

## 1.12 Software Technologies

Figure 1.16 lists a number of buzzwords that you’ll hear in the software development community. We’ve created Resource Centers on most of these topics, with more on the way.

Technology	Description
Agile software development	<b>Agile software development</b> is a set of methodologies that try to get software implemented faster and using fewer resources. Check out the Agile Alliance ( <a href="http://www.agilealliance.org">www.agilealliance.org</a> ) and the Agile Manifesto ( <a href="http://www.agilemanifesto.org">www.agilemanifesto.org</a> ).
Refactoring	<b>Refactoring</b> involves reworking programs to make them clearer and easier to maintain while preserving their correctness and functionality. It’s widely employed with agile development methodologies. Many IDEs contain built-in <i>refactoring tools</i> to do major portions of the reworking automatically.
Design patterns	<b>Design patterns</b> are proven architectures for constructing flexible and maintainable object-oriented software. The field of design patterns tries to enumerate those recurring patterns, encouraging software designers to <i>reuse</i> them to develop better-quality software using less time, money and effort (see online Appendix N, Design Patterns).
LAMP	<b>LAMP</b> is an acronym for the open-source technologies that many developers use to build web applications inexpensively—it stands for <i>Linux</i> , <i>Apache</i> , <i>MySQL</i> and <i>PHP</i> (or <i>Perl</i> or <i>Python</i> —two other popular scripting languages). MySQL is an open-source database-management system. PHP is a popular open-source server-side “scripting” language for developing web applications. Apache is the most popular web server software. The equivalent for Windows development is WAMP— <i>Windows</i> , <i>Apache</i> , <i>MySQL</i> and <i>PHP</i> .
	Software has generally been viewed as a product; most software still is offered this way. If you want to run an

Software as a Service (SaaS)	<p>application, you buy a software package from a software vendor—often a CD, DVD or web download. You then install that software on your computer and run it as needed. As new versions appear, you upgrade your software, often at considerable cost in time and money. This process can become cumbersome for organizations that must maintain tens of thousands of systems on a diverse array of computer equipment. With <b>Software as a Service (SaaS)</b>, the software runs on servers elsewhere on the Internet. When that server is updated, all clients worldwide see the new capabilities—no local installation is needed. You access the service through a browser. Browsers are quite portable, so you can run the same applications on a wide variety of computers from anywhere in the world. Salesforce.com, Google, Microsoft and many other companies offer SaaS.</p>
Platform as a Service (PaaS)	<p><b>Platform as a Service (PaaS)</b> provides a computing platform for developing and running applications as a service over the web, rather than installing the tools on your computer. Some PaaS providers are Google App Engine, Amazon EC2 and Windows Azure™.</p>
Cloud computing	<p>SaaS and PaaS are examples of cloud computing. You can use software and data stored in the “cloud”—i.e., accessed on remote computers (or servers) via the Internet and available on demand—rather than having it stored locally on your desktop, notebook computer or mobile device. This allows you to increase or decrease computing resources to meet your needs at any given time, which is more cost effective than purchasing hardware to provide enough storage and processing power to meet occasional peak demands. Cloud computing also saves money by shifting to the service provider the burden of managing these apps (such as installing and upgrading the software, security, backups and disaster recovery).</p>
Software Development Kit (SDK)	<p><b>Software Development Kits (SDKs)</b> include the tools and documentation developers use to program applications.</p>

Fig. 1.16

Software technologies.

Software is complex. Large, real-world software applications can take many months or even years to design and implement. When large software products are under development, they typically are made available to the user communities as a series of releases, each more complete and polished than the last (Fig. 1.17).

Version	Description
Alpha	<i>Alpha</i> software is the earliest release of a software product that's still under active development. Alpha versions are often buggy, incomplete and unstable and are released to a relatively small number of developers for testing new features, getting early feedback, etc. Alpha software also is commonly called <i>early access</i> software.
Beta	<i>Beta</i> versions are released to a larger number of developers later in the development process after most major bugs have been fixed and new features are nearly complete. Beta software is more stable, but still subject to change.
Release candidates	<i>Release candidates</i> are generally <i>feature complete</i> , (mostly) bug free and ready for use by the community, which provides a diverse testing environment—the software is used on different systems, with varying constraints and for a variety of purposes.
Final release	Any bugs that appear in the release candidate are corrected, and eventually the final product is released to the general public. Software companies often distribute incremental updates over the Internet.
Continuous beta	Software that's developed using this approach (for example, Google search or Gmail) generally does not have version numbers. It's hosted in the <i>cloud</i> (not installed on your computer) and is constantly evolving so that users always have the latest version.

Fig. 1.17

Software product-release terminology.