

Setting Up the Application Development Environment in Oracle® Solaris 11

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Using This Documentation

- **Overview** – This book provides an introduction to setting up a development environment on the Oracle Solaris 11 operating system and also provides links to sources of detailed information that would be useful for developers.
- **Audience** – Developers using a variety of programming languages including C, C++, Java, PHP, and Ruby.
- **Required knowledge** – Readers of this guide should be familiar with basic experience in developing applications.

Product Documentation Library

Late-breaking information and known issues for this product are included in the documentation library at <http://www.oracle.com/pls/topic/lookup?ctx=E36784>.

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Introduction to Setting Up an Application Development Environment in Oracle Solaris 11

Setting up an application development environment involves activities such as installing developer tools, installing and configuring web servers, installing databases and so on. Oracle Solaris 11 provides various packages and tools that enable you to develop applications. This document covers the following topics:

- [“Installing Software Useful for Application Development” on page 7](#)
- [“Installing Oracle Solaris Studio” on page 9](#)
- [“Installing Web and Application Servers” on page 10](#)
- [“Installing a Version Control System” on page 11](#)
- [“Installing a Database” on page 12](#)
- [“Debugging Applications” on page 13](#)
- [“Creating IPS Packages” on page 14](#)
- [“Configuring Boot Environments” on page 14](#)

Installing Software Useful for Application Development

The Oracle Solaris 11 OS provides various software packages that enable you to develop, debug, and maintain applications. The packages listed in the following table are likely to be helpful when developing applications on the Oracle Solaris operating system.

TABLE 1-1 Developer-Related Packages

Package	Description
group/feature/amp	AMP (Apache, MySQL, PHP) Deployment Kit for Oracle Solaris
developer/build/ant	Apache Ant
developer/build/automake	Makefile generator
developer/build/gnu-make	A utility for directing compilation

Package	Description
developer/debug/gdb	GNU project debugger
developer/debug/mdb	Modular debugger
developer/documentation-tool/openjade	DSSSL engine for SGML documents
developer/documentation-tool/gtk-doc	GTK+ Docbook generator
developer/lexer/flex	Flex lexical analyzer
developer/ui-designer/glade	GNOME UI designer
developer/vala	Vala programming language
developer/java/jdk	Java Platform Standard Edition Development Kit
library/libmemcached	An open source C/C++ client library and tools for the memcached server
web/java-servlet/tomcat	Tomcat Servlet/JSP Container
runtime/perl-5120	Perl
library/python-2/ipython-26	Enhanced interactive Python shell
runtime/ruby-19	Ruby & RubyGems
library/java/grails	A web application framework
runtime/tcl-8	Tcl, a portable scripting environment
web/proxy/squid	Squid web proxy cache
web/server/lighttpd-14	Lighttpd web server
web/editor/bluefish	Bluefish, a powerful editor for experienced web designers
developer/dtrace/toolkit	A collection of useful documented DTrace scripts
web/php-52	PHP server
developer/gcc-45	GCC, 4.5 compilers
developer/gcc-47	GCC, 4.7 compilers
developer/gcc-48	GCC, 4.8 compilers
developer/versioning/cvs	CVS version control system
developer/versioning/git	Git version control system
developer/versioning/mercurial	Mercurial version control system
developer/versioning/subversion	Subversion version control system

Tip - To view a comprehensive list of packages useful for development, type `pkg list -as 'developer/*'` in a terminal window.

Use the `pkg` command to install or update a software. For example, to install Ruby, you would run the following command:

```
$ pkg install runtime/ruby-19
```

For information about the `pkg` command, see [pkg\(1\)](#).

Installing Oracle Solaris Studio

Oracle Solaris Studio consists of two suites of tools: a compiler suite and an analysis suite. The tools of each suite are designed to work together to provide an optimized development environment for the development of single, multithreaded, and distributed applications.

Oracle Solaris Studio provides everything you need to develop C, C++, and Fortran applications to run in Oracle Solaris 10 or Oracle Solaris 11 on SPARC or x86 and x64 platforms, or in Oracle Linux on x86 and x64 platforms. The compilers and analysis tools are engineered to make your applications run optimally on Oracle Solaris systems.

