WHITE PAPER

APACHE Web Server in BS2000/OSD

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APACHE – the world's most popular web server

The new version of Apache, the world's most widely used web server (see www.netcraft.com), is available for BS2000/OSD business servers. Like previous releases, Version 2.2 too offers a number of new functions and programs. This will open up new application areas for web servers on BS2000/OSD and add massive support for innovations to enhance existing BS2000 applications.

Web programmers will be able to develop and support web applications in BS2000 with ease. Most of all, it will allow access to a host of ready-made solutions on the web.

APACHE (BS2000/OSD) V2.2 is based on the official release version Apache 2.2.8 of Apache Software Foundation. Actual relevant security fixes are included in addition. Like the previous version APACHE (BS2000/OSD) V2.2 is available free of charge and you can also transfer WWW pages in encrypted form on the basis of the SSL protocol and so make BS2000 server suitable for sensitive application areas.

The payable product "interNet Security V1.3 (BS2000/OSD)" can drop consequently without replacement and is offered no longer.

From BS2000/OSD V8.0, APACHE (BS2000/OSD) V2.2 is component of the BS2000/OSD delivery unit.

**WWW server
APACHE**

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Complete Java-Servlet support through Tomcat

Apache Tomcat (called Tomcat for short below) provides a runtime environment for Java code (servlets) which can be addressed via the web; in other words, it is a servlet container. With the aid of the Jasper JSP compiler, it can also convert Java server pages (static content such as e.g. HTML with embedded Java code) into servlets, which can then be executed. It can also be used as a regular web server for static content, though the Apache web server is better suited for this purpose. Tomcat features two connectors: HTTP connector and AJP connector. The first is used for direct access or for operation behind a web server proxy (e.g. Apache with mod_proxy). The AJP connector serves for high-performance connection to a web server which independently handles the delivery of static content. In this way APACHE V2.2 enables support via Tomcat for JAVA servlets and JAVA server pages in your web presentation.

JAVA servlets are JAVA applications which run in the server's JAVA environment. This allows access to all the local resources of the server, e.g. to SESAM or Oracle databases with JDBC ("Java Database Connectivity"). The result of the JAVA application is transferred in the form of HTML code to the client, which consequently has no need for a JAVA runtime environment. JAVA servlets run as independent applications under the control of the JVM ("JAVA Virtual Machine") and communicate with the web server via a Socket connection.

Java Server Pages (JSPs) permit JAVA code to be embedded directly in HTML files, thereby greatly simplifying the creation and maintenance of these pages. In this case the JAVA code is compiled automatically at the time of the first call. The result can be reused until such time as a change is made to the source code. As with JAVA servlets, the entire JAVA functionality, including database connectivity via JDBC, is available.

JAVA applets, by contrast, are JAVA applications which are transferred from the server to the client and execute in the client's JAVA environment.

SESAM and Oracle SQL database connection using PHP

PHP ("PHP: Hypertext Preprocessor") is a scripting language embedded in HTML which is interpreted on the server side. It was specially designed for WWW application development, is easy to learn and offers powerful tools for creating web pages with dynamic content. The syntax is similar to C, Java and Perl, extended with PHP-specific features, mainly for accessing databases.

In APACHE V2.2 are ready with PHP a whole row of functions, which now also permit SESAM and Oracle databases to be processed from within PHP scripts. Contents of existing databases can be posted easily on the web, but write accesses are also possible.

New entries can be added to the database, and existing entries changed or deleted. The PHP code is executed exclusively on the server, with only HTML code being transferred to the client. This keeps the application logic hidden from the web user, so even higher-level security requirements are fully complied with.

Perl

Perl ("practical extraction and reporting language"), an execution automation scripting language familiar from the UNIX environment, has become more important on the internet. Perl is not specialized for one particular application area, but is suitable for general-purpose use thanks to a host of available modules and enhancements. The syntax is based on C and shell script languages. Aficionados appreciate the convenience and the rich functionality of the language. What's more, a steadily growing number of plug-and-play Perl modules for all possible applications are available on the internet.

Perl is fully integrated into the APACHE web server, which is a guarantee for highly efficient execution of the scripts. Moreover, Perl can also be installed and used as a standalone – i.e. without APACHE, e.g. for execution automation in POSIX.

WebDAV

WebDAV ("Web-based Distributed Authoring and Versioning") is a standard published by the Internet Engineering Task Force (IETF). WebDAV allows simple and secure administration of documents based on web technology. A WebDAV interface is also integrated in Microsoft products.

WebDAV permits users at different locations to access central documents, which can then be processed like local documents. Security mechanisms ensure that a number of users cannot work on the same document simultaneously. Access rights are assigned via APACHE standard mechanisms. As well as access to individual documents, entire directory hierarchies or namespaces can also be processed.

WebDAV is ideally suited for managing web contents. Particularly on BS2000/OSD systems, which operate with EBCDIC-based code, WebDAV greatly simplifies management of the web content. Documents can be processed by direct access, e.g. on an ASCII-based Windows PC. Separate file transfers of modified documents to BS2000/OSD are not necessary. WebDAV-managed documents are opened in Office 2000 almost as easily as local documents. Only the IP address of the WebDAV server and the document path needs to be specified in addition to the file name.

