdocs/Topo/sport.gif
/opt/SUNWrasag/htdocs/Topo/switch.gif
/opt/SUNWrasag/htdocs/Topo/t300.gif
/opt/SUNWrasag/htdocs/Topo/topo.jar
```

CODE EXAMPLE D-1

```
/opt/SUNWrasag/htdocs/a5000.gif
/opt/SUNWrasag/htdocs/arrow1.gif
/opt/SUNWrasag/htdocs/arrow2.gif
/opt/SUNWrasag/htdocs/bg.gif
/opt/SUNWrasag/htdocs/buttons.js
/opt/SUNWrasag/htdocs/device_registration.html
/opt/SUNWrasag/htdocs/discover.html
/opt/SUNWrasag/htdocs/doc.html
/opt/SUNWrasag/htdocs/dot_blue.gif
/opt/SUNWrasag/htdocs/dot_clear.gif
/opt/SUNWrasag/htdocs/empty.html
/opt/SUNWrasag/htdocs/empty2.html
/opt/SUNWrasag/htdocs/fc_readwrite.html
/opt/SUNWrasag/htdocs/fcutil.html
/opt/SUNWrasag/htdocs/fcutil_welcome.html
/opt/SUNWrasag/htdocs/gif/al_alert.gif
/opt/SUNWrasag/htdocs/gif/al_alert2.gif
/opt/SUNWrasag/htdocs/gif/al_caution.gif
/opt/SUNWrasag/htdocs/gif/al_caution2.gif
/opt/SUNWrasag/htdocs/gif/al_crit.gif
/opt/SUNWrasag/htdocs/gif/al_crit2.gif
/opt/SUNWrasag/htdocs/gif/al_down.gif
/opt/SUNWrasag/htdocs/gif/al_down2.gif
/opt/SUNWrasag/htdocs/gif/al_ok.gif
/opt/SUNWrasag/htdocs/gif/al_ok2.gif
/opt/SUNWrasag/htdocs/gif/al_unk.gif
/opt/SUNWrasag/htdocs/gif/al_unk2.gif
/opt/SUNWrasag/htdocs/gif/bclick.gif
/opt/SUNWrasag/htdocs/gif/bg0.gif
/opt/SUNWrasag/htdocs/gif/bout.gif
/opt/SUNWrasag/htdocs/gif/bover.gif
/opt/SUNWrasag/htdocs/gif/dot_blue.gif
/opt/SUNWrasag/htdocs/gif/dot_clear.gif
/opt/SUNWrasag/htdocs/gif/item.gif
/opt/SUNWrasag/htdocs/gif/item0.gif
/opt/SUNWrasag/htdocs/gif/item1.gif
/opt/SUNWrasag/htdocs/gif/lights.gif
/opt/SUNWrasag/htdocs/gif/line.gif
/opt/SUNWrasag/htdocs/gif/menu_root.gif
/opt/SUNWrasag/htdocs/gif/minus.gif
/opt/SUNWrasag/htdocs/gif/plus.gif
/opt/SUNWrasag/htdocs/gif/ras0.gif
/opt/SUNWrasag/htdocs/gif/redarrow.gif
```

CODE EXAMPLE D-1

```
/opt/SUNWrasag/htdocs/gif/space.gif
/opt/SUNWrasag/htdocs/gifTopo/bclick.gif
/opt/SUNWrasag/htdocs/gifTopo/bg0.gif
/opt/SUNWrasag/htdocs/gifTopo/bout.gif
/opt/SUNWrasag/htdocs/gifTopo/bover.gif
/opt/SUNWrasag/htdocs/gifTopo/dot_blue.gif
/opt/SUNWrasag/htdocs/gifTopo/dot_clear.gif
/opt/SUNWrasag/htdocs/gifTopo/item.gif
/opt/SUNWrasag/htdocs/gifTopo/item0.gif
/opt/SUNWrasag/htdocs/gifTopo/item1.gif
/opt/SUNWrasag/htdocs/gifTopo/line.gif
/opt/SUNWrasag/htdocs/gifTopo/menu_root.gif
/opt/SUNWrasag/htdocs/gifTopo/minus.gif
/opt/SUNWrasag/htdocs/gifTopo/plus.gif
/opt/SUNWrasag/htdocs/gifTopo/ras0.gif
/opt/SUNWrasag/htdocs/gifTopo/redarrow.gif
/opt/SUNWrasag/htdocs/gifTopo/space.gif
/opt/SUNWrasag/htdocs/graph.html
/opt/SUNWrasag/htdocs/help.html
/opt/SUNWrasag/htdocs/helpF.html
/opt/SUNWrasag/htdocs/helpPage.html
/opt/SUNWrasag/htdocs/helpWelcome.html
/opt/SUNWrasag/htdocs/host.gif
/opt/SUNWrasag/htdocs/host_registration.html
/opt/SUNWrasag/htdocs/index.html
/opt/SUNWrasag/htdocs/instr_frame.html
/opt/SUNWrasag/htdocs/leftPage.html
/opt/SUNWrasag/htdocs/local_notification.html
/opt/SUNWrasag/htdocs/log.html
/opt/SUNWrasag/htdocs/logF.html
/opt/SUNWrasag/htdocs/logWelcome.html
/opt/SUNWrasag/htdocs/maint.html
/opt/SUNWrasag/htdocs/maintF.html
/opt/SUNWrasag/htdocs/maintWelcome.html
/opt/SUNWrasag/htdocs/monitor.html
/opt/SUNWrasag/htdocs/monitorF.html
/opt/SUNWrasag/htdocs/monitorWelcome.html
/opt/SUNWrasag/htdocs/provider_Http.html
/opt/SUNWrasag/htdocs/provider_NetConnect.html
/opt/SUNWrasag/htdocs/provider_Trap.html
/opt/SUNWrasag/htdocs/provider_Uucp.html
/opt/SUNWrasag/htdocs/redarrow.gif
/opt/SUNWrasag/htdocs/san.html
```

CODE EXAMPLE D-1

```
/opt/SUNWrasag/htdocs/san.html1
/opt/SUNWrasag/htdocs/san.html2
/opt/SUNWrasag/htdocs/sanF.html
/opt/SUNWrasag/htdocs/sanWelcome.html
/opt/SUNWrasag/htdocs/san_discover.html
/opt/SUNWrasag/htdocs/san_health.html
/opt/SUNWrasag/htdocs/san_health_pass.html
/opt/SUNWrasag/htdocs/san_help.html
/opt/SUNWrasag/htdocs/san_merge.html
/opt/SUNWrasag/htdocs/san_utilities_login.html
/opt/SUNWrasag/htdocs/san_verify.html
/opt/SUNWrasag/htdocs/save
/opt/SUNWrasag/htdocs/sched.html
/opt/SUNWrasag/htdocs/snake.js
/opt/SUNWrasag/htdocs/snapshot.html
/opt/SUNWrasag/htdocs/st_welcome.html
/opt/SUNWrasag/htdocs/state_frame.html
/opt/SUNWrasag/htdocs/state_frame2.html
/opt/SUNWrasag/htdocs/state_welcome.html
/opt/SUNWrasag/htdocs/sttoolsframe.html
/opt/SUNWrasag/htdocs/sun.gif
/opt/SUNWrasag/htdocs/switch.gif
/opt/SUNWrasag/htdocs/system.html
/opt/SUNWrasag/htdocs/systemF.html
/opt/SUNWrasag/htdocs/systemWelcome.html
/opt/SUNWrasag/htdocs/t1.html
/opt/SUNWrasag/htdocs/t300.gif
/opt/SUNWrasag/htdocs/title.gif
/opt/SUNWrasag/htdocs/top.html
/opt/SUNWrasag/htdocs/topPage.html
/opt/SUNWrasag/htdocs/topoWelcome.html
/opt/SUNWrasag/htdocs/topo_gifs/Ultra-250.gif
/opt/SUNWrasag/htdocs/topo_gifs/WS_FTP.LOG
/opt/SUNWrasag/htdocs/topo_gifs/a5k.gif
/opt/SUNWrasag/htdocs/topo_gifs/g0.gif
/opt/SUNWrasag/htdocs/topo_gifs/g1.gif
/opt/SUNWrasag/htdocs/topo_gifs/g2.gif
/opt/SUNWrasag/htdocs/topo_gifs/g3.gif
/opt/SUNWrasag/htdocs/topo_gifs/hba.gif
/opt/SUNWrasag/htdocs/topo_gifs/hba0.gif
/opt/SUNWrasag/htdocs/topo_gifs/host.gif
/opt/SUNWrasag/htdocs/topo_gifs/sport.gif
/opt/SUNWrasag/htdocs/topo_gifs/switch.gif
```

CODE EXAMPLE D-1

