CHAPTER 1

System Recommendations

This chapter describes the system recommendations and requirements for Cisco IP Solution Center (ISC). ISC is a web-based application you install on a Sun Solaris server, along with a web server and other supporting packages. You access ISC using a web browser.

The recommendation is to thoroughly review this list before even planning your installation, to be sure you have all the hardware and software you must successfully install.

The recommendations are explained in the following topics:

ISC Server Hardware

You must have a CD-ROM drive to install the ISC 6.0 product.

For the Sun™ Solaris server, the minimum recommendations are as shown in Table 1-1.

Table 1-1 Minimum Sun Solaris Server Recommendations for ISC Applications

Class	Applications	Minimum Sun Solaris Server	RAM	Swap Space	Disk Space
Entry	Cisco MPLS Diagnostics Expert or L2VPN and L3 MPLS with a total of up to 1500 attachment circuits Note: Not recommended for API use.	Sun™ SPARC T5210, Quad-core CPU, 1.2 GHz	8 GB (see note below)	8 GB	73 GB hard drive

Table 1-1 Minimum Sun Solaris Server Recommendations for ISC Applications (continued)

Mid-range	Traffic Engineering Management (TEM) of up to 5000 TE tunnels or L2VPN and L3 MPLS with a total of up to 10,000 attachment circuits	Sun™ SPARC T5220, Quad-core CPU, 1.2 GHz	8 GB	8 GB	73 GB hard drive
High End	Traffic Engineering Management (TEM) of more than 5000 TE tunnels or L2VPN and L3 MPLS with a total of more than 10,000 attachment circuits	Sun™ SPARC M4000, 2 CPUs, 2.15 GHz	16 GB	32 GB	146 GB hard drive

Notes:

The recommended servers in this table are examples for typical installations. Relative performance can be impacted by many factors. Please contact your Cisco account representative if you need assistance in selecting the correct server.

The default Oracle and Sybase database layouts are sufficient for ISC. Further optimization is your preference.

For server vitualization, minimum recommendations are a Sun™ SPARC T5210 with 8 GB of memory (minimum orderable).

The minimum resources required for an entry-level LDOM running ISC are two 1.2 GHz cores and 4 GB RAM and 8 GB swap space.

The minimum memory resources required for a mid-level LDOM running ISC are 4 GB RAM and 8 GB swap space. To determine whether all of the CPU core resources are needed for running ISC, it is recommended that you perform benchmark testing of your server under typical load.

ISC Server Solaris Configuration

Solaris 10 is supported in this release. Solaris 10 with recommended patches of at least 118822-30 for the kernel level of the patch cluster and JDK 1.6.0_07 patches are found at: http://sunsolve.sun.com. As a minimum, you must get your system up to the 118822-30 Kernel patch level. For installation instructions, see the README file which is at the same location as the patch bundle.

Before installing ISC, configure the server to be able to perform hostname to IP address translations. Ensure that Domain Naming System (DNS) or an alternative is configured.

Table 1-2, "Solaris Software Requirements," explains the Solaris requirements.

Table 1-2 Solaris Software Requirements

Requirements	Description
Solaris 10	Install Solaris 10 on the Sun Sparc server. Choose either the Developer System Support or the Entire Distribution software groups. Do *not* choose the End User System software group. Then follow these guidelines: Full Distribution—The full distribution includes the following required packages. If you did not install the full distribution, before proceeding with the installation, ensure that at a minimum the following packages are installed: —**SUNWbtool**—Software development utilities —**SUNWbzip**—The **bzip** compression utility —**SUNWlldap**—LDAP libraries —**SUNWscpu**—Utilities for user interface and source build compatibility with SunOS 4.x —**SUNWsprot**—Solaris Bundled tools —**SUNWxcu4**—Utilities providing conformance with XCU4 specifications To check if your installation includes these packages, enter: **pkginfo** *package* where: *package* is one of the packages listed above.

Caution Make sure that the file descriptor limit is *not* set in the ISC workstation login shell file (which can be the **.login** file, the **.cshrc** file, the .**profile** file, or the **.kshrc** file). If the login shell file contains a line with the **ulimit -n** command (for example, "`ulimit -n <number>`"), comment out this command line in the file. Log out and then log back in to ensure that the ulimit is no longer set.

