

Recommendations for CWMS Local Area Network Configuration:

Item	Description	Recommendation
1	Network Bandwidth	100 Base T or faster
2	Network Topology	Water Control Located on its Own Subnet
3	Network Traffic	TCP/IP, Isolated from Other District / Division Net Traffic
4	Access to CEEIS Network	Subnet Connects Directly to District / Division Firewall *
5	Access to Internet	Subnet Connects Directly to District / Division Firewall *
6	Location of WWW Servers	Water Control Subnet and Internet Accessible Subnet
7		
8		
9		

* Connection through hubs and routers OK, don't piggy back Water Control subnet behind another District / Division subnet

Commercial Off-the-shelf Software used by CWMS:

Item	Description	Recommendation
1	Oracle 9.2.0 (Patch level 5)	8-User Oracle Enterprise Edition – Version 9.2.0 License *
2	ArcInfo GIS Software	Version #7.1 (or higher) – Unix Implementation **
3	ArcView GIS Software	Version #3.2 – Unix Implementation
4	Java Runtime Environment	Version #1.4.1.3 – Supplied with CWMS Software
5	Hummingbird Exceed	X-Windows Server Software for the PC
6	Hummingbird Security Package	Secure Shell and Secure FTP Package for the PC
7	Apache Web Server	Available for both Unix or the PC
8		
9		

* Oracle Database Software per 2 CPU / CWMS Sun Server:

Oracle Corps License contacts:

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** ArcInfo GIS Software Package for UNIX – Version 7.1 or higher with TIN module.
[Note: This item required only if performing inundation computation.]

CWMS Server Side - Hardware Specifications

This document describes both the hardware and software components that are used to setup a CWMS client / server data acquisition and modeling system. The equipment is divided up into two groups, the Sun equipment used to provide the CWMS server side system and the PC specifications used for the CWMS client side system.

2004 CWMS Hardware Specification – Typical Workstation Configuration

Item	Part Number	Description	List Price	Discounted Price *
1	A29-PB2-9AA-2GMAJ	SUN Blade 2000 Model 1.2GHz, 1 * 1.2 GHz UltraSPARC III Cu Processor with 8 MB Cache. SUN XVR-100 graphics accelerator (HD15 to 13W3 adapter cable included). 2 GB Memory (4*512MB Differential DIMMS), 73-GB 10K-RPM FC-AL Internal hard disk. 10/100 BaseT Ethernet port, 2 * Serial ports, 1 * Parallel port, 4 * USB ports, 2* IEEE1394 ports, 1 * SCSI port, 1 * FC-AL Port, 4 * PCI slots, No Keyboard included. Solaris 8 HW 12/02 and Solaris 9 12/03 pre-installed (Standard Config)	\$ 10995.00	
2	X3531A	USB Country Kit (PC Style)	\$ 45.00	
3		Internal DVD-ROM Drive 10X Speed	\$ 300.00	
4		73GB Internal Disk Add-on Drive 10K RPM	\$ 900.00	
5		2 GB Memory (4 * 512MB Differential DIMMS)	\$ 1900.00	
6		22 Inch Flat Panel Display	\$ 900.00	
7	SOLZS-09FC9AYM	Solaris 9 12/03 CD-ROM media kit. SPARC Platform Edition. Multilingual. No license, no hardcopy documentation	\$ 95.00	

CWMS Client Side - Hardware / Software Specifications

The tables listed below shows the recommended disk partitions for a CWMS server system, where several hard disks are available for CWMS and Oracle to use. When setting up a CWMS server, the major recommendation is to keep the Solaris Operating System on a separate disk from the disk(s) that contain the CWMS and Oracle filesystems. This configuration will minimize downtime when a hard disk fails. Either the operating system or the CWMS/Oracle filesystem will be un-useable, but not both at the same time. Once the bad disk is replaced, its contents can be retrieved from the Solaris system CDROM or from the disks and tapes of your backup system.

