

Student Project JABBA

JABBA is an Internet interface to any kind of device. Using JABBA, it is possible to operate, configure an service any appliance from your desktop computer over the Internet. Connect JABBA Box to the Ethernet on one side, the device's serial port to the other, fire up your web browser and start to interact.

Problem

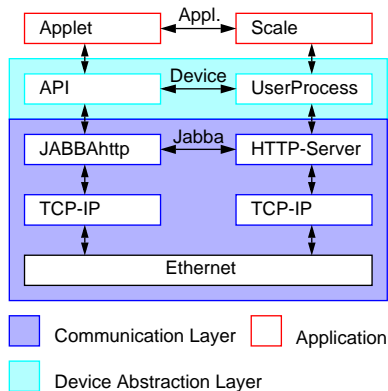
Devices like balances or coffee-machines are going online in near future. Designed for point-to-point communication or no interface at all, special innovation is needed to use today's Internet technology with these appliances.

The main problems are:

- needed know-how for development
- long development cycles
- communication delays over network
- firewalls limit range

The JABBA solution

The JABBA concept shifts resource-hungry applications to where resources are available - your PC. Using Java applets. Engineering gets splitted into Java GUI development and C++ firmware for device control and adaptation. Communication over HTTP allows remote access over firewalls. The HTTP packets may contain any kind of data - HTML or controlling code.



Advantages of JABBA

- easy adaptation to any device
- quick development
- different levels of programming:
 - Java application
 - Java API
 - C++ firmware (if needed)
- realtime control
- simple configuration via RS232 or web
- small size, low power
- low-cost

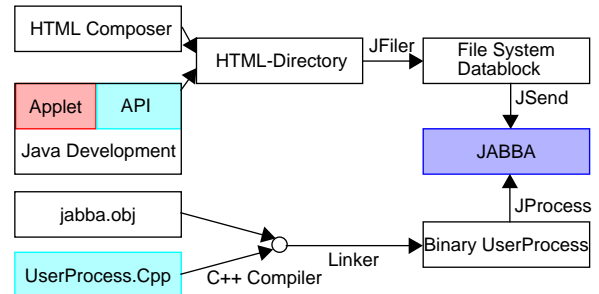
How it works

When interacting with an appliance, your web browser connects via Internet to the web server implemented on JABBA. It downloads a Java applet. The applet, which runs on your workstation, uses a very simple protocol to 'talk' to your appliance via JABBA. The applet controls your device.

Using HTML pages and Java applets stored on JABBA's web server are not the only possibility to customize JABBA. The UserProcess is a layer of software which lies between device and web server. It can further enhance JABBA's functionality.

Development

The applets are written, compiled and uploaded to the Jabba - Box from any workstation, all you need is a Java Developers Kit. The necessary uploading tools are Java applications, which makes them platform independent as well. The userprocess has to be crosscompiled and uploaded. This makes together a simple development platform.



Applets

Applets are not only used to visualize data, they are also the console for the user. All the wide variety of assistants to make a GUI may be used to have a good looking frontend to your appliance. Controlling your machine is made easy by using the JABBAhttp-class. This class provides the methods to communicate with JABBA, without getting into the details of network programming. Data distribution may be done by the userprocess on JABBA or by polling from clients.

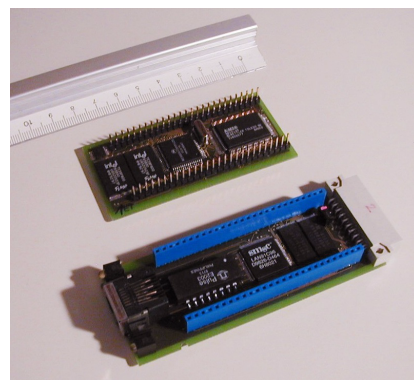
UserProcess

The userprocess interfaces JABBA to your machine. The JABBA idea is to do machine specific operations in the Java applet on the client without modification to the UserProcess. The userprocess can be enhanced to accomplish device specific tasks. Here a few possible examples:

- realtime control
- timestamping requested result, to compensate for network delay
- open a TCP or UDP connection on its own, rather than just react on requests. This achieves an interrupt capability.
- provide a continuous stream of data to the client using proprietary protocols
- evaluation and compression of collected data prior to transmission
- send out e-mails requesting machine maintenance

Scale on the Internet

To demonstrate the capabilities of JABBA we implemented a remote control for Mettler scales. The Java applet controls all the necessary functions of the balance. No special adjustments had to be made to the default userprocess, which is implemented on every JABBA Device.



Hardware insert for the Mettler Duplo scale, using a Motorola 68000 CPU

Contact persons: Lukas Karrer, lkarrer@ee.ethz.ch
Thomas Moser, tmoser@ee.ethz.ch
Thomas Zwicker, tzwicker@ee.ethz.ch
Jonas Greutert, greutert@tik.ee.ethz.ch
Mettler Toledo LabTec, Marcel.Walder@mt.com