ISC cannot override the file descriptor limitation setting in the login shell file. If the value is set incorrectly, ISC might experience operational problems.

ISC provides support for Solaris Virtualization. This is described in Appendix C, "Solaris Virtualization Support."

ISC Client

The following is needed for the ISC client:

- A web browser is needed for the client machine on which to run ISC. Microsoft Internet Explorer 7.0 and 8.0 for Windows, Mozilla Firefox 2.0 for Windows, and Mozilla Suite 1.7 for Solaris are supported.

Note In Internet Explorer, we recommend disabling the script debugging feature. To do this, navigate to **Tools > Internet Options** and click the **Advanced** tab. Select the check box **Disable script debugging** and click **OK**.

Note When using Mozilla Firefox and launching ISC in a second window, you *might* lose the information in the first ISC window. To avoid this, stay in ISC and launch a new ISC from a tab or a hyperlink within ISC.

If launching a new Firefox window is necessary, do so with a different Firefox profile.

- Java Runtime Environment (JRE) and Java Web Start must be installed on the client machine to run Inventory Manager. Java 6.0 Update 7 is supported.

Note When using more than one ISC login, ensure each login is using a different HTTP session. To do so, run each session in a separate browser launched from the command line or by clicking on the browser icon on the desktop or **Start** menu. Do not run parallel ISC logins in tabs within the same browser window or in browser windows launched from existing browser windows.

IOS XR Device Setup

The following are the minimum patches for IOS XR, PIEs:

- **mini.pie** - Always required
- **mpls.pie** - Always required for ISC
- **mcast.pie** - Required for ISC layer 3 multicast functionality
- **mgbl.pie** - Required for ISC layer 2 and layer 3 deployment to work (because they use the XML agent); not required for TEM
- **k9sec.pie** - Required only if using Secure Shell (SSH)

Supported Cisco Network Devices and Software Versions

The following hardware and software are recommended and required as specified:

- ISC 6.0 testing on an Oracle database has been on Oracle Database 10g Enterprise Edition Release 10.2.0.1.0 - 64 bit Production. If you would like to use another version of Oracle, see Oracle's compatibility information.
- CEs are supported with Cisco IOS 12.1 or later if the CE is a router, and if connecting using Ethernet then it must have a VLAN ethernet interface. The Management Customer Edge router (MCE) can be any CE.
- The Network-facing Provider Edge (NPE) and User-facing Provider Edge (UPE) can be any of the PE devices in the following tables.

The devices and related software supported are listed in the following tables:

- Table 1-3, "MPLS/L3VPN Devices for N-PE Role and Related Software Supported with ISC 6.0"

- Table 1-4, "L2VPN/Ethernet Over MPLS (Including VPLS) N-PE Devices and Related Software Supported with ISC 6.0"
- Table 1-5, "Ethernet U-PE and PE-AGG Devices for Access Into L2VPN and MPLS/L3VPN and Related Software Supported with ISC 6.0"
- Table 1-6, "MVRFCE Devices for MPLS/L3VPN and Related Software Supported with ISC 6.0"
- Table 1-7, "MPLS Diagnostics Expert (MDE) Devices and Related Software Supported with ISC 6.0"
- Table 1-8, "Traffic Engineering Management (TEM) Devices and Related Software Supported with ISC 6.0"

Table 1-3 specifies the version of software supported on alphabetically listed MPLS/L3VPN devices for N-PE role.

Table 1-3 MPLS/L3VPN Devices for N-PE Role and Related Software Supported with ISC 6.0

