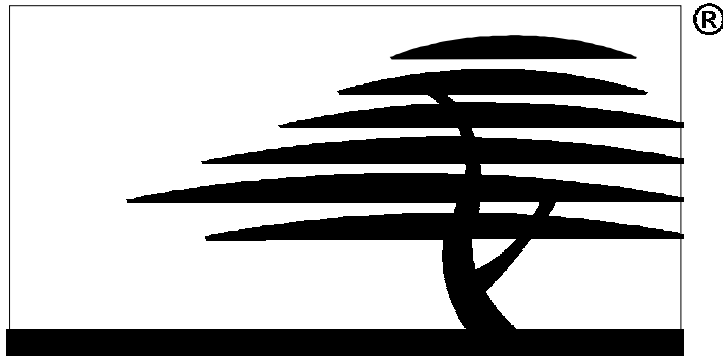




SCO

UnixWare® 7 Webtop

Instructor Guide

Course Release: 1.0.2

For Software: UnixWare 7

Table of Contents

Lesson 1: Course Introduction	1-1
Introduction.....	1-3
Course goal and purpose.....	1-3
Target audience	1-4
Student Materials	1-6
The Student Guide	1-6
Typographical Conventions	1-7
Lesson 2: Getting Started with the Webtop	2-1
Describing the Webtop.....	2-4
Compare the Webtop and Tarantella.....	2-7
Role of the Webtop administrator	2-8
Webtop help resources	2-8
Additional Webtop resources.....	2-9
Installing and Configuring the Webtop.....	2-11
Hardware requirements.....	2-11
Software requirements	2-11
Installing the Webtop during your initial system installation	2-12
Installing the Webtop after your initial system installation	2-13
Configuring your Netscape FastTrack Server for Webtop use	2-14
Configuring your Apache Server for Webtop use.....	2-14
Using the Webtop user information services	2-16
Configuring the Webtop for use with a firewall	2-17
Installing the Java applets for root	2-19
Logging into the Webtop as root	2-20
Troubleshooting error messages	2-20
Lesson Summary.....	2-23
Relevant Commands	2-25
Answers to Review Questions	2-26
Lesson 3: Using the Webtop	3-1
Using the Webtop.....	3-6
Installing the user Webtop applets	3-6
Logging into the Webtop	3-7
Components of the default Webtop.....	3-9
Launching an application.....	3-12
Session suspend and resume	3-12
Logging out of the Webtop	3-14
Administering a UnixWare 7 System with the Webtop	3-17
Logging into the Webtop as root	3-17
System Troubleshooting	3-21

System Administration	3-23
Lesson Summary	3-26
Relevant Files	3-27
Answers to Review Questions	3-28

Lesson 4: Webtop System Administration	4-1
---	------------

Webtop concepts	4-7
Datastore	4-7
Organizational hierarchy	4-7
Objects	4-8
Themes	4-10
Applets	4-11
Files and directories	4-11
Control Center	4-13
Running the Control Center	4-15
Control Center screen areas and navigation	4-17
Views	4-18
Login process	4-19
User login authentication	4-20
Using the Control Center to configure the Webtop	4-21
Adding a person object	4-21
Adding additional Webtop Administrator accounts	4-22
Assigning an existing application to a person object's Webtop	4-22
Assigning an application to a group of users or organization	4-23
Creating new application objects	4-23
Debugging application objects	4-26
Terminating sessions	4-27
Controlling the Webtop using the command line	4-27
Customizing the Webtop by editing <i>.html</i> and graphic files	4-30
Add custom links to existing pages	4-30
Changing the administration default embedded application	4-33
Replacing the user Webtop "Welcome" message	4-34
Creating additional user Webtop themes	4-39
Changing Webtop graphics	4-39
Adding documentation to the webtop	4-41
Adding documentation to the Help pages	4-41
Adding links to the Webtop guides	4-42
Troubleshooting Webtop problems	4-44
View Webtop diagnostic messages	4-44
Lesson Summary	4-46
Relevant Commands, Files, Directories, and Scripts	4-48
Lab: Create a new user and theme to run a custom application	4-49
Answers to Review Questions	4-53

Appendix A: Webtop Application Programming	A-1
Customizing with new applications	A-6
Java, JavaScript, and CGI	A-6
Java using X versus Java networked	A-7
JavaScript basics	A-7
CGI Basics	A-18
Summary	A-26

1

Course Introduction

Instructor Guide

Instructor Guide

Lesson 1

Course Introduction

1.1 Introduction

The UnixWare[®] 7 Webtop course is designed for technically-oriented individuals who already have a solid understanding of UNIX[®] system administration and Internet/Intranet basics and would like learn to install, configure, and customize the UnixWare 7 Webtop.

1.1.1 Course goal and purpose

At the conclusion of this course, students should be able to perform the tasks and duties associated with installing, configuring, and customizing the Webtop:

- Describe the features and functions of the UnixWare 7 Webtop
- Install and configure the Webtop
- Navigate the user Webtop interface
- Navigate the Webtop system administration interface
- Customize the Webtop environment
- Troubleshoot Webtop problems
- Describe Webtop application programming basics

1.1.2 Target audience

The target audience includes support technicians, developers, engineers, system administrators, and other technical users who require an advanced level of understanding for installing, configuring, and customizing a UnixWare 7 Webtop. Students are likely to have a wide variety of backgrounds in XENIX® or UNIX, but must have prerequisite skills equal to or exceeding those provided in the **UnixWare 7 Administration I: User Services course**. The student should also be familiar with Internet/Intranet technologies including basic networking concepts, browsers, and web servers.

Previous experience with CSS (Cascading StyleSheets), JavaScript and a CGI scripting language such as Perl or TCL is helpful but not required.

Course schedule

A suggested lesson duration is specified at the beginning of each lesson in this **Instructor Guide**.

The labs included in the course must be completed in order to meet course objectives.

Suggestions for practice exercises are also included throughout the course. Ample time has been allotted to each lesson to allow for completion of these exercises.

Equipment

The classroom should support 14 students and include:

- 14 (7 if shared) industry-standard Pentium® computers
- 1.2GB hard disk for each system; second hard disk for each system for the labs for configuring additional hard disks (minimum 80 megabytes)
- A minimum of 64 MB RAM in each system.
- One supported CD-ROM drive per system (for installation)
- 14 (7 if shared) VGA monitors, 800x600 resolution (minimum)
- 14 (7 if shared) mice
- Network cards and cables
- Access to the Internet for browsing the Webtop website

Training materials

- Instructor Guide and transparencies
- Student Guide
- Sample Webtop configuration files

Software

- UnixWare 7.0.1 with SLS PTF7132A or
- UnixWare 7.1.1

You can use any UnixWare 7 Edition. The Webtop installs by default on the Base Edition during the UnixWare 7 initial system load. On all other Editions you can install the Webtop by

The *Instructor Guide*

The ***Instructor Guide (IG)*** is organized as follows: Instructor notes are intermingled with text in the ***Student Guide (SG)*** to allow the instructor to easily refer to section content. Page numbers in the ***IG*** will not correspond to those in the ***SG***; however, the heading numbers will.

The ***IG*** contains instructional aid notes, including:

AV 1-1: Slide Title

These notes explain the instructional objective of every transparency. The AV number cross references to the number that appears on every slide.

GuruNotes This is extra information not directly presented in the student guide and is intended for more advanced students.

1.2 Student Materials

Your student guide is yours to keep and write notes in. Your instructor may have other reference materials in the classroom for your use while attending this class. Please do not take or write in these materials as they will be needed again for later classes.

1.2.1 The *Student Guide*

The *Student Guide* contains:

- Outline of presentation
- Copy of class overhead transparencies

Lesson plan

Each lesson follows a similar approach, or methodology, in the delivery of instruction:

- The suggested lesson duration and instructor preparation notes are provided at the beginning of each lesson when applicable
- The lesson begins with an overview transparency of the major topics and a list of the lesson objectives
- The lesson continues with the presentation of lesson topics and the demonstration of lesson tasks
- Exercises that allow the students to practice discrete tasks appear throughout the presentation
- References appear where appropriate
- The lesson content concludes with a summary. Use this to reinforce the topics and tasks covered. You should also refer back to the objectives that were presented at the beginning of the lesson.
- Following the content of most lessons are summary exercises, which consist of review questions and labs. The review questions allow the instructor to determine how well the students understood the content, and the labs allow students to apply the material that they learned.

1.3 Typographical Conventions

This publication presents commands, filenames, keystrokes, and other special elements as shown here:

lp or lp(1)	Commands, device drivers, programs, and utilities (names, icons, or windows); the letter in parentheses indicates the reference manual section in which the command, driver, program, or utility is documented
<i>/new/client.list</i>	Files, directories, and desktops (names, icons, or windows)
root	System or user names
<i>arg</i> or <i>arg</i>	Place holders (replace with appropriate name or value)
[<i>arg</i>]	Surrounds an <i>option</i> or <i>cmdarg</i> that is not mandatory
<i>arg</i> ...	Indicates multiple occurrences of the <i>option</i> or <i>cmdarg</i>
\$	Command line prompt for commands executable from the Bourne shell by any user
#	Command line prompt for commands only executable by the superuser from the root account
F2	Keyboard keys
CTRL SPACE	Press CTRL and SPACE keys simultaneously
CTRL ALT DEL	Press all three keys, CTRL , ALT , and DEL , simultaneously
CTRL d	Press CTRL key. With CTRL still depressed, also press D .
ALT 0240	Press ALT key. With ALT still depressed, also press and release in sequence 0 , 2 , 4 , and 0 .
CTRL Q + i	Press CTRL key. With CTRL still depressed, also press Q . Release both keys and press I .
CTRL Q + I	Press CTRL key. With CTRL still depressed, also press Q . Release both keys and press SHIFT I .
Exit program?	System output (prompts, messages)

tar tv	User input, such as on a command line
“Description”	Field names or column headings (on screen or in database)
Cancel	Button names
Edit	Menu names
Copy	Menu items
File ⇨ Find ⇨ Text	Sequences of menus and menu items
open or open(S)	Library routines, system calls, kernel functions, C keywords; the letter in parentheses indicates the reference manual section in which the file is documented
\$HOME	Environment or shell variables
SIGHUP	Named constants, signals, and kernel parameters
“adm3a”	Data values
<i>employees</i>	Database names and tables
buf	C program structures
b_b.errno	Structure members

Using scoadmin(1M)

In the procedures in this course, we consistently use “Run **scoadmin(1M)**” as the step for invoking the SCOadmin utilities. Make sure students are logged in as **root** when they run **scoadmin(1M)**.

You can choose to run **scoadmin(1M)** from the command line to bring up the CHARM version of SCOadmin, or double-click on the appropriate icons and options to bring up the desired graphical versions of these utilities. You should demonstrate both ways to the class, and encourage the students to try the various methods for launching these utilities. In addition, you may prefer to use traditional UNIX commands to perform certain functions instead of using **scoadmin(1M)**.

If students log in as system owner on the desktop, they will not be able to use traditional UNIX commands. They can only perform system administration using the graphical interface to **scoadmin(1M)**.

Classroom setup

Classroom setup includes:

- Install sample scripts and configuration files
- Configure classroom equipment, your own display, and the LCD

Lesson preparation

To prepare for each lesson:

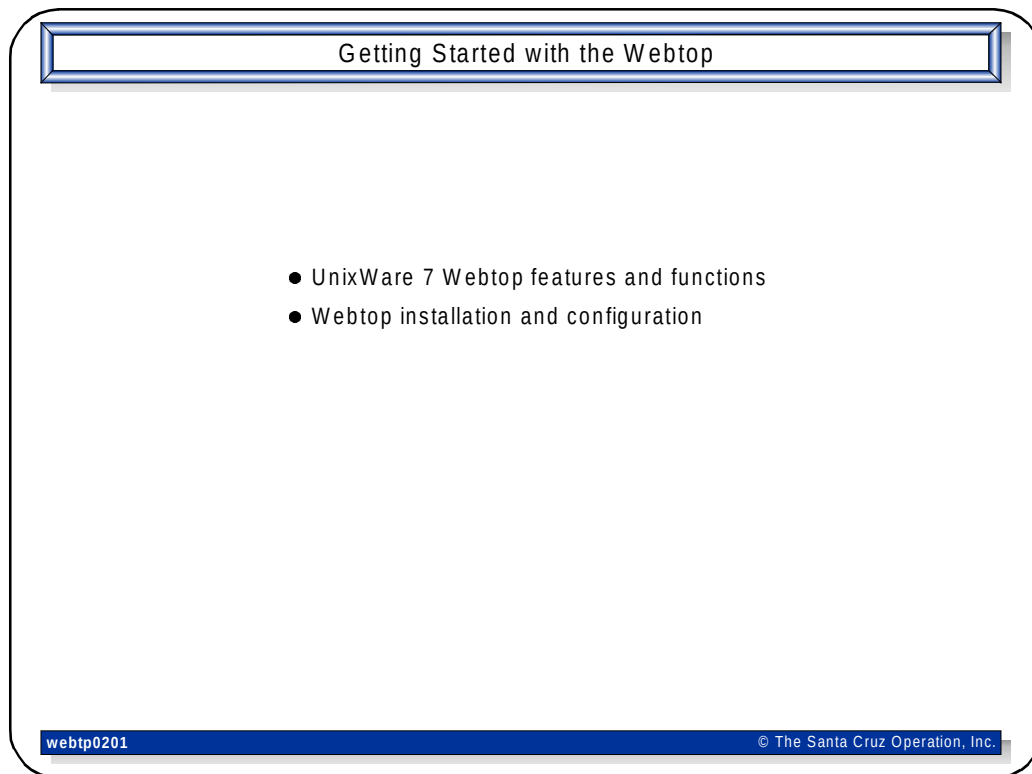
- Read the pre-lesson preparation prior to each lesson and complete any tasks listed in the preparation
- Read the lesson thoroughly before teaching and add your own notes or exercises, if desired
- Read through the appropriate sections of the SCO documentation in support of the lesson topics
- Review the system files in each lesson to which students need access, and change the file permissions to make the files readable if necessary

2

Getting Started with the Webtop

Instructor Guide

AV 2-1



Instructor Guide

Lesson 2

Getting Started with the Webtop

Introduction

This lesson will help you start using and administering the UnixWare 7 Webtop.

Objectives

AV 2-1: Installation Planning

The first slide describes the overall topics covered in this lesson.

By the end of this lesson, you will be able to:

- Describe the UnixWare 7 Webtop features and functions
- Install and configure the Webtop

2.1 Describing the Webtop

The UnixWare 7 Webtop is a new, innovative web-based interface that allows a UnixWare 7 system and its applications to be accessed securely from a Java™ enabled browser. Through the Webtop, clients as diverse as Network Computers and PCs are able to tap in to the full power of UnixWare 7.

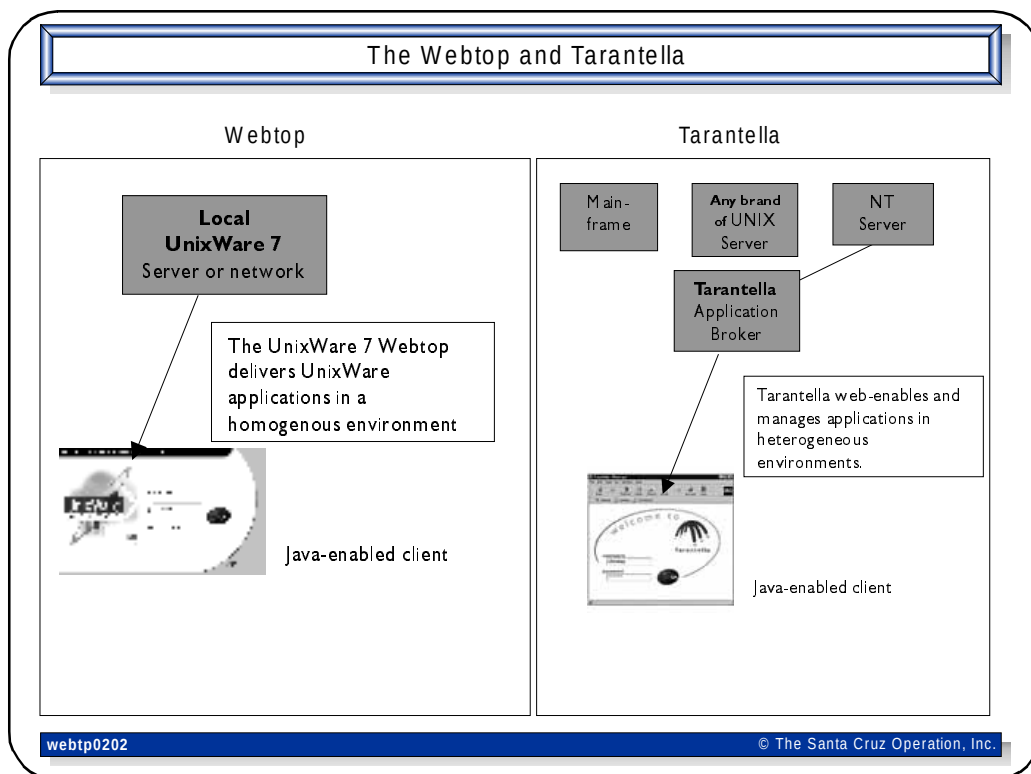
The Webtop gives end users quick and easy access to UnixWare 7 applications, without requiring any UnixWare 7 experience. In addition, the Webtop improves user efficiency because applications are maintained by a central administrator, thus freeing users from needing the skills or time to do so themselves. Designated "Webtop administrators" control which applications are available to users, making it possible for each user to receive a set of applications customized for his or her needs.

The Webtop also benefits system administrators, who can perform a wide range of system administration tasks without being tied to the console. The new System Troubleshooting interface provides an immediate overview of potential system difficulties and allows administrators to quickly resolve problems.

Exercise: Webtop Demonstration

Use a Netscape® browser to run through a Webtop demonstration at:
<http://www.sco.com/unixware/webtop/demo/demo.html>.

AV 2-2



2.1.1 Compare the Webtop and Tarantella

AV 2-2: The Webtop and Tarantella

This diagram compares the features of the UnixWare Webtop to Tarantella™ features.

The Webtop uses technology from Tarantella™ to allow users and system administrators to access UnixWare 7 applications from their Webtop using a supported web browser on any client device. The UnixWare 7 Webtop is a feature of UnixWare 7. Tarantella is a separate product.

Tarantella provides more functionality than the Webtop. Tarantella is an Application Broker product that web-enables applications on a variety of server types including; UNIX, mainframe, and Windows servers. Tarantella includes enterprise-strength scalability and security features.

There are three broad areas for comparison of Webtop and Tarantella technologies:

Application access	The UnixWare 7 Webtop is designed to access local applications for network clients on a single UnixWare 7 Webtop server. Tarantella acts as a broker to any application server on the network, in heterogeneous server environments. So while the UnixWare 7 Webtop delivers UnixWare applications and administration tools to a browser, Tarantella can broker applications from a variety of UNIX servers, mainframes, and Windows servers.
Application management	Tarantella allows administrators to access any administration tool on any server (the UnixWare 7 Webtop is adapted to work with UnixWare administration tools). Tarantella is designed to run on a variety of UNIX systems.
Scalability	Tarantella features its own load balancing technology which monitors and shifts sessions around application servers for load balancing purposes. This works for all the types of application server brokered by Tarantella. UnixWare 7 features its own highly sophisticated fail-over and load balancing options. The Tarantella-derived Webtop technology that delivers the UnixWare 7 Webtop does not include any load balancing functionality from Tarantella.

To learn more about the roles of the Webtop and Tarantella, see:

<http://tarantella.sco.com/ttauw7.html>

2.1.2 Role of the Webtop administrator

Only a restricted set of users, called Webtop Administrators, can configure the Webtop.

When you first install the Webtop, **Webtop Setup** makes the **root** user a Webtop Administrator. This means that when you first install the Webtop, you must log into the Webtop as **root** to configure the Webtop. You can add and remove other Webtop Administrators easily.

Administrators use the Webtop **Control Center** to configure the Webtop. In addition, a powerful set of UNIX commands let Webtop Administrators perform advanced configuration from the UnixWare 7 command line.

