While1 World in SIX parts

Part n.2

Do .. While

While .. Do

Loop Init

Loop Init

Loop Body

Loop Body

WHILE (TRUE) ECHO

while condition evaluated

statement

BIOS and OS base software
Unix and MS kernels drivers and special software implementation.

Embedded software
Real time systems projects and products for automotive, aeronautic transportation

Network software
Standard and proprietary protocols design
Special application file transfer and screen scraping software
Host systems interface software

Telecommunication software
Router and Network elements
Provisioning systems
Special appliance applications

Mission critical software
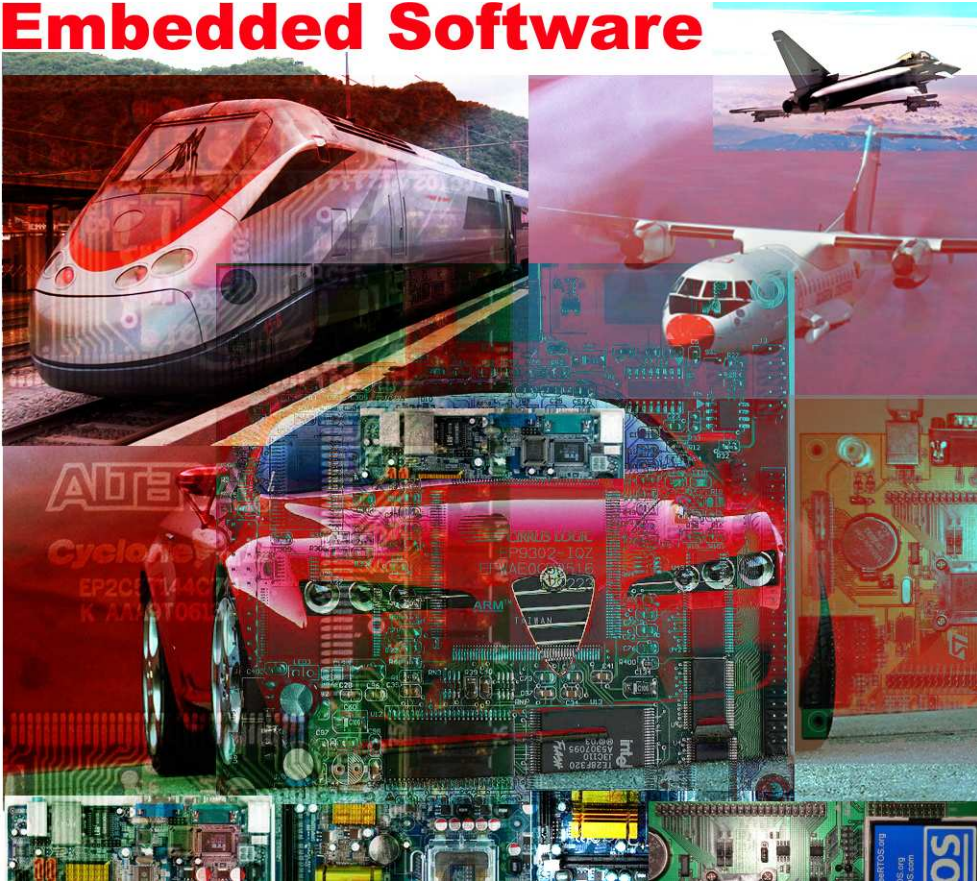World wide company mission critical applications

Software products

condition

FALSE

TRUE
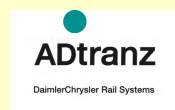
Instruction

No

Program continues

Embedded Software

**Some of the developed projects
for Big Companies
on embedded software**

While1
(www.while1.com)

While1 main
customers for
Embedded
software:

ADtranz
DaimlerChrysler Rail Systems

Alenia
AERONAUTICA

ITALTEL
Roots to the future

Tattile
digital devices

ALSTOM

Compuprint

SELEX GALILEO

Galileo Avionica – Selex

SELEX GALILEO

VOIP module

Analysis and development of a VOIP module interfacing with all on board and land based control systems projected by Galileo Avionica and host on airplanes dedicated to **Australian cost patrol**. The system guarantees FullDuplex communication using a very narrow band on a satellite connection. The development included the project of an on board audio systems interface, a dedicated **RTP protocol**, a decoder derived by **G711** with **Delta Modulation (PCM, MuLAW, ALAW)**. To get the minimum band usage, we inserted a **silence-check** mode: in case of audio silence, it does not transmit anything and not use band. The device interfaces on board and land based systems. It allows the on board and land operators to activate/deactivate and monitor all the conversations. The project includes a mixer and a recorder module to allow conversation recording. This software allows the synchronization of the two conversation flows, to mix them and record on a audio file (wav).