MPLS/L3VPN Devices for N-PE Role	Specified Software Supported
Cisco ASR 1000 Series Routers	Cisco IOS XE 2.3.0, 2.3.1, 2.4, and 2.5
Cisco ASR 9000 Series Routers	IOS XR 3.7.2, 3.7.3, 3.9.0, 3.9.1, and 4.0
Cisco 2800 Integrated Service Routers (ISR) Series Routers	Cisco IOS 12.3(14) T
Cisco Catalyst 3550 Series Switches	Cisco IOS 12.1(11) and 12.2(37) SE
Cisco Catalyst ME 3750 Series Switches	12.2(50)SE
Cisco 3800 (ISR) Series Routers	Cisco IOS 12.3(14) T
Cisco 6400 Series Routers	Cisco IOS 12.1(5) DC1 and 12.2(2) B5
Cisco ME 6524 Ethernet Switch	12.2(33)SXI
Cisco Catalyst 6500 Series Switches	Cisco IOS 12.2(18) ZU1 and 12.2(33)SXI
Cisco 7200 Series Routers	Cisco IOS 12.0(23) S, 12.0(27) S, 12.0(27) S2, 12.0(31) S, 12.0(19991029:003049), 12.1(5) a, 12.2(2) T2, 12.2(3), 12.2(4) SBD, 12.2(13) T, 12.2(15) T2, 12.2(28) SB, 12.2(31) SB5, 12.4(4) XD, and 12.4(13)
Cisco 7300 Series Routers	Cisco IOS 12.2(4) SBD
Cisco 7500 Series Routers	Cisco IOS 12.0(22) S1, 12.0(28) S, 12.2(4) SBD, 12.2(8) T, and 12.2(28) SB
Cisco 7600 Series Routers	Cisco IOS 12.2(16.13) S, 12.2(17a) SX3, 12.2(17b) SX, 12.2(17d) SXB4, 12.2(18) SXE, 12.2(18) SXF, 12.2(33) SRA, 12.2(33) SRB, 12.2(33) SRC, 12.2(33) SRD, and 12.2(33)SRE*.

Table 1-3 MPLS/L3VPN Devices for N-PE Role and Related Software Supported with ISC 6.0

MPLS/L3VPN Devices for N-PE Role	Specified Software Supported
Cisco 10000 Edge Services Router (ESR) Series Routers	Cisco IOS 12.2(4) SBD, 12.2(8) BC2a, 12.2(16) BX2, 12.2(28) SB, and 12.2(31) SB5
Cisco 12000 (GSR) Series Routers	Cisco IOS 12.0(14) ST, 12.0(26) S, 12.0(27) S, 12.0(27) S2, 12.0(27)Sv2, 12.0(28) S, 12.0(31) S, 12.0(32) S, and 12.0(32) SY and Cisco IOS XR 3.4.2, 3.5.2, 3.5.3, 3.6.0, 3.6.1, 3.6.2, 3.7.0, 3.7.1, 3.8.1, 3.8.2, 3.8.4, 3.9.0, 3.9.1, and 4.0
Cisco Carrier Routing System-1 (CRS-1) Series Routers	Cisco IOS XR 3.4.2, 3.5.2, 3.5.3, 3.6.0, 3.6.1, 3.6.2, 3.7.0, 3.7.1, 3.8.1, 3.8.2, 3.8.4, 3.9.0, 3.9.1, and 4.0
Cisco MGX 8000 Series Multiservice Switches	Cisco IOS 12.1(1), 12.1(5), 12.2(4) T, 12.2(15) ZS3, and 12.3(11) T5

*If IOS images prior to 12.2(33)SRE2 on the 12.2(33)SRE train are deployed, enabling of IPv6 support on an existing IPv4 vrf on this platform will fail because the IOS defect CSCtd93417 causes the service request to move to the FAILED_DEPLOY state.

Table 1-4 specifies the version of software supported on alphabetically listed L2VPN/Ethernet over MPLS (including VPLS) N-PE devices.

Table 1-4 L2VPN/Ethernet Over MPLS (Including VPLS) N-PE Devices and Related Software Supported with ISC 6.0