```
/opt/SUNWrasag/htdocs/topo_gifs/t300.gif
/opt/SUNWrasag/htdocs/utilities.html
/opt/SUNWrasag/htdocs/welcome.html
/opt/SUNWrasag/install/install_end
/opt/SUNWrasag/install/install_intro
/opt/SUNWrasag/install/install_master
/opt/SUNWrasag/install/install_slave
/opt/SUNWrasag/install/postinstall
/opt/SUNWrasag/install/preremove
/opt/SUNWrasag/lib/Agent.pm
/opt/SUNWrasag/lib/Agent/A3500FCAgent.pm
/opt/SUNWrasag/lib/Agent/A5KAgent.pm
/opt/SUNWrasag/lib/Agent/BROCADEAgent.pm
/opt/SUNWrasag/lib/Agent/HOSTAgent.pm
/opt/SUNWrasag/lib/Agent/MESSAGEAgent.pm
/opt/SUNWrasag/lib/Agent/SANAgent.pm
/opt/SUNWrasag/lib/Agent/STOOLS4Agent.pm
/opt/SUNWrasag/lib/Agent/SWITCHAgent.pm
/opt/SUNWrasag/lib/Agent/T3Agent.pm
/opt/SUNWrasag/lib/Agent/TOPOAgent.pm
/opt/SUNWrasag/lib/Agent/_DiskInq.pm
/opt/SUNWrasag/lib/BER.pm
/opt/SUNWrasag/lib/BK2.pm
/opt/SUNWrasag/lib/BerkCache.pm
/opt/SUNWrasag/lib/BerkeleyDB.pm
/opt/SUNWrasag/lib/BerkeleyDB/Btree.pm
/opt/SUNWrasag/lib/BerkeleyDB/Hash.pm
/opt/SUNWrasag/lib/CIM.pm
/opt/SUNWrasag/lib/CIM/Base.pm
/opt/SUNWrasag/lib/CIM/GenInstance.pm
/opt/SUNWrasag/lib/CIM/Instance.pm
/opt/SUNWrasag/lib/CIM/Key.pm
/opt/SUNWrasag/lib/CIM/Mof.pm
/opt/SUNWrasag/lib/CIM/Property.pm
/opt/SUNWrasag/lib/CIM/README
/opt/SUNWrasag/lib/CIM/Tree.pm
/opt/SUNWrasag/lib/CIM/doc
/opt/SUNWrasag/lib/CIM/test.pl
/opt/SUNWrasag/lib/Carp.pm
/opt/SUNWrasag/lib/Catalog.pm
/opt/SUNWrasag/lib/Crypt/Blowfish.pm
/opt/SUNWrasag/lib/Crypt/MD5.pm
/opt/SUNWrasag/lib/Data/Dumper.pm
```


CODE EXAMPLE D-1

```
/opt/SUNWrasag/lib/Date/Format.pm
/opt/SUNWrasag/lib/Date/Language.pm
/opt/SUNWrasag/lib/Date/Parse.pm
/opt/SUNWrasag/lib/Debug.pm
/opt/SUNWrasag/lib/DeviceId.pm
/opt/SUNWrasag/lib/Event.pm
/opt/SUNWrasag/lib/Events.pm
/opt/SUNWrasag/lib/FC.pm
/opt/SUNWrasag/lib/FCConfig/Python.pm
/opt/SUNWrasag/lib/FCRules.pm
/opt/SUNWrasag/lib/FCRules/Rule1.pm
/opt/SUNWrasag/lib/FCRules/Rule2.pm
/opt/SUNWrasag/lib/FCRules/Rule3.pm
/opt/SUNWrasag/lib/FCRules/Rule4.pm
/opt/SUNWrasag/lib/FCRules/Rule6.pm
/opt/SUNWrasag/lib/FCRules/Rule8.pm
/opt/SUNWrasag/lib/Fibre/ByDisk.pm
/opt/SUNWrasag/lib/Fibre/ByDiskSw.pm
/opt/SUNWrasag/lib/Fibre/ByDiskT3.pm
/opt/SUNWrasag/lib/Fibre/Discover.pm
/opt/SUNWrasag/lib/Fibre/History.pm
/opt/SUNWrasag/lib/Fibre/Rules.pm
/opt/SUNWrasag/lib/Fibre/Rules/README
/opt/SUNWrasag/lib/Fibre/Rules/Rule1.pm
/opt/SUNWrasag/lib/Fibre/Rules/Rule2.pm
/opt/SUNWrasag/lib/Fibre/Rules/Rule3.pm
/opt/SUNWrasag/lib/Fibre/Rules/Rule4.pm
/opt/SUNWrasag/lib/Fibre/Rules/Rule6.pm
/opt/SUNWrasag/lib/Fibre/Rules/Rule8.pm
/opt/SUNWrasag/lib/Fibre/State.pm
/opt/SUNWrasag/lib/Fibre/Stools.pm
/opt/SUNWrasag/lib/Fibre/T3Data.pm
/opt/SUNWrasag/lib/FibreGUI.pm
/opt/SUNWrasag/lib/FibreStat.pm
/opt/SUNWrasag/lib/Filter/Util/Call.pm
/opt/SUNWrasag/lib/Filter/Util/Exec.pm
/opt/SUNWrasag/lib/Filter/cpp.pm
/opt/SUNWrasag/lib/Filter/decrypt.pm
/opt/SUNWrasag/lib/Filter/exec.pm
/opt/SUNWrasag/lib/Filter/sh.pm
/opt/SUNWrasag/lib/Filter/tee.pm
/opt/SUNWrasag/lib/FindBin.pm
/opt/SUNWrasag/lib/GDBM_File.pm
```

CODE EXAMPLE D-1

```
/opt/SUNWrasag/lib/GUI/A5KUtil.pm
/opt/SUNWrasag/lib/GUI/Cache.pm
/opt/SUNWrasag/lib/GUI/Config.pm
/opt/SUNWrasag/lib/GUI/Devices.pm
/opt/SUNWrasag/lib/GUI/Errlog.pm
/opt/SUNWrasag/lib/GUI/EventLog.pm
/opt/SUNWrasag/lib/GUI/Graph.pm
/opt/SUNWrasag/lib/GUI/Hosts.pm
/opt/SUNWrasag/lib/GUI/Instr.pm
/opt/SUNWrasag/lib/GUI/InstrReport.pm.old
/opt/SUNWrasag/lib/GUI/MessageLog.pm
/opt/SUNWrasag/lib/GUI/Notifs.pm
/opt/SUNWrasag/lib/GUI/Providers.pm
/opt/SUNWrasag/lib/GUI/RUNAgent.pm
/opt/SUNWrasag/lib/GUI/ReadMess.pm
/opt/SUNWrasag/lib/GUI/Review.pm
/opt/SUNWrasag/lib/GUI/SAN.pm
/opt/SUNWrasag/lib/GUI/SWITCHUtil.pm
/opt/SUNWrasag/lib/GUI/Sched.pm
/opt/SUNWrasag/lib/GUI/Start.pm
/opt/SUNWrasag/lib/GUI/Stats.pm
/opt/SUNWrasag/lib/GUI/StorTools.pm
/opt/SUNWrasag/lib/GUI/T3Util.pm
/opt/SUNWrasag/lib/GUI/Thresholds.pm
/opt/SUNWrasag/lib/GUI/Timeouts.pm
/opt/SUNWrasag/lib/GUI/Topo.pm
/opt/SUNWrasag/lib/GUIAdmin.pm
/opt/SUNWrasag/lib/GUIAdmin/A1000.pm
/opt/SUNWrasag/lib/GUIAdmin/A3500FC.pm
/opt/SUNWrasag/lib/GUIAdmin/A5K.pm
/opt/SUNWrasag/lib/GUIAdmin/BROCADE.pm
/opt/SUNWrasag/lib/GUIAdmin/SWITCH.pm
/opt/SUNWrasag/lib/GUIAdmin/Subnet.pm
/opt/SUNWrasag/lib/GUIAdmin/T3.pm
/opt/SUNWrasag/lib/GUIAdmin/test.c
/opt/SUNWrasag/lib/HTML/Entities.pm
/opt/SUNWrasag/lib/HTML/Filter.pm
/opt/SUNWrasag/lib/HTML/Form.pm
/opt/SUNWrasag/lib/HTML/HeadParser.pm
/opt/SUNWrasag/lib/HTML/LinkExtor.pm
/opt/SUNWrasag/lib/HTML/Parser.pm
/opt/SUNWrasag/lib/HTML/TokeParser.pm
/opt/SUNWrasag/lib/HTTP/Cookies.pm
```

CODE EXAMPLE D-1