The components of Oracle Solaris Studio include:

- **IDE** – An integrated development environment for application development in a graphical environment. The Oracle Solaris Studio IDE integrates several other Oracle Solaris Studio tools and uses Oracle Solaris technologies such as DTrace.
- **C compiler** – Includes a C compiler, incremental link editor, and lint program.
- **C++ compiler** – Includes a full-featured C++ compiler and interval arithmetic library.
- **Fortran compiler** – Includes a full-featured environment and libraries for both f95 and f77.
- **dbx debugger** – An interactive, source-level, command-line debugging tool.
- **dmake make tool** – A command-line tool for building targets in distributed, parallel, or serial mode.
- **Math libraries** – A floating-point environment that is supported by software and hardware on SPARC® and x86 platforms that run the Oracle Solaris OS.
- **OpenMP** – A portable, pragma-based parallel programming model for shared memory multiprocessor architectures. It is natively accepted and compiled by all three Oracle Solaris Studio compilers.
- **Performance Analyzer** – A GUI and command-line tool for collecting and analyzing performance data.
- **Thread Analyzer** – A GUI and command-line tool for analyzing the execution of multithreaded programs and checking for a variety of multithreaded programming errors.

- **Oracle Performance Library** – A library of Oracle -specific extensions and features for using optimized, high-speed mathematical subroutines for solving linear algebra and other numerically intensive problems.

Oracle Solaris Studio is freely available for production use on Oracle Solaris and Linux operating systems. It is available both as an IPS package and a tar file. You can download Oracle Solaris Studio from the Oracle Technology Network (OTN) [Oracle Solaris Studio 12.3](#) website.

Note - To download the software you must have an Oracle web account. If you do not have an Oracle web account, you can [sign up](#) for free.

To install the Oracle Solaris Studio IPS package, you must request a certificate. Visit the <http://pkg-register.oracle.com> site and follow the instructions to install the certificate and the IPS package.

Installing Web and Application Servers

As a developer, you might need an application server to test your programs, deploy your applications, and run test scenarios. This section describes the servers that you can install.

Apache Web Server

Apache is a widely used open-source web server. Apache web server version 2.2 is available as an IPS package for Oracle Solaris 11 operating system. For more information on the Apache web server, see the [Apache documentation](#).

▼ How to install the Apache Web Server

1. **Type the following command:**

```
$ pkg install web/server/apache-22
```

Tip - Alternately, you can install the group/feature/amp package. This package contains Apache web server, MySQL database, and PHP.

2. **Enable the server so that it listens to the incoming HTTP requests.**

```
$ svcadm -v enable /network/http:apache22
```

3. To verify that the web server works, open the <http://localhost:80> link in a web browser. A valid web page should be displayed.

Oracle iPlanet Web Server

Oracle iPlanet Web Server is a high-performance web server that improves web security, enhances the end-user experience, and reduces the cost and complexity of deploying and managing web applications. It is available on the Oracle Solaris, Windows, HP-UX, AIX, and GNU/Linux platforms. It supports the JSP and Java Servlet technologies, PHP, NSAPI, CGI, and ColdFusion.

Oracle iPlanet Web Server is available for download at the [Oracle iPlanet Web Server](#) website.

For installation instructions, see [How to Install Oracle iPlanet Web Server](#).

Oracle HTTP Server

Oracle HTTP Server is the web server component for Oracle Fusion Middleware. It provides a listener for Oracle WebLogic Server and the framework for hosting static pages, dynamic pages, and applications over the web.

Oracle HTTP Server serves static content directly or through standard interfaces such as the WebDAV standard. It provides features such as single sign-on, clustered deployment, and high availability. You can use it as a proxy server, both forward and reverse. A reverse proxy enables content served by different servers to appear as if coming from one server.

For more information, see the [Oracle HTTP Server](#) website.

Installing a Version Control System

Oracle Solaris does not have a proprietary version control system. However, you can install and configure an open-source version control system. Some of the open-source version control systems that are available as IPS package are listed in the following table.