L2VPN/Ethernet Over MPLS (Including VPLS) N-PE Devices	Specified Software Supported
Cisco ASR 1000 Series Routers	Cisco IOS XE 2.4*, and 2.5* *VPLS not supported
Cisco ASR 9000 Series Routers	Cisco IOS XR 3.7.2, 3.7.3, 3.9.0, 3.9.1, and 4.0
Cisco 2600 Series Routers	Cisco IOS 12.0(27) SV2, 12.0(28) S, 12.1, and 12.2(3)
Cisco 3620 Series Routers	Cisco IOS 12.0(27) SV2, 12.0(28) S, and 12.1(1a) T1
Cisco Catalyst ME 3750 Series Switches, ERS/EWS service only, not VPLS	Cisco IOS 12.2(25) EXA, 12.2(25) EY, 12.2(25) EY2-7, 12.2(50)SE
Cisco Catalyst 4000 Series Switches	Cisco IOS 12.1(12c) EW1 and 12.1(13) EW
Cisco Catalyst 6500 Series Switches	Cisco CatOS 7.5 and 7.5(1) and Cisco IOS 12.1(11b) EX1, 12.1(12c) EW1, 12.2(18) SXF, and 12.2(33)SXI
Cisco 7200 Series Routers	Cisco IOS 12.0(22) S, 12.0(27) SV2, 12.0(28) S, and 12.2(28) SB
Cisco 7500 Series Routers	Cisco IOS 12.0(22) S, 12.0(27) SV2, and 12.0(28) S

Table 1-4 L2VPN/Ethernet Over MPLS (Including VPLS) N-PE Devices and Related Software Supported with ISC 6.0 (continued)

L2VPN/Ethernet Over MPLS (Including VPLS) N-PE Devices	Specified Software Supported
Cisco 7600 Series Routers	Cisco IOS 12.2(17a) SX3, 12.2(18) SXD1, 12.2(18) SXD4, 12.2(18) SXE, 12.2(18) SXF, 12.2(33) SRA, 12,2(33) SRB, 12.2(33) SRB1, 12.2(33) SRC, 12.2(33) SRD, 12.2(33)SRE, 12.2(TETONS_SXB_THROTTLE_INTEG_040519), and 12.2(TETONS_3_1_SBC_EON2.041120)
Cisco 12000 (GSR) Series Routers	Cisco IOS 12.0(22) S, 12.0(27) S, 12.0(28) S, 12.0(32) S, 12.0(32) SY, 12.0(32)SY6, and Cisco IOS XR 3.8.1, 3.8.2, 3.8.4, 3.9.0, 3.9.1, and 4.0
Cisco Carrier Routing System-1 (CRS-1) Series Routers, ERS/ERW service only, UNI on NPE for ERS service only	Cisco IOS XR 3.4.2, 3.5.2, 3.6.0, 3.6.1, 3.6.2, 3.7.0, 3.7.1, 3.8.1, 3.8.2, 3.8.4, 3.9.0, 3.9.1, and 4.0

Table 1-5 specifies the version of software supported on alphabetically listed Ethernet U-PE and PE-AGG devices for access into L2VPN and MPLS/L3VPN.

Table 1-5 Ethernet U-PE and PE-AGG Devices for Access Into L2VPN and MPLS/L3VPN and Related Software Supported with ISC 6.0

Ethernet U-PE and PE-AGG Devices for Access into L2VPN and MPLS/L3VPN	Specified Software Supported
Cisco ASR 1000 Series Routers	Cisco IOS XE 2.3.1, 2.4, and 2.5
Cisco Catalyst 2950 Series Switches	Cisco IOS 12.1(11) EA1 and 12.1(22) EA1
Cisco ME 3400 Series Ethernet Access Switches	Cisco IOS 12.2(25) EX, 12.2(25) SEG, 12.2(37) SE, and 12.2(50) SE
Cisco ME 3400E Series Ethernet Access Switches	Cisco IOS 12.2(50) SE

Table 1-5 Ethernet U-PE and PE-AGG Devices for Access Into L2VPN and MPLS/L3VPN and Related Software Supported with ISC 6.0 (continued)