```
/opt/SUNWrasag/lib/HTTP/Daemon.pm
/opt/SUNWrasag/lib/HTTP/Date.pm
/opt/SUNWrasag/lib/HTTP/Headers.pm
/opt/SUNWrasag/lib/HTTP/Headers/Auth.pm
/opt/SUNWrasag/lib/HTTP/Headers/ETag.pm
/opt/SUNWrasag/lib/HTTP/Headers/Util.pm
/opt/SUNWrasag/lib/HTTP/Message.pm
/opt/SUNWrasag/lib/HTTP/Negotiate.pm
/opt/SUNWrasag/lib/HTTP/Request.pm
/opt/SUNWrasag/lib/HTTP/Request/Common.pm
/opt/SUNWrasag/lib/HTTP/Response.pm
/opt/SUNWrasag/lib/HTTP/Status.pm
/opt/SUNWrasag/lib/Health.pm
/opt/SUNWrasag/lib/Health/A3500FCHealth.pm
/opt/SUNWrasag/lib/Health/A5KHealth.pm
/opt/SUNWrasag/lib/Health/BrocadeHealth.pm
/opt/SUNWrasag/lib/Health/GUIHealth.pm
/opt/SUNWrasag/lib/Health/HostHealth.pm
/opt/SUNWrasag/lib/Health/MessageHealth.pm
/opt/SUNWrasag/lib/Health/SANHealth.pm
/opt/SUNWrasag/lib/Health/STools4Health.pm
/opt/SUNWrasag/lib/Health/SlaveHealth.pm
/opt/SUNWrasag/lib/Health/SwitchHealth.pm
/opt/SUNWrasag/lib/Health/T3Health.pm
/opt/SUNWrasag/lib/Health/TOPOHealth.pm
/opt/SUNWrasag/lib/Http.pm
/opt/SUNWrasag/lib/IO.pm
/opt/SUNWrasag/lib/IO/File.pm
/opt/SUNWrasag/lib/IO/Handle.pm
/opt/SUNWrasag/lib/IO/Pipe.pm
/opt/SUNWrasag/lib/IO/Seekable.pm
/opt/SUNWrasag/lib/IO/Select.pm
/opt/SUNWrasag/lib/IO/Socket.pm
/opt/SUNWrasag/lib/Ilist.pm
/opt/SUNWrasag/lib/Jade.pm
/opt/SUNWrasag/lib/Julian.pm
/opt/SUNWrasag/lib/LWP.pm
/opt/SUNWrasag/lib/LWP/Authen/Basic.pm
/opt/SUNWrasag/lib/LWP/Authen/Digest.pm
/opt/SUNWrasag/lib/LWP/Debug.pm
/opt/SUNWrasag/lib/LWP/MediaTypes.pm
/opt/SUNWrasag/lib/LWP/MemberMixin.pm
/opt/SUNWrasag/lib/LWP/Protocol.pm
```

CODE EXAMPLE D-1

```
/opt/SUNWrasag/lib/LWP/Protocol/data.pm
/opt/SUNWrasag/lib/LWP/Protocol/file.pm
/opt/SUNWrasag/lib/LWP/Protocol/ftp.pm
/opt/SUNWrasag/lib/LWP/Protocol/gopher.pm
/opt/SUNWrasag/lib/LWP/Protocol/http.pm
/opt/SUNWrasag/lib/LWP/Protocol/https.pm
/opt/SUNWrasag/lib/LWP/Protocol/mailto.pm
/opt/SUNWrasag/lib/LWP/Protocol/nntp.pm
/opt/SUNWrasag/lib/LWP/RobotUA.pm
/opt/SUNWrasag/lib/LWP/Simple.pm
/opt/SUNWrasag/lib/LWP/UserAgent.pm
/opt/SUNWrasag/lib/LWP/media.types
/opt/SUNWrasag/lib/ListSort.pm
/opt/SUNWrasag/lib/MIME/Base64.pm
/opt/SUNWrasag/lib/MIME/Body.pm
/opt/SUNWrasag/lib/MIME/Decoder.pm
/opt/SUNWrasag/lib/MIME/Decoder/Base64.pm
/opt/SUNWrasag/lib/MIME/Decoder/Binary.pm
/opt/SUNWrasag/lib/MIME/Decoder/Gzip64.pm
/opt/SUNWrasag/lib/MIME/Decoder/NBit.pm
/opt/SUNWrasag/lib/MIME/Decoder/QuotedPrint.pm
/opt/SUNWrasag/lib/MIME/Decoder/UU.pm
/opt/SUNWrasag/lib/MIME/Entity.pm
/opt/SUNWrasag/lib/MIME/Field/ConTraEnc.pm
/opt/SUNWrasag/lib/MIME/Field/ContDisp.pm
/opt/SUNWrasag/lib/MIME/Field/ContType.pm
/opt/SUNWrasag/lib/MIME/Field/ParamVal.pm
/opt/SUNWrasag/lib/MIME/Head.pm
/opt/SUNWrasag/lib/MIME/IO.pm
/opt/SUNWrasag/lib/MIME/Latin1.pm
/opt/SUNWrasag/lib/MIME/Lite.pm
/opt/SUNWrasag/lib/MIME/Parser.pm
/opt/SUNWrasag/lib/MIME/ParserBase.pm
/opt/SUNWrasag/lib/MIME/QuotedPrint.pm
/opt/SUNWrasag/lib/MIME/ToolUtils.pm
/opt/SUNWrasag/lib/MIME/Tools.pm
/opt/SUNWrasag/lib/MIME/Words.pm
/opt/SUNWrasag/lib/Message.pm
/opt/SUNWrasag/lib/NWS.pm
/opt/SUNWrasag/lib/NWS/.Schema.pm.swo
/opt/SUNWrasag/lib/NWS/A3500FC.pm
/opt/SUNWrasag/lib/NWS/A5K.pm
/opt/SUNWrasag/lib/NWS/Brocade.pm
```

CODE EXAMPLE D-1

