

## Embedded Linux – BSP Development

### Board Support Package – PXA270 based Platform

#### **Project Objective**

To customize & port Linux for PXA270 based platform.

#### **Approach**

- Test Boot loader to kernel transition & boot parameters.
- Test the early Kernel Initialization.
- Mapping IO devices.
- IRQ setup.
- System Timer tick.
- Core subsystem Initialization.
- Final board Initialization.
- Device Drivers.
- Porting File system.

#### **Challenges**

- latest 2.6 version kernel
- Redboot boot loader

#### **Tools**

- GNU Cross Compiler
- GNU Debugger
- Quilt

## Embedded Linux - Driver Development

### Display & Audio driver - PXA320 based Platform

#### Project Objective

To provide Display & Audio driver support for PXA320 running on Embedded Linux.

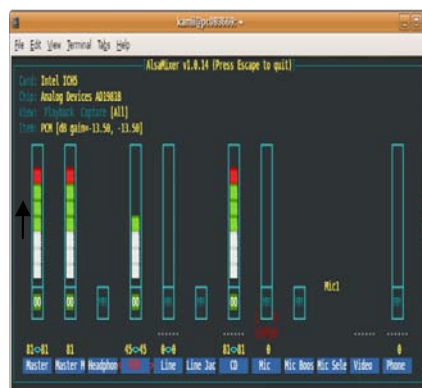
#### Approach

The kernel inbuilt PXA2xx audio & display Drivers were upgraded to support PXA320. Provided application to test the performance of display driver. Complete testing on Audio playback and recording at different sampling rates.

Match-box Desktop



ALSA sound Mixer



#### Challenges

- latest 2.6 version kernel
- Display Driver supporting 18bpp (Bits Per Pixel)
- Audio Driver with Latest ALSA Sound Mixer

#### Tools

- GNU Cross Compiler
- GNU Debugger

## Embedded Linux - Driver Development

### Serial Touch screen driver – PXA270 based Platform

#### Project Objective

To provide Touch Screen support for PXA270 running on Embedded Linux.

#### Approach

Developed Xserver input driver which will use tslib at backend. The tslib utilities are customized to calibrate and test the touch screen.



#### Challenges

- Latest 2.6 version kernel
- Porting with Xserver
- Incorporating various Noise Filters