New PC Acquisition – Minimum Hardware / Software Specification:

Item	Description	Details
1	Intel Pentium 4 Processor	2.5 GHz or better
2	256 MB RAM	Base memory or more
3	40 GB Internal Hard Disk	ATA / 100 or faster
4	Network Adapter Card	10 / 100 Base T
5	CD / DVD RW Drive	CD-RW + DVD-ROM or DVD-RW
6	Keyboard	Compatible with standard 101 keyboard
7	Mouse	Compatible with Microsoft Mouse
8	Flat Panel Plasma Color Display	17 inch or greater
9	100 MHZ PCI bus	Minimum of two PCI bus slots available
10	Advanced Graphics Processor	Must display 1024 x 768 x 256 colors or better
11	Audio Controller	Able to generate Stereo signal
12	Stereo Speakers	Includes wiring
13	Microsoft Windows XP Operating System	Home or professional edition
14	Hummingbird Exceed X-Windows Software	Optional software pkg. for CWMS administrators
15	Hummingbird Security Package with SSH	Optional software pkg. for CWMS administrators

The tables listed below shows the recommended disk partitions for a CWMS server system, where several hard disks are available for CWMS and Oracle to use. When setting up a CWMS server, the major recommendation is to keep the Solaris Operating System on a separate disk from the disk(s) that contain the CWMS and Oracle filesystems. This configuration will minimize downtime when a hard disk fails. Either the operating system or the CWMS/Oracle filesystem will be un-useable, but not both at the same time. Once the bad disk is replaced, its contents can be retrieved from the Solaris system CDROM or from the disks and tapes of your backup system.

New PC Acquisition – Example Hardware / Software Configuration and Pricing:
 (Dell Dimension Model 2400 Desktop – <http://www.dell.com>)

Item	Description	Details
1	Intel Pentium 4 Processor	2.53 GHz
2	256 MB Shared DDR SDRAM	333 Mhz
3	40 GB Internal Hard Disk	ATA / 100
4	Integrated 10 / 100 Ethernet	Ethernet Adapter
5	Dual CD / DVD Drive	48 x CD-RW and 16 x DVD-ROM
6	Dell Quietkey Keyboard	Compatible with standard 101 keyboard
7	Dell 2-Button Scroll Mouse	Compatible with Microsoft Mouse
8	Flat Panel Display	17 inch
9	533 MHZ Front Side Bus	PCI Bus also included
10	Integrated Intel 3D Extreme Graphics	AGP Video Card
11	Integrated Audio	Audio integrated into motherboard
12	Stereo Speakers	Includes wiring
13	56K PCI Data Fax Modem	Dial-up Networking
14	Microsoft Windows XP Operating System	Home Edition
15	1 Year Limited Warranty	Includes: 1 Year At-Home Service
Web Special Price: \$ 799.00 + Tax and Shipping		

Existing PC – Minimum Hardware / Software Specification:

Item	Description	Details
1	Intel Pentium 3 or 4 Processor	1.0 GHz or better
2	256 MB RAM	Base memory or more
3	20 GB Internal Hard Disk	Seek Time < 10 ms
4	Network Adapter Card	10 Base T
5	CD-ROM Drive	CD-R compatible
6	Keyboard	Compatible with standard 101 keyboard
7	Mouse	Compatible with Microsoft Mouse
8	Color Monitor	17 inch or greater
9	100 MHz PCI Bus	Minimum of two PCI bus slots available
10	Advanced Graphics Processor	Must display 1024 x 768 x 256 colors or better
11	Microsoft Windows 2000 or Windows XP	Operating System – Home or Professional

Backup storage capacity for 72+ Gbytes of hard disk space

CWMS Hardware / Software / COTS Specifications		Draft Report
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Add-on Disk (External Disk #2) – Oracle Disk #2

Partition	Example Block Device	Example Raw Device	Recommended Size in KB	Comments
/usr3	/dev/dsk/c0t1d0s6	/dev/rdisk/c0t1d0s6	73728 KB	73 GB – Oracle (Disk2)

Add-on Disk (External Disk #3) – Oracle Disk #3

Partition	Example Block Device	Example Raw Device	Recommended Size in KB	Comments
/usr4	/dev/dsk/c0t1d0s6	/dev/rdisk/c0t1d0s6	73728 KB	73 GB – Oracle (Disk3)

If greater reliability for the CWMS and Oracle filesystem is desired, it is recommended that a RAID disk system be used instead of individual disks that are specified here. The RAID system should provide capabilities such as mirroring and hot swapping as well as have features like disk striping.