2.1.3 Webtop help resources

The UnixWare 7 Webtop web site at: <http://www.sco.com/unixware/webtop> is an excellent resource for all Webtop information. It includes:

Basics	Introduction to the Webtop
Demonstration	Demonstration of how the Webtop works
Download	Free tools and applications to enhance your Webtop
News	Latest happenings in the Webtop world
Customization	Information on how to customize your Webtop
Assistance	Webtop documentation and support

The UnixWare 7 Webtop documentation includes three guides available from the Webtop web site. After the Webtop is installed, these guides are also available from any **Help** link on the upper right of the Webtop pages.

The Webtop guides are also available in **SCOhelp** on the UnixWare 7 host machine, under Desktops. To access the guides in **SCOhelp**, the port 80 web server must be running and the Webtop must be installed.

The Webtop documentation is not served from port 457 like the rest of the **SCOhelp** documentation. If you would like to setup a single documentation server on your network with **SCOhelp** and Webtop help, you do not have to have the Webtop running on the documentation server, just installed. The **ttserver** daemons can be disabled from your documentation server by removing Webtop startup scripts from `/etc/rc[0-3].d`

These guides include:

Using Your Webtop

This guide helps end users learn more about the capabilities of the User Webtop.

UnixWare 7 Webtop Administration Guide

This guide provides information about how to administer the Webtop and customize it for end users.

Administering your System with the UnixWare 7 Webtop

This guide explains how system administrators can use the Webtop to administer and troubleshoot UnixWare 7 systems remotely.

In addition to the online guides, the ***UnixWare 7 Webtop Release Notes*** are available from the Webtop website and on the UnixWare 7 Release 7.1 installation media.

The UnixWare 7 Webtop also contains extensive on-page help text to assist administrators in performing system troubleshooting tasks.

Exercise: UnixWare Webtop web site

Use a Netscape[®] browser to browse through the Webtop web site at: <http://www.sco.com/unixware/webtop/>. Select **Assistance** from the list of options on the left of the screen to access and browse the Webtop documentation.

2.1.4 Additional Webtop resources

The Webtop uses standard Internet technologies including:

- Web Browsers
- HTML
- Cascading Style Sheets
- Java

- JavaScript
- CGI
- Perl

Because these are standard technologies there is a wealth of third party resources available to help you. For a list of books and web sites with helpful information see the UnixWare 7 web site: <http://www.sco.com/unixware/webtop/custom/moreinfo.html>

2.2 Installing and Configuring the Webtop

The next sections describe the information and steps required for installation and initial configuration of the Webtop.

2.2.1 Hardware requirements

In addition to the base hardware requirements for your networked UnixWare 7 system, to install and use the Webtop you will need:

RAM: 32MB required, 64MB recommended; 4MB extra per user

Disk space: 40MB for initial install

Client video: Clients must be configured for a minimum of 256 colors to display the Webtop. For best results, we strongly recommend 16 thousand colors or more.

2.2.2 Software requirements

To install and use the Webtop you will need the following software.

Operating system: UnixWare 7 Release 7.1.0 or later

Operating system update: SLS PTF7132A should be installed on UnixWare 7.1.0 systems.

Web server: You must have a web server running on the host on which Webtop is installed. You can use any web server that supports CGI 1.0. SCO recommends using Netscape FastTrack™, Netscape Enterprise™ or the Apache HTTP server.

Supported browsers: The UnixWare 7 Webtop can be accessed by any Netscape Communicator™ or Microsoft Internet Explorer™ web browser supporting Java™, HTML 4.0, JavaScript™ 1.2, and frames. For optimal Java support, use the latest released version of a browser. To use the Webtop, a web browser must have Java enabled. We recommend that you enable your browser's JIT compiler, if it is configurable. We also recommend that the browser have JavaScript enabled.

Supported web platforms and browsers include:

UnixWare 7	Netscape Communicator 4.04, 4.08
SCO OpenServer 5.0.2+	Netscape Communicator 4.05, 4.08
SCO UnixWare 2.1.2+	Netscape Communicator 4.04
Microsoft Windows 95; Windows NT 4	Netscape Communicator 4.04 (with JDK 1.1.4), 4.06+, 4.5 Microsoft Internet Explorer 4.0, 4.01
Microsoft Windows 98	Netscape Communicator 4.06+, 4.5 Microsoft Internet Explorer 4.01 (with JVM build 4.79.2424 or 4.79.2925+)
Sparc Solaris 2.5.1+	Netscape Communicator 4.08, 4.5
IBM AIX 4.2+	Netscape Communicator 4.08, 4.5
HP-UX 10.01+	Netscape Communicator 4.08, 4.5

Check the Webtop website for support of updated browser versions.

If you want to use copy and paste, your browser must be able to use the signed Java archives included with the Webtop. Currently, this is limited to PC-based versions of Netscape Navigator and Microsoft Internet Explorer.

Browsers must support the Java JDK 1.1. for Netscape Navigator, the JDK 1.1 Update is required. For Internet Explorer, version 4.79.2424 or later of the Java Virtual Machine is required.

2.2.3 Installing the Webtop during your initial system installation

You can install the Webtop during your initial UnixWare 7 system installation.

If you have the Business Edition of UnixWare 7 Release 7.1, the Webtop is installed by default.

To install the Webtop on all other editions during initial system installation, select the Webtop for installation during the additional software loading that occurs directly after your mouse configuration.

2.2.4 Installing the Webtop after your initial system installation

For proper configuration to occur, you should have your Netscape web server installed before installing the Webtop.

To check to see if a Netscape web server is installed enter:

pkginfo nsfast

To install the Webtop after the initial system load, use the **SCOadmin Application Installer** or the **pkadd(1M)** command.

To install from the **Application Installer**:

- Step 1. Insert the UnixWare 7 Update CD-ROM 2.
- Step 2. Log into the Desktop.
- Step 3. Start **SCOadmin** ⇒ **Software_Manager** ⇒ **Application Installer** .
- Step 4. Select **CD-ROM** at the **Install From** menu.
- Step 5. Click on the **Webtop** icon. Click on **Install**.

If you are using the **pkgadd** command, enter:

pkgadd -d cdrom1 webtop

Exercise: Install the Webtop

Install the Webtop using the **SCOadmin Application Installer**.

When you install the Webtop, setup does the following:

- Adds the Webtop packages using **pkgadd**. The Webtop packages are UNIX SVR4 packages.
- Installs the Webtop in the Webtop installation directory */opt/webtop*. Ensures that the Webtop starts when the system boots, by adding a file in the appropriate start-up directory usually */etc/rc3.d*.
- Creates the first objects in your organizational hierarchy: some simple demonstration applications, and objects for the **Control Center** and **Help**.
- Configures your Netscape FastTrack or Netscape Enterprise web servers for use with the Webtop.

2.2.5 Configuring your Netscape FastTrack Server for Webtop use

The Webtop setup automatically configures Netscape FastTrack and Netscape Enterprise servers to work with the Webtop. For proper configuration to occur, you should have your Netscape web server installed before installing the Webtop.

If you are running a Netscape web server, installing the Webtop replaces your existing server configuration (*obj.conf*) and access control (*generated.httpd-80.acl*) files. This removes any customization that may have been performed on these files previous to installing the Webtop. The Webtop setup backs up existing versions of these files as follows:

The *obj.conf* file, located in the */usr/ns-home/httpd-80/config* directory, is copied to *obj.conf.v1* in the same directory. If you install and remove the Webtop repeatedly on the same system, each successive *obj.conf* file will append successive numbers to the file (*obj.conf.v2*, *obj.conf.v3*).

2.2.6 Configuring your Apache Server for Webtop use

You can also use an Apache web server with the Webtop. If you have the UnixWare 7.1.1 media kit, Apache comes preconfigured for the Webtop on the Open Source Software Supplement CD.

If you have the 7.1.0 version of the media kit, Apache is not automatically configured to work with the Webtop. To use an Apache server from the 7.1.0 media kit you must configure Apache to work with the Webtop or download the Apache version 1.3.6 or higher from the SCO Open Source web site at: <http://www.sco.com/skunkware/>.

To use an Apache server from the 7.1.0 media kit you must configure Apache to work with the Webtop:

- Step 1. Add the following configuration directives in the order shown below to one of your web server configuration files, for example *srm.conf*:

```
ScriptAlias /webtop/cgi-bin /opt/webtop/cgi-bin  
Alias /webtop /opt/webtop
```

- Step 2. Add the following lines to your *httpd.conf* file:

```
<Directory "/opt/webtop/cgi-bin/admin">  
    AllowOverride AuthConfig  
    Options ExecCGI FollowSymLinks  
    Order allow,deny  
    Allow from all  
</Directory>
```

- Step 3. Create a *.htaccess* file in the */opt/webtop/cgi-bin/admin* directory, containing the following lines:

```
AuthType Basic  
AuthName "Webtop Admin Directory"  
AuthUserFile /usr/local/lib/apache/users  
require user root
```

- Step 4. Create a users file in the */usr/local/lib/apache* directory, containing the following line:

```
root: passwd
```

Where **passwd** is the encrypted **root** password for the UnixWare 7 system, taken from the */etc/shadow* file.

- Step 5. Restart the web server.

2.2.7 Using the Webtop user information services

The User Information page (accessible from the User Webtop) lists information for users on the UnixWare 7 system running the Webtop. Users can have links to their personal web sites as well as their personal FTP sites. To give users these links, you must configure your web and FTP servers.

The Netscape FastTrack server provided with your UnixWare 7 system is preconfigured to support personal web site access. To enable access, users must have a *public_html* directory in their home directory. You can choose to create this directory and pre-populate it with information, or users can create it themselves. You can also use the Netscape FastTrack server administration tool to disable this feature on your system.

If you are using a web server other than the Netscape FastTrack or Enterprise servers, consult the documentation supplied with that server to enable *public_html* support.

To set up personal FTP service:

Step 1. Use the **SCOadmin FTP Server Manager** to create a public FTP site in */home/ftp*.

Step 2. Create a users directory under the public FTP site:

```
mkdir /home/ftp/users
```

```
chmod 755 /home/ftp/users
```

Step 3. Run the following commands for each user that you want to have personal FTP service:

```
mkdir /home/ftp/users/username
```

```
chown username /home/ftp/users/username
```

```
chmod 755 /home/ftp/users/username
```

```
ln -s /home/ftp/users/username /home/username/.ftp
```

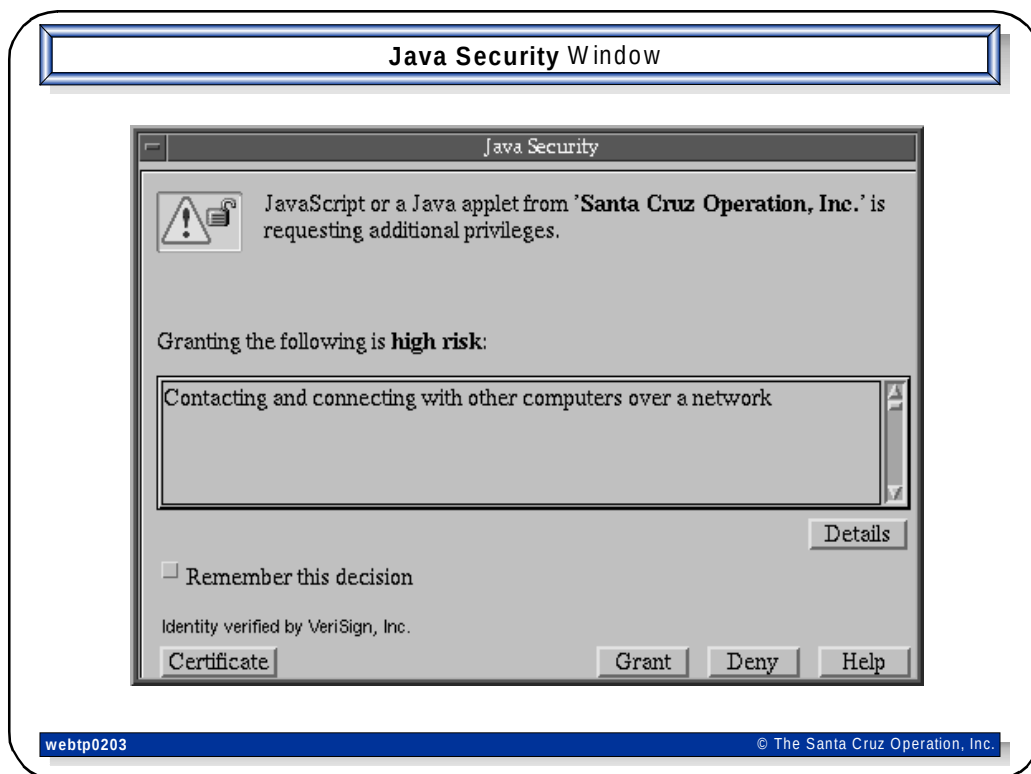
For username, substitute the account name of the individual user.

2.2.8 Configuring the Webtop for use with a firewall

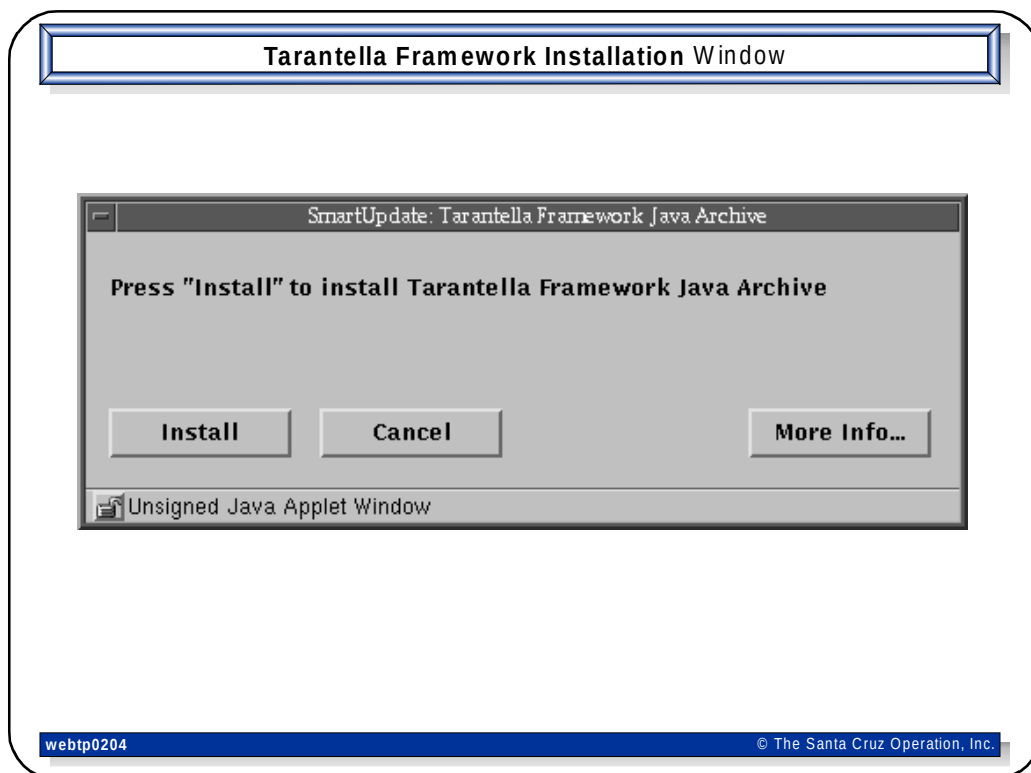
To allow access to the Webtop from outside your firewall, you must configure your firewall to accept connections at ports *80* for the standard port for web servers

This port number is registered with the Internet Assigned Numbers Authority (IANA).

AV 2-3



AV 2-4



2.2.9 Installing the Java applets for root

Before you log into the Webtop as **root**, you should install the Java applets used by the Webtop. Rather than installing each of the applets separately you can install them simultaneously in one operation.

To install the default Webtop user and administrator Java applets:

- Step 1. Log into your UnixWare 7 system as **root** from a graphical console.
- Step 2. Open a Netscape browser window.
- Step 3. Point your browser at: *http://hostname/webtop/install.en.html*. Replacing *hostname* with the name of the your UnixWare 7 Webtop server. For example, on a system with the name of *honey*, point your browser to *http://honey/webtop/install.en.html*.
- Step 4. Click on **Java archives for Webtop webtop and application access.**

AV 2-3: Java Security Window

This is a screen shot of the **Java Security** Window.

- Step 5. Click on **Grant** in the **Java Security** window. You might need to wait a few seconds for this window to display.

AV 2-4: Tarantella Framework Window

This is a screen shot of the **Tarantella Framework Installation Window**.

- Step 6. Click on **Install** in the **SmartUpdate: Tarantella Framework Java Archive** window.
- Step 7. Click on **OK** in the **Netscape Error** window. This window does not signify that you encountered an error. It is a notice that informs you that the Tarantella Framework Java Archive installed successfully.
- Step 8. Click on **Back** from the Netscape browser.
- Step 9. Click on **Java archives for Control Center(Webtop Administrators only)**
- Step 10. Click on **Install** in the **SmartUpdate: Tarantella Control Center Java Archive** window.
- Step 11. Reload or restart your Netscape window so that you can log into the Webtop.

Exercise: Install the Java applets for root

Follow the steps in Section 2.2.9, “Installing the Java applets for root,” on page 2-19 to prepare for logging into the Webtop as the Webtop administrator.

2.2.10 Logging into the Webtop as root

After you have installed the Java administration applets, you can easily log into the Webtop as **root**.

- Step 1. Log into your UnixWare 7 system as **root** from a graphical console. (Use this step if you are connecting to the Webtop from the UnixWare 7 system console.)
- Step 2. Run a Netscape browser window.
- Step 3. Enter: *http://hostname/webtop* in the **Go To/Netsite** field (replace *hostname* with the name of your system).

Exercise: Log into the Webtop as the administrator

Follow the above steps to log into the Webtop as **root**.

2.2.11 Troubleshooting error messages

In most cases you can easily open your browser, download the Java archives, and begin using the Webtop without any problems. Most of the problems that can occur are not related to the Webtop but are due to a problem with your network and **http** server setup or both.

- If you point your browser to *http://hostname/webtop* and you receive a Tarantella message that indicates that your connection to the Webtop is lost, check to ensure the Webtop is running on your system by running **webtop status**. You can find the **webtop** command in */opt/webtop/bin*. If this command returns the message **UnixWare 7 Webtop server is not running**, then run **webtop start** to start the Webtop server.

- If you point your browser to `http://hostname/webtop` and you receive the following error message:

A network error occurred:

Unable to connect to server (TCP Error:Broken pipe)

The Server may be down or unreachable.

Try connecting again later

Your web server is probably not running. Check with the documentation for your web server instructions for starting your web server.

- If you would like to use the Webtop on a non-networked system for demonstration or practice purposes and you receive the following error message:

Netscape is unable to locate the server localhost

The server does not have a DNS entry

Check the server name in the location (URL) and try again

This error message also occurs if the system is on a Local Area Network without DNS configured.

then:

Step 1. Log into a dtterm or character screen as **root**.

Step 2. Verify that the name service is not running, enter:

nslookup localhost

It should return the following:

```
***<server_name> can't find localhost: No response
from server
```

Step 3. Start a "port listener" at port 80, this allows the Webtop to work. This is done by running the command:

nsfast enable

It should return the following information:

```
UX: nsfast: INFO: Enabling httpd-80 ... done.
```

```
UX: nsfast: INFO: Starting httpd-80 ... done.
```

```
startup: listening to port 80 as nobody
```

```
UX: nsfast: INFO: Enabling httpd-nsm ... done.
```

```
UX: nsfast: INFO: Starting httpd-nsm ... done.
```

```
warning: daemon is running as super-user
```

```
startup: listening to port 80 as root
```

You should now be able to point your browser to *http://hostname/webtop* and log into the Webtop.

2.3 Lesson Summary

The UnixWare 7 Webtop is a web-based interface that allows a UnixWare 7 system to be accessed remotely over the company Intranet. Using a Java-enabled web browser, clients as diverse as Network Computers and PCs can tap in to the full power of UnixWare 7.

The Webtop uses technology from Tarantella to allow users and system administrators to access UnixWare 7 applications from their Webtop using a supported web browser on any client device. Tarantella includes more features than are available with the Webtop. Tarantella is an Application Broker product that web-enables applications on any type of UNIX, mainframe, or Windows server.

Only a restricted set of users, called Webtop Administrators, can configure the Webtop. By default **root** is setup as a Webtop Administrator.

The Webtop includes a full set of documentation. Because the Webtop is based on standard Internet technologies, there is wealth of information available to help you configure and customize the Webtop.