#### Tools

- GNU Cross Compiler
- GNU Debugger
- Quilt

# Embedded Linux - Driver Development

## Power Management – PXA270 based Platform

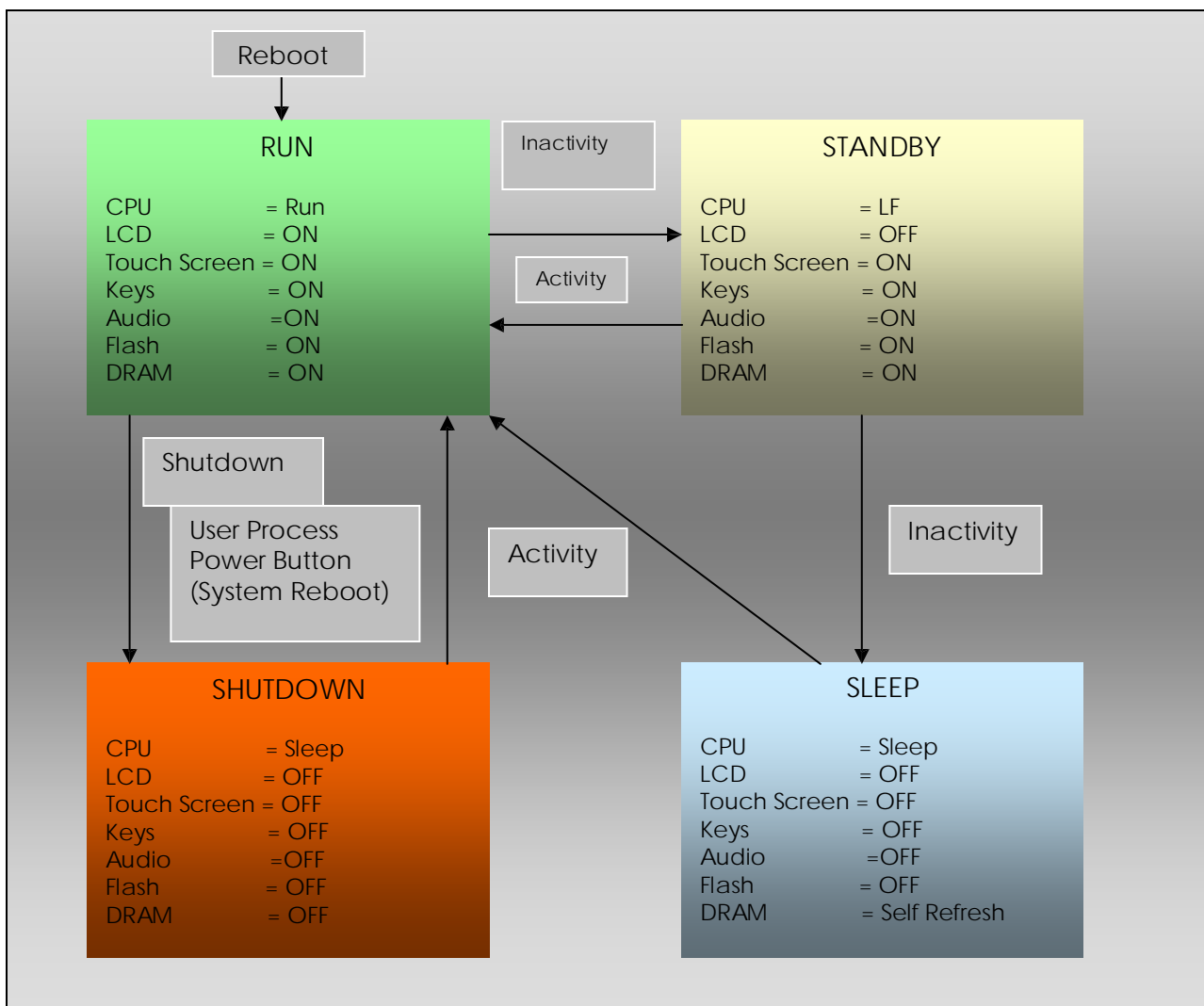
### Project Objective

To enable Power Management features of PXA270.

### Approach

The kernel inbuilt power Management supports for PXA270 are enabled. The Linux boot loader upgraded to cooperate with Power Management System.

Complete testing on sleep-wakeup & suspend-resume.



## Challenges

- Latest 2.6 version kernel
- Retaining device status at sleep Mode
- Stable performance at different operating frequencies

## Tools

### GNU Cross Compiler

- GNU Debugger
- Quilt

## Embedded Linux - Application Development

### Front Panel interface control

#### Project Objective

Developing application to control serial Front Panel interface consisting Matrix LCD, LEDs, Keypad, fan & GPIOs.

#### Approach

Developed user space serial driver to control each elements of Front Panel. Facilities to check each device status & displaying current status on LCD. Provided sample application for testing.



#### Challenges

- Multiple device over single serial line
- Server client Model LCD display (like Xserver)
- Bug free & accurate performance.

#### Tools

- GNU Cross Compiler
- GNU Debugger
- Quilt

# Embedded Linux - Application Development

## Customized Editor For PLC control system

### Project Objective

Modify existing open source editor Nedit to include function keys for easy access to common CNC editor functions without the use of a mouse & Gcode syntax highlighting.

### Approach

The source code completely analyzed and traced the functionality. Updated to incorporate new function keys and syntax highlighting. Complete documentation for future updates.

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1 static const char CVSID[] = "%Id: nedit.c,v
2 /-----
3 *
4 * nedit.c -- Hirvana Editor main program
5 *
6 * Copyright (C) 1999 Mark Edul
7 *
8 * This is free software; you can redistribute it and/or modify it under the
9 * terms of the GNU General Public License as published by the Free Software
10 * Foundation; either version 2 of the License, or (at your option) any later
11 * version. In addition, you may distribute version of this program linked to
12 * NetIF or Open NetIF. See README for details.
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### Challenges

- Adding new function keys without affecting existing functionality
- Syntax highlighting for selected file formats
- Application window auto resizing for different screen resolutions
- Stable on any Linux distributions