```
/opt/SUNWrasag/lib/NWS/Host.pm
/opt/SUNWrasag/lib/NWS/SAN.pm
/opt/SUNWrasag/lib/NWS/SCH_Events.pm
/opt/SUNWrasag/lib/NWS/SCH_Storage.pm
/opt/SUNWrasag/lib/NWS/Schema.pm
/opt/SUNWrasag/lib/NWS/Schemal.pm
/opt/SUNWrasag/lib/NWS/Switch.pm
/opt/SUNWrasag/lib/NWS/T3.pm
/opt/SUNWrasag/lib/NWS/key.xml
/opt/SUNWrasag/lib/Net/Config.pm
/opt/SUNWrasag/lib/Net/Domain.pm
/opt/SUNWrasag/lib/Net/Ping.pm
/opt/SUNWrasag/lib/Net/SNMP.pm
/opt/SUNWrasag/lib/Net/Telnet.pm
/opt/SUNWrasag/lib/Net/hostent.pm
/opt/SUNWrasag/lib/Net/netent.pm
/opt/SUNWrasag/lib/Net/protoent.pm
/opt/SUNWrasag/lib/Net/servent.pm
/opt/SUNWrasag/lib/ORA.pm
/opt/SUNWrasag/lib/PDM.pm
/opt/SUNWrasag/lib/PDM/Catalog0.pm
/opt/SUNWrasag/lib/PDM/ConfigFile.pm
/opt/SUNWrasag/lib/PDM/Index.pm
/opt/SUNWrasag/lib/PDM/Index.pm0
/opt/SUNWrasag/lib/PDM/Map.pm
/opt/SUNWrasag/lib/PDM/Modules.pm
/opt/SUNWrasag/lib/PDM/SAF.pm
/opt/SUNWrasag/lib/PDM/Thresholds.pm
/opt/SUNWrasag/lib/PDM/pod2html-dircache
/opt/SUNWrasag/lib/PDM/pod2html-itemcache
/opt/SUNWrasag/lib/PDM/tryCatalog
/opt/SUNWrasag/lib/Paging.pm
/opt/SUNWrasag/lib/Proc/Background.pm
/opt/SUNWrasag/lib/Proc/Background/Unix.pm
/opt/SUNWrasag/lib/Proc/Background/Win32.pm
/opt/SUNWrasag/lib/Proc/Killall.pm
/opt/SUNWrasag/lib/Proc/Killfam.pm
/opt/SUNWrasag/lib/Proc/ProcessTable.pm
/opt/SUNWrasag/lib/Proc/ProcessTable/Process.pm
/opt/SUNWrasag/lib/Proc/usage.pl
/opt/SUNWrasag/lib/Provider.pm
/opt/SUNWrasag/lib/Provider/EmailProvider.pm
/opt/SUNWrasag/lib/Provider/HttpProvider.pm
```

CODE EXAMPLE D-1

```
/opt/SUNWrasag/lib/Provider/NetConnectProvider.pm
/opt/SUNWrasag/lib/RASAgentSNMPTrap.pm
/opt/SUNWrasag/lib/Report.pm
/opt/SUNWrasag/lib/ReportContent.pm
/opt/SUNWrasag/lib/Rules.pm
/opt/SUNWrasag/lib/SNMP_Session.pm
/opt/SUNWrasag/lib/Scheduler.pm
/opt/SUNWrasag/lib/SelectSaver.pm
/opt/SUNWrasag/lib/Serialize.pm
/opt/SUNWrasag/lib/Shuttle.pm
/opt/SUNWrasag/lib/Socket.pm
/opt/SUNWrasag/lib/Socket.pm0
/opt/SUNWrasag/lib/Solaris/Procfs.pm
/opt/SUNWrasag/lib/Solaris/Procfs/Filesystem.pm
/opt/SUNWrasag/lib/Solaris/Procfs/Process.pm
/opt/SUNWrasag/lib/Solaris/Procfs/include/sys/procfs.ph
/opt/SUNWrasag/lib/State.pm
/opt/SUNWrasag/lib/Storable.pm
/opt/SUNWrasag/lib/System.pm
/opt/SUNWrasag/lib/TO.pm
/opt/SUNWrasag/lib/TObjects.pm.save
/opt/SUNWrasag/lib/Time/CTime.pm
/opt/SUNWrasag/lib/Time/DaysInMonth.pm
/opt/SUNWrasag/lib/Time/HiRes/HiRes.pm
/opt/SUNWrasag/lib/Time/JulianDay.pm
/opt/SUNWrasag/lib/Time/Timezone.pm
/opt/SUNWrasag/lib/Time/Zone.pm
/opt/SUNWrasag/lib/Time/gmtime.pm
/opt/SUNWrasag/lib/Time/localtime.pm
/opt/SUNWrasag/lib/Time/tm.pm
/opt/SUNWrasag/lib/Timelapse.pm
/opt/SUNWrasag/lib/Tree.pm
/opt/SUNWrasag/lib/URI.pm
/opt/SUNWrasag/lib/URI/Escape.pm
/opt/SUNWrasag/lib/URI/Heuristic.pm
/opt/SUNWrasag/lib/URI/URL.pm
/opt/SUNWrasag/lib/URI/WithBase.pm
/opt/SUNWrasag/lib/URI/_foreign.pm
/opt/SUNWrasag/lib/URI/_generic.pm
/opt/SUNWrasag/lib/URI/_login.pm
/opt/SUNWrasag/lib/URI/_query.pm
/opt/SUNWrasag/lib/URI/_segment.pm
/opt/SUNWrasag/lib/URI/_server.pm
```

CODE EXAMPLE D-1

```
/opt/SUNWrasag/lib/URI/_userpass.pm
/opt/SUNWrasag/lib/URI/data.pm
/opt/SUNWrasag/lib/URI/file.pm
/opt/SUNWrasag/lib/URI/file/Base.pm
/opt/SUNWrasag/lib/URI/file/FAT.pm
/opt/SUNWrasag/lib/URI/file/Mac.pm
/opt/SUNWrasag/lib/URI/file/OS2.pm
/opt/SUNWrasag/lib/URI/file/Unix.pm
/opt/SUNWrasag/lib/URI/file/Win32.pm
/opt/SUNWrasag/lib/URI/ftp.pm
/opt/SUNWrasag/lib/URI/gopher.pm
/opt/SUNWrasag/lib/URI/http.pm
/opt/SUNWrasag/lib/URI/https.pm
/opt/SUNWrasag/lib/URI/ldap.pm
/opt/SUNWrasag/lib/URI/mailto.pm
/opt/SUNWrasag/lib/URI/news.pm
/opt/SUNWrasag/lib/URI/nntp.pm
/opt/SUNWrasag/lib/URI/pop.pm
/opt/SUNWrasag/lib/URI/rlogin.pm
/opt/SUNWrasag/lib/URI/snews.pm
/opt/SUNWrasag/lib/URI/telnet.pm
/opt/SUNWrasag/lib/Util.pm
/opt/SUNWrasag/lib/Util/Http.pm
/opt/SUNWrasag/lib/Util/Lhf.pm
/opt/SUNWrasag/lib/Util/Socket.pm
/opt/SUNWrasag/lib/Util2.pm
/opt/SUNWrasag/lib/WebTabs.pm
/opt/SUNWrasag/lib/auto/BerkeleyDB/.packlist
/opt/SUNWrasag/lib/auto/BerkeleyDB/BerkeleyDB.bs
/opt/SUNWrasag/lib/auto/BerkeleyDB/BerkeleyDB.so
/opt/SUNWrasag/lib/auto/BerkeleyDB/autosplit.ix
/opt/SUNWrasag/lib/auto/Crypt/Blowfish/.packlist
/opt/SUNWrasag/lib/auto/Crypt/Blowfish/Blowfish.bs
/opt/SUNWrasag/lib/auto/Crypt/Blowfish/Blowfish.so
/opt/SUNWrasag/lib/auto/Crypt/MD5/.packlist
/opt/SUNWrasag/lib/auto/Crypt/MD5/MD5.bs
/opt/SUNWrasag/lib/auto/Crypt/MD5/MD5.so
/opt/SUNWrasag/lib/auto/Data/Dumper/Dumper.bs
/opt/SUNWrasag/lib/auto/Data/Dumper/Dumper.so
/opt/SUNWrasag/lib/auto/Filter/.packlist
/opt/SUNWrasag/lib/auto/Filter/Util/Call/Call.bs
/opt/SUNWrasag/lib/auto/Filter/Util/Call/Call.so
/opt/SUNWrasag/lib/auto/Filter/Util/Exec/Exec.bs
```

CODE EXAMPLE D-1