You can install the Webtop during your initial system installation (ISL) or after ISL with the **SCOadmin Application Installer** or **pkgadd(1M)**. Your Netscape FastTrack or Netscape Enterprise servers are configured automatically when you install the Webtop. You can also configure an Apache server for use with the Webtop.

To configure your Webtop for use with a firewall, configure your firewall to accept connections from port 80.

To use the **User Information** page (accessible from the User Webtop), you must configure your web and FTP servers.

After you have installed and completed your initial configuration of the Webtop, you should download the Java archives for the Webtop administrator and test logging into the Webtop. In most cases you will not have a problem connecting to the Webtop.

Review questions

1. Briefly describe the features and functions of the UnixWare 7 Webtop.
2. List three areas for comparison of the Webtop to Tarantella.

3. List the software requirements for running the Webtop.

4. Describe the methods that you can use to install the Webtop.

2.4 Relevant Commands

The following commands were presented in this lesson.

Relevant commands

netsca	Invokes the Netscape browser
pkgadd(1M)	Transfer software package or set to the system
scoadmin(1M)	Invokes SCOadmin applications in this lesson, the Application Installer
scohelp(X1)	Command to invoke the online documentation browser

2.5 Answers to Review Questions

1. The Webtop allows users and administrators to access the power of UnixWare 7 from a standard internet browser interface. It allows user to launch applications and access documents from a variety of client systems. It allows system administrators to easily perform system administration of a system from a network client. It also gives system administrators the ability to setup a custom user environment that gives users easy access to a UnixWare 7 system and applications.
2. The three areas for comparing the Webtop to Tarantella are:
 - Application access—The UnixWare 7 Webtop is designed to access local applications for network clients on a single server [image] in a homogeneous, UnixWare 7 environment. Tarantella acts as a broker to any application server on the network, in heterogeneous server environments.
 - Application management—Tarantella allows administrators to access any administration tool on any server (the UnixWare 7 Webtop is adapted to work with UnixWare administration tools). Tarantella is designed to run on a variety of UNIX systems.
 - Scalability—Tarantella features its own load balancing technology which monitors and shifts sessions around application servers for load balancing purposes. This works for all the types of application server brokered by Tarantella. The Webtop does not include any tools for load balancing.
3. The software requirements to run the Webtop are:
 - UnixWare 7 Release 7.1.0 or later
 - Operating system update SLS PTF7132A for UnixWare 7.1.0
 - Web server
 - Supported browsers
4. You can install the Webtop during your initial system load (ISL) and after ISL with **pkgadd(1M)** or **SCOadmin Application Installer**.

3

Using the Webtop

Instructor Guide

Instructor Guide

Lesson 3

Using the Webtop

Suggested lesson duration

This lesson is designed to be completed in approximately 30 minutes.

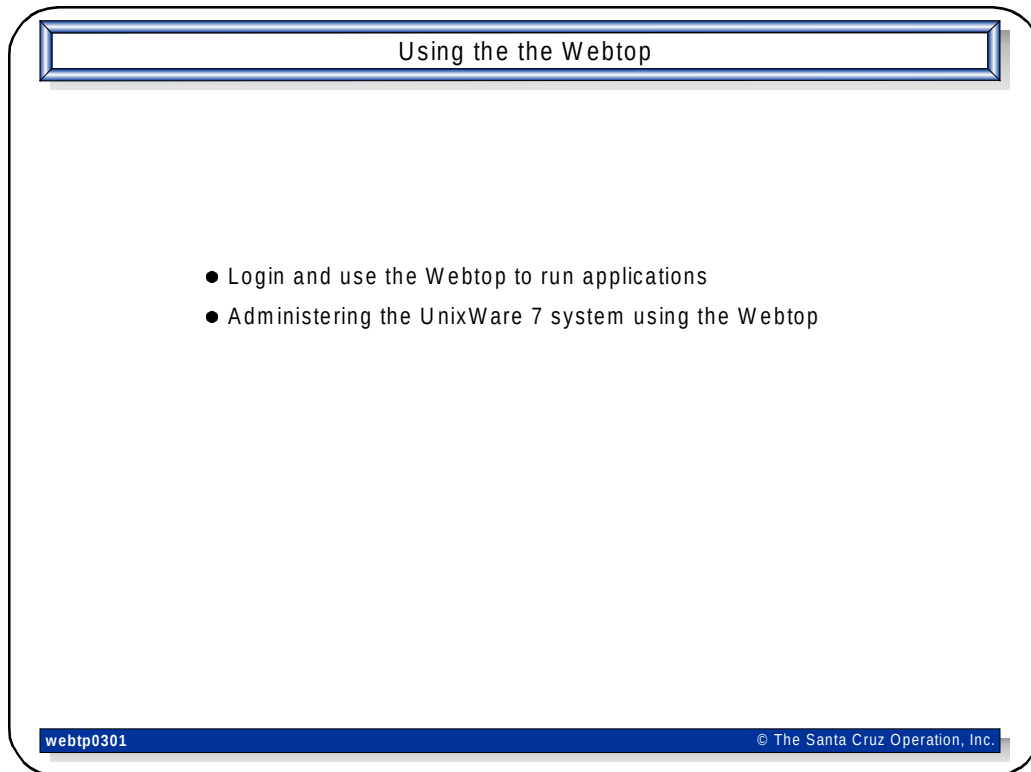
Pre-lesson classroom preparation

Verify that students are accessing the Webtop from an account or system that has not previously logged into the Webtop so that the student is able to run through the necessary steps for downloading all the Java archives they will need at the same time.

Instructor preparation

Be familiar with the Webtop application concepts of suspend and resume.

■ AV 3-1 Practice navigation within the user and administrator Webtops.



Introduction

The Webtop gives users quick and easy access to UnixWare 7 applications, without requiring any UnixWare 7 experience. Through a familiar and easy to use browser, users are able to run a variety of applications, browse the Internet, access documents, and share documents and files with other users. You can also use the Webtop from a graphical console or over a network to perform UnixWare 7 system administration.

Objectives

AV 3-1: Using the Webtop

The first slide describes the overall topics covered in this lesson.

By the end of this lesson, you will be able to:

- Log into and use the Webtop to run applications
- Administer the UnixWare 7 system using the Webtop

3.1 Using the Webtop

This section reviews the basics of using the user Webtop.

3.1.1 Installing the user Webtop applets

The Webtop uses Java applets, which web browsers must download before use. It is easier to install these applets all at once rather than installing them one at a time as you invoke them through the Webtop. Each new user to the Webtop run through the download steps to download the Webtop applets.

To install the default Webtop user Java applets:

- Step 1. Point your browser at: *http://hostname/webtop/install.en.html*. Replacing *hostname* with the name of the UnixWare 7 that is configured for you to use as your Webtop server. For example, on system with the name of honey you would point your browser to *http://honey/webtop/install.en.html*.
- Step 2. Click on **Java archives for Webtop webtop and application access.**
- Step 3. Click on **Grant**.
- Step 4. Click on **Install** in the **SmartUpdate Tarantella Framework Java Archive** window.
- Step 5. Click on **OK** in the **Netscape Error** window.
- Step 6. Reload or restart your Netscape window to be ready for logging into the Webtop.

Exercise: Install the Webtop applets

Follow the steps in Section 3.1.1, “Installing the user Webtop applets,” on page 3-6 to prepare for logging into the Webtop.

3.1.2 Logging into the Webtop

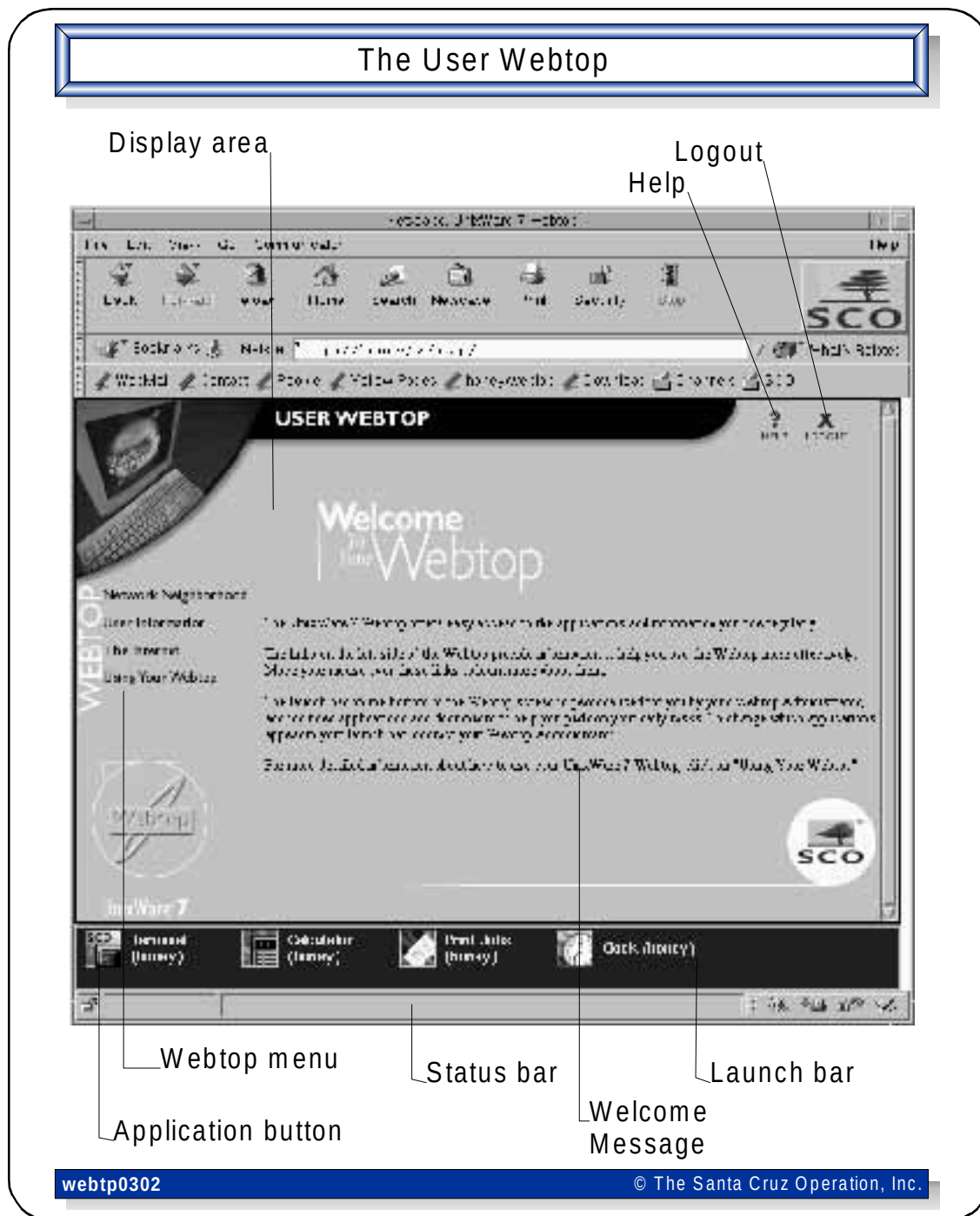
After you have installed the Java applets and granted permission in the **Java Security** window, you can easily login into the Webtop. Logging in identifies a user to the Webtop, which allows a personalized user Webtop to appear.

To log into the Webtop:

- Step 1. Point your web browser to the Webtop URL at *http://hostname/webtop*. Replace *hostname* with the name of the UnixWare 7 system that you are using as a Webtop server.
- Step 2. Enter your username and password in the Webtop login screen.

Exercise: Log into the Webtop

Follow the steps in Section 3.1.2, “Logging into the Webtop,” on page 3-7 to log into the Webtop.



3.1.3 Components of the default Webtop

AV 3-2: User Webtop

This is a screen shot of the user Webtop.

The main function of the user Webtop is to provide you with access to applications and documents. This access is provided using a launch bar with buttons that contain links to applications and documents.

When you click on one of the buttons, the Webtop displays the application or document it represents. The Webtop Administrator can choose to setup your Webtop to bring the application or document up in the display area or in a separate window.

The default Webtop is setup with:

- Launch bar with application buttons that give you access to applications and documents.
- **Logout** link lets you quickly and easily logout of the Webtop.
- **Help** link provides fast access to the Webtop documentation.
- Web browser status bar which displays information regarding:
 - Whether the application is resumable or not.
 - Whether the application will appear in a new window or not.
 - User name that you are logged into the Webtop as.
- Webtop menu

The Webtop menu on the left side of your Webtop provide information to help you use the Webtop more effectively.

These menu items are:

- Network Neighborhood

Lists and allows access to the other servers in your workgroup (the local subnet).

- User Information

Lists all the users that have accounts on the local system and allows you to send the user email, display the user's personal home page, access the user's personal FTP site, and view the user's *.plan* file.

- The Internet

Provides access to your personalized gateway to the WorldWide Web.

- Using Your Webtop

Displays the Using Your Webtop book.

The Webtop Administrator can configure both the links that appear on your webtop, and the appearance of your webtop itself (its background color, or layout for example). The user cannot change either the links or the appearance of the Webtop.

AV 3-3

Icon Showing that an Application is Running



Cog

Cog

webtp0303

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3.1.4 Launching an application

AV 3-3: User Webtop with cogs on Launch Bar

This a screen shot shows applications on the launch bar with a cog indicating that the application is running.

To start an application, click on the application's button in the launch bar on your Webtop.

The Webtop starts the application and displays it, ready for you to use. The application button in the launch bar changes to show that the application is running. Running applications have a cog icon superimposed on the application's icon.

Depending on how your Webtop Administrator configured the application, it might continue running when you follow another link, click on another button, or log out of the Webtop.

Depending on how your Webtop Administrator configured the application, it might appear on your main Webtop window, in an independent window, or in a new browser window.

To change the way the application is displayed, press **CTRL** when you click on the button in the launch bar:

- If the application is configured to appear on your Webtop, the application appears in an independent window instead.
- If the application is configured to appear in an independent window or in a new browser window, the application appears on your webtop instead.

Exercise: Run Applications

Launch applications from the launch bar. Use the **CTRL** to change the way an application is displayed.

3.1.5 Session suspend and resume

The Webtop Administrator configures applications to either exit or continue to run when you follow other links, start other applications on your Webtop, or log out of the Webtop.

To see if an application is resumable or not, point to its button in the launch bar on your Webtop. Buttons show whether applications are currently running or not.

Running applications have a cog icon super-imposed on the application's button. The status bar displays one of the following messages:

Not resumable

If the application is configured to display on the Webtop, the application exits when you follow another link on your Webtop. The next time you click on the button, a new instance of this application starts.

If the application is configured to display in a separate window (the default setting for all applications except the default application, if any), "not resumable" applications continue running if you click on another button in your launch bar. Essentially, non-resumable applications continue running until another application or document is displayed in the window.

Resumable until log out

This application continues running when you follow other links on your webtop, even if the application is configured to display on the Webtop and another application is displayed on top of it. The next time you click the button, the running application is displayed. This application continues running until you log out of the Webtop. When you log back into the Webtop and click on the application's button, a new instance of this application starts.

Always resumable

This application continues running when you follow other links on your Webtop (even if the application is configured to display on the Webtop) and when you log out of the Webtop. When you log back into the Webtop and click on the application's button, the running application is displayed.

If the application is configured to appear in a new browser window, when you resume the application, its window may be hidden by other windows. Bring its window to the front to use the application.

The Webtop administrator can configure timeouts so that the Webtop will stop any application (even Always Resumable applications) after a certain amount of time.

For more information regarding configuring Webtop application resumability and timeouts, see Lesson 4: "Setting session resumability options".

3.1.6 Logging out of the Webtop

To Log out of the Webtop, click on the **Logout** icon in the upper right-hand corner of your Webtop.

The Webtop does not prompt for confirmation when you click on the **Logout** icon.

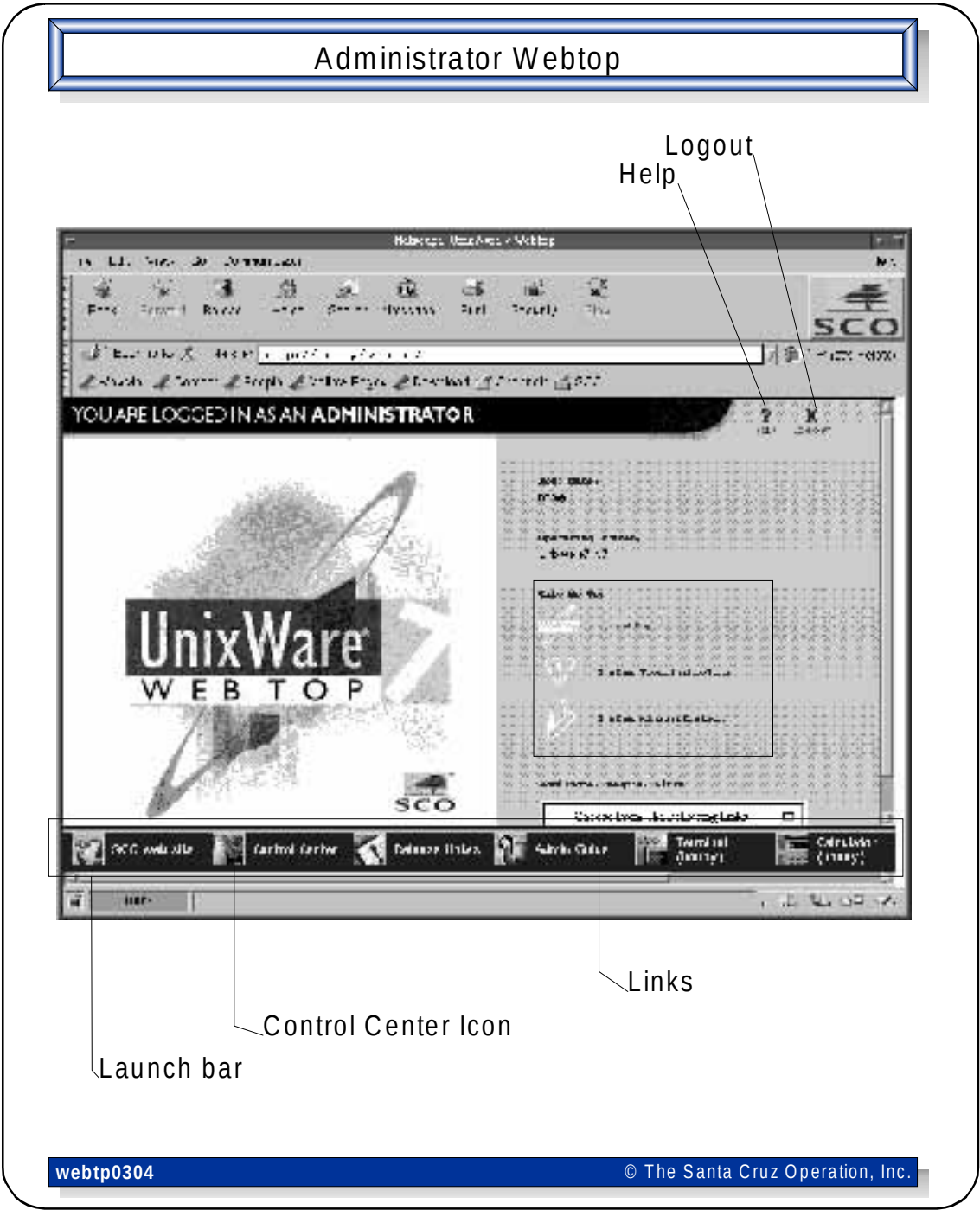
Depending on how your Webtop Administrator has configured your applications, some applications might continue to run when you log out of the Webtop.

When you log back into the Webtop, you can click on these applications' buttons to continue using them.

Exercise: Logging out

Log out of the Webtop with several applications running. Note whether the applications continue to run or close. Log back into the Webtop and note the status of the applications available on the launch bar.

AV 3-4



Instructor Guide

3.2 Administering a UnixWare 7 System with the Webtop

When you log into the Webtop as **root** or any other user who has been granted Webtop administrator status, you will see a customized Webtop that allows you to perform system administration tasks on your UnixWare 7 system.

3.2.1 Logging into the Webtop as root

AV 3-4: Administrator Webtop

This is a screen shot shows the Administrator Webtop. After you have installed the general and control center Java applets and granted permission in the **Java Security** window, you can easily login into the Webtop. For instruction on installing the Java applets for **root** see: Lesson 2: “Installing the Java applets for root”.

Logging in identifies a user to the Webtop which allows a personalized user Webtop to appear.