Ethernet U-PE and PE-AGG Devices for Access into L2VPN and MPLS/L3VPN	Specified Software Supported
Cisco Catalyst 3550 Series Switches	Cisco IOS 12.1(11) EA1, 12.1(22) EA1, 12.1(22) EA1a, and 12.2(37) SE
Cisco Catalyst 3560-E Series Switches	Cisco IOS 12.2(50) SE
Cisco Catalyst 3750 ME Series Switch	Cisco IOS 12.2(25) EXA, 12.2(25) EY, 12.2(25) EY2-7, and 12.2(50) SE
Cisco Catalyst 4500 Series Switches	Cisco IOS 12.2(20) EW, 12.2(25) EWA, 12.2(53)SG1, and 12.2(54)SG
Cisco Catalyst 4900M Series Switches	12.2(53)SG1, 12.2(54)SG
Cisco Catalyst 4948 Series Switches	12.2(31)SGA11
Cisco Catalyst 6500 Series Switches	Cisco CatOS 7.5 and 7.5(1) and Cisco IOS 12.1(11b) EX1, 12.1(12c) EW1, 12.2(18) SXF, and 12.2(33)SXI
Cisco ME 6524 Ethernet Switch	Cisco IOS 12.2(25) EX, 12.2(18) ZU1 (with N-PE role), and 12.2(33)SXI
Cisco 7600 Series Routers	Cisco IOS 12.2(17a) SX3, 12.2(18) SXD1, 12.2(18) SXD4, 12.2(18) SXE, 12.2(18) SXF, 12.2(33) SRA, 12.2(33) SRB, 12.2(33) SRB1, 12.2(33) SRD, 12.2(33) SRE, 12.2(TETONS_SXB_THROTTLE_INTEG_040519), and 12.2(TETONS_3_1_SBC_EON2.041120)

Table 1-6 specifies the version of software supported on alphabetically listed MVRFCE devices for MPLS/L3VPN.

Table 1-6 MVRFCE Devices for MPLS/L3VPN and Related Software Supported with ISC 6.0

Multi-VPN Routing and Forwarding CE (MVRFCE) Devices for MPLS/L3VPN	Specified Software Supported
Cisco 836	Cisco IOS 12.3(11) T3
Cisco 1841 Routers	12.4(24)T
Cisco 2821 Routers	12.4(24)T
Cisco 2651XM Routers	12.4(24)T
Cisco Catalyst 3560-E Series Switches	12.2(50)SE
Cisco Catalyst 3750 ME Series Switch	Cisco IOS 12.1(14) AX1, 12.2(25) EYa, and 12.2(25) EY2
Cisco Catalyst 4900M Series Switches	12.2(53)SG1, 12.2(54)SG
Cisco Catalyst 6500 Series Switches	12.2(33)SXI
Cisco 7400 Series Routers	Cisco IOS 12.2(4) B3 and 12.2(4) SBD

Table 1-7 specifies the version of software supported on alphabetically listed MDE devices.

Table 1-7 MPLS Diagnostics Expert (MDE) Devices and Related Software Supported with ISC 6.0

P and PE Network Devices, Exceptions Noted	MDE 2.1 Supported with Specified Software
MGX8800/RPM-PR (PE only)	Cisco IOS 12.4(6) T5a
MGX8800/RPM-XF (PE only)	Cisco IOS 12.2(15) ZS5
Cisco ASR 1000 Series Routers	Cisco IOS XE 2.3.0
Cisco 3800 Series (PE only)	Cisco IOS 12.4(6) T*
Cisco Catalyst 6500 Series Switches	Cisco IOS 12.2(18) SXF
Cisco 7200 Series	Cisco IOS 12.0(27) S to 12.0(31) S, 12.2(28) SB, and 12.2(31) SB5
Cisco 7200 Series (PE only)	Cisco IOS 12.2(15) T4, 12.2(18) S, 12.2(28) SB3, 12.3(9), 12.3(10), 12.3(10c), and 12.3(13)
Cisco 7300 Series	Cisco IOS 12.2(20) S, 12.2(28) SB, 12.2(28) SB3, 12.2(31) SB5, and 12.2(33) SRA

Table 1-7 MPLS Diagnostics Expert (MDE) Devices and Related Software Supported with ISC 6.0 (continued)