### Tools

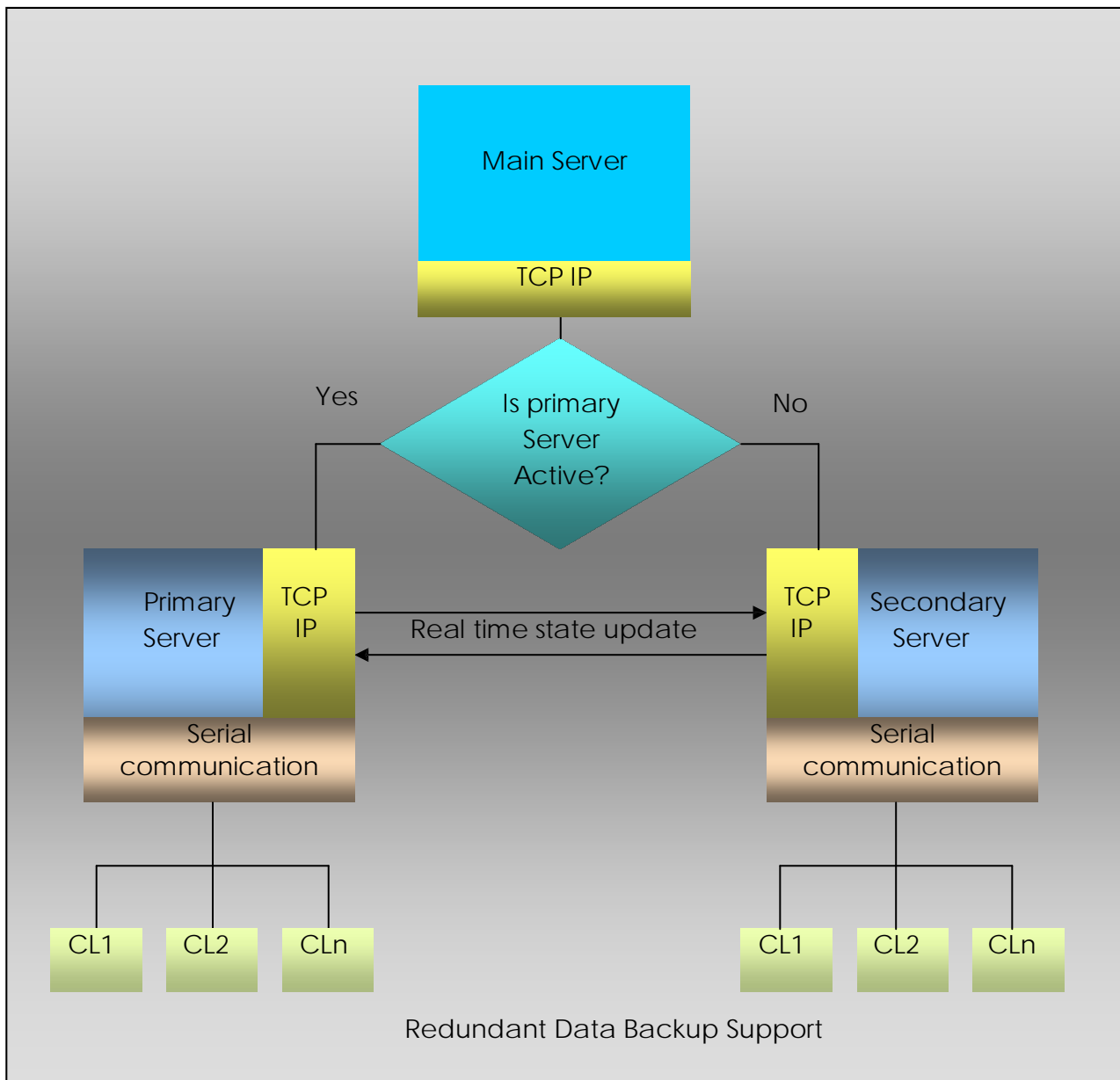
- GNU Cross Compiler
- GNU Debugger
- Quilt

## Embedded Linux - Application Development

## Redundant Data Backup for Real-time Data Acquisition System

**Project Objective**

To develop application to achieve redundant data backup for Real-time Data Acquisition System.



## Targets

- Avoid system failure
- Real-time implementation
- Redhat Linux

## Approach

There were two Servers (viz. Primary Server and Secondary Server) which maintained the real-time data. Each Server acts as a redundant system to its counterpart so that in case one server failed, the data can be accessed through the other server.

## Challenges

- Real-time TCP/IP communication
- Real-time Interprocess communication

## Achievement

- Tested & accepted by our reputed client
- Implemented in client plants across India

## Tools

- GNU Cross Compiler
- GNU Debugger
- Quilt