To log into the Webtop:

- Step 1. Point your web browser to the Webtop URL at *http://hostname/webtop*. Replace *hostname* with the name of the UnixWare 7 system that you are using as a Webtop server.
- Step 2. Enter username **root** and the **root** password in the Webtop login screen.

Exercise: Log into the Webtop as root

Follow the steps in Section 3.1.2, “Logging into the Webtop,” on page 3-7 to log into the Webtop as the **root** user.

When an administrator logs into the Webtop, a main page with links to the three sections of the Webtop displays:

- My Webtop
- System Troubleshooting
- System Administration

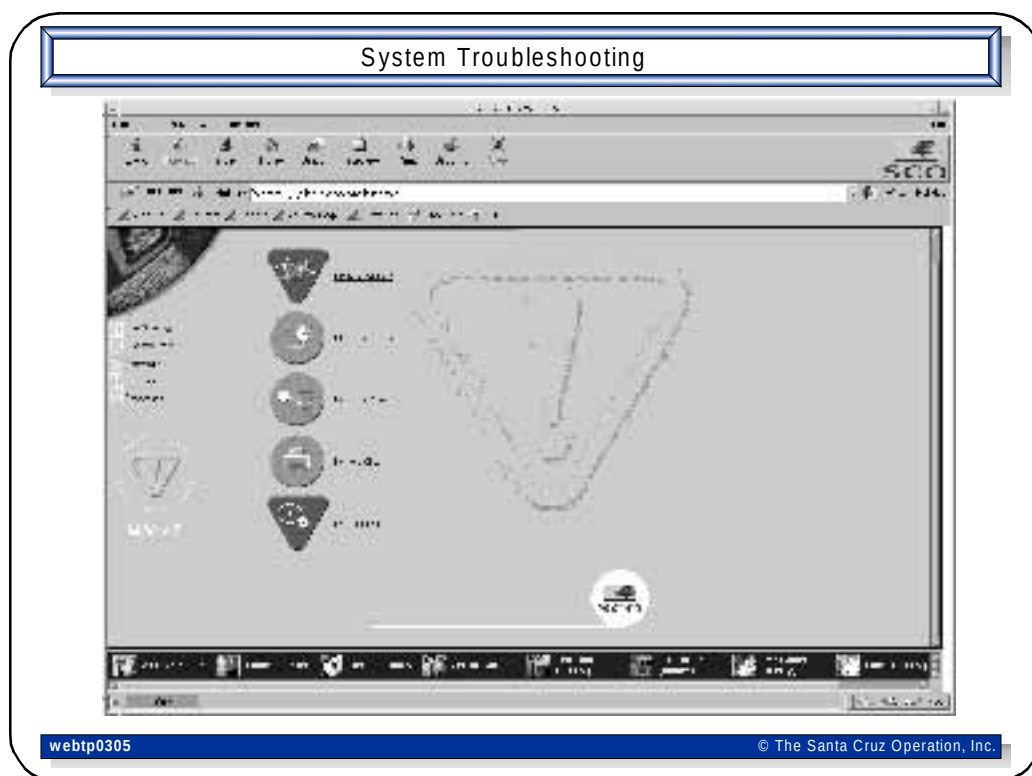
Each page of the Webtop provides helpful links in the upper right corner of the browser window. These links may include:

- | | |
|---------------|--|
| Back | Points to the previous level of the Webtop, if one exists. It operates independently of the "Back" function of your browser. |
| Help | Brings up a page with links to the Webtop documentation. |
| Logout | Logs you out of the Webtop (no confirmation). |

In addition, the main Webtop pages provide navigational links on the left of the screen and a launch bar along the bottom of the screen, with buttons that link to documents and applications.

AV 3-5

Instructor Guide



3.2.2 System Troubleshooting

AV 3-5: System Troubleshooting

This is a screen shot shows the **System Troubleshooting** Webtop page. To access the **System Troubleshooting** Webtop interface, click on the **System Troubleshooting** link from the main Webtop Administration page. You will need to re-enter the **root** and the **root** password to enter this area.

The **System Troubleshooting** interface provides you with a quick overview of potential problems with your UnixWare 7 system. The troubleshooting topics allow you to view the status of your system and resolve simple problems. Most topics also provide a link to a relevant **SCOadmin** manager for more in-depth problem solving.

The main System Troubleshooting page provides links to the troubleshooting topics. Additionally, if there are any possible problems within a topic, an alert will appear.

The **System Troubleshooting** topics include:

File Sharing	The File Sharing page provides information on three types of file sharing services that can be installed on your system--the Network File System (NFS), SCO VisionFS, and SCO Advanced File and Print Services (AFPS). Any directories shared by the service are listed, along with descriptions and attributes of the shared directories.
File Volumes	The File Volumes page lists the status of each filesystem on your system including: ● Usage ● Description ● Capacity
Networks	The Networks page shows the current status of the network interfaces on your system, including: ● Status (Up/Down) ● IP Address ● Broadcast Address ● Netmask

- Router Address
- Inbound Packets
- Outbound Packets
- Collisions

Printers

The Printers page provides information on all local and network printers configured on your system. From the main Printers page, you can access pages with specific information about the print service, each configured printer, and any current print jobs.

- Print Service Status
- Individual printer
- Print job

Processes

The Processes page provides a list of the top ten processes on your system, sorted by consumption of CPU (processor) time. Processes that consume their full allotment (~100%) of CPU usage are also listed in a separate table of CPU-Intensive Processes.

Exercise: System Troubleshooting

Click on the **System Troubleshooting** link. Explore each of the topics available.

3.2.3 System Administration

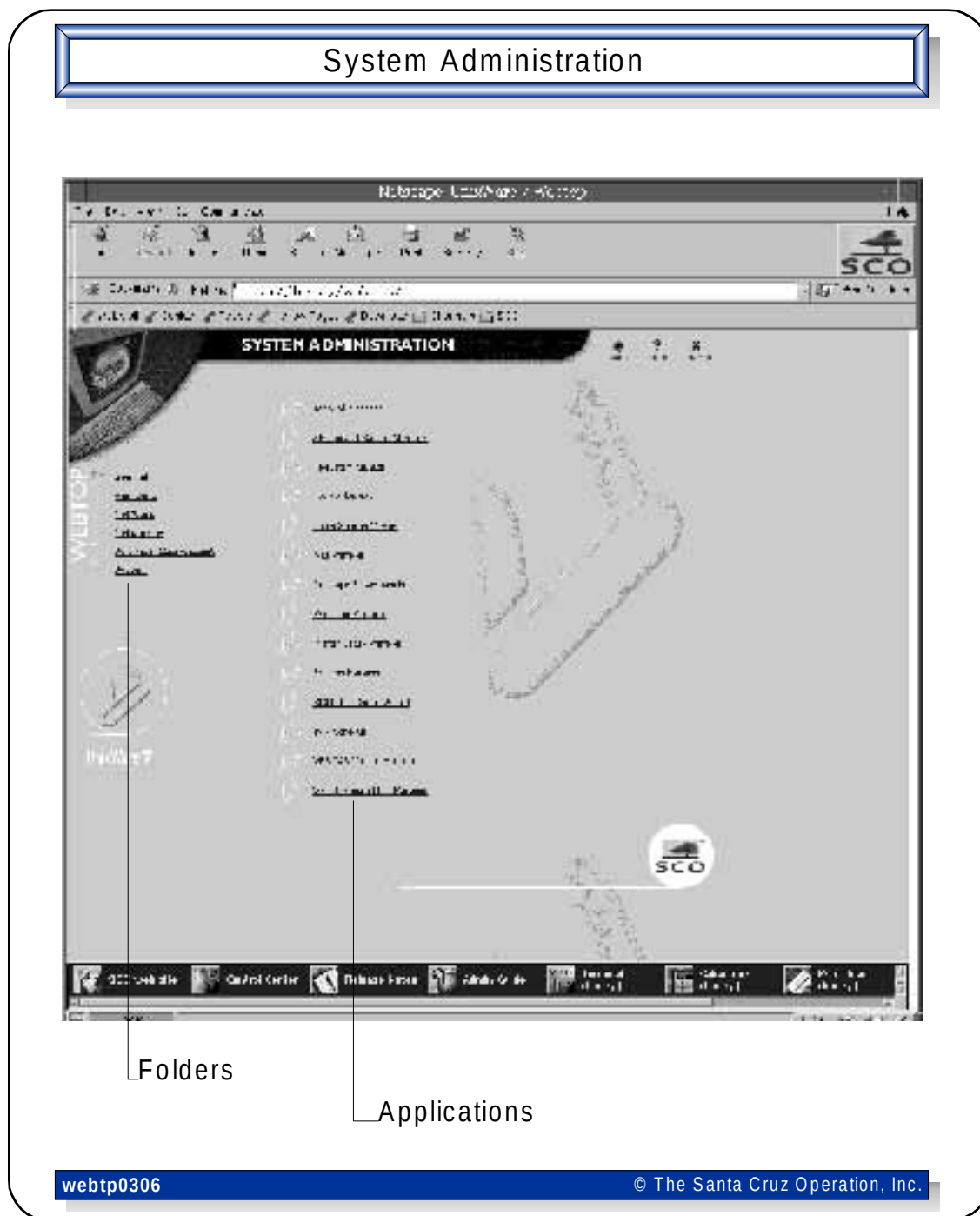
To access the Webtop **System Administration** interface, click on the **System Administration** link from the main Webtop administration page. You will need to re-enter the **root** and the **root** password to enter this area.

The **System Administration** page provides links to all **SCOadmin** managers available on your system. Many of these managers can also be accessed from the individual System Troubleshooting pages on the Webtop.

By default, the following folders appear on the **System Administration** page:

- General
- Hardware
- NetWare
- Networking
- Software Management
- System

AV 3-6



Exercise: System Administration

Click on the **System Administration** link. Explore the links available. Check the **System** ⇌ **Process Manager** to see what processes are running on your system.

AV 3-6: System Administration

This is a screen shot shows the **System Administration** Webtop page.

3.3 Lesson Summary

The Webtop is an easy to use interface that gives you access to the power of a UnixWare 7 System and applications.

Both the user and administration Webtops are easy to navigate. You will find access to applications and documents by clicking on links and the Webtop launch bar.

Depending on how your Webtop Administrator configured the application, it might appear on your Webtop, in an independent window, or in a new browser window. To change the way the application is displayed, press  when you click on the button in the launch bar.

The Webtop Administrator configures applications to either exit or continue to run when you follow other links, start other applications on your Webtop, or log out of the Webtop. If an application is running, you will see a picture of a cog in the applications launch bar icon.

Review questions

1. How can you install the default applets used by the Webtop in a single download?
2. How can you tell if an application available from the launch bar is running?
3. How do you change the way an application is displayed in the Webtop?
4. How do you logout of the Webtop?

3.4 Relevant Files

The following files were presented in this lesson.

Relevant files

<http://hostname/webtop/install.en.html>

URL to access the file used to access programs to install Webtop applets in a single download.

3.5 Answers to Review Questions

1. You can install the applets used by the default Webtop in a single download by pointing your browser to: *http://hostname/webtop/install.en.html*. Replace *hostname* with the name of the UnixWare 7 system that is configured for you to use as your Webtop server and click on the links presented.
2. You can determine if an application is running by looking at the icon for the application in the launch bar. Running applications have a cog icon superimposed on the application's button.
3. To change the way the application is displayed, press  when you click on the button in the launch bar.
4. Click on the **Logout** button on the user and administrator Webtops. Do not close your browser window.

4

Webtop System Administration

Instructor Guide

Instructor Guide

Lesson 4

Webtop System Administration

Suggested lesson duration

This lesson is designed to be completed within 2 hours.

Pre-lesson classroom preparation

Load the sample Hypertext Markup Language (HTML) files, themes, and programs into a directory on each of the classroom systems.

Instructor preparation

Review the *UnixWare 7 Webtop Administration Guide*.

Run the Webtop **Control Center**. Practice **Control Center** navigation.

AV 4-1



Introduction

As a Webtop system administrator, you will need to understand the concepts used to describe the Webtop components, manage Webtop files and directories, setup and customize user access to the Webtop, and troubleshoot problems with the Webtop.

Objectives

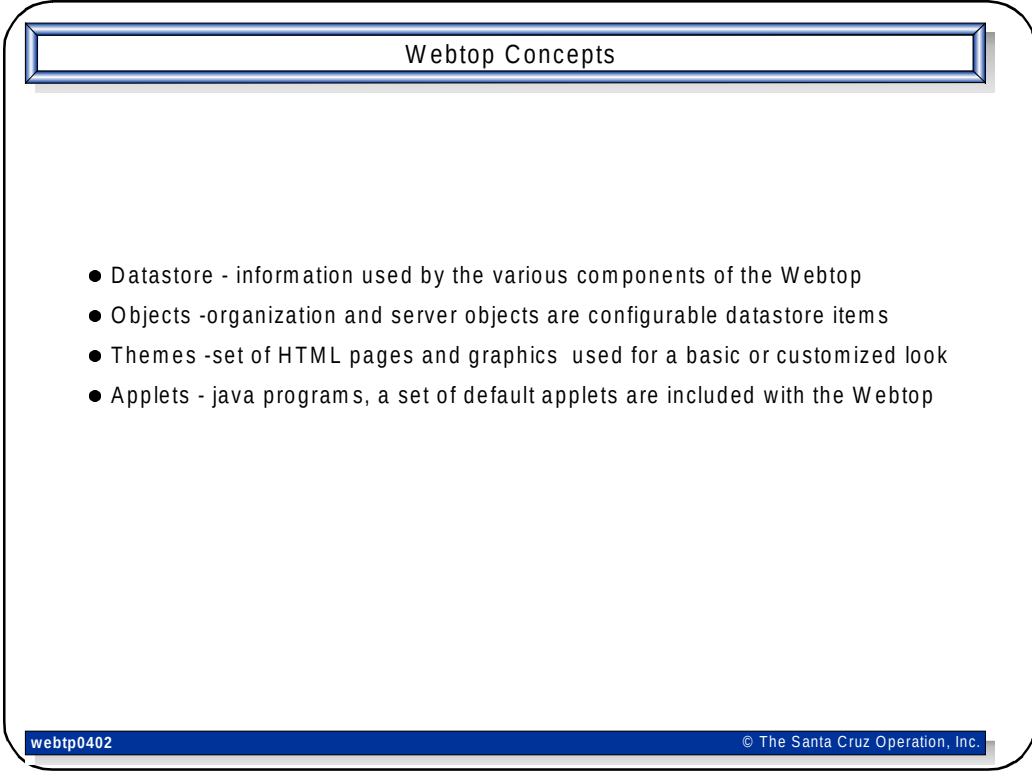
AV 4-1: Installation Planning

The first slide describes the overall topics covered in this lesson.

By the end of this lesson, you will be able to:

- Use the Webtop administration tools
- Configure the Webtop
- Customize the Webtop
- Troubleshoot Webtop problems

AV 4-2

A diagram titled "Webtop Concepts" enclosed in a rounded rectangle. The title is in a blue-bordered box at the top. Below it is a bulleted list of four items: Datastore, Objects, Themes, and Applets. At the bottom, there is a blue bar containing the text "webtp0402" on the left and "© The Santa Cruz Operation, Inc." on the right.

Webtop Concepts

- Datastore - information used by the various components of the Webtop
- Objects -organization and server objects are configurable datastore items
- Themes -set of HTML pages and graphics used for a basic or customized look
- Applets - java programs, a set of default applets are included with the Webtop

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Instructor Guide

4.1 Webtop concepts

The next sections describe concepts that are used with the Webtop. To perform Webtop Administration, you will need to understand these concepts:

- Datastore
- Organization hierarchy
- Objects
- Themes
- Applets

4.1.1 Datastore

The Webtop datastore is the sum of all the information used by the various components of the Webtop. The datastore includes information about hosts and users on the network, Webtop session information, and organizational information that you provide.

The diverse sources of this information are all accessed in the same way, using TFN (Tarantella Federated Naming) names.

Each object in the datastore can be specified by a unique TFN name. Webtop Administrators are most likely to use TFN names to specify:

- Objects in the organizational hierarchy
- Users

4.1.2 Organizational hierarchy

Your organization contains a number of resources, including people, applications, and documents. In the Webtop, each of your organization's resources is represented by an object, which stores all the important information about that resource.

There are many different types of objects in the Webtop, each representing a different type of resource. For example:

- Person objects store information about Tarantella users.
- Application objects represent the applications your users can run. Each type of application has its own object: there are X application objects, VT420 application objects, and others.
- Document objects represent documents your users can access.

Most organizations are subdivided in some way -- into departments or divisions, for example. These subdivisions have resources, not necessarily related to any other subdivision. For example, an accounting department might use a payroll application that no other department needs. People usually belong to one part of the organization, such as a department.

In general, an organization contains a number of organizational units (OUs), each of which may contain other OUs, creating a tree-like hierarchical structure. The "leaves" of the tree are the resources themselves. You can reflect this organizational hierarchy in Tarantella, using the organization and OU objects.

When you first install the Webtop, the Setup program creates your organization object (only one of these can exist, at the top of the hierarchy) and a number of other example objects, each belonging to the organization object.

You're free to create OUs to arrange your resources however you prefer. However, it is recommended that you use physical and/or departmental OUs and do not create OUs for individual "people" and "applications", for instance.

Proper use of OUs often makes publishing applications to multiple users a single action.

4.1.3 Objects

Objects represent your organization's resources and hierarchy. The Webtop **Control Center** allows you to create, maintain and manipulate objects in the organizational hierarchy.

You see your organization's objects in the Control Center's Organization view.

Each object has a set of attributes that collectively define the object in the Webtop datastore.

The following organizational objects are available:

- Organization—Top of the organizational hierarchy. It's the only object in the organizational hierarchy that isn't owned by any other object
- Organizational Unit—Subdivision of your organization
- Person—Webtop user
- Document—HTML document
- Group—Collection of document or application objects
- SCO Console Application
- VT420 Application
- Wyse 60 Application
- X Application
- Windows SCO Merge application

For more information on organizational objects, refer to **scohelp ⇒ Desktops ⇒ UnixWare 7 Webtop Administration Guide ⇒ Your organization's resources and the Webtop ⇒ different types of objects**.

For a reference of attributes for each object, refer to **scohelp ⇒ Desktops ⇒ UnixWare 7 Webtop Administration Guide ⇒ Reference ⇒ Objects**.

The **Server** view in the Webtop **Control Center** lets you configure the UnixWare 7 Webtop.

The following server configuration objects are available:

Access	Change the default Webtop and the Webtop server's login theme.
Character Protocol	View and change settings for the Character Protocol Engine.
Emulator Sessions	Change the Webtop's resumability timeouts.
Null Protocol Engine	View and change settings for the Null Protocol Engine.
Security	View and change settings which affect Webtop security.
Webtop Protocol	View and change settings for the Webtop Protocol Engine.

X Protocol Engine View and change settings for the X Protocol Engine.

For more information on server objects, refer to **scohelp** ⇒ **Desktops** ⇒ **UnixWare 7 Webtop Administration Guide** ⇒ **Server configuration objects**.

4.1.4 Themes

A Webtop theme is a set of HTML pages and graphics files used to define a basic or customized look. There are two types of Webtop themes:

Login	Governs the appearance of the Webtop's authentication dialog.
Webtop	Governs the appearance of a user's Webtop and how applications are displayed.

Themes are constructed in HTML and make use of applets supplied with the Webtop. There is a standard user and standard administrator theme included by default with the Webtop. You can also create your own customized themes.

Creating your own theme gives you complete control over the look and feel of the Webtop, allowing you to tailor a Webtop solution to your exact requirements.

Exercise: View the sample themes at the SCO Webtop web site

Go to <http://www.sco.com/unixware/webtop/custom/themes.html> and view the sample themes at the Webtop web site.

4.1.5 Applets

The Webtop uses applets to authenticate users, render Webtops, and to display applications.

The following applets are supplied with the Webtop:

Login	The login applet, LoginApp.class , controls access to the Webtop server. It is located in <i>/opt/webtop/java</i>).
Webtop Tray	Webtop tray applet, SmartIconHost.class , creates a Webtop tray. A Webtop tray contains links to objects in the Webtop datastore. Typically, links are implemented as icons.
Terminal emulator	Terminal emulator applet, TDE.class , emulates SCO ANSI, VT420, and Wyse 60 terminals. It is located in <i>/opt/webtop/java/sco/tta12/tde</i> . TDE.class is used in the file <i>tde.html</i> , which is the HTML page used to display character applications in the standard Webtop theme supplied with the Webtop.
X emulator	X emulator applet, XDE.class , displays X applications on the client device. It is located in <i>/opt/webtop/java/sco/tta12/xde</i> . XDE.class is used in the file <i>xde.html</i> , which is the HTML page used to display X or Merge applications in the standard Webtop theme supplied with the Webtop.