```
/opt/SUNWrasag/lib/auto/Filter/Util/Exec/Exec.so
/opt/SUNWrasag/lib/auto/Filter/decrypt/decrypt.bs
/opt/SUNWrasag/lib/auto/Filter/decrypt/decrypt.so
/opt/SUNWrasag/lib/auto/Filter/tee/tee.bs
/opt/SUNWrasag/lib/auto/Filter/tee/tee.so
/opt/SUNWrasag/lib/auto/GDBM_File/.packlist
/opt/SUNWrasag/lib/auto/GDBM_File/GDBM_File.bs
/opt/SUNWrasag/lib/auto/GDBM_File/GDBM_File.so
/opt/SUNWrasag/lib/auto/GDBM_File/autosplit.ix
/opt/SUNWrasag/lib/auto/IO/IO.bs
/opt/SUNWrasag/lib/auto/IO/IO.so
/opt/SUNWrasag/lib/auto/MIME/Base64/.packlist
/opt/SUNWrasag/lib/auto/MIME/Base64/Base64.bs
/opt/SUNWrasag/lib/auto/MIME/Base64/Base64.so
/opt/SUNWrasag/lib/auto/MIME/Lite/.packlist
/opt/SUNWrasag/lib/auto/Proc/ProcessTable/.packlist
/opt/SUNWrasag/lib/auto/Proc/ProcessTable/Process/autosplit.ix
/opt/SUNWrasag/lib/auto/Proc/ProcessTable/ProcessTable.bs
/opt/SUNWrasag/lib/auto/Proc/ProcessTable/ProcessTable.so
/opt/SUNWrasag/lib/auto/Socket/Socket.bs
/opt/SUNWrasag/lib/auto/Socket/Socket.so
/opt/SUNWrasag/lib/auto/Solaris/Procfs/Procfs.bs
/opt/SUNWrasag/lib/auto/Solaris/Procfs/Procfs.so
/opt/SUNWrasag/lib/auto/Storable/Storable.bs
/opt/SUNWrasag/lib/auto/Storable/Storable.so
/opt/SUNWrasag/lib/auto/Storable/_freeze.al
/opt/SUNWrasag/lib/auto/Storable/_store.al
/opt/SUNWrasag/lib/auto/Storable/_store_fd.al
/opt/SUNWrasag/lib/auto/Storable/autosplit.ix
/opt/SUNWrasag/lib/auto/Storable/fd_retrieve.al
/opt/SUNWrasag/lib/auto/Storable/freeze.al
/opt/SUNWrasag/lib/auto/Storable/nfreeze.al
/opt/SUNWrasag/lib/auto/Storable/nstore.al
/opt/SUNWrasag/lib/auto/Storable/nstore_fd.al
/opt/SUNWrasag/lib/auto/Storable/retrieve.al
/opt/SUNWrasag/lib/auto/Storable/retrieve_fd.al
/opt/SUNWrasag/lib/auto/Storable/store.al
/opt/SUNWrasag/lib/auto/Storable/store_fd.al
/opt/SUNWrasag/lib/auto/Storable/thaw.al
/opt/SUNWrasag/lib/auto/Time/HiRes/.packlist
/opt/SUNWrasag/lib/auto/Time/HiRes/HiRes.bs
/opt/SUNWrasag/lib/auto/Time/HiRes/HiRes.so
/opt/SUNWrasag/lib/common.remove
```


CODE EXAMPLE D-1

```
/opt/SUNWrasag/lib/date.sh
/opt/SUNWrasag/lib/myMenu.js
/opt/SUNWrasag/lib/newhtml.pl
/opt/SUNWrasag/lib/ras_telnet.pl
/opt/SUNWrasag/lib/read_config.pl
/opt/SUNWrasag/lib/sdt.pl
/opt/SUNWrasag/lib/string.pl
/opt/SUNWrasag/lib/subroutines.pm
/opt/SUNWrasag/lib/template.pod
/opt/SUNWrasag/lib/template_pod.pl
/opt/SUNWrasag/lib/test_events.pl
/opt/SUNWrasag/man/man1m/checkcron.1m
/opt/SUNWrasag/man/man1m/clearcache.1m
/opt/SUNWrasag/man/man1m/disk_inquiry.1m
/opt/SUNWrasag/man/man1m/ras_install.1m
/opt/SUNWrasag/man/man1m/rasagent.1m
/opt/SUNWrasag/man/man1m/sandbox.1m
/opt/SUNWrasag/man/man1m/save_password.1m
/opt/SUNWrasag/man/man1m/testt3.1m
/opt/SUNWrasag/rasagent.conf.mk
/opt/SUNWrasag/snmp/mibs/.index
/opt/SUNWrasag/snmp/mibs/INET-ADDRESS-MIB.txt
/opt/SUNWrasag/snmp/mibs/IP-FORWARD-MIB.txt
/opt/SUNWrasag/snmp/mibs/IP-MIB.txt
/opt/SUNWrasag/snmp/mibs/IPV6-ICMP-MIB.txt
/opt/SUNWrasag/snmp/mibs/IPV6-MIB.txt
/opt/SUNWrasag/snmp/mibs/IPV6-TC.txt
/opt/SUNWrasag/snmp/mibs/IPV6-TCP-MIB.txt
/opt/SUNWrasag/snmp/mibs/IPV6-UDP-MIB.txt
/opt/SUNWrasag/snmp/mibs/SNMP-COMMUNITY-MIB.txt
/opt/SUNWrasag/snmp/mibs/SNMP-FRAMEWORK-MIB.txt
/opt/SUNWrasag/snmp/mibs/SNMP-MPD-MIB.txt
/opt/SUNWrasag/snmp/mibs/SNMP-NOTIFICATION-MIB.txt
/opt/SUNWrasag/snmp/mibs/SNMP-PROXY-MIB.txt
/opt/SUNWrasag/snmp/mibs/SNMP-TARGET-MIB.txt
/opt/SUNWrasag/snmp/mibs/SNMP-USER-BASED-SM-MIB.txt
/opt/SUNWrasag/snmp/mibs/SNMP-VIEW-BASED-ACM-MIB.txt
/opt/SUNWrasag/snmp/mibs/SNMPv2-CONF.txt
/opt/SUNWrasag/snmp/mibs/SNMPv2-MIB.txt
/opt/SUNWrasag/snmp/mibs/SNMPv2-SMI.txt
/opt/SUNWrasag/snmp/mibs/SNMPv2-TC.txt
/opt/SUNWrasag/snmp/mibs/SNMPv2-TM.txt
/opt/SUNWrasag/snmp/mibs/t300.mib
```

CODE EXAMPLE D-1

```
/opt/SUNWrasag/snmp/mibs/v2_2FA.mib
/opt/SUNWrasag/snmp/mibs/v2_2FE.mib
/opt/SUNWrasag/snmp/mibs/v2_2SW.txt
/opt/SUNWrasag/tmp/Catalog.pm
/opt/SUNWrasag/tmp/ConfigFile.pm
/opt/SUNWrasag/tmp/Graph.pm
/opt/SUNWrasag/tmp/T3Agent.pm
/opt/SUNWrasag/tmp/TO.pm
/opt/SUNWrasag/tmp/TOPOAgent.pm
/opt/SUNWrasag/tmp/WWNINFO
[ verifying class <none> ]
## Executing postinstall script.
libsnp-0.4.2.0.2.so

Using '/usr/bin/perl' version 5.00503
-----
After the package is completely installed, execute
the program '/opt/SUNWrasag/bin/ras_install'.
This will install the rasagent inet service and cron.
-----
If you choose not to use cron this time, re-run
ras_install later to establish a cron entry.
-----

Installation of <SUNWrasag> was successful.

