Ingenieurbüro Dr. Kaneff

EUROSplus, TCP/IP and Web Server

Utilizing web technology for remote diagnosis/remote maintenance

During recent years the World Wide Web (WWW) expanded enormously, together with the necessary infrastructure of TCP/IP based networks, the global Internet. Today access to the Internet is possible nearly everywhere, provided there is at least a telephone line availble. The WWW's protocols (HTTP) and data formats (HTML) are standardized. Every modern PC operating system comes with a TCP/IP protocol stack and a web browser these days, or these components can be added at minor cost or even for free

These facts suggest to utilize the technology and infrastructure of the WWW for remote maintenance and remote diagnosis of embedded systems. The advantages compared to proprietary solutions are ...:


- there's no need to develop your own client software

- accessing the target system is possible from nearly everywhere, and with simple tools like a laptop computer running PC standard software and a modem.

- no need to build the communication infrastructure to the target system yourself

- you can access the target system over your corporate network or over your local Internet provider easily and at a low cost, even when the target system is located on the other side of the globe.

- the redundant communication lines of the Internet guarantee high availability

- Advances of HTML and of web browsers can be utilized immediately for your own application.

Apart from supporting the actual real-time application, EUROS*plus* also provides a TCP/IP protocol stack, which is used by the EUROS*plus* web server. The web server is running as an EUROS task and enables the real-time application to be monitored and configured remotely via the Internet. The web server accepts connections from web browsers, processes their requests and replies with prepared or dynamically created web pages.

HTML pages are first created as ASCII text, using either a simple text editor or a sophisticated HTML editor. These pages are then converted to C source code using a dedicated tool. The source code is compiled and linked to EUROS, the application and the web server. There's a second tool to convert binary files like images or Java applets to C source code, providing a means to embed logos or Java applets in the target system.

All pages can not only be placed on the target as a whole, but also split to several parts. This can be used to optimize the ROM space occupied by the web pages. Common parts of the pages like header/footer lines need only be placed once in the target system.

For dynamic web pages a user-provided function can be specified. This function is called by the web server when the associated page is requested. The user function can then modify the contents of the page, e.g. to embed status information or to announce machine errors. A page can be modified punctually, parts of the page can be exchanged, it can be assembled from prepared parts, or it can be created from ground up.
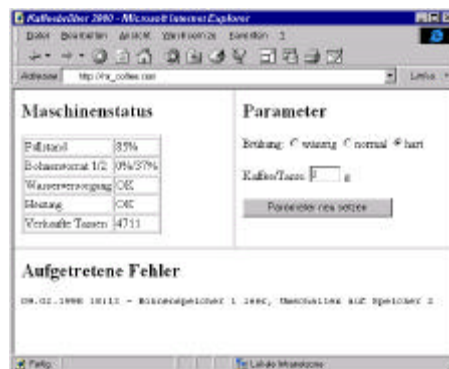
Security issues

When the target system is reachable unrestricted from the Internet, access restrictions may be necessary. The EUROS*plus* web server provides a means to authenticate a user by user name and password, which is also supported by most web browsers. A software tool is used to encode the user name/password combinations in the target system.

Technical specification

- Supported HTTP versions: 0.9, 1.0

- Size: ca. 5 kBytes ROM (w/o web pages), 500 bytes RAM

- Maximum number of pages: unlimited (limited only by available memory and by restrictions of the processor architecture, apprx. 450 for the C16x family)

- Maximum size of a single page: unlimited (limited only by available memory and by restrictions of the processor architecture, theoretically 4 GB)

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