These applets are used in HTML pages, which, together with graphics files, make up the Webtop themes. For example, the X emulator **applet XDE.class** is used in the HTML page *xde.html* which forms part of the standard Webtop theme.

4.1.6 Files and directories

Webtop files are installed in */opt/webtop/* on the UnixWare 7 server. There are a number of directories contained in */opt/webtop* organized by function. These directories include:

<i>/opt/webtop/cgi-bin</i>	CGI files used for user Webtops
<i>/opt/webtop/cgi-bin/administration</i>	CGI scripts used in the administrator Webtop. These scripts are predominantly Perl with a few that are Tcl.
<i>/opt/webtop/login/boot</i> and <i>/opt/webtop/login/en_US/standard</i>	
	Files that are used during the login process including the:
	● Splash page ● Login name and password page

The HTML files aren't accessed directly but through the `/webtop/cgi-bin/ttawebtop.cgi` CGI script.

`/opt/webtop/webtops/en_US/standard`

HTML files for the standard desktop that ordinary users see. For the initial release of the Webtop, the en_US locale is the only one used. Check the Webtop web site for news on support for additional locales.

`/opt/webtop/webtops/en_US/admin`

HTML files for the administration Webtop. The administration Webtop is a special desktop for Webtop administrators. By default, root is the only user that gets the administration Webtop. The administration Webtop provides a larger number of system related applications than the default standard user desktop includes.

`/opt/webtop/media`

The `.gif` and `.jpg` graphics files.

`/opt/webtop/java`

Java applets and `.class` files.

`/var/webtop/log`

Directory containing the log files.

4.2 Control Center

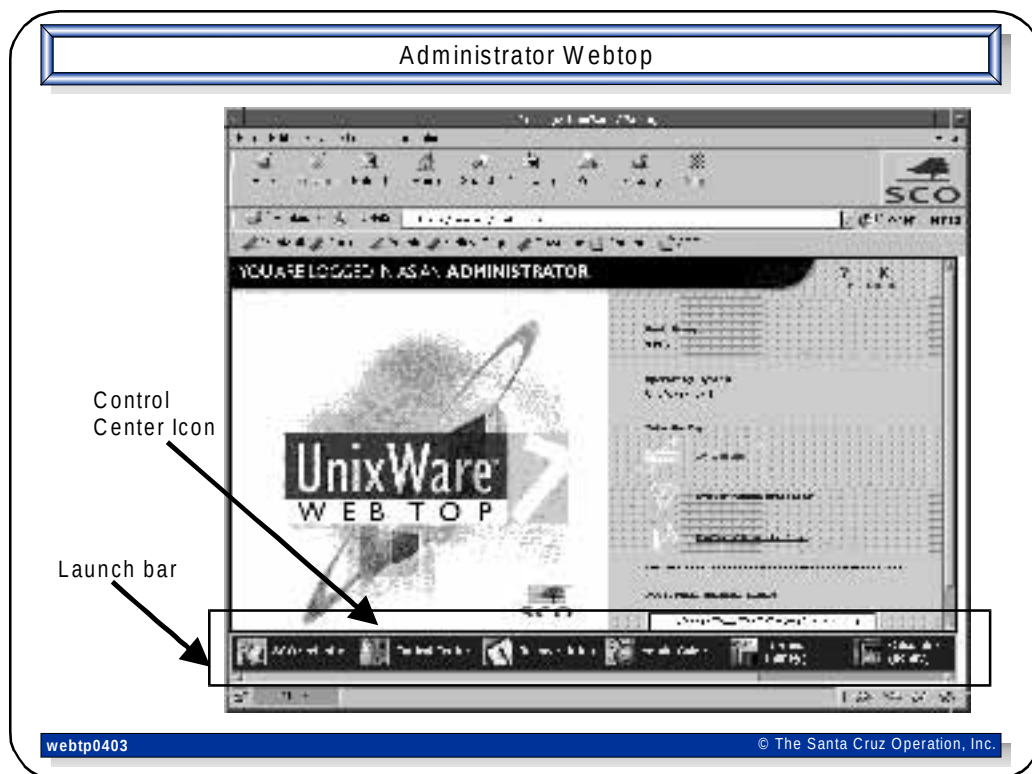
The Webtop **Control Center**, which only Webtop Administrators can run, is the main graphical tool for configuring the Webtop.

The **Control Center** is a Java applet provided with the Webtop.

The **Control Center** lets you:

Create objects	In the Webtop, your organization's resources including people, applications, and documents are represented by objects in a hierarchy. You can use the Control Center to create and configure these objects, and structure them in a hierarchy which matches your organization's.
Customize Webtops	Configure exactly which links users see on their Webtops.
Perform housekeeping	Keep track of which applications users are running and maintain the password cache.
Configure the server	Configure options which affect the server as a whole, for example, setting default timeouts or the login theme.

AV 4-3



4.2.1 Running the Control Center

AV 4-2: Administrator Webtop

Screen shot showing the location of the **Control Center** icon in the Webtop administrator launch bar.

To run the **Control Center**:

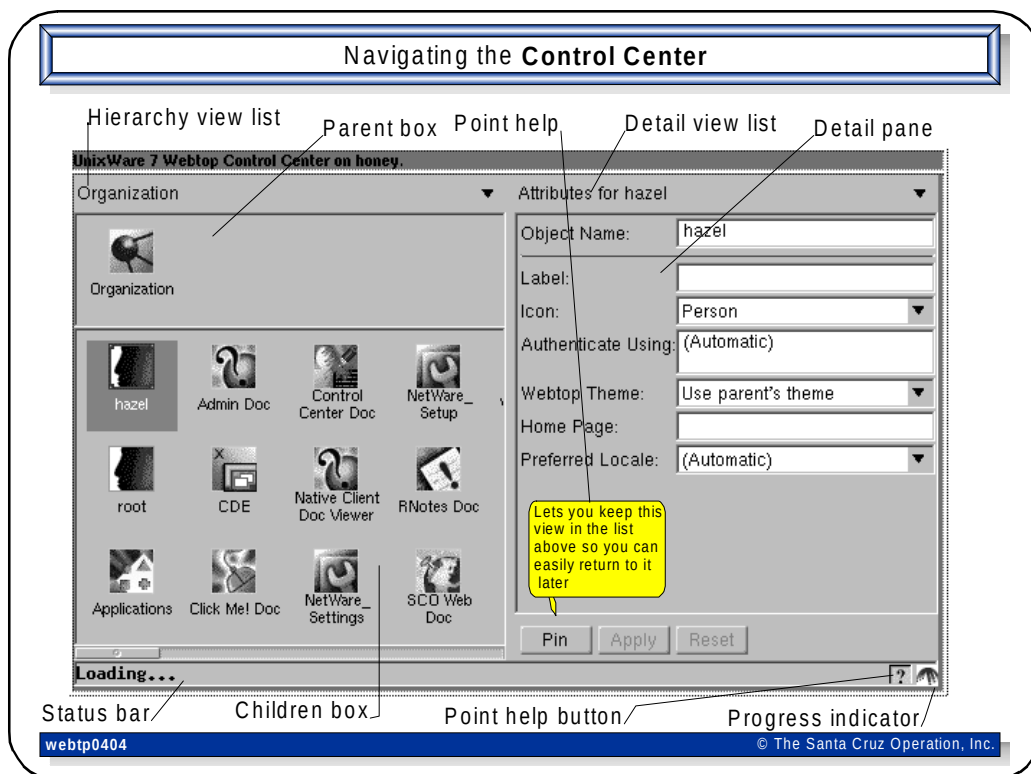
- Step 1. Log into your UnixWare 7 system as **root** from a graphical console.
- Step 2. Run a Netscape browser window.
- Step 3. Enter: *http://hostname/webtop* in the **Go To/Netsite** field (replace *hostname* with the name of your system).
- Step 4. Log into the Webtop as **root**.
- Step 5. Click on the **Control Center** icon from the launch bar at the bottom of the default administration Webtop Netscape browser window.

If you encounter **Java Security** windows make sure that you install the Java applets for **root** as described in Lesson 2: “Installing the Java applets for **root**”, this let you avoid multiple **Java Security** grants for each of the administration Java applets that you run.

Exercise: Run the Control Center

Follow the steps in Section 4.2.1, “Running the **Control Center**,” on page 4-15 to run the **Control Center**.

AV 4-4



4.2.2 Control Center screen areas and navigation

AV 4-3: Control Center screen areas

This graphic shows the main screen areas available in the **Control Center**

The **Control Center** main screen areas are:

Hierarchy view list	List of views for selecting which part of the datastore you are viewing and configuring. This list includes: ● Organization view ● Session view ● Server view ● Password cache view
Parents box and Children box	Shows the path from the top of the hierarchy to the objects in the Children box below. The left-most object in the Parents box is at the top of the hierarchy. The right-most object is the parent of all the objects in the Children box.
Details view list	List of information categories that can be selected to show in the details view pane.
Details view pane	Displays information about objects and allows for item configuration. To make the details view pane wider or narrower, you can drag its left-hand edge.
Status bar	Short help messages. The ? button turns point help on and off. The progress indicator animates to show that the Control Center is communicating with the Webtop server.

To navigate within the **Control Center**:

- Left click to navigate the hierarchy and see information about objects.
- Right-click for menus which offer more options.
- Drag and drop to move objects and add links.

4.2.3 Views

The **Control Center** has four main areas of operation which are called views.

The view is selected using the hierarchy view list located at the top left of your **Control Center** window.

The views available for you to select include:

Organization view	Objects which represent your organization's resources and structure.
Session view	Shows which users have emulator sessions running. An emulator session begins when a user starts an application by clicking on its button on their launch bar.
Server view	Shows the different parts of the Webtop server you can configure.
Password cache view	Shows which users that have Webtop stored passwords. Webtop administrators will not need to use this view. This view is needed by Tarantella due to the three-tier architecture used in the Tarantella environments. A Tarantella administrator needs to know whether or not to cache the passwords from various "third-tier" application servers on a "second-tier" tarantella server.

Exercise: Navigate the Control Center

Practice navigating within the **Control Center**.

Select each of the views that you will use with the Webtop from the hierarchy view list including the organization, session, and server views.

Turn the point help off. Notice that the yellow balloon pop-ups contain only label information when the point help is off.

Right click on an icon in the children box and select **Attributes** to view details about the object in the detail pane. Practice using the **Pin** button to keep attributes in the Attributes view list.

4.2.4 Login process

When a browser accesses the URL: *http://hostname/webtop*, the following occurs:

- The UnixWare 7 system's web server maps URLs that begin with */webtop* to */opt/webtop* and CGI URLs that begin with */webtop/cgi-bin* to */opt/webtop/cgi-bin*.
- The */opt/webtop/index.html* is loaded. The *index.html* is a frameset which creates two frames, one for the splash page */opt/webtop/login/en_US/boot/splash.html*, and one for the bootstrap applet *strap.html* which is not seen. Both the splash page and the page with the bootstrap applet are loaded indirectly by calling */opt/webtop/cgi-bin/ttawebtop.cgi* with the appropriate arguments. This scheme allows for dynamic or system-specific information to be loaded, and inserted in the HTML files. Values can be added or substituted in the HTML by the CGI program. This is done frequently throughout the Webtop, especially in the Web-based administration applications on the administration Webtop.
- The bootstrap process downloads several Java applets. Usually these are downloaded only once, after which the archives remain on the client. The browser's JVM is started and Java applets are loaded. These applets establish a connection back to the server where server-side Webtop programs establish the basic setup information such as connection speed and optimizations.
- When the bootstrapping completes, the login page, */opt/webtop/login/en_US/standard/index.html*, is loaded. The login Java applet is started, which loads the graphics from both the */opt/webtop/media* and */opt/webtop/login/en_US/standard* directories.
- When the user enters a login name and password, their information is validated and the appropriate Webtop displayed. If the user has a custom theme specified with an entry in the Webtop databases created by the **webtop** command line or the Webtop **Control Center**, the specified custom theme is used. If there is no specific entry for the user in the Webtop database, the default theme is used. Standard and administration are the two themes included by default. The theme is used to determine which Webtop pages are loaded after login.
- When you log into, the default theme, the *index.html* file in */opt/webtop/webtops/en_US/standard* is accessed. The *left.html*, which provides the Webtop launch bar applet, is called by **ttawebtop.cgi**, the main frame containing the Webtop area for applications and additional Webtop pages is called directly.

4.2.5 User login authentication

If a user doesn't have a person object, they can still log into the Webtop provided that the **Allow UnixWare 7 Login** attribute in the Security server configuration object is selected. When such users log in, they will see the Webtop of the organization or organizational unit object specified as the **UNIX users' OU** in the Access server configuration object.

Users without person objects can also log into the Webtop without typing a username and password, provided that the **Allow Anonymous Login** attribute in the Security server configuration object is selected. When such users log in, they will see the Webtop of the organization or organizational unit object specified as the **Anonymous users' OU** in the Access server configuration object.

A person object need not be an actual person. For example, you could create person objects and Webtops for guest users or finance users.

To set the Webtop login security options:

- Step 1. Follow the steps in Section 4.2.1, “Running the Control Center,” on page 4-15 to run the Webtop **Control Center**.
- Step 2. Select **Server** from the **Hierarchy view list**.
- Step 3. Right-click on the **Security** icon.
- Step 4. Click on the **Security** options you desire from the list of options shown in the **Attributes for Security** pane.

Exercise: Setting the login security options

View the security attributes for your Webtop server. De-select the **Allow UnixWare 7 Login**. Create a user and attempt to log into the Webtop as the new user. Select the **Allow UnixWare 7 Login** and attempt to log into the Webtop.

4.3 Using the Control Center to configure the Webtop

The next sections describe several basic configuration tasks that are accomplished using the **Control Center**. These tasks include:

- Adding person objects
- Adding additional Webtop administrator accounts
- Assigning existing applications to users and groups of users
- Adding new application objects

4.3.1 Adding a person object

A person object represents a Webtop user.

To add a person object:

- | | |
|---------|---|
| Step 1. | Click on the organizational unit object (or the organization object) you want the user's person object to belong |
| Step 2. | Right-click in the background of the Children box, click on New Object, then click on Person. The new person object's attributes are shown in the Details pane. |
| Step 3. | Enter a user name in the Object Name box. This is the user name the new user will use to log into the Webtop. |
| Step 4. | Enter the user name in the Authenticate Using box of a UNIX user whose password this user can type to log into the Webtop. Prefix the user name with _user/ or use the special setting (Automatic) to use the person object's Object Name. |
| Step 5. | Set any other attributes you want. For a full description of the attributes see scohelp ⇒ Desktops ⇒ UnixWare 7 Webtop Administration Guide ⇒ Reference ⇒ Person Object . |
| Step 6. | Click on Apply . |

4.3.2 Adding additional Webtop Administrator accounts

By default, the Webtop ships with only one user **root** explicitly configured. All other users are given access to the Webtop by virtue of having an account on the system (an entry in */etc/passwd*).

To add another user as a Webtop Administrator, you need to add a person object for the user and then add the user to the Administration view.

To make a user a Webtop administrator, add the users person object to the Administration view:

- Step 1. Right-click on the organization object (in the Parents box) in the Organization view and select **Administration** from the menu. The **Administration view** is displayed in the Details pane.
- Step 2. Drag the user's person object from the Children pane and drop it into the **Administration for Organization** detail pane.
- Step 3. Click on the person object icon in the children box to bring up the attributes for the user you would like to make an administrator.
- Step 4. Change the **webtop Theme** to **admin**.

Exercise: Adding another Webtop administrator

Follow the steps in Section 4.3.1, “Adding a person object,” on page 4-21 to add a new Webtop administrator. Log in as the new user to note that the user is a Webtop administrator and has access to the administration Webtop.

4.3.3 Assigning an existing application to a person object's Webtop

If you already have a person object or after you have created a desired person object, you can assign an application to the person.

To assign an existing application to a person object's Webtop:

- Step 1. Right click on the desired person object to select it.
- Step 2. Choose **Webtop** from the drop-down list.
- Step 3. Drag the application icon from the Object frame onto the Webtop in the detail pane.
- Step 4. Click on **Apply**.

The next time the user logs into the Webtop, the application will be available from the Webtop launch bar.

4.3.4 Assigning an application to a group of users or organization

To assign an application to a group of users, you need to first create an **Organizational Unit** object. An **Organizational Unit** object will hold Person objects.

Creating an Organizational Unit is much like creating a Person object. To move a Person to an Organizational Unit, drag the Person object icon onto the Organizational Unit object icon in the Object frame.

A group object is not like a UNIX system group; it is a container for applications so that a group of applications can be assigned to Person, Organizational Unit or Organization objects.

4.3.5 Creating new application objects

To make an application that is not already setup in the Webtop, accessible to Webtop users, you need to create an application object using the **Control Center**. The next sections describe how you can add X windows and character applications, set session resumability options, and debug application objects.

4.3.5.1 Setting session resumability options

Each of the application objects has a **Resumable** attribute which you can use to set an application's resumability. You can set **Resumable** to one of the following:

Never	The application can never be resumed and clicking the link always starts a new application instance. In addition, the application is terminated as soon as it disappears from the webtop. For example, if you click a link that launches another application on the webtop. Never is recommended for applications that do not provide a mechanism for the user to exit, for example, a clock application.
Webtop Session	The application keeps running and is resumable until the user logs out of the Webtop. This is the default setting for Webtop application objects. If a user doesn't log out of the Webtop cleanly, for instance, if they close their web browser or it crashes, then any emulator sessions that have their resumability set to Webtop Session will keep running.
Always	The application keeps running after the user logs out of the Webtop, and can be resumed when they next log in. Always is recommended for applications that need to exit in a controlled way, for example, an email application which may need to remove lock files before it exits.

To provide you with greater administrative control, each application object has a Resumable For (min) attribute. This allows you to set a timeout. This is the length of time that a resumable session is guaranteed to be resumable for. After this time, the Webtop may terminate suspended emulator sessions.

In addition to timeouts on a per application basis, the Emulator Sessions object in the Webtop Control Center's Server view lets you set default timeouts for Webtop Session and Always. These timeouts only take effect if you set an application object's resumability to Webtop Session or Always, but do not set a timeout in the application object itself. If set, an application's own timeout always takes precedence.

4.3.5.2 Adding a new X Windows application

To add a new X Windows application to the Webtop:

- Step 1. Right-click in an empty area of the Object frame. To avoid selecting an existing object, click on the top of the children box.
- Step 2. Select **New Object** ⇒ **X Application** from the drop-down list.
- Step 3. Fill in the attribute list in the detail pane.

For the most part, you can choose the default values in the attributes. You will need to supply:

- Object name
- Label for the object which is displayed with the application icon in the Webtop launchbar
- Height and width in pixels that the application needs to display properly
- Command required to start the X application. This is the same command that you would use if you were starting the application on a regular X server.
- Command line arguments to the X application
- Environment variables that need to be set for the X application (usually none)

You can experiment with different values for the icon and you can try different values for **Display Using** and **Resumable**. See the **Webtop Control Center Assistant** or Section 4.3.5.1, “Setting session resumability options,” on page 4-24 for information on what effect the different values have for these attributes.

- Step 4. Click on **Apply**.

You can now add this object to any Webtop you desire by dragging and dropping its icon onto the selected Webtop and clicking the **Apply** button. The application will not appear in the launch bar until the next time the user logs in.

Exercise: Add an X application

Follow the steps in Section 4.3.5.2 on page 4-25 to add a new X application to the Webtop.

4.3.5.3 Adding a new character application

The process for adding a character application to the Webtop is similar to the process for adding an X application.

- Step 1. Right-click in an empty area of the children box.
- Step 2. Select **New Object** ⇒ **SCO Console Application** from the drop-down list.
- Step 3. Fill in the attribute list in the detail view pane.

Don't use the VT420 Application or Wyse 60 Application unless you are sure there is a need.

The height and width value for a standard 80 character by 25 line application is 560(w) x 375(h) with the font set to 12 point Courier. This value will change with changes to the font and font size. Be sure to look at the other attributes. The default settings may be fine, but you can do quite a bit of customization.