P and PE Network Devices, Exceptions Noted	MDE 2.1 Supported with Specified Software
Cisco 7300 Series (PE only)	Cisco IOS 12.2(20) S and12.2(25) S4
Cisco 7500 Series	Cisco IOS 12.0(27) S to 12.0(31) S, 12.0(30) S1, 12.2(22) S, 12.2(28) SB, and 12.2(28) SB3
Cisco 7500 Series (PE only)	Cisco IOS 12.2(15) T4, 12.2(18) S, 12.3(15) B, and 12.3(17) A
Cisco 7600 Series with SUP 720	Cisco IOS 12.2(18) SXE, 12.2(18) SXF, 12.2(33) SRA, 12.2(33) SRB1, 12.2(33) SRC, 12.2(33) SRD, and 12.2(33) SRE.
Cisco 10000 Series with Performance Routing Engine 2 (PRE2)	Cisco IOS 12.2(28) SB and 12.2(31) SB5
Cisco 10000 Series with Performance Routing Engine 2 (PRE2) (PE only)	Cisco IOS 12.2(3) 7XI, 12.2(28) SB3, and 12.3(7) X17
Cisco 12000 (GSR) Series	Cisco IOS 12.0(27) S to 12.0(32) S, 12.0(32) SY, 12.0(32) S10**, 12.0(33) S1, and Cisco IOS XR 3.3.0, 3.4.2*, 3.5.3, 3.5.4, 3.6.0, 3.6.1, 3.6.2, 3.7.0, 3.7.1, 3.8.1, 3.8.2, 3.8.4, 3.9.0, 3.9.1, and 4.0.
Cisco Carrier Routing System-1 (CRS-1) Series Routers	Cisco IOS XR 3.3, 3.3.5, 3.4.2*, 3.5.3, 3.5.4, 3.6.0, 3.6.1, 3.6.2, 3.7.0, 3.7.1, 3.8.1, 3.8.2, 3.8.4, 3.9.0, 3.9.1, and 4.0.

* Cisco IOS and IOS XR MPLS LSP Ping/Traceroute must be configured to use version 3 of the Internet Engineering Task Force (IETF) label switched path (LSP) Ping draft (draft-ietf-mpls-lsp-ping-03.txt). For details of how to configure the Cisco IOS and IOS XR MPLS LSP Ping/Traceroute version, see the *Cisco IP Solution Center MPLS Diagnostics Expert User Guide, 6.0.*
** Cisco IOS 12.0(32) S10 supports MPLS OAM RFC.

Table 1-8 specifies the version of software supported on alphabetically listed TEM devices.

Table 1-8 Traffic Engineering Management (TEM) Devices and Related Software Supported with ISC 6.0

P and PE Network Devices	Traffic Engineering Management (TEM) Supported with Specified Software
Cisco 7200 Series Routers	Cisco IOS 12.0(22) S, 12.0(22) S2, 12.0(24) S, 12.0(26) S, 12.0(26) S2, 12.0(27) S, 12.0(27) S4, 12.0(28) S, 12.0(28) S5, 12.0(31) S, 12.0(32) S, and 12.2(31) SB5** ** No Fast Re-route (FRR) support for 12.2(28) SB
Cisco 7500 Series Routers	Cisco IOS 12.0(22) S, 12.0(22) S2, and 12.0(27) S4
Cisco 7600 Series Routers	Cisco IOS 12.2(18) SXD1, 12.2(18) SXF, 12.2(33) SRA, 12.2(33) SRB, 12.2(33) SRC, 12.2(33) SRD, and 12.2(33) SRE.

Table 1-8 Traffic Engineering Management (TEM) Devices and Related Software Supported with ISC 6.0 (continued)

P and PE Network Devices	Traffic Engineering Management (TEM) Supported with Specified Software
Cisco 10000 (ESR) Series Routers	Cisco IOS 12.0(25) S1, 12.0(30) S3, 12.0(32) S, 12.2(31) SB5, and 12.2(SB) REL3** ** No Fast Re-route (FRR) support for 12.2(28) SB
Cisco 12000 (GSR) Series Routers	Cisco IOS 12.0(26) S, 12.0(31) S, and 12.0(32) S and Cisco IOS XR 3.2, 3.3, 3.4.2, 3.5.2, 3.6.0, 3.6.1, 3.6.2, 3.7.0, 3.7.1, 3.8.1, 3.8.2, 3.8.4, 3.9.0, 3.9.1, and 4.0.
Cisco Carrier Routing System-1 (CRS-1) Series Routers	Cisco IOS XR 3.2, 3.3, 3.4.2, 3.5.2, 3.6.0, 3.6.1, 3.6.2, 3.7.0, 3.7.1, 3.8.1, 3.8.2, 3.8.4, 3.9.0, 3.9.1, and 4.0.