Recommended Disk Partitions for CWMS Servers

The tables listed below shows the recommended disk partitions for a CWMS server system, where several hard disks are available for CWMS and Oracle to use. When setting up a CWMS server, the major recommendation is to keep the Solaris Operating System on a separate disk from the disk(s) that contain the CWMS and Oracle filesystems. This configuration will minimize downtime when a hard disk fails. Either the operating system or the CWMS/Oracle filesystem will be un-useable, but not both at the same time. Once the bad disk is replaced, its contents can be retrieved from the Solaris system CDROM or from the disks and tapes of your backup system.

The minimum number of hard disks required to implement a CWMS server is a two disk system, one disk for the operating system, and one disk for the CWMS and Oracle application data. As more disks are added to the system, performance can dramatically improve by distributing simultaneous disk reads and writes over more disks and disk controllers.

At this time, typical SCSI disk sizes for use in a CWMS server come in the following sizes: 36GB, 73GB, and 147GB. These drives are all 5 ¼ inches wide and 1 inch in height with seek times of 4.7 ms or better, and operate at 10K RPM or faster. For more information about disk drives, a good starting point is: <http://www.seagate.com>

Boot Disk (Internal Disk #1) – Solaris Operating System

Partition	Example Block Device	Example Raw Device	Recommended Size in KB	Comments
/	/dev/dsk/c0t0d0s0	/dev/rdisk/c0t0d0s0	1024 KB	1 GB
/var	/dev/dsk/c0t0d0s1	/dev/rdisk/c0t0d0s1	5120 KB	5 GB
/opt	/dev/dsk/c0t0d0s3	/dev/rdisk/c0t0d0s3	5120 KB	5 GB
/usr	/dev/dsk/c0t0d0s4	/dev/rdisk/c0t0d0s4	5120 KB	5 GB
/usr/openwin	/dev/dsk/c0t0d0s5	/dev/rdisk/c0t0d0s5	1024 KB	1 GB
/tmp (swap)	/dev/dsk/c0t0d0s6	/dev/rdisk/c0t0d0s6	8192 KB	8 GB
/export/home	/dev/dsk/c0t0d0s7	/dev/rdisk/c0t0d0s7		Remainder of Disk

Add-on Disk (Internal Disk #2) – CWMS Application

Partition	Example Block Device	Example Raw Device	Recommended Size in KB	Comments
/usr1	/dev/dsk/c0t0d0s6	/dev/rdisk/c0t0d0s6	73728 KB	73 GB – CWMS Filesystem

Add-on Disk (External Disk #1) – Oracle Disk #1

Partition	Example Block Device	Example Raw Device	Recommended Size in KB	Comments
/usr2	/dev/dsk/c0t1d0s6	/dev/rdisk/c0t1d0s6	73728 KB	73 GB – Oracle (Disk1)

As the CWMS hardware and software has evolved, most CWMS users and administrators access the Sun workstation remotely from a PC using the X-Windows software. The need for direct console access is usually associated with operating system installs or routine tasks such as backups. Since the high-end graphics provided by the Blade workstations are not as extensively used, we are now recommending a Sun server alternative to the Sun Blade workstation. The server equipment is rack-mountable and is designed for computer rooms where access is limited.

2004 CWMS Hardware Specification – Typical Server Configuration

Item	Part Number	Description	List Price	Discounted Price *
1		SUN Fire 280R Server with 2 * 1.2 GHz UltraSPARC III Cu Processor with 8 MB Cache. 2 GB Memory (4*512MB Differential DIMMS), 2 * 73-GB 10K-RPM FC-AL Internal hard disk. 10/100 BaseT Ethernet port, 2 * Serial ports, 1 * Parallel port, 1 * SCSI port, 1 * FC-AL Port, 4 * PCI slots, No Keyboard included. Solaris 8 HW 12/02 and Solaris 9 12/03 pre-installed (Standard Config)	\$ 14995.00	
2		USB Country Kit (PC Style)	\$ 45.00	
3		73GB Internal Disk Add-on Drive 10K RPM	\$ 900.00	
4		4 GB Memory (1 * 4GB Differential DIMMS)	\$ 3800.00	
5		17 Inch Flat Panel Display	\$ 325.00	
6	SOLZS-09FC9AYM	Solaris 9 12/03 CD-ROM media kit. SPARC Platform Edition. Multilingual. No license, no hardcopy documentation	\$ 95.00	