- Step 4. Click on **Apply**.

4.3.6 Debugging application objects

After creating an application object, you'll want to test that it launches correctly from the Webtop. To do this, you could assign it to a user's Webtop, log out, and log back in again as that user and launch it from the launch bar. However, this can be a time-consuming process.

Instead, you can launch the application from within the **Webtop Control Center** by clicking on the application icon in the detail pane displaying the Webtop for any organizational object (Org, Org Unit, or Person).

Depending on the value for **Display Using** for the application, the application will start up in the main Webtop window, a new independent browser window, or in an independent applet window (no browser controls).

4.3.7 Terminating sessions

If an application fails to launch properly and hangs due to improperly set values for the application object, you can monitor and kill application sessions with the **Control Center** ⇒ **Sessions** view.

To kill a session:

- Step 1. Right click in the parent box. Select **Sessions** from the drop-down list.
- Step 2. Select the user that launched the problem Application.
- Step 3. Select the problem application from the applications in the children box.
- Step 4. Select the specific session that is causing the problem. The sessions are identified by a timestamp.
- Step 5. Right-click on the **Session** object and select **End Session** from the drop-down list.

4.3.8 Controlling the Webtop using the command line

In addition to using the **Control Center** for Webtop administration, you can use a command line program called **webtop** in `/opt/webtop/bin` to control the Webtop.

Any user can run the **webtop help** and **webtop version** commands. All other **webtop** commands must be run as **root**.

Using the **webtop** command is the only supported way of controlling the Webtop server from the command line.

Do not attempt to control the Webtop server by running binaries directly, or by using **kill(1)**.

The **webtop** utility is a good tool for making modifications to the Webtop object store automatically. If you've created some sort of installation script (postinstall, for example, with the **pkg** tools), you can use the **webtop** command to add an application for your object and assign it to different Webtops automatically.

This command is also used to stop and restart the webtop daemon processes, determine status, and manage log files.

The **webtop** command has the following syntax:

webtop *option* [option-specific-arguments]

The options let you control the Webtop server in different ways, or produce information about the Webtop server. The command options are:

<i>admin</i>	Lets you manipulate parts of the datastore. This allows you to do many of the tasks that also can performed with the Control Center .
<i>archive</i>	Archives the Webtop server's log files.
<i>help</i>	Displays information about the usage of the webtop command.
<i>info</i>	Displays UNIX user and group information.
<i>query</i>	Examines the Webtop server's log files.
<i>restart</i>	Restarts the Webtop server.
<i>setup</i>	Lets you change Setup options.
<i>start</i>	Starts the Webtop server.
<i>status</i>	Reports Webtop server details: ● Whether the Webtop server's running ● Who's connected ● Which users are Webtop Administrators ● IP addresses of the connected client devices and Webtop server ● Running emulator sessions.
<i>stop</i>	Stops the Webtop server.
<i>version</i>	Displays the version of the Webtop.

For help on a particular option:

webtop *option* --help

Replace ***option*** with the **webtop** command you want help on. For example to display help on the **admin** option:

webtop admin --help

For more information on the **webtop** command options reference: **scohelp** ⇒ **Desktops** ⇒ **UnixWare 7 Webtop Administration Guide** ⇒ **UNIX commands** ⇒ **The webtop command**.

Exercise: Use the webtop command

Run the **webtop status** command. Review the information presented when you run **webtop admin --help**.

4.4 Customizing the Webtop by editing *.html* and graphic files

The Webtop provides administrators and developers with powerful customization capabilities. There are a variety of ways that you can customize the Webtop for your users. Simple modifications can be complete in as little as five minutes. More complex modifications can be made by using standard technologies like CGI, Java, and JavaScript.

The HTML files in the Webtop were created with Go Live™ Cyberstudio (now Adobe® GoLive™) which is a cross-browser web page editor. Cross-browser means that the HTML/DHTML/JavaScript produced by Cyberstudio will work for both Netscape and Microsoft Internet Explorer browsers, as well as other derivative web browsers. Cyberstudio excels at creating web pages that utilize mouse over effects that change page elements like buttons, dynamic help, opening new windows, and others.

When you hand edit a Webtop HTML file, you need to be aware of the different pieces of HTML and JavaScript that Cyberstudio has incorporated to create these effects and work with them. The first customization example shows how you can edit an HTML tag that includes additional instructions from Cyberstudio.

4.4.1 Add custom links to existing pages

The next sections describe two examples of how you can add custom links to existing pages. The first example shows you how to change the page accessed by the **The Internet** link on the user Webtop or on the administrator's **My Webtop** page.

The second example shows you how to add a link to the drop-down list of **Additional Helpful Links** on the administration Webtop. In each of these examples, you will encounter additional instructions that are created by Cyberstudio.

4.4.1.1 Changing The Internet link

To edit the **The Internet** link, there are two places that need changes in the */opt/webtop/webtops/en_US/admin/Webtop.html* or the */opt/webtop/webtops/en_US/standard/Webtop.html* file. The first is one of the CyberStudio objects. You can easily search for and replace the URL.

Two lines need editing:

The first line reads:

```
CSAct['B2807E4B4'] = new Array(CSGotoLink,/*URL*/
'http://www.sco.com/unixware/webtop/internet-links.html', '_blank');
```

CSAct is a JavaScript array. The **'B2807E4B4'** is a unique index in the array. This index was generated by Cyberstudio to be unique. It can be associated with any string like "The Internet." If you change it be sure to change all instances.

To change the link, for example, you can edit this line to read:

```
CSAct['B2807E4B4'] = new Array(CSGotoLink,/*URL*/
'http://www.varxyz.com/services.html', '_blank');
```

Then the second line to edit reads:

```
<CSACTION name="B2807E4B4" class="Open Window"
val0="http://www.sco.com/unixware/webtop/internet-links.html" val1
val2="540" val3="375" val4="NO" val5="YES" val6="NO" val7="NO" val8="NO"
val9="NO" val10="NO">
```

You can edit this line to read:

```
<CSACTION name="B2807E4B4" class="Open Window"
val0="http://www.varxyz.com/ services.html" val1 val2="540" val3="375"
val4="NO" val5="YES" val6="NO" val7="NO" val8="NO" val9="NO" val10="NO">
```

Note that there isn't a regular **** tag around this link, only the CS objects created by Cyberstudio.

4.4.1.2 Adding a link in the Additional Helpful Links drop-down list

The **Additional Helpful Links** link is also created with traditional HTML element tags and instructions from Cyberstudio.

There are two places that you need to edit to add a new link to this list. Locate the lines in the `/opt/webtop/webtops/en_US/admin/AdminHome.html` by searching for **"Choose From The Following Links"**.

Locate the following text:

```
<TD><CSOBJ w="205" h="18" t="URLPopup" data='{ 0 = { label = &quot;Choose
From The Following Links"; selected = &quot;YES&quot;; }; 1 = { label =
&quot;SCO web site (www.sco.com)"; url = &quot;http://www.sco.com&quot;;
}; 2 = { label = &quot;UnixWare 7 Help"; url =
&quot;http://honey.sco.com:457&quot;; }; 3 = { label = &quot;SCO OpenServer
5 to Unixware 7 Migration"; url =
&quot;http://honey.sco.com:457/DIFFS/CONTENTS.html&quot;; }; }'
target="_blank"><SELECT name="cs_popup_name_0"
onchange="CSURLPopupShow('FormName', 'cs_popup_name_0', '_blank');">
```

For example, to add a link, you can edit the line to read:

```
<TD><CSOBJ w="205" h="18" t="URLPopup" data='{ 0 = { label = &quot;Choose
From The Following Links"; selected = &quot;YES&quot;; }; 1 = { label =
&quot;SCO web site (www.sco.com)"; url = &quot;http://www.sco.com&quot;;
}; 2 = { label = &quot;UnixWare 7 Help"; url =
&quot;http://honey.sco.com:457&quot;; }; 3 = { label = &quot;SCO
OpenServer 5 to Unixware 7 Migration"; url =
&quot;http://honey.sco.com:457/DIFFS/CONTENTS.html&quot;; }; 4 = { label =
&quot;VARXYZ Service Page"; url =
&quot;http://www.varxyz.com/services.html&quot;; };
}'target="_blank"><SELECT name="cs_popup_name_0"
onchange="CSURLPopupShow('FormName', 'cs_popup_name_0', '_blank');">
```

<CSOBJ> is an object generated by Cyberstudio that gets attributes for width (**w**), height (**h**), type (**t**), data, and a target. The **target _blank** indicates that a new window will open. The data attribute contains an ordered list of links starting at **0**. Each element of this ordered list is an attribute value pair describing the list element label and the URL to go to if the element is selected.

The next line that you need to edit is standard HTML:

```
<OPTION value="http://www.sco.com">SCO web site (www.sco.com)
```

A similar line would be added, such as:

```
<OPTION value="http://www.varxyz.com/services.html"> VARXYZ Service
Page(www.varxyz.com)
```

Exercise: Add custom links

Follow the instructions in Section 4.4.1.1 on page 4-30 and Section 4.4.1.2 on page 4-31 to change and add links on the Webtop.

4.4.2 Changing the administration default embedded application

An embedded application is an application which is setup to appear automatically in the display area of the Webtop.

The administration Webtop is setup by default with CDE as an embedded application. When an administration user clicks on the **My Webtop** CDE is displayed within the display area of the Webtop.

To change the embedded application that is displayed from the **My Webtop** link from the administrator main Webtop page:

- Step 1. Create an object in the Webtop data for the replacement application as described in Section 4.3.4 on page 4-23.
- Step 2. Test the application by launching it from the Webtop launch bar or the Webtop **Control Center**, before you try using it to replace the default application on the administration Webtop. Follow the instructions described in Section 4.3.6 on page 4-26 to test the launching of the application.
- Step 3. Edit `/opt/webtop/webtops/en_US/admin/AdminHome.html`. The **HREF** value for the link to **My Webtop** that is responsible for starting the application is located in this file and it also references the page where the application is specified.

The relevant line in `/opt/webtop/webtops/en_US/admin/AdminHome.html` is:

```
<P class="tabletext"><A href="/webtop/cgi
bin/ttawebtop.cgi/webtop/webtops/en_US/
admin/Webtop.html?ob=../_ens/Org/CDE&aw=640&ah=480&ts=foo">
My Webtop</A></TD>
```

The **HREF** value for the **<A>** tag indicates that `/webtop/cgi-bin/ttawebtop` is called and is passed the filename `/webtop/webtops/en_US/admin/Webtop.html` with the arguments:

- **ob = ../_ens/Org/CDE**—Refers to an object.

Objects are in the form:

```
../_ens/Org/<object name>
```

where object name is the name of the object created for an application when added to the Webtop in the **Control Center**.

- **aw = 640**—Application width
- **ah = 480**—Application height
- **ts = foo**—Refers to timestamp or in this case a dummy value

Timestamps require JavaScript code for an exact calculation. If you don't have the need to create a timestamp (remember this identifies a particular application session in the **Control Center**) you can use a dummy value like **foo**.

All you need to replace in this line is the **ob** value. For example, if you want to run the **KDE** desktop instead of **CDE**, create an Application object using the Webtop **Control Center** and then edit the *AdminHome.html* file so that the line that links to **My Webtop** looks like:

```
<P class="tabletext"><A href="/webtop/cgi-bin/ttawebtop.cgi/webtop/webtops/en_US/admin/Webtop.html?ob=.../_ens/Org/KDE&aw=640&ah=480&ts=foo">My Webtop</A></TD>
```

4.4.3 Replacing the user Webtop "Welcome" message

By default, users accessing the user Webtop see a welcome message. This message can be replaced by more dynamic information or an embedded application.

In the following example, the welcome message is replaced by using a CGI script that reads the */etc/motd* file and inserts it into the Webtop page in place of the "Welcome" message:

Step 1. Edit the *Webtop.html* file.

In the *Webtop.html* file, the following lines refer to the welcome message graphic and text:

```
<TD><FONT size="4"><IMG height="93" width="291" src="media/Welcome.gif"></FONT></TD>
```

```
</TR>
```

```
</TABLE>
```

```
<P>
```

The UnixWare 7 Webtop offers easy access to the applications and information you use regularly.

```
<P>
```

The links on the left side of the Webtop provide information to help you use the Webtop more effectively. Move your mouse over these links to learn more about them.

<P>

The launch bar on the bottom of the Webtop screen is personalized for you by your Webtop Administrator, and includes applications and documents to help you perform your daily tasks. To change which applications appear in your launch bar, contact your Webtop Administrator.

<P>

For more detailed information about how to use your UnixWare 7 Webtop, click on "Using Your Webtop".

<P>

Leave the the graphic (and the table tags that position it) alone and replace everything between the first and last **<P>** tag with an identifier that can be recognized by a CGI bin script.

The edited lines:

```
<TD><FONT size="4"><IMG height="93" width="291"
src="media/Welcome.gif"></FONT></TD></TR></TABLE><P>%%MOTD
CONTENTS%%<P>
```

The %% is a start and end marker that is used throughout the Webtop to enclose a string. The Webtop CGI scripts search for specific strings to perform data substitutions. In this case we'll search for **%%MOTD CONTENTS%%** in a CGI script and replace it with the text found in the */etc/motd* file.

Because the */etc/motd* file contains plain text, you need to pay attention to how the Perl CGI script formats the text for HTML before doing the substitution.

- Step 2. Copy the *welcome.cgi* script into the */opt/webtop/cgi-bin* directory.

```
#welcome.cgi is a sample cgi script

#This sample file should be available from your
instructor or available with your training
materials

#!/bin/perl

#Changes the %%MOTD CONTENTS%% in an HTML file with
the real /etc/motd

#First get MOTD into a variable

open FH, "/etc/motd";

my ($buffer) = "";

while (<FH>){

    $buffer .= "$_<BR>";

}

close FH;

#Now replace the identifier in the Webtop.html file
with the motd message and write out to the Browser

open FH,
"/opt/webtop/webtops/en_US/standard/Webtop.html";

print "Content-type: text/html\n\n";

while (<FH>){

    s/%%MOTD CONTENTS%%/$buffer/g;

    print;

}

close FH;

exit;
```

This Perl CGI script:

- Puts the contents of */etc/motd* into a buffer.
- Reads the contents of */opt/webtop/webtops/en_US/standard/Webtop.html* each line at a time changing any reference of **%%MOTD CONTENTS%%** to the value of the buffer, and output each line to the browser.

Step 3. Edit the */opt/webtop/webtops/en_US/standard/index.html* file to replace the line:

```
<frame src="Webtop.html" name="DisplayFrame"
scrolling="auto">
```

with:

```
<frame src="/webtop/cgi-bin/welcome.cgi"
name="DisplayFrame" scrolling="auto">
```

When the *index.html* file is loaded, it reads the output of */webtop/cgi-bin/webtop.cgi* into the first frame instead of directly loading the */webtop/webtops/en_US/standard/Webtop.html* file.

4.4.3.1 Embedding an application into the user Webtop

Another method for changing the welcome screen is to embed an application into the user Webtop.

To replace the Welcome message in the user Webtop with an embedded application:

Step 1. Copy */opt/webtop/webtops/en_US/admin/Webtop.html* file to */opt/webtop/webtops/en_US/standard*. This is an easy way to begin the process of embedding an application into the user Webtop because the administration Webtop is already setup with an embedded application.

This will give you a page with all the embedded applet tags that will be required for an X application.

If you'd like to run a character application instead, edit the new *Webtop.html* file you copied from the */opt/webtop/webtops/en_US/admin* directory and replace instances of the string **XDE** with **TDE**. There will be two of them in the **<APPLET>** area plus a change to the value for **name**.

The original lines for the X application:

```
code="sco/tta12/xde/XDE.class"
```

```
name="Webtop X Emulator"
```

```
ID="XDE"
```

The lines modified for a character application:

```
code="sco/tta12/tde/TDE.class"
```

```
name="Webtop Emulator"
```

```
ID="TDE"
```

- Step 2. Modify the URL that loads the *Webtop.html*. For **root** and other administrator users using the *admin* theme, this is the *AdminHome.html* file.

For users with the standard Webtop theme, edit the *index.html* file. This is the first file loaded after login.

The *index.html* file contains a frameset specification. The source for the first frame is the *Webtop.html* file, so this is the URL that you need to modify to make the embedded application launch when the user logs in.

The relevant line *index.html* file before being modified:

```
<frame src="Webtop.html" name="DisplayFrame"  
scrolling="auto">
```

or if you worked through the MOTD example

```
<frame src="welcome.cgi" name="DisplayFrame"  
scrolling="auto">
```

and then after:

```
<frame src="/webtop/cgi-  
bin/ttawebtop.cgi/webtop/webtops/en_US/standard/Webtop.html?o  
b=.../_ens/Org/NewApp&aw=560&ah=375&ts=foo"  
name="DisplayFrame"scrolling="auto">
```

Notice that the value for **src** now looks like the value for the **HREF** in the previous section, where you modified the default application for root. This line in the *index.html* file will cause the application associated with the application object *NewApp* to be launched when the user logs in to their Webtop.

4.4.4 Creating additional user Webtop themes

Not all users will want the same application embedded in their Webtop. For example, a user in finance might want a financial or accounting application and a user in support might want a support trouble ticket application.

To create different environments for users beyond the application assignment in the Webtop **Control Center** you need to create new Webtop themes.

To create a new Webtop theme:

Step 1. Copy all the files (and symlinks) from the standard directory into a new directory in `/opt/webtop/webtops/en_US`. Name the directory something that has a connection to the users who will access this Webtop--“finance” or “support” for example. After the files are copied, make your customizations to the *Webtop.html* and *index.html* files.

Next you need to give a user or group of users the new Webtop theme. This is done with Webtop **Control Center**:

Step 2. Start the **Control Center**.

Step 3. Select the user or organizational unit to receive the new Webtop theme.

Step 4. Find the **Webtop Theme** attribute, from the attribute list in the detail pane.

Step 5. Enter in a new value for the theme. If your new directory is called “finance”, for example, enter finance. The name of the theme must be the same as the name of the new directory you create to hold the theme files.

The next time the user logs in, the Webtop pages will be taken from the new directory.

4.4.5 Changing Webtop graphics

Adding or changing the graphics for the Webtop can be tricky. Many of the pages have buttons that change when the mouse rolls over them. Some also display short help in the upper left corner when the mouse rolls over a button. If you decide to change the graphics for buttons or the the corner graphic, you need to be aware of all the graphic files affected.

You need to decide whether you’re going to replace all the related graphics or eliminate the rollover effects from the HTML files. Either way, it is additional work.

Also, you need to be aware that the dimensions of the graphics are often specified in the HTML files where they appear. If you change the dimensions of any graphics, you'll need to update the corresponding HTML file.

When testing, view the page with the new graphic and look especially for other elements on the page being out of position relative to the new graphic. Some other elements have been given specific positions on the screen based on the layout with the original graphics. Changes to graphics which include new dimensions may make the layout less readable unless these other elements are also repositioned.

Almost all graphics files are kept in */opt/webtop/media*. If you have a graphics viewer program (like **xv**), view each graphic and take notes on the size, the file name and the file names of other related graphics before you replace the file.

Use the themes that are available on the SCOWebtop website:
<http://www.sco.com/unixware/webtop/custom/themes.html> as template for how the pages can be laid out and what graphics you'll need to replace or create.

4.5 Adding documentation to the webtop

If you're customizing the Webtop, you can add documentation on new features or properties you've given the Webtop. Adding documentation to the Webtop is simple for anyone with a basic grasp of UNIX and HTML.

The three main Webtop guides are located in `/opt/webtop/help/html/en_US`.

To add new documentation, create new directories under the `en_US` directory. Add HTML files in these directories. You can then make the files accessible by creating links to your documentation from the:

- launch bar
- Help pages

or

- Webtop guides

For all adding or editing of documentation files, you should be logged in as **root** on the Webtop host. You should also be sure that the directories and files you are creating have the proper permissions for Web access.

4.5.1 Adding documentation to the Help pages

There are two Help pages; one is accessed from the user webtop and the other from the administrator Webtop. The files are:

User Webtop	<code>/opt/webtop/webtops/en_US/standard/wt_options.html</code>
-------------	---

Administrator Webtop	<code>/opt/webtop/webtops/en_US/admin/wt_options.html</code>
----------------------	--

To add links to either of these files, edit the file and insert links wherever it makes sense. These files use a table structure in which each table row has a cell with the title of a book and a cell with the description of the book. You can add links in this format, or change the format if you prefer.