Further improvements

Along with these enhancements there are numerous other improvements in APACHE (BS2000/OSD) V2.2 :

Extensions in V2.2 versus V1.3, that the Apache basic already brings:

- **New Apache API**
  The API for modules has changed significantly. Most of the module-ordering/-priority problems from 1.3 should now have disappeared. Much of this is done automatically in version 2 . Module ordering is now performed per-hook to allow greater flexibility. Also, new API calls have been added that provide additional module capabilities with no need to patch the core Apache server.
- **IPv6 support**
  On systems in which the underlying Apache Portable Runtime library supports IPv6, Apache gets IPv6 listening sockets by default. In addition, the configuration directives Listen, NameVirtualHost and VirtualHost support IPv6 numeric address strings (e.g. "Listen [2001:db8::1]:8080").
- **Filtering**
  Apache modules may now be written as filters which act on the stream of content as it is delivered to or from the server. This allows, for example, the output of CGI scripts to be parsed for Server Side Include directives using the INCLUDES filter in mod_include. The module mod_ext_filter allows external programs to act as filters in much the same way that CGI programs can act as handlers.
- **Multilanguage error responses**
  Error response messages to the browser are now provided in several languages, using SSI documents. They may be customized by the administrator to achieve a consistent look and feel.
- **Simplified configuration**
  Many confusing configuration directives have been simplified. The often confusing Port and BindAddress directives are gone. Only the Listen directive is now used for IP address binding and setting port numbers. The ServerName directive specifies the server name and port number only for redirection and vhost recognition.
- **SSL and DAV modules integrated**
  Apache includes the SSL and DAV modules as standard in the official Apache code base and these modules will henceforth be maintained and developed further by Apache developers. Both modules have been revamped and their functionality extended.

- **Authentication / authorization**
  The bundled authentication and authorization modules have been refactored. The new mod_authn_alias module can greatly simplify certain authentication configurations. See module name changes, and the developer changes for more information about how these changes affect users and module writers.
- **Caching**
  htcacheclean has been introduced to clean up mod_disk_cache setups.
- **Configuration snippets**
  The default configuration layout has been simplified and modularized. Configuration snippets which can be used to enable commonly used features are now bundled with Apache, and can be easily added to the main server config.
- **Graceful stop**
  The prefork, worker and event MPMs now allow httpd to be shutdown gracefully via the graceful-stop signal. The GracefulShutdownTimeout directive has been added to specify an optional timeout, after which httpd will terminate regardless of the status of any requests being served.
- **Proxying**
  The new mod_proxy_balancer module provides load balancing services for mod_proxy. The new mod_proxy_ajp module adds support for the Apache JServ Protocol version 1.3 used by Apache Tomcat.
- **Regular Expression Library updated**
  An up-to-date version of the Perl Compatible Regular Expression Library (PCRE) is now included. All regular expression evaluation now uses the more powerful Perl 5 syntax.
- **Smart filtering**
  mod_filter introduces dynamic configuration to the output filter chain. It enables filters to be conditionally inserted, based on any Request or Response header or environment variable.
- **Large file support**
  httpd is now built with support for files larger than 2GB on modern 32-bit Unix systems. Support for handling >2GB request bodies has also been added.
- **SQL database support**
  mod_dbd, together with the apr_dbd framework, brings direct SQL support to modules that need it. Supports connection pooling in threaded MPMs.

Expansions in V2.2 in the framework of the BS2000 adaptations:

■ **Unicode extension**
   APACHE (BS2000/OSD) V2.2 also supports the BS2000-specific Unicode variant UTF-E (modified UTF-8), the various 8-bit EBCDIC-DF04, the 7-bit equivalent national EBCDIC-DF03 code variants and the 8-bit ISO codes 8859-x, together with a host of other standardized character sets, as well as the conversion between these code sets during input and output.

■ **SDF-Command-interface**
   In the delivery unit APACHE (BS2000) V2.2, also a SDF-syntax-file becomes with delivered, with their help the commands to starting, restarting, stopping and to the status-retrieval directly from TSOS or SYSROOT as SDF-commands can be executed.

■ **Support-programs**
   Included support-programs allow the Web-server-operator to enforce explicit font-conversions of files in the POSIX, to generate SSL-certificates and to produce and operate SQLite3-Databases.

■ **Modular installation**
   At installation time, only those product components selected and required by the customer are installed, thereby avoiding unnecessary use of memory space.

■ **Interactive installation**
   Thanks to the new interactive installation, the basic configuration can already be carried out while POSIX is being installed, so the web server can optionally be started immediately upon completion of the installation. When the add-on modules for providing PHP and Perl support are installed, the newly installed module will be activated immediately on request and so will be instantly available.

■ **Optimized SX support**
   To optimize throughput, SPARC code is now executed on SPARC-based machines.

Published by department:

Erwin Fischer
Phone: ++49 89 3222 2621
Fax: ++49 89 3222 329 2621
erwin.fischer@ts.fujitsu.com
ts.fujitsu.com/bs2000

Partner login
partners.ts.fujitsu.com/bs2000