Video Grabbing

Analysis and development of a **Video Grabbing** module to get a digital video from a board and to send it to a station that visualize. The connection is very narrow band (~ 100 kbits) satellite line. The goal is to transfer in real-time film shot from patrol airplanes flying over **Australian coast**. The more complex item was to define how to transfer a MPEG4 video flow using a so narrow band without compromising its usability. Video grabber uses an AMP MP4000 board. The architecture includes all streaming items implementation and the interaction with control systems both on board and land based. Streaming can be realized both using RSTP protocol and a simple RTP via IDP Monocast and Multicast.

Tattile

PIS – Passengers Information System

Analysis and development of the software to implement **PIS (Passenger Information System)** host on **High Speed Trains** by **Ansaldo/Breda**. Final customers are **Dutch** and **Belgian Railways**. The system was developed according to HAS V250 specifications and respects all the requirements defined in AB AA03AH6 specification. To handle connectivity among PIS modules present on coaches, all the connection problems on **Rs485 MultiDrop** were considered. We developed a dedicated protocol (WISP) that provides LAN services (e.g. sockets) in not-exlusive mode (without declared Mater). Moreover, for external device interaction, we developed an interface to **MVB** and **UIC 568** buses.

The most important system functions are:

Public address
- *Audio announcement*
  - Communications from driver or train guard
  - Communications from train crew from any coach
  - Communications from Ground Central Control
  - Automatic announcements
- *Visual announcement*
  - Train number
  - Coach number
  - End station information
  - Next station information
  - Public services messages

Intercom communication

- Cab to cab and/or staff area Intercom
- Call to cab from any coach
- Call to ground central control from every coach, cab and staff area
- Passenger alarm Intercom
- Warning acoustic signal for calls between driver and train guard
- Warning acoustic signal for calls between train guard and another train guard

The system offers an automatic route management. It works reading current position (GPS) and all working parameters via MVB, handling information to passengers using internal and external signs and multilanguage audio synthesis.

In addition, the project included all configuration services, diagnosis and system parameters visualization. Each coach has a video/keyboard console at control personnel disposal.

CAN/MVB bus interaction

Analysis and development of a complete communication system to interact with **CAN/MVB** bus installed on **railway systems** by **Alstom S.p.A.**

The project led to realize a system able to interface to **CAN** bus operating with **CANOPEN** protocol (**CIA** specification: 301_v04000201) used on **CA250** trains (**Pendolino for Chinese railways**) by **Alston**. Besides protocol development, the project included an application interface that exports variable control (Get and Put) defined in operating train implementation, via **micro Web Service**.

Using this technology, client can interact with the system in a totally structured way controlled by **WSDL (Soap)** related to exported services. To simplify the complete management of each event related to variables change, we studied a system of **asynchronous notify** to realize all **alerting and changing policies** on values assumed by the variables.

With this schema, clients automatically become **micro-server** able to export Web Services used by main server to communicate asynchronous events and to raise events on clients. This avoids polling activations.

The developed protocols allow the realization, for CANOPEN standard, both **Master** semantic and **Slave** one. In that way we were able to develop both project sides and to build simulators for tests. The hardware was developed by Tattile and the OS was **Lunix Debian**.

Distributed services

Analysis and development of a new hardware architecture that allows to proprietary systems to have providers of distributed generic services. Central system communicates with remote subsystems connected via LAN, using an object mode. Service providers are named **MicroServer** and can offer: pure calculation, I/O complex peripherals not available or not supported by central system. For instance you can add to proprietary system the use of a DVD unit able to burn disks, without integrating all needed software support on central system. To have a complete solution in terms of contents and very easy to integrate, we chose Linux as operating system. The project was realized on **Motorola MPC5200** hardware based on **PowerPC** processor family. The project included search phases concerning Motorola HW and related software environments:

- Verification of all available development systems and final choice of **DENX** as the only available public domain
- Study of board and process characteristics
- Study of **DBUG** environment available on the board as low level initialization environment and base debugger
- Modification and adaptation of **U-Boot** boot generation environment concerning board MPC5200
- Setting of Linux kernel 2.4 to run on board MPC5200:
  a. **IDE** interface activation (fix)
  b. Arrangement to the use of **iso9660 jffs, jffs2 file systems**
  c. Image generation according U-Boot specification to execute the load using U-Boot itself
- Setting of U-Boot environment to execute kernel boot and for root file system in different modes: **Ram, Flash, via NFS**
- Setting of download environment via **TFTP**
- Setting-up of a small file system (**7 Mb jffs2**) that guarantees all the functionalities required by the server

- Use of **MTD** tools to prepare root file system images
- Setting of NFS server providing root file system on network whenever executed the selection that prearranges the system to load root file system via NFS.
- Study, generation and test of **DVD** management tools in ppc environment
- Tools adaptation to work on jffs2 file system (mmap not supported)
- Complete development of **a client/server application** able to send remotely DVD burn requirements (DVDS)

Adtranz

ADtranz

DaimlerChrysler Rail Systems

On board announcement

Development of a **complete system** used by Adtranz to manage on-board announcement system (SAP - Sistema Annunci Passeggeri - Passengers Announcement System) on E464 locomotive. The software has been developed for Motorola MC68360 microprocessor and operates connected to several peripherals: **Bus MVB**, **Bus Can**, Bargellini keyboard, Flash card, RS485/422/232 lines. The system has been designed using While 1's real-time kernel named **WMTK**

Alenia

EFA European Fighter Aircraft - Typhoon

- Development of subsystem version for managing **RMS boards** (ENCORE REFLECTING MEMORY) within the project FLIGHT SIMULATOR FOR "E.F.A." EUROPEAN FIGHTER PLANES (ALENIA). This subsystem version includes a driver in **UNIX TCIX** (Control Data) environment. This is used to manage EBA BUS-ADAPTER and **firmware** residing on a MOTOROLA **M167 smart board** based on MC68040 processor for DMA management with CACHE memory on basic system (CD).

- SOFTWARE-DEBUGGER which can **functionally control** online communication packages (BSC, SNA, X25 protocols, etc.) residing on INTEL platform-based smart boards. This product runs on PC and provides **ICE tool** capabilities for 8086 CPU or the like.

Italtel

Self Diagnosis

POWER-ON and **ON-LINE SELF-DIAGNOSIS** for **ITALTEL CPM-200** packet-switching center. This project implies implementation of **tests** on **CPU** board, **RAM** board, **ROM** board, **I/O controller** and **EL controller**. In addition to testing individual chips on boards, we have provided hardware/software **interconnection self-diagnosis** between different boards in the system (some chips: I80386, I82380, AMD8516, and ZSCC8530).

Compuprint – Sferal WWT

Compuprint

Web Services for printer

Analysis and development of a module host inside multifunction printers **SP40** by Sferal, providing **Web Services** to export **printer control and management functions**. The service allows more users to connect to the printer and to access to its functions invoking web services methods (control, print, fax management, check read and so on). This was one of the early worldwide project to furnish a printer a web service with print functions. To reach the target, there was a porting and adaptation of **nanohttp** and **csoap library**.

Interface library

Analysis and development of some components of an interface library to allow to bank applications to directly interface **Usv SP40 printer** without a printer driver. The interface was projected to allow a double way to connect the printer based on different systems. The first one included the realization of a module that directly uses **USBPRINT.SYS** device driver (kernel entry point to manage **USB-PRINTER** type class-driver). Since the interface is not officially documented by Microsoft, the study was performed in experimental way using reverse-engineering. The second one was based on an "official" way but less efficient, using a **Language Monitor** expressly developed and all the chain **WinSpool, Language Monitor/Port Monitor, Usbmon.dll**.

SEPA

Dedicated device driver

Mac device driver for Ethernet **3COM PCI 3c509** boards on MOTOROLA **VMEXEC** environment on PCI and with POWER-PC processor. This device driver can manage links to ESIC devices (video projectors for vector images) and can interface with programs that were designed for a project about driving emulation.

NetFrame Systems Incorporated

Diagnostic program

Diagnostics program for **NETFRAME CLUSTER SYSTEM 9000 - RAPTOR** systems which can test all of the functionality of **WIRE-SERVICE** system. This system is used to control all functional parameters (such as temperatures, fan speed, input voltage, damaged boards, etc.) using seven processors located in different points of the system and connected with an **I2C** serial bus. The final test of the project has been executed at NETFRAME System Incorporated laboratories in Milpitas (California).

WHILE 1 S.r.l.
The measure of quality

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