4.5.2 Adding links to the Webtop guides

Adding links to the Webtop guides is more complicated, because the navigation buttons used in the guides must be edited by hand. The easiest way to get the proper HTML links in place is to copy an existing page and manually edit which pages the “back” and “next” links refer to, depending on where in the table of contents you want your page to go.

To create a page about a customized theme for the Webtop in the **Webtop Administration Guide**:

- Step 1. Create a directory in `/opt/webtop/help/html/en_US` for your new documentation. For example, by entering the following:

```
cd /opt/webtop/help/html/en_US  
  
mkdir custom_doc
```

- Step 2. Copy a page from the **Webtop Administration Guide** into your new directory. Example:

```
cp /opt/webtop/help/html/en_US/ag_ref/standard_webtheme.html  
/opt/webtop/help/html/en_US/custom_doc/custom_theme.html
```

- Step 3. Decide where you want your new page to go by looking at the table of contents file for the appropriate guide. To put the new file into the Webtop Administration Guide, you would view its table of contents file (`/opt/webtop/help/html/en_US/admin_toc.html`).

For example, to place your customized theme page in the **Reference** section after **Standard webtop theme**, you would add the new link by editing the table of contents file and adding HTML text after the entry for the standard Webtop theme:

```
</A><LI><A  
HREF="ag_ref/standard_webtheme.html#standardwebtopt  
heme">Standard webtop theme</A></UL>
```

```
<LI><A  
HREF="custom_doc/custom_theme.html">Customized  
theme</A>
```

```
<LI>Applets</LI>
```

- Step 4. Edit the navigation links in your new document. Note the locations of the pages that come before and after your new page in the Table of Contents. Search for the HREF values for the navigation images. For the **Back** button look for `prev.gif`. For the **Next** button look for `next.gif`.

Replace the page references with the relative URLs for the new pages that come before and after your document. In this example, you'd make the following changes:

```
<A HREF="../ag_ref/standard_logintheme.html"><IMG  
border=0 SRC="../art/prev.gif" ALT="Back"></A>
```

becomes

```
<A HREF="../ag_ref/custom_webtheme.html"><IMG  
border=0 SRC="../art/prev.gif" ALT="Back"></A>
```

Because we used the page that comes immediately before the new document as our base when creating the new document, the **Next** reference remains the same:

```
<A HREF="../ag_ref/applet_overview.html"><IMG  
border=0  
  
SRC="../art/next.gif" ALT="Next"></A>
```

- Step 5. Edit the **Next** button in the document that comes before your new page, and the **Back** button in the document that comes after your new page. Follow the guidelines in Step 6 to search for the HREF values for the next and previous images and replace them with the appropriate relative URLs.

Your new file should now be appropriately referenced in the table of contents file and linked to in the navigation.

To add information from your new document to the Index for the Guide, edit the `admin_keywords.html` file for the **Webtop Administration Guide** by adding links to your new information.

4.6 Troubleshooting Webtop problems

Most problems with the Webtop can be solved using the **Control Center**.

The **Control Center Assistant**, displayed in a frame under the **Control Center**, provides easy to follow instructions for performing common tasks. The **Control Center Assistant** includes a section on diagnosing and solving users' problems.

To solve a user's problem, click on the **Control Center** ⇒ **Solve A User's Problem**.

4.6.1 View Webtop diagnostic messages

To view the Webtop diagnostic messages:

- Step 1. Login into the Webtop as **root**.
- Step 2. Click on the **Admin Guide** icon on the launch bar.
- Step 3. Click on the **Webtop Diagnostics** link near the bottom of the Webtop Administration Guide topic list.

You can use the **webtop query** command to examine the Webtop log files. Webtop log files contain diagnostic, statistical and error information output by the Webtop server.

The Webtop server uses multiple log files which it may write to at any time. The name of the diagnostic and statistical logs contains the process id of the Webtop process about which information is being logged.

Log files are stored in `/var/webtop/log`. To access this directory, you must be logged into the UNIX host as root.

Do not delete any files in the log directory. To reclaim some disk space, first use the **webtop archive** command to archive the logs, then delete the archive. Archiving the logs compresses the files and moves them to a numbered subdirectory of the log directory. A file *summary.txt* in this directory contains the results of performing **webtop query** at the time of the archive. You can delete archived log files without affecting the server.

The **webtop status** command reports Webtop server details including:

- Whether the Webtop server's running
- Who's connected
- Which users are Webtop Administrators

- IP addresses of the connected client devices and the Webtop server
- Running emulator sessions.

4.7 Lesson Summary

As a Webtop system administrator you will need to understand the concepts that describe the Webtop components. These concepts include:

- Datastore
- Organization hierarchy
- Objects
- Themes
- Applets

You will also need to manage Webtop files and directories located in `/opt/webtop` and `/var/webtop/log`.

You can complete simple modifications to the Webtop easily. You can use the **Control Center**, **webtop** command line, and you can edit the default administrator and user Webtop files to create a customized solution for your organization and users.

For more complex modifications, as well as for programming new applications, you can use powerful and standard Internet programming tools like CGI, Perl, TCL, Java, and JavaScript.

Review questions

1. What is the Webtop datastore?
2. What two user types are setup by default with the Webtop?
3. From which **Control Center** view do you add an application to the Webtop?

4. How can a user without a person object log into the Webtop?

5. What tool is used to create the Webtop HTML files? How does this affect the process of making customization edits to the standard Webtop files?

4.8 Relevant Commands, Files, Directories, and Scripts

The following commands, files, directories, and scripts were presented in this lesson.

Relevant commands

webtop Program to control the Webtop. To run this program, you must be logged into the UNIX host as root, with the exception of the **webtop help** and **webtop version** commands, which any user can run.

Relevant files, directories, and scripts

<i>/opt/webtop/cgi-bin</i>	CGI files used for user Webtops
<i>/opt/webtop/cgi-bin/admin</i>	CGI scripts used in the administrator Webtop.
<i>/opt/webtop/login/boot</i>	Files that are used during the login process.
<i>/opt/webtop/login/en_US/standard</i>	Files that are used during the login process.
<i>/opt/webtop/webtops/en_US/standard</i>	HTML files for the standard desktop that ordinary users see.
<i>/opt/webtop/webtops/en_US/admin</i>	HTML files for the administration (admin) Webtop.
<i>/opt/webtop/media</i>	The <i>.gif</i> and <i>.jpg</i> graphics files.
<i>/opt/webtop/java</i>	Java applets and <i>.class</i> files.
<i>/var/webtop/log</i>	Directory containing the log files.

Example scripts include in */opt/webtop/cgi-bin*:

<i>/userinfo.cgi</i>	User Information
<i>/sysinfontet_get.cgi</i>	Network Neighborhood
<i>/admin/*k at/opt/webtop/bin/ns</i>	System Troubleshooting
<i>/admin/scoadmin_get.cgi</i>	Sample Tcl script

4.9 Lab: Create a new user and theme to run a custom application

Overview

Create a new user and new theme for the user. Customize the new user theme to automatically run a custom character based application from within the browser window when the new users logs into to the Webtop. This lab uses the standard application **pine(1)** as an example because it is a standard application available on all UnixWare 7 systems. You can use the same instructions to add a custom character application that is important to your user base, such as an accounts receivable database application for users in an accounting department or a customer service database application in a support department.

Procedure

Create a new application object.

- Step 1. Run the Webtop **Control Center**.
- Step 2. Right-click in an empty area of the Object frame.
- Step 3. Select **New Object** ⇒ **SCO Console Application** from the context menu.
- Step 4. Fill in the attribute list in the detail pane.

Object Name—pine

Label—pine

Application—/usr/bin/pine

Use the existing defaults for the remaining attributes.

- Step 5. Click on **Apply**.

Add the application to the user Webtop.

- Step 1. Right-click on Organization and select **Webtop**.
- Step 2. Click on the **Application** icon in the details view pane.
- Step 3. Drag the **pine** application icon from the children box to the details view.

- Step 4. Create a new UnixWare 7 user account for **lab1** with **SCOadmin** or **useradd(1M)**.
- Step 5. Log into the **lab1** account.
- Step 6. Click on the **pine** icon in the launch to make sure that you can run **pine(1)** from the Webtop.

Create a new user object.

- Step 1. Run the **Control Center** as a Webtop administrator.
- Step 1. Click on the organizational unit object (or the organization object) you want the user's person object to belong.
- Step 2. Right-click in the background of the Children box, click on New Object, then click on Person. The new person object's attributes are shown in the Details pane.
- Step 3. Enter a **lab1** for username in the Object Name box. This is the username the new user will use to log into the Webtop.
- Step 4. Enter the username in the **Authenticate Using** box of a UNIX user whose password this user can type to log into the Webtop. Prefix the username with the special setting (**Automatic**) to use the person object's Object Name.
- Step 5. Click on **Apply**.

Create a new theme for **lab1**.

- Step 1. Type **mkdir /opt/webtop/webtops/en_US/lab1** while you are logged in as root.
- Step 2. Copy the following files and directories from **/opt/webtop/webtops/en_US/admin.html** to **/opt/webtop/webtops/en_US/lab1**.
 - **/media**
 - **Webtop.html**
 - **WebtopNetworkNei.html**
 - **WebtopUsers.html**
 - **appserv_handlogin.html**

- *appserv_logindetails.html*
- *dologout.html*
- *index.html*
- *left.html*
- *sco.css*
- *tde.html*
- *wt_options.html*

The file *index.html* is a frameset which divides the browser into two frames; the **DisplayFrame**, containing the Webtop, and the **Linkframe**, containing the launch bar. You may see the identifier **%%CGIPASSTHRU...** within many of the frameset pages.

This keyword is used by the CGI program **ttawebtop.cgi** as a way of telling the program to parse the HTML page specified by the **src** attribute in the **<FRAME>** tag. The rest of the files copied support the features of the HTML page, such as logout, help, style sheets, and images.

Edit the *index.html* file to load **pine(1)** by default and remove the **back** button.

Step 1. Edit *index.html*.

The page must be modified to call the **pine(1)** application and load it into the page *Webtop.html*. The file *index.html* is modified to look like this:

```
<html><head>

<base href="%%BASE%%">

<title>Horizontal webtop</title>

</head>

<frameset rows="*,60" border="1" framespacing="1"
frameborder="yes">

<frame
```

```

src="/webtop/cgi-
bin/ttawebtop.cgi/webtop/webtops/en_US/lab1/Webtop.
html?ob=.../_ens/Org/pine&aw=640&ah=480&ts=gunk"

name="DisplayFrame" scrolling="auto">

<frame marginwidth="0" marginheight="0"
src="%%CGIPASSTHRU left.html%%"

name="LinkFrame" scrolling="auto">

</frameset>

</html>

```

When the first frame is loaded, **ttawebtop.cgi** is called and passed the file name */webtop/webtops/en_US/lab1/Webtop.html*, the application object **pine** (**_ens/Org** is the datastore directory in */var/webtop*), and the applet parameters width, height, and timestamp.

After this modification is made, the application will be launched when the **lab1** user logs into their Webtop. An additional modification is made to *Webtop.html* to remove the **Back** button from the upper right hand corner. The button is useless in a single page scheme such as this. To remove this button:

Step 2. Delete the following line in *Webtop.html*:

```

<TD><A href="javascript:history.back()"><IMG
height="37" width="44" src="media/
TopNavBack_y.gif" border="0"></A></TD>

```

Assign the new theme to your user object.

- Step 1. Select your organization.
- Step 2. Right click on **lab1** users object.
- Step 3. Change the Webtop theme to **lab1**.

Test your customization.

- Step 1. Log into the Webtop as **lab1**.
- Step 2. Confirm that **pine(1)** automatically launches.

4.10 Answers to Review Questions

1. The Webtop datastore is the sum of all the information used by the various components of the Webtop. The datastore includes information about hosts and users on the network, Webtop session information, and organizational information that you provide.
2. The administration (admin) and a standard user Webtop are setup by default when you install the Webtop.
3. To add an application to the Webtop, select the **Organization view**.
4. Users without person objects can also log into the Webtop without typing a username and password, provided that the **Allow Anonymous Login** attribute in the Security server configuration object is selected.
5. The HTML files in the Webtop were created with GoLive™ Cyberstudio (now Adobe® GoLive™) which is a cross-browser web page editor. When you hand edit a Webtop HTML file, you need to be aware of the different pieces of HTML and JavaScript that Cyberstudio has incorporated to create these effects and work with them.

A

***Webtop Application
Programming***

Instructor Guide

Instructor Guide

Lesson A

Webtop Application Programming

Suggested lesson duration

This lesson is designed to be completed within 1 hour.

Pre-lesson classroom preparation

Load the sample Hypertext Markup Language (HTML) files, themes, and programs into a directory on each of the classroom systems.

Instructor preparation

Review programming basics for Java, JavaScript, CGI, Perl, and Tcl.

AV 1-1

The slide is titled "Webtop Application Programming" in a blue header bar. The main content area contains a bulleted list of topics. The footer is a blue bar with the text "webtp0501" on the left and "© The Santa Cruz Operation, Inc." on the right.

- Define Webtop programming basics for:
 - Java
 - JavaScript
 - CGI
 - Perl
 - Tcl
- Compare and contrast Webtop programming tools

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Instructor Guide

Introduction

You can use powerful industry standard programming tools for creating sophisticated customizations and new programs to use with the Webtop. These tools include:

- Java
- JavaScript
- Common Gateway Interface (CGI)
- Perl
- Tool command language (Tcl)

Objectives

AV 1-1: Installation Planning

The first slide describes the overall topics covered in this lesson.

By the end of this lesson, you will be able to:

- Define Webtop programming basics for:
 - Java
 - JavaScript
 - CGI
 - Perl
 - Tcl
- Compare and contrast Webtop programming tools

1.1 Customizing with new applications

In addition to adding traditional X and character applications that have already been developed. You can develop new applications and rewrite old applications for the Webtop using web-oriented languages, including:

- Java
- JavaScript
- CGI

You can use the stock Webtop as a source of examples for creating new programs. The Webtop itself contains many examples of how to solve different types of problems with new html and Java and JavaScript Webtop programs. Read through the different files; borrow and adapt what you can to implement roll-over effects on buttons, create forms, open new windows, embed applications, layout page elements, and other tasks.

To see an example of registering an application with the Webtop programmatically, take a look at: `/opt/webtop/bin/scoadmin`. This is a shell script called to register each of the **scoadmin** applications with the Webtop during the Webtop installation.

You may also want to take a look at scripts in `/opt/webtop/cgi-bin/admin`. There are several Perl scripts that implement the **System Troubleshooting** pages in the administrator Webtop. In this directory, there is also a useful TCL CGI example:

`/opt/webtop/cgi-bin/adminscoadmin_get.cgi`

1.1.1 Java, JavaScript, and CGI

Java, JavaScript, and CGI are all used together to create the Webtop and they are excellent choices for Webtop application development.

Java is the most powerful and complete language available but also takes the most time to learn and to program well in. The benefit of Java is that its power can be harnessed to perform just about any task you undertake.

JavaScript and the scripting languages commonly used to create CGI programs are more readily accessible to the non-programmer than Java. However, due to security considerations and the **http** protocol, these tools are inherently limited in the tasks they can be applied to. Still, they offer a rich set of methods to meet application programming needs.

1.1.2 Java using X versus Java networked

Java has the ability to run inside a web browser (an applet) or as a full application running independently of a browser. Because Java is designed to be a cross-platform language, your Java applets and applications should run on any supported operating system without recompiling.

Running a Java applet or application through the Webtop works well. If you would like the Java application to run on the server, create an X application object for it in the **Control Center**. It would then be displayed through the XDE applet in a browser window just like any other X application. If you would like the Java application to run on the client, create a Document object for the HTML page containing the applet.

Java applications will need to take care of their own networking (if needed) or use the **http** protocol to communicate with the web server.

There are several potential advantages to running the Java application under X.

- If there is no need for the application to be on the client (not performing any client-specific access), then you won't need to worry about networking. The server resources are accessed locally, not from the client over the network.
- If you have lightweight clients or underpowered PCs, you can keep the CPU load and memory consumption concentrated on a more heavily configured central server.
- You can take advantage of running Java on a more efficient server JVM, such as SCO's PerkUp which allows multiple applications to run concurrently on a single JVM with dramatically improved performance.
- You can take advantage of the performance improvement gained by using a native compilation of your Java application.

1.1.3 JavaScript basics

JavaScript is a language unrelated to Java. It does, however, provide for some limited communication with Java applets by allowing access to exported methods of a Java applet.

JavaScript can also be used to generate dynamic content, validate user input before it is submitted to the server, create animation effects, and swap images (to make a button look like it is pressed in when the mouse rolls over it, for instance).

1.1.3.1 JavaScript embedded in an HTML file

The **<SCRIPT>** and **</SCRIPT>** tags indicate the beginning and end of a JavaScript block within an HTML document.

Most frequently, JavaScript functions and variable initializations are written in a block, within the **<HEAD>** portion of the document.

Event handlers (or callbacks) are used to access variables and functions. The event handlers are specified as parameters to HTML tags in the **<Body>** section of the document. They can be called by events such as a mouse click on a link, a mouse rollover of a link or button, processing a form or validating a form field, and others.

<SCRIPT> blocks may occur in the **<BODY>** section of the documents as well.

The usual usage is: **<SCRIPT language="JavaScript">/JavaScript commands ...</SCRIPT>**

For more information on other values for language tag, consult a JavaScript reference text.

1.1.3.2 <!-- ... //--> commenting

Some browsers do not support JavaScript. Webtop users should be accessing the Webtop through version 4.0 browsers, with full JavaScript support (see the **UnixWare 7 Webtop Release Notes** for a list of supported browsers).

If you are using existing JavaScripts you might see the convention for hiding JavaScript from incompatible browsers. This convention uses HTML comment markers inside the **<SCRIPT></SCRIPT>** block with a JavaScript comment marker before the HTML close comment. Example:

```
<SCRIPT language="JavaScript">  
  
<!--  
  
...  
  
//-->  
  
</SCRIPT>
```

The contents of the **<SCRIPT>** block are ignored by browsers that don't support JavaScript and the embedded HTML comment is ignored by JavaScript capable browsers. For comments within the JavaScript, use a double-slash **//** as the first non-white space string:

```
// Function List() : list the environment variables

function List() {

...

}
```

1.1.3.3 Variables, control Statements, input/output

JavaScript is very readable. It uses syntax that is similar to C and C++. Variables are declared, semi-colons end a statement, and it uses if-then-else and while control statements.

There are functions, return values and also events which can call functions.

There are methods, attributes, and an object-oriented syntax, including:

variable declaration and initial assignment **var** *name* 10;

conditional branch **if** (*condition*) **then** {*statements*; } **else** {*statements*; }

conditional loop **while** (*condition*) { *statements*; }

write method for document object write output to page
 document.write("Message: " + message); .

function declaration **function validate** (*arguments*) {*statements*; }

event handlers that call a function
 onclick, onmouseover, onchange, onload
 DOM (Document Object Model)

The Document Object Model describes how to reference different elements or objects of an HTML document. Each HTML tag in a web page creates an object that the browser keeps track of.

The objects are organized into a hierarchy that reflects a parent-child relationship between objects. A window would be a top-level object.

Windows can have children such as Documents and Frames. Documents can have a variety of children: Anchors, Layers, Forms, Images, and others. This hierarchy of objects makes it possible to reference the attributes and values of the various HTML tags so that you can read the current state of the values and modify the values with JavaScript. This allows the web designer to create dynamic and interactive content without always having to force a page to reload.

The document object model differs from browser to browser, and even between different versions of the same browser. It's best to get a reference book with a diagram that lays out the DOM as well as the supported functions and event handlers available for the various object classes.

1.1.3.4 Testing web pages that you use JavaScript

If you can not specify that your users use a specific browser and browser release. Test any web pages you create using JavaScript on, at the very least, Microsoft Internet Explorer and Netscape Navigator/Communicator browsers.

The implementation of JavaScript and the objects that can be referenced and manipulated from JavaScript vary significantly from browser to browser. Keep a reference handy and always test changes on all browsers (and even platforms, because the browser implementation on each operating system type may vary) that you intend to support.

There are also differences in the JavaScript and DOM between different releases of the same browser.

Web technology is theoretically open and cross-platform but in practice you can run into incompatibilities. Try to use simple, straight forward features that are indicated as cross-platform in the various JavaScript, HTML, and DHTML reference books.