TABLE 1-2 Version Control Packages

Software	IPS Package Name
CVS	developer/versioning/cvs
Git	developer/versioning/git
Mercurial	developer/versioning/mercurial

Software	IPS Package Name
Subversion	developer/versioning/subversion
SCCS	developer/versioning/sccs

Installing a Database

The Oracle Solaris operating system supports Oracle, MySQL, Berkeley DB, PostgreSQL, SQLite, and YAZ databases.

The following sections provide brief installation information about Oracle and MySQL databases.

Oracle Database

Oracle Database is available in different editions. To view the comparison between the various editions, see [Oracle Database 12c Enterprise Edition](#) website.

You might find the following resources useful:

- [Oracle Database 12c Release 1 \(12.1\) Documentation Library](#)
- [Oracle Database 12c Release 1 \(12.1\) Solaris Installation Guides](#)

Note - As a pre-requisite to install the Oracle Database on Oracle Solaris, you must install the group/prerequisite/oracle/oracle-rdbms-server-12-1-preinstall group package. This group package has all the required packages.

MySQL Database

The MySQL database is available as an IPS package. For information on using MySQL, see [MySQL 5.5 Reference Manual](#)

▼ How to install the MySQL IPS Package

1. Type the following command:

```
$ pkg install database/mysql-55
```

After the installation is complete, you must start the database.

2. Start the database:

```
$ svcadm enable mysql
```

3. Type mysql in a terminal window to access the mysql> prompt.

For example:

```
mysql> show databases;
Database
information_schema
mysql
test
3 rows in set (0.01 sec)

mysql> quit;
Bye
```

Debugging Applications

You can run debugging tools such as the Modular Debugger `mdb`, the GNU debugger `gdb`, the `dbx` debugger provided by Oracle Solaris Studio, and `Dtrace` that enable you to debug complex software systems.

The Modular Debugger `mdb` is an extensible, general purpose debugging tool for the Oracle Solaris operating system. `mdb` allows you to debug at assembly language level. By using `mdb`, you can debug the Oracle Solaris kernel and associated device drivers and modules. For information about the `mdb` language syntax and debugger features, and the `mdb` module programming language, see [“Oracle Solaris Modular Debugger Guide”](#).

The `gdb` and the `dbx` debuggers allow you to debug at the source code levels.

Oracle Solaris Dynamic Tracing (`Dtrace`) is a comprehensive dynamic tracing framework for the Oracle Solaris OS. The `Dtrace` facility enables you to concisely answer questions about the behavior of the operating system and user programs. `Dtrace` can help developers identify performance issues and bugs in applications. [“Oracle Solaris 11.2 Dynamic Tracing Guide”](#) describes in depth how to use `Dtrace` to observe, debug, and tune system behavior. This guide also includes a complete reference for bundled `Dtrace` observability tools and the `D` programming language.

Creating IPS Packages

In the Oracle Solaris 11 operating system, you should deliver the software you develop as Image Package System (IPS) packages. IPS packages are installed and updated from IPS repositories.

IPS is a framework for complete software life cycle management including packaging, installing, upgrading, and removing software. You must deliver software as IPS packages to obtain the following benefits:

- Automatically calculate sufficient correct dependencies on other software
- Automatically install or update dependency software as needed
- Automatically refresh or restart necessary system services to perform tasks such as software configuration and automatically starting other dependent services
- Form a single package, automatically install only the components appropriate for the current system architecture, virtual system, or other variants
- Make updates in a new boot environment without modifying the current boot environment
- Enable users to easily verify whether the software installation is correct

See [“Packaging and Delivering Software With the Image Packaging System in Oracle Solaris 11.2”](#) for detailed information on creating IPS packages.

Configuring Boot Environments

A boot environment is a bootable instance of the Oracle Solaris operating system image along with any other software packages installed in that image. You can maintain multiple boot environments on your systems, and each boot environment can have different software versions installed. You can backup the current boot environment, you can update software without any risk of loss of data or the system environment. You can also update a boot environment that is currently not active. Use the [beadm\(1M\)](#) utility to create and manage boot environments.

See [“Creating and Administering Oracle Solaris 11.2 Boot Environments”](#) for detailed information about boot environments.