# pkgadd -d /download/SUNWsmgr

Processing package instance <SUNWsmgr>r from </download>
SANsurfer, QLogic Fibre Channel Administration
(i86pc,sparc) 2.07.54, REV=2001.01.09.13.05
Copyright 2001 Sun Microsystems, Inc. All rights reserved.
Copyright 2000 QLogic, Inc.
All Rights Reserved except where specifically shared.
## Processing package information.
## Processing system information.
1 package pathname is already properly installed.
## Verifying disk space requirements.
## Checking for conflicts with packages already installed.
## Checking for setuid/setgid programs.

This package contains scripts which will be executed with super-
user
```

CODE EXAMPLE D-1

```
permission during the process of installing this package.

Do you want to continue with the installation of <SUNWsmgr> [y,n,?]
y

Installing SANsurfer, QLogic Fibre Channel Administration as
<SUNWsmgr>

## Installing part 1 of 1.
/usr/opt/SUNWsmgr/app.dat
/usr/opt/SUNWsmgr/bin/Sun.jar
/usr/opt/SUNWsmgr/bin/esm_smgr
/usr/opt/SUNWsmgr/default.fab
/usr/opt/SUNWsmgr/flash/m08030462.flx
/usr/opt/SUNWsmgr/flash/m16030462.flx
/usr/opt/SUNWsmgr/jre/COPYRIGHT
/usr/opt/SUNWsmgr/jre/ControlPanel.html
/usr/opt/SUNWsmgr/jre/LICENSE
/usr/opt/SUNWsmgr/jre/bin/.java_wrapper
/usr/opt/SUNWsmgr/jre/bin/ControlPanel
/usr/opt/SUNWsmgr/jre/bin/awt_robot
/usr/opt/SUNWsmgr/jre/bin/java <symbolic link>
/usr/opt/SUNWsmgr/jre/bin/keytool <symbolic link>
/usr/opt/SUNWsmgr/jre/bin/policytool <symbolic link>
/usr/opt/SUNWsmgr/jre/bin/rmid <symbolic link>
/usr/opt/SUNWsmgr/jre/bin/rmiregistry <symbolic link>
/usr/opt/SUNWsmgr/jre/bin/sparc/native_threads/java
/usr/opt/SUNWsmgr/jre/bin/sparc/native_threads/java_vm
/usr/opt/SUNWsmgr/jre/bin/sparc/native_threads/keytool
/usr/opt/SUNWsmgr/jre/bin/sparc/native_threads/policytool
/usr/opt/SUNWsmgr/jre/bin/sparc/native_threads/rmid
/usr/opt/SUNWsmgr/jre/bin/sparc/native_threads/rmiregistry
/usr/opt/SUNWsmgr/jre/bin/sparc/native_threads/tnameserv
/usr/opt/SUNWsmgr/jre/bin/tnameserv <symbolic link>
/usr/opt/SUNWsmgr/jre/jre_config.txt
/usr/opt/SUNWsmgr/jre/lib/audio/soundbank.gm
/usr/opt/SUNWsmgr/jre/lib/cmm/CIEXYZ.pf
/usr/opt/SUNWsmgr/jre/lib/cmm/GRAY.pf
/usr/opt/SUNWsmgr/jre/lib/cmm/LINEAR_RGB.pf
/usr/opt/SUNWsmgr/jre/lib/cmm/PYCC.pf
/usr/opt/SUNWsmgr/jre/lib/cmm/sRGB.pf
/usr/opt/SUNWsmgr/jre/lib/content-types.properties
/usr/opt/SUNWsmgr/jre/lib/flavormap.properties
```

CODE EXAMPLE D-1

```
/usr/opt/SUNWsmgr/jre/lib/font.properties
/usr/opt/SUNWsmgr/jre/lib/font.properties.5.5.1
/usr/opt/SUNWsmgr/jre/lib/font.properties.ISO8859_13
/usr/opt/SUNWsmgr/jre/lib/font.properties.ISO8859_13.5.7
/usr/opt/SUNWsmgr/jre/lib/font.properties.ISO8859_15_FDIS
/usr/opt/SUNWsmgr/jre/lib/font.properties.ISO8859_2
/usr/opt/SUNWsmgr/jre/lib/font.properties.ISO8859_4
/usr/opt/SUNWsmgr/jre/lib/font.properties.ISO8859_5
/usr/opt/SUNWsmgr/jre/lib/font.properties.ISO8859_7
/usr/opt/SUNWsmgr/jre/lib/font.properties.ISO8859_9
/usr/opt/SUNWsmgr/jre/lib/font.properties.UTF8
/usr/opt/SUNWsmgr/jre/lib/font.properties.UTF8.5.6
/usr/opt/SUNWsmgr/jre/lib/font.properties.UTF8.5.7
/usr/opt/SUNWsmgr/jre/lib/font.properties.ar
/usr/opt/SUNWsmgr/jre/lib/font.properties.iw
/usr/opt/SUNWsmgr/jre/lib/font.properties.ja
/usr/opt/SUNWsmgr/jre/lib/font.properties.ja.5.5.1
/usr/opt/SUNWsmgr/jre/lib/font.properties.ja_JP_UTF8
/usr/opt/SUNWsmgr/jre/lib/font.properties.ja_JP_UTF8.5.7
/usr/opt/SUNWsmgr/jre/lib/font.properties.ko
/usr/opt/SUNWsmgr/jre/lib/font.properties.ko.5.5.1
/usr/opt/SUNWsmgr/jre/lib/font.properties.ko.5.6
/usr/opt/SUNWsmgr/jre/lib/font.properties.ko.5.7
/usr/opt/SUNWsmgr/jre/lib/font.properties.ko_KR_UTF8
/usr/opt/SUNWsmgr/jre/lib/font.properties.ko_KR_UTF8.5.6
/usr/opt/SUNWsmgr/jre/lib/font.properties.ko_KR_UTF8.5.7
/usr/opt/SUNWsmgr/jre/lib/font.properties.th
/usr/opt/SUNWsmgr/jre/lib/font.properties.zh_CN_UTF8
/usr/opt/SUNWsmgr/jre/lib/font.properties.zh_EUC_CN
/usr/opt/SUNWsmgr/jre/lib/font.properties.zh_EUC_CN.5.5.1
/usr/opt/SUNWsmgr/jre/lib/font.properties.zh_GBK
/usr/opt/SUNWsmgr/jre/lib/font.properties.zh_TW_Big5
/usr/opt/SUNWsmgr/jre/lib/font.properties.zh_TW_Big5.5.5.1
/usr/opt/SUNWsmgr/jre/lib/font.properties.zh_TW_Big5.5.6
/usr/opt/SUNWsmgr/jre/lib/font.properties.zh_TW_EUC_TW
/usr/opt/SUNWsmgr/jre/lib/font.properties.zh_TW_EUC_TW.5.5.1
/usr/opt/SUNWsmgr/jre/lib/font.properties.zh_TW_UTF8
/usr/opt/SUNWsmgr/jre/lib/fonts/LucidaBrightDemiBold.ttf
/usr/opt/SUNWsmgr/jre/lib/fonts/LucidaBrightDemiItalic.ttf
/usr/opt/SUNWsmgr/jre/lib/fonts/LucidaBrightItalic.ttf
/usr/opt/SUNWsmgr/jre/lib/fonts/LucidaBrightRegular.ttf
/usr/opt/SUNWsmgr/jre/lib/fonts/LucidaSansDemiBold.ttf
/usr/opt/SUNWsmgr/jre/lib/fonts/LucidaSansDemiOblique.ttf
```

CODE EXAMPLE D-1

