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Motivation

• Old school
  – 8051 developed in 1980 by Intel
  – Simple harvard(-ish) architecture
  – Many oddities
• Widespread
  – 20+ manufacturers
  – Large span of applications from home automation to breath analyzer
  – Cheap
  – Now coming out as SoC
• What is it good for?
  • Implement TinyOS and experiment
• Issues:
  – How will TinyOS cope with the simple architecture?
  – No gcc: how to build tool chain?
Progress

- **TinyOS 1.x**
  - Basic port for nRF24E1 (March 2006)
    - TEP121

- **TinyOS 2.x**
  - Basic port for CC2430 (May 2007)
    - (come see demo outside)
  - TEP on new platform in progress

- **Tool chain**
  - Script to rewrite code to Keil (mangeAppC)
    - More elaborate

- **Working group**
  - Small DIKU centered
  - Independent projects, not coordinated
Tool chain

- Keil vs. GCC
  - Different dialects ie.
    - `__attribute`, `#warning`, `[] != [0]`, etc.
  - Size of variables ie. `unsigned int = ?`
  - No inline
- 8051 oddities
  - Non ANSI-C
    - Memory locations `sfr`, `xdata`, `code`, etc.
    - Bit addressable locations
- Hack: `mangleAppC.pl`

```
NesC  app.c  mangleAppC  mangle.c  Keil
```
T2 CC2430 platform

- Lives in “contrib”
  - Make system allows compiling apps from Core eg. “Blink”
- Variants of chip
  - inherit from “mcs51” meta-chip
- Subsystems
  - Timers, UART, ADC
  - Radio
    - SimpleMac
    - CC2420 stack
      - in progress
Next steps

- **Tool chain**
  - Solve inline problem
  - Integrate Keil support in NesC
    - multi compiler support is generally interesting

- **Working group**
  - Define scope of group
  - Encourage participation
    - Organize collaboration/competition
    - Collect feedback, in particular from industry

- **Platforms**
  - Port nRF24E1 to TinyOS 2
  - Expand CC2430 port
Demo

- Sample and send
  - Accelerometer input
  - PC as base station

Nano
- cc2430 / cc2431 (w. location engine)
- 25x15 mm
- Available 2007 60 € ~ 75 $

http://www.sensinode.com