Mainline u-boot for Tizen - "war stories"

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Outline

1 Introduction

2 "War stories"

3 Cooperation with community

4 Discussion

Introduction

A few words about me

- Embedded systems programmer
- Using u-boot since 2008
- "Blame me" for:
  - PMIC framework (v1/v2)
  - Device Firmware Upgrade
  - trats2/trats
  - OneNAND

A few words about Tizen

- Open source, Linux based OS
- Samsung Linux Platform + MeeGo + BADA API
- Developed by community with main support from Samsung and Intel
- Multiple profiles based on Tizen Common:
  - Tizen In-Vehicle Infotainment
  - Tizen Mobile
  - Tizen TV
  - Tizen Wearable

Why do we need u-boot?

- Providing reliable way of booting Linux on a variety of boards by using Flattened Image Tree
- Updating on-board persistent memory (DFU, THOR, Mass Storage)
- Recovering to the "default" state
- Facilitating development

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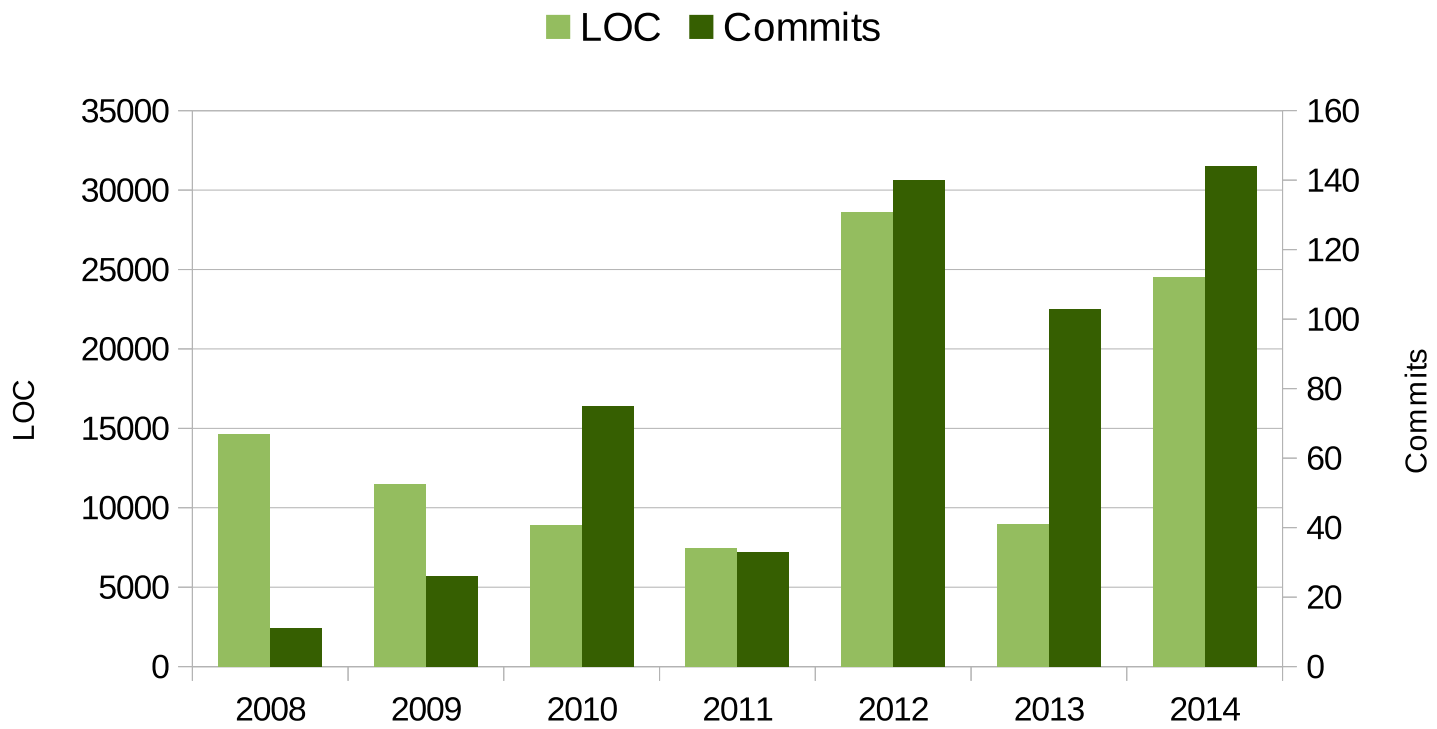
- GOAL: Mainline u-boot on Tizen devices!

Samsung - history of involvement

- Boards:
  - SLP: smdkc100 (Q3'09), goni (Q2'10) and universal c210 (Q1'11)
  - Tizen: trats (Q1'12), trats2 (Q3'12) and odroidU3/X2 (Q3'14)
- PMIC framework (Q3'11)
- Porting UDC driver to u-boot (Q4'11)
- USB Gadget infrastructure (Q2'12)
- DFU (Q3'12)
- GUID Partition Table (Q4'12)
- Mass Storage (Q1'13)
- Universally Unique ID (Q2'14)

Samsung - contribution chart



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- Mainline - full functional support
  - trats, trats2 and odroid U3/X2 development boards supported
- tizen.org - minor enhancements
  - One u-boot for trats2 and odroid U3/X2
  - Special animations which appear when charging battery on trats2

"War stories"

USB Gadget

Problem:

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