

## µClinux porting on SH2 Target

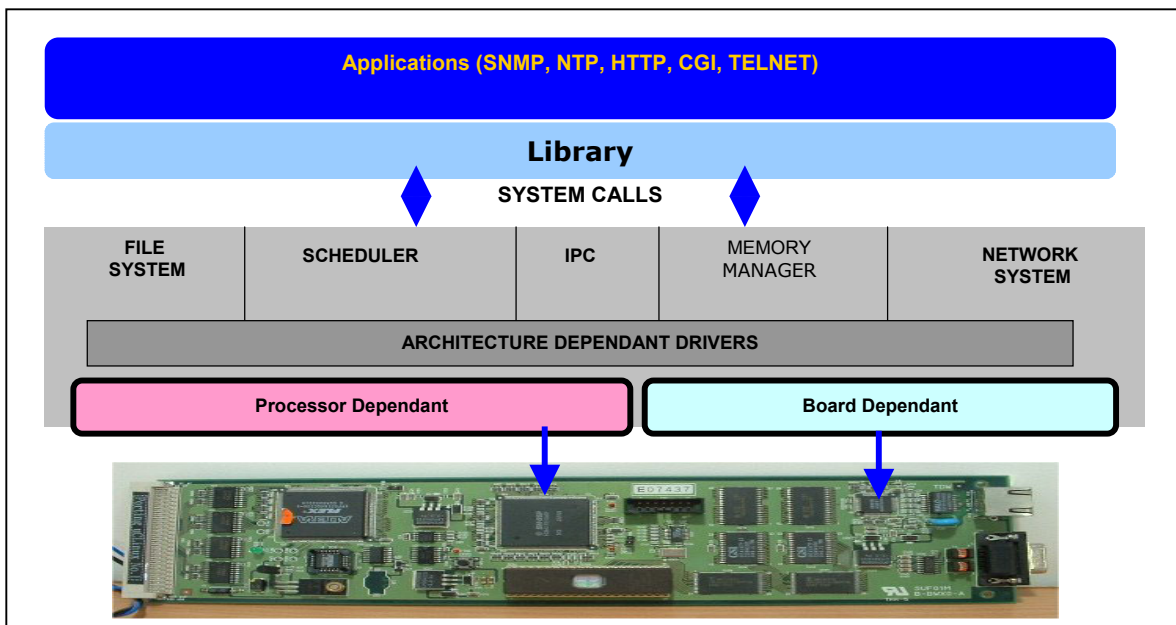
The customer is an embedded device manufacturer based in Japan.

### Business Objective

The customer was using a Network management switch based on Hitachi SH2 processor, which was running applications on Nucleus OS. Nucleus is a per-user licensed OS, which burdened the client with a recurring cost. The client wanted Ushustech to find a royalty free Real-Time OS and port it on to their target board along with the existing applications. µClinux was found out to be an ideal alternative, as the target processor was not supporting MMU.

### System Overview – Challenges and Solution

Porting a Kernel is done at two levels of abstraction - Processor level and Board level. The OS vendor itself normally supplies processor dependant portion of an OS. Once the Kernel is adapted for a particular processor, only the board dependant portions need to be modified by different board vendors. However, for SH2 processor, there was no port of µClinux available. Therefore our target board with SH2 processor demanded 'processor level' and 'board level' porting.



There is no 'generic' µClinux that will suit all processors. Open source OS like µClinux is already ported to processors like Motorola-PowerPC, ARM, etc. µClinux source code ported for a particular board using the above processor is available in µClinux site. This is called the 'reference port'. In the case of a board using the same processor (like PowerPC), the requirement is just to identify the "board-dependant" portion and modify it to suit the newly developed board.

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But in this project, the major challenge was that, there were no hardware architectures similar to SH2 on which μClinux was running. In the absence of a good 'reference port', we had to identify the code ported to the nearest matched processor as the reference port. We chose Motorola-Dragonball code as the reference port. The non-availability of a good reference port expanded the dimension this project from porting to a near development of a kernel. We ported a stable μClinux kernel image to the SH2 based switching hub. Also the applications developed in Nucleus RTOS were ported to μClinux. This was the first instance of porting uClinux to SH2 processor. The following were the key highlights of the project:

- 1) Development of Boot Loader and serial port drivers.
- 2) Kernel modification to support the SH2 architecture
- 3) Implementation of ROM FS & proc FS File Systems
- 4) Implementation of Network Sub system (Ethernet driver, TCP/IP Protocol stack).
- 5) Porting Network applications like SNMP, NTP, TELNET, HTTP/CGI, TFTP and X-MODEM on to μClinux