```
/usr/opt/SUNWsmgr/jre/lib/fonts/LucidaSansOblique.ttf
/usr/opt/SUNWsmgr/jre/lib/fonts/LucidaSansRegular.ttf
/usr/opt/SUNWsmgr/jre/lib/fonts/LucidaTypewriterBold.ttf
/usr/opt/SUNWsmgr/jre/lib/fonts/LucidaTypewriterBoldOblique.ttf
/usr/opt/SUNWsmgr/jre/lib/fonts/LucidaTypewriterOblique.ttf
/usr/opt/SUNWsmgr/jre/lib/fonts/LucidaTypewriterRegular.ttf
/usr/opt/SUNWsmgr/jre/lib/fonts/fonts.dir
/usr/opt/SUNWsmgr/jre/lib/i18n.jar
/usr/opt/SUNWsmgr/jre/lib/images/cursors/cursors.properties
/usr/opt/SUNWsmgr/jre/lib/images/cursors/invalid32x32.gif
/usr/opt/SUNWsmgr/jre/lib/images/cursors/motif_CopyDrop32x32.gif
/usr/opt/SUNWsmgr/jre/lib/images/cursors/motif_CopyNoDrop32x32.g
if
/usr/opt/SUNWsmgr/jre/lib/images/cursors/motif_LinkDrop32x32.gif
/usr/opt/SUNWsmgr/jre/lib/images/cursors/motif_LinkNoDrop32x32.g
if
/usr/opt/SUNWsmgr/jre/lib/images/cursors/motif_MoveDrop32x32.gif
/usr/opt/SUNWsmgr/jre/lib/images/cursors/motif_MoveNoDrop32x32.g
if
/usr/opt/SUNWsmgr/jre/lib/javaplugin.jar
/usr/opt/SUNWsmgr/jre/lib/jvm.cfg
/usr/opt/SUNWsmgr/jre/lib/jvm.hprof.txt
/usr/opt/SUNWsmgr/jre/lib/jvm.jcov.txt
/usr/opt/SUNWsmgr/jre/lib/psfont.properties.ja
/usr/opt/SUNWsmgr/jre/lib/psfontj2d.properties
/usr/opt/SUNWsmgr/jre/lib/rt.jar
/usr/opt/SUNWsmgr/jre/lib/security/cacerts
/usr/opt/SUNWsmgr/jre/lib/security/java.policy
/usr/opt/SUNWsmgr/jre/lib/security/java.security
/usr/opt/SUNWsmgr/jre/lib/sparc/client/Xusage.txt
/usr/opt/SUNWsmgr/jre/lib/sparc/client/libjvm.so
/usr/opt/SUNWsmgr/jre/lib/sparc/hotspot <symbolic link>
/usr/opt/SUNWsmgr/jre/lib/sparc/jexec
/usr/opt/SUNWsmgr/jre/lib/sparc/libJdbcOdbc.so
/usr/opt/SUNWsmgr/jre/lib/sparc/libawt.so
/usr/opt/SUNWsmgr/jre/lib/sparc/libcmm.so
/usr/opt/SUNWsmgr/jre/lib/sparc/libdcpr.so
/usr/opt/SUNWsmgr/jre/lib/sparc/libfontmanager.so
/usr/opt/SUNWsmgr/jre/lib/sparc/libhprof.so
/usr/opt/SUNWsmgr/jre/lib/sparc/libioser12.so
/usr/opt/SUNWsmgr/jre/lib/sparc/libjava.so
/usr/opt/SUNWsmgr/jre/lib/sparc/libjavaplugin_jni.so
/usr/opt/SUNWsmgr/jre/lib/sparc/libjawt.so
/usr/opt/SUNWsmgr/jre/lib/sparc/libjcov.so
```

CODE EXAMPLE D-1

```
/usr/opt/SUNWsmgr/jre/lib/sparc/libjdgasUNWafb.so <symbolic link>
/usr/opt/SUNWsmgr/jre/lib/sparc/libjdgasUNWcg6.so
/usr/opt/SUNWsmgr/jre/lib/sparc/libjdgasUNWffb.so
/usr/opt/SUNWsmgr/jre/lib/sparc/libjdgasUNWm64.so
/usr/opt/SUNWsmgr/jre/lib/sparc/libjpeg.so
/usr/opt/SUNWsmgr/jre/lib/sparc/libjsound.so
/usr/opt/SUNWsmgr/jre/lib/sparc/libjvm.so
/usr/opt/SUNWsmgr/jre/lib/sparc/libmllib_image.so
/usr/opt/SUNWsmgr/jre/lib/sparc/libmllib_image_v.so
/usr/opt/SUNWsmgr/jre/lib/sparc/libmon_Axil-210.so <symbolic
link>
/usr/opt/SUNWsmgr/jre/lib/sparc/libmon_Axil-220.so <symbolic
link>
/usr/opt/SUNWsmgr/jre/lib/sparc/libmon_Axil-235.so <symbolic
link>
/usr/opt/SUNWsmgr/jre/lib/sparc/libmon_Axil-240.so <symbolic
link>
/usr/opt/SUNWsmgr/jre/lib/sparc/libmon_Axil-245.so <symbolic
link>
/usr/opt/SUNWsmgr/jre/lib/sparc/libmon_Axil-311.so <symbolic
link>
/usr/opt/SUNWsmgr/jre/lib/sparc/libmon_Axil-320.so <symbolic
link>
/usr/opt/SUNWsmgr/jre/lib/sparc/libmon_PFU,S-4_20A.so <symbolic
link>
/usr/opt/SUNWsmgr/jre/lib/sparc/libmon_PFU,S-4_20B.so <symbolic
link>
/usr/opt/SUNWsmgr/jre/lib/sparc/libmon_PFU,S-4_5T.so <symbolic
link>
/usr/opt/SUNWsmgr/jre/lib/sparc/libmon_PFU,S-4_Leia.so <symbolic
link>
/usr/opt/SUNWsmgr/jre/lib/sparc/libmon_PFU,S-4_Leia2.so <symbolic
link>
/usr/opt/SUNWsmgr/jre/lib/sparc/libmon_SUNW,S240.so <symbolic
link>
/usr/opt/SUNWsmgr/jre/lib/sparc/libmon_SUNW,SPARCcenter-2000.so
<symbolic link>
/usr/opt/SUNWsmgr/jre/lib/sparc/libmon_SUNW,SPARCclassic-X.so
<symbolic link>
/usr/opt/SUNWsmgr/jre/lib/sparc/libmon_SUNW,SPARCclassic.so
<symbolic link>
/usr/opt/SUNWsmgr/jre/lib/sparc/libmon_SUNW,SPARCengine-EC-3.so
<symbolic link>
/usr/opt/SUNWsmgr/jre/lib/sparc/libmon_SUNW,SPARCserver-1000.so
<symbolic link>
```

CODE EXAMPLE D-1

```
/usr/opt/SUNWsmgr/jre/lib/sparc/libmon_SUNW,SPARCserver-2000.so
<symbolic link>
/usr/opt/SUNWsmgr/jre/lib/sparc/libmon_SUNW,SPARCstation-
10,SX.so <symbolic link>
/usr/opt/SUNWsmgr/jre/lib/sparc/libmon_SUNW,SPARCstation-10.so
<symbolic link>
/usr/opt/SUNWsmgr/jre/lib/sparc/libmon_SUNW,SPARCstation-20.so
<symbolic link>
/usr/opt/SUNWsmgr/jre/lib/sparc/libmon_SUNW,SPARCstation-4.so
<symbolic link>
/usr/opt/SUNWsmgr/jre/lib/sparc/libmon_SUNW,SPARCstation-5.so
<symbolic link>
/usr/opt/SUNWsmgr/jre/lib/sparc/libmon_SUNW,SPARCstation-LX+.so
<symbolic link>
/usr/opt/SUNWsmgr/jre/lib/sparc/libmon_SUNW,SPARCstation-LX.so
<symbolic link>
/usr/opt/SUNWsmgr/jre/lib/sparc/libmon_SUNW,SPARCsystem-600.so
<symbolic link>
/usr/opt/SUNWsmgr/jre/lib/sparc/libmon_SUNW,Sun_4_20.so <symbolic
link>
/usr/opt/SUNWsmgr/jre/lib/sparc/libmon_SUNW,Sun_4_25.so <symbolic
link>
/usr/opt/SUNWsmgr/jre/lib/sparc/libmon_SUNW,Sun_4_40.so <symbolic
link>
/usr/opt/SUNWsmgr/jre/lib/sparc/libmon_SUNW,Sun_4_50.so <symbolic
link>
/usr/opt/SUNWsmgr/jre/lib/sparc/libmon_SUNW,Sun_4_60.so <symbolic
link>
/usr/opt/SUNWsmgr/jre/lib/sparc/libmon_SUNW,Sun_4_600.so
<symbolic link>
/usr/opt/SUNWsmgr/jre/lib/sparc/libmon_SUNW,Sun_4_65.so <symbolic
link>
/usr/opt/SUNWsmgr/jre/lib/sparc/libmon_SUNW,Sun_4_75.so <symbolic
link>
/usr/opt/SUNWsmgr/jre/lib/sparc/libmon_TSBW,5000.so <symbolic
link>
/usr/opt/SUNWsmgr/jre/lib/sparc/libmon_TWS,Super_COMPstation_20.
so <symbolic link>
/usr/opt/SUNWsmgr/jre/lib/sparc/libmon_TWS,micro_COMPstation_5.s
o <symbolic link>
/usr/opt/SUNWsmgr/jre/lib/sparc/libmon_Tadpole_S3.so <symbolic
link>
/usr/opt/SUNWsmgr/jre/lib/sparc/libmon_Tadpole_S3000ST.so
<symbolic link>
```

CODE EXAMPLE D-1