Webtop applications can be accessed from an enormous array of clients such as handheld PDA's, cell phones, WebTV, and the standard PC. Each device will contains a different browser, further complicating the developer's test matrix.

Before attempting to build a web-based application, take good inventory of the browsers which you feel you must support, and drop those clients and browsers which you think will have little use of your application. This will save time and energy in the design, development, and testing of your application.

1.1.3.5 Controlling existing character applications with JavaScript

The Terminal or Character applet used in the Webtop is a powerful tool that allows you to transform existing character applications into graphical or semi-graphical applications within a web browser. With the Character applet and JavaScript, you can turn a character application into a full form-based web application, or simply add a couple of shortcut buttons for common operations that are displayed alongside the character application screen.

Knowledge of JavaScript, the Document Object Model (DOM) and HTML are requirements for any developer who would like to create a richer graphical interface for a character application within the Webtop.

The Terminal applet `/opt/webtop/java/TDE.class` is the primary component of the Webtop's display engine. This applet establishes a line of communication between server and client, allowing for the emulation of a character application and interaction with the application. **TDE.class** is a Java binary file called from within `tde.html`.

TDE.class can emulate ansi, VT420 and Wyse terminals. This attribute is configured when the application is registered with the Webtop.

The file `tde.html` can be augmented with additional HTML content to suit design needs, or can be copied to a new file if the changes are specific to only certain applications. It is important that the file specified by the application object attributes in the **Control Center** must contain the correct embedded applet information `<TTAAPPLET>` to invoke the **TDE.class** applet.

The applet reference specifies the codebase, name, ID and timestamp for the applet being invoked. After the **TDE.class** applet is run, access to the character display it creates on the Webtop is available for JavaScript access. It's important to note that the application seen within the browser is just a display, not the actual application. The application is running on the server with its input and output being captured by the Webtop.

You should keep in mind that there is network latency in transmission of characters between the server and client, as well as display latency introduced by the CPU, browser, and client side Java Virtual Machine. Accessing the character application with the browser should be thoroughly tested for timing issues and latency in order to gain the most from moving the application to HTML. This may require some modifications to the display characteristics of the applications, such as removing buffer lines.

A compact application with delimiters and a small number of rows and columns will be an easy type to move to HTML. Applications with many levels of menus, inconsistent screen layout or delimiter usage, and a larger number of lines and columns will be more difficult and require much more JavaScript code.

Using HTML controls such as buttons or select lists can speed up the use of an application by writing multiple commands to the emulator screen at once. For example, a button element which, when pushed, advances the user ahead several screens. Such a shortcut can be developed using HTML and JavaScript and the TDE.class methods.

You need to decide what your goals will be. You might choose to completely hide the character interface to the application by placing it in a hidden frame, or by setting its height and width to **0**. You could also provide a mixed environment where common functions like **Execute** or **Print** are available as shortcut buttons alongside the regular character interface. Either way, your goal is to make the application more accessible and easy to use.

1.1.3.6 Using JavaScript to access the emulator applet

The TDE applet makes three methods, available through JavaScript: **GetText**, **SendKey** and **SetText**. Each of these may be accessed using the applet's DOM reference and calling the method directly.

The term "scraping" is used to describe getting text from an emulator applet.

A JavaScript example of scraping the first 20 characters from the first row of the emulator applet and sending an alert to the user is:

```
<SCRIPT language="JavaScript">

var alerttext = document.applets[0].GetText(0,0,20);

alert (alerttext);

</SCRIPT>
```

This example assumes several things. First, that the JavaScript is embedded or referenced from the page containing the applet, and second, that the TDE applet is the first applet on the page. The first applet is literally the first **<ttaapplet>** reference seen by the browser's interpreter. The browser stores the applet's reference in an array of applets for access.

The previous section mentioned that the character application display could be hidden from view. If you were to use a hidden frame, the JavaScript call would have to access the other frame through the DOM:

```
<SCRIPT language="JavaScript">

var alerttext =
parent.EmulatorFrame.document.applets[0].GetText(0,0,20)

alert(alerttext)

</SCRIPT>
```

Within the Frameset page, the frame containing the emulator would have **name=EmulatorFrame**, and again, the applet would need to be the first applet on that page.

Netscape Communicator and Internet Explorer implement the DOM in different ways. You will notice in *tde.html* that there is an ID tag within **<ttaapplet>**. This tag is supported by Internet Explorer, so that accessing the applet's methods is a bit simpler:

```
document.TDE.GetText(x,y,z)
```

1.1.3.7 Reference for the GetText function

GetText function:

Description	This function scrapes text from the emulator screen. It has two forms. The first returns text of a given length from the current cursor position. The second form allows you to specify the position from which text is returned.
Syntax	<pre>string GetText(intLength) string GetText(intLine, intCol, intLength)</pre>
Parameters	intLength—The number of characters to be scraped. intLine—The starting line position that text is to be scraped from. intCol—The starting column position that text is to be scraped from.

Screen coordinates are calculated from the top left corner of the emulator screen and begin at line 0, column 0.

1.1.3.8 Reference for the SendKey function

Description	This function sends an action key to the remote UNIX application. You can specify a modifier key.
Syntax	<code>void SendKey(strKey, strModifier)</code>
Parameters	<code>strKey</code>—The key to be sent to the application. You can send one of the following: Return, Enter, Tab, Escape, CapsLock, Insert, Home, PageUp, Delete, End, PageDown, Up, Down, Left, Right, NumLock, PrintScreen, ScrollLock, Pause, F1 to F12 <code>strModifier</code>—A modifier key used in conjunction with <code>strKey</code>. Each modifier key is represented by a mask as follows: • None—0 • Shift—1 • Ctrl—2 • Alt—4

The following JavaScript code sends an unmodified carriage return to the application running in a Webtop terminal emulator:

`SendKey(Enter, 0)`

1.1.3.9 Reference for the SendText function

Description	This function sends a character string to the remote UNIX application.
Syntax	<code>void SetText(strString)</code>
Parameter Description	<code>strString</code> —The string to send.

The following piece of JavaScript code sends the text “Hello world!” to the remote UNIX application.

```
SetText("Hello world!")
```

1.1.3.10 Launching applications using JavaScript

You can use JavaScript to bypass the Webtop mechanism and launch application objects directly. For example, you could engineer a solution where an application is launched as soon as one of your users logs in to the Webtop. In addition, the functionality illustrated here, used in conjunction with the methods exposed for the login, Webtop tray, terminal emulator, and X emulator applets, opens the possibility for you to create a JavaScript application to handle a user's Webtop session.

Launching an application object from a JavaScript application involves constructing the URL that the Webtop would use to launch the application from the HTML. The code below illustrates how to do this. The first segment of code, *Launch.html*, is an HTML file containing details of an application object (an Xterm). These details are parsed by the second piece of code (*Launch.js*), which is the JavaScript that constructs the URL.

If you recreate this example, all referenced objects and files must exist in the locations specified, and the HTML file must be called through the **ttawebtop.cgi** program.

The next two pages show a sample launch JavaScript.

```
<HTML>
<TITLE>Launch.html</TITLE>
```

```
</HTML>
<BODY>
<SCRIPT LANGUAGE="JavaScript" SRC="launch.js"></SCRIPT>
<FORM>
<INPUT TYPE=button VALUE="Xterm"
onClick='launch("../_ens/Org/xterm", 640, 480, "xde.html")'>
</FORM>
</BODY>
</HTML>

// This function is used by the timestamp generator.
function pad(number, digits) {
  num = new String(number)
  while(num.length != digits) {
    num = '0' + num;
  }
  return num;
}

// Launch an application object. Arguments:
// - object's TFN name in datastore.
// - applet width in pixels.
// - applet height in pixels.
// - emulator applet page (usually xde.html or tde.html).
//
// Emulator applet pages assumed to be in
// $TTADIR/webtops/en_US/custom
function launch(object, width, height, applet_page) {
  days = new Array("Sun", "Mon", "Tue", "Wed", "Thu", "Fri", "Sat");
  months = new Array("Jan", "Feb", "Mar", "Apr", "May", "Jun", "Jul",
    "Aug", "Sep", "Oct", "Nov", "Dec");
  // This is the page's URL.
  this_url="%%CGIPASSTHRU%%";

  // Check that it has been run through ttawebtop.cgi
  if (this_url.indexOf("cgi-bin") == -1) {
```

```
document.write("Error - Must run through ttawebtop.cgi!");
return;
}
// Get the Webtop stuff out of the URL.
a = this_url.split("/");
loc = "";
i = 3;
while (a[i] != "cgi-bin") {
loc += a[i] + "/";
i++;
}
tta_url = a[0] + "://" + a[2] + "/" + loc + "cgi-bin/ttawebtop.cgi/" +
loc + "webtops/en_US/custom/" + applet_page;
// Generate a timestamp.
d = new Date();
urldate = days[d.getDay()] + ' ' +
months[d.getMonth()] + ' ' +
pad(d.getDate(), 2) + ' ' +
pad(d.getHours(), 2) + '%3a' +
pad(d.getMinutes(), 2) + '%3a' +
pad(d.getSeconds(), 2) +
'+GMT%2b00%2b00' + ' ' + ' ';
year = d.getFullYear();
if (year < 1900) year += 1900;
urldate += year;
// Build the final URL.
url = tta_url + "?ob=" + object + "&aw=" + width + "&ah=" height +
"&ts=" + urldate;
// Launch the application. Replaces the current page.
location.href = url;
}
// The End
```

1.1.3.11 JavaScript restrictions

There are several things that JavaScript can not do. These are restrictions rather than deficiencies, and they have to do with security. You would not want a random web page author to have the ability to write arbitrary files to your client's hard disk or, worse yet, to remove files.

A good JavaScript book will list these restrictions.

1.1.4 CGI Basics

CGI is a protocol which specifies how information may be passed from a web page to a web server and back to the client browser.

CGI 1.1 is the protocol used by the Netscape FastTrack Server 2.01a, which ships with all versions of UnixWare 7. The actual CGI program is similar to invoking an **rsh**, **rexec** or **rcmd** as a user with a reduced set of permissions and having the program's output sent back and interpreted by the browser.

The reduced set of privileges is a result of the web server spawning processes with owner "nobody." (By default, "nobody" should have fewer privileges than a guest account.)

The CGI programs for the Webtop are located in `/opt/webtop/cgi-bin`. They consist of CGI programs developed by SCO Tarantella and the Webtop team. The directory `/opt/webtop/cgi-bin/admin` is a password protected directory containing private CGIs which can only be accessed by the FastTrack user group **webtopadmin** or by **root**.

The **System Troubleshooting** and **System Administration** pages access this protected directory where the CGI scripts that implement the functionality of those application pages are kept. (This is why the web browser asks you to re-authenticate before allowing access to these pages.) Several of these CGI programs are **setuid** to **root** in order to accomplish their tasks.

The CGI program runs within an environment containing information from the **http** request and the local environment.

1.1.4.1 Environment variables

Understanding environment variables is the first step in using CGI to process and return information. Examine the environment variables that the client's web browser sends to the server when it makes a CGI request. They are a mix of server-and client-side attributes and values.

Detecting a browser type through CGI is as simple as parsing the value sent to the server using the **HTTP_USER_AGENT** variable.

Likewise, the client's IP address can be accessed through the **REMOTE_HOST** variable.

The most common environment variables to access are the ones that transfer data from the client to the server (**CONTENT_LENGTH** and **QUERY_STRING**), the browser type requesting the data (**HTTP_USER_AGENT**), and the remote hosts' location and language (**HTTP_ACCEPT_LANGUAGE** and **LANG**).

The browser type is important to determine because certain page behavior requires a different implementation in HTML, DHTML, or JavaScript depending on the browser

The most common differences are between Netscape Navigator/Communicator and Microsoft Internet Explorer.

Although the Webtop has not been fully internationalized, you can choose to take different actions in your CGI scripts depending on the **LANG** settings.

1.1.4.2 Perl - The de facto standard for CGI scripting

Perl has become the de facto standard for CGI programming because of its fast execution and built-in regular expression matching.

As mentioned earlier, several scripts need to run as **setuid root** in order to provide the functionality for the **System Troubleshooting** pages.

One of Perl's strengths is its **setuid** security. A Perl script running as **setuid** will run in "taint" mode. The script "taints" all outside information accessed from within the script. This requires the programmer to check for valid input for each variable that they wish to use as an argument to a command that is run within the script.

1.1.4.3 Processing a form

One of the most common tasks performed by CGI is processing user input that has been submitted using an HTML form. To write a CGI script to do this, you need to be familiar with the basics of how data is passed to a CGI, how to read that data, and how to write it back out to the browser.

1.1.4.4 Environment variables

Perl keeps all CGI environment variables in a type of associative array called a hash. The name of the environment variable hash is **%ENV**. The % sign in Perl is used to describe a hash. Hashes contain a key-value pair.

In the case of a CGI request, the key refers to a CGI environment variable, and both the web server and the client browser fill in the values.

Below is a partial list of sample CGI environment variables on UnixWare 7.1:

GATEWAY_INTERFACE: CGI/1.1

HTTPS: OFF

HTTP_ACCEPT: image/gif, image/x-xbitmap, image/jpeg, image/pjpeg, image/png, */*

HTTP_ACCEPT_CHARSET: iso-8859-1,*,utf-8

HTTP_ACCEPT_ENCODING: gzip

HTTP_CONNECTION: Keep-Alive

HTTP_HOST: dinky

HTTP_USER_AGENT: Mozilla/4.08 [en] (X11; I; UnixWare 5 i386)

LANG: C

PATH:
/sbin:/usr/sbin:/usr/bin:/etc:/usr/ccs/bin:/usr/ccs/bin:/usr/local/bin:./

REMOTE_ADDR: 132.17.93.9

REMOTE_HOST: 132.17.93.9

REQUEST_METHOD: GET

SCRIPT_NAME: /cgi-bin/env.pl

SERVER_NAME: \$HOSTNAME

SERVER_PORT: 80

SERVER_PROTOCOL: HTTP/1.0

SERVER_SOFTWARE: Netscape-FastTrack/2.01a

SERVER_URL: http://\$HOSTNAME

TZ: :US/Pacific

The variables listed above are not sent by all browsers.

1.1.4.5 Simple CGI example

Writing results to the client in the form of a web page (HTML) requires a message to the web browser to describe what type (MIME type) of data is to follow. In most cases this will be **Content-type: text/html**. A blank line **MUST** follow this MIME type message before any data is written to the web page. The additional data is easiest to read if it is formatted with HTML tags. Take a look at the example below. This Perl script is a CGI program that outputs the environment variable hash (Perl's associative array) listed above.

```
#!/bin/perl

#The magic line. Whenever a CGI returns content to the client
# browser, it must be preceeded
# by the following line which notifies the browser that it is
# about to receive data.

print "Content-type: text/html\n\n";

# Cycle through the %ENV hash and print out the key and value
# pair. Remember
# you're sending output to the browser, so a little markup is
# nice.

foreach $k (sort keys %ENV){
    print "<B>$k:</B> $ENV{$k}<BR>\n";
}

exit;
```

1.1.4.6 Reading arguments and data

There are two methods by which data can be passed to a server with the CGI request:

- GET

The GET method sends data to the server appended to the URL of the CGI program. It is the more basic of the two methods in that it simply concatenates the **QUERY_STRING** variable onto the end of the URL, preceded by a **?**.

Passing certain form elements, such as passwords, with the GET method is not a good idea because they will appear in plain text in the URL field. The data is sent encoded, so long strings may have a **+** or hex-encoded values in them. If values are passed using a FORM action, name/value pairs will be separated by ampersands **&**.

The GET method stores its data in the environment variable **QUERY_STRING**; the CGI program can access this variable using **\$ENV{ 'QUERY_STRING' }**.

There is a soft restriction to the length of a GET request, but its simplicity and ability to minimize the amount of HTML code needed to provide access to a CGI program are its greatest benefits.

- POST

For larger amounts of data, the POST method is generally used because it sends the data as a separate data stream. The data stream consists of several lines of intermixed hex-encoded data and text name/value pairs. As it is a separate stream, the programmer needs to read the data from STDIN and store it in a buffer prior to parsing the data.

See the example on the next page for a sample CGI parser that reads from the correct data stream based on which method is used.

```
#!/bin/perl

my (@args, $args,%args, $item, $equal_sign, $name, $value,
$k);

#The magic line. Whenever a CGI returns content to the
client browser, it must be preceded

#by the following line which notifies the browser that it
is about to receive data.

print "Content-type: text/html\n\n";

#Determine how the data is being sent
if ($ENV{'REQUEST_METHOD'} =~ /POST/){
read (STDIN, $args, $ENV{'CONTENT_LENGTH'});
@args = split /\&/, $args;
}else{
@args = split /\&/, $ENV{'QUERY_STRING'};
}

#Remove encoded data. Pack name/value pairs into an
associative array.

foreach $item (@args){
#switch "+" signs to whitespace
$item =~ s/\+/ /g;
#convert hex encoded data into characters.
$item =~ s/%(..)/pack("c", hex($1))/ge;
$equal_sign = index ($item, "=");
$name = substr($item, 0, $equal_sign);
%args{$name} = substr ($item, $equal_sign+1);
}

#Print name/value pairs to browser
foreach $k (sort keys %args){
print "<B>$k</B> : $args{$k}<BR>\n";
}

exit;
```

1.1.4.7 CGI scripts are not protected by the Webtop login

Traditional applications are launched on the Webtop by calling the CGI program `/webtop/cgi-bin/ttawebtop.cgi`. They are launched with the user id of the user logged into the Webtop and with all the privileges and/or restrictions of that user.

Web-based applications that use CGIs to implement their functionality do not use **ttawebtop.cgi** and are run as **nouser**, because anyone can type in a URL which runs the CGI program.

CGI programs that need to run with some level of authentication must be placed in a directory that is protected by a user name and password. Your web server documentation will specify the details on how to do this.

For example, the Webtop configuration on the Netscape FastTrack server. This is most easily configured through the Netscape FastTrack configuration utility (<http://<hostname>:620>).

Another example is `/opt/webtop/bin/nsregiste`, which is a TCL script that performs the setup required to protect the `/webtop/cgi-bin/admin` directory.

To avoid additional webserver authentication for CGI scripts, future releases of the Webtop will incorporate the security check with the Webtop login.

1.1.4.8 Handling user data

You'll want to be sure that any new pages you create that allow user input do not become a vehicle for a malicious user to attack your system.

If you accept user input, check the values carefully. Look for legal input and perhaps restrict input length, especially on **<TEXT>** and **<TEXTAREA>** elements. You can define a maximum number of characters for these form elements in the HTML tag, but you'll also want to double check in your CGI, as it is possible for the user to make a local copy of the page and remove the restriction.

1.1.4.9 Examples in the Webtop

Look at the Perl CGI scripts that help create the content for the User Information, Network Neighborhood and System Troubleshooting pages. You can use what you learn from these scripts to start writing your own.

Example scripts include:

User Information */opt/webtop/cgi-bin/userinfo.cgi*

Network Neighborhood */opt/webtop/cgi-bin/sysinfo_get.cgi*

System Troubleshooting */opt/webtop/cgi-bin/admin/*k at/opt/webtop/bin/ns*

1.1.4.10 TCL - A powerful alternative to CGI

TCL is an embeddable scripting language and shell tool. This means you can write applications and link the TCL interpreter into your applications to give them scripting capability.

TCL also comes with a shell version of the interpreter, in which you can write programs much the same way as you can with Perl or Python.

One of the best features of TCL is the sheer number of extensions available for it. There are many of them, and most of them will be found on the SCO Open Source License Supplement (Skunkware) in time.

One extension, Extended TCL, is a set of extra commands and functions designed to make standard UNIX features more accessible in TCL.

Expect is another extension to TCL that allows a script to drive any application that normally requires human interaction (such as **ftp**, **telnet**, **fsck**, **rlogin**, **passwd**).

There are a few scripts in the Webtop that use TCL. These include:

- */opt/webtop/bin/nsregister*
- */opt/webtop/bin/scoadminreg*
- */opt/webtop/cgi-bin/admin/scoadmin_get.cgi*

Most of the UnixWare 7 System Administration applications are written in an extended version of TCL called Visual TCL (Vtcl).

1.2 Summary

For complex modifications to the Webtop, as well as for programming new applications, you can use powerful and standard Internet programming tools like CGI, Perl, TCL, Java, and JavaScript. Your choice of the appropriate tool will depend on the task you want to accomplish and your level of programming skill.