```
/usr/opt/SUNWsmgr/jre/lib/sparc/libmon_Tadpole_S3000XT.so
<symbolic link>
/usr/opt/SUNWsmgr/jre/lib/sparc/libmon_Tadpole_S3GS.so <symbolic
link>
/usr/opt/SUNWsmgr/jre/lib/sparc/libmon_Tadpole_S3GX.so <symbolic
link>
/usr/opt/SUNWsmgr/jre/lib/sparc/libmon_Tadpole_S3LC.so <symbolic
link>
/usr/opt/SUNWsmgr/jre/lib/sparc/libmon_Tadpole_S3TS.so <symbolic
link>
/usr/opt/SUNWsmgr/jre/lib/sparc/libmon_Tadpole_S3TX.so <symbolic
link>
/usr/opt/SUNWsmgr/jre/lib/sparc/libmon_Tadpole_S3XP.so <symbolic
link>
/usr/opt/SUNWsmgr/jre/lib/sparc/libmon_Tadpole_S3XS.so <symbolic
link>
/usr/opt/SUNWsmgr/jre/lib/sparc/libmon_sun4c.so <symbolic link>
/usr/opt/SUNWsmgr/jre/lib/sparc/libmon_sun4d.so <symbolic link>
/usr/opt/SUNWsmgr/jre/lib/sparc/libmon_sun4m.so <symbolic link>
/usr/opt/SUNWsmgr/jre/lib/sparc/libmon_tadpole4m.so <symbolic
link>
/usr/opt/SUNWsmgr/jre/lib/sparc/libnet.so
/usr/opt/SUNWsmgr/jre/lib/sparc/libsunwdga.so
/usr/opt/SUNWsmgr/jre/lib/sparc/libverify.so
/usr/opt/SUNWsmgr/jre/lib/sparc/libxinerama.so
/usr/opt/SUNWsmgr/jre/lib/sparc/libzip.so
/usr/opt/SUNWsmgr/jre/lib/sparc/motifl2/libmawt.so
/usr/opt/SUNWsmgr/jre/lib/sparc/motif21/libmawt.so
/usr/opt/SUNWsmgr/jre/lib/sparc/native_threads/libhpi.so
/usr/opt/SUNWsmgr/jre/lib/sparc/server/Xusage.txt
/usr/opt/SUNWsmgr/jre/lib/sparc/server/libjvm.so
/usr/opt/SUNWsmgr/jre/lib/sunrsasign.jar
/usr/opt/SUNWsmgr/jre/lib/tz mappings
/usr/opt/SUNWsmgr/jre/man/man.1/java.1
/usr/opt/SUNWsmgr/jre/man/man.1/keytool.1
/usr/opt/SUNWsmgr/jre/man/man.1/rmid.1
/usr/opt/SUNWsmgr/jre/man/man.1/rmiregistry.1
/usr/opt/SUNWsmgr/jre/man/man.1/tnameserv.1
/usr/opt/SUNWsmgr/jre/plugin/sparc/ns4/javaplugin.so
/usr/opt/SUNWsmgr/jre/plugin/sparc/ns600/libjavaplugin_oji.so
[ verifying class <none> ]
## Executing postinstall script.
/usr/opt/SUNWsmgr/bin/esm_smgr
Now you can start the GUI by typing :
```


CODE EXAMPLE D-1

```
/usr/opt/SUNWsmgr/bin/esm_smgr

Installation of <SUNWsmgr> was successful.

# patchadd /download/110696-03

Checking installed patches...
Verifying sufficient filesystem capacity (dry run method)...
Installing patch packages...

Patch number 110696-03 has been successfully installed.
See /var/sadm/patch/110696-03/log for details

Patch packages installed:
    SUNWsmgr
```


Glossary

This glossary contains a definitions for terms used in this guide.

Terms

- AL_PA** Arbitrated Loop Physical Address; 8-bit value used to identify a device.
- FL_Port** On a Fibre Channel switch, a port that supports Arbitrated Loop devices.
- F_Port** On a Fibre Channel switch, a port that supports an N_Port. A Fibre Channel port in a point-to-point or Fabric connection.
- N_Port** A Fibre Channel port in a point-to-point or Fabric connection.
- NL_Port** Node loop port; a port that supports Arbitrated Loop protocol.
- G_Port** On a Fibre Channel switch, a port that supports either F_Port or E_Port
- SL_Port** Segmented Loop Port. A port connected to a private loop device.
- T_Port** An inter-switch port, one that is used to attach a port on one switch to a port on another switch.
- TL_Port** A Translated Loop Port on the Sun StorEdge T3 array.
- Public Loop** An Arbitrated Loop attached to a Fabric switch.
- Private Loop** An Arbitrated Loop without a Fabric switch
- Segmented Loop** A set of ports that behave as one private loop.
- Zone** A set of ports and their connected devices that have been grouped together to control information exchange.

- Zoning** Zoning allows the user to divide the Fabric ports into zones for more efficient and secure communication among functionally grouped nodes. There are several types of zones and a port may be defined in any. No port can be in all zone types simultaneously.
- Hard Zones** Hard Zones allow the division of the Fabric (one or more Switch chassis) into as many as 16 Fabric-wide zones that define the ports that can communicate with each other. A particular port may be placed in only one Hard Zone (no overlapping Hard Zones). If Hard Zones are enabled, Name Server Zones and SL Zones will not communicate across defined Hard Zone boundaries.
- Broadcast Zone** Zone type used to filter broadcast traffic away from end nodes that cannot use or interpret it. A port will broadcast to all ports in the same Broadcast Zone(s) in which the port is defined. Broadcast zoning is primarily used for doing IP over Fibre Channel or when mixing IP and SCSI traffic on the switch. These zones are not yet useful or interesting in Suns current SAN implementations.
- SL_Port Zone** A set of ports and their connected devices (zone) that behave as a single private loop. SL Zones on the switch allow the division of the Fabric (one or more Switch chassis) into Fabric-wide zones that define the ports that can communicate with each other.
- Cascade** Connection of two or more switches together to increase the number of available ports or to allow for increased distances between components of the SAN.
- Name Server** Zones allow the division of the Fabric (one or more Switch chassis) into as many as 256 Fabric-wide zones that define which ports or devices receive Name Server information. If Hard Zones are enabled, Name Server Zones will not communicate across defined Hard Zone boundaries.
- Fabric** Fibre channel network built around one or more switches. It is also common to refer to something as a "Fabric device" or being in "Fabric mode". When used in this context, it simply means a public device, capable of logging into a Fabric and having public loop characteristics (as opposed to a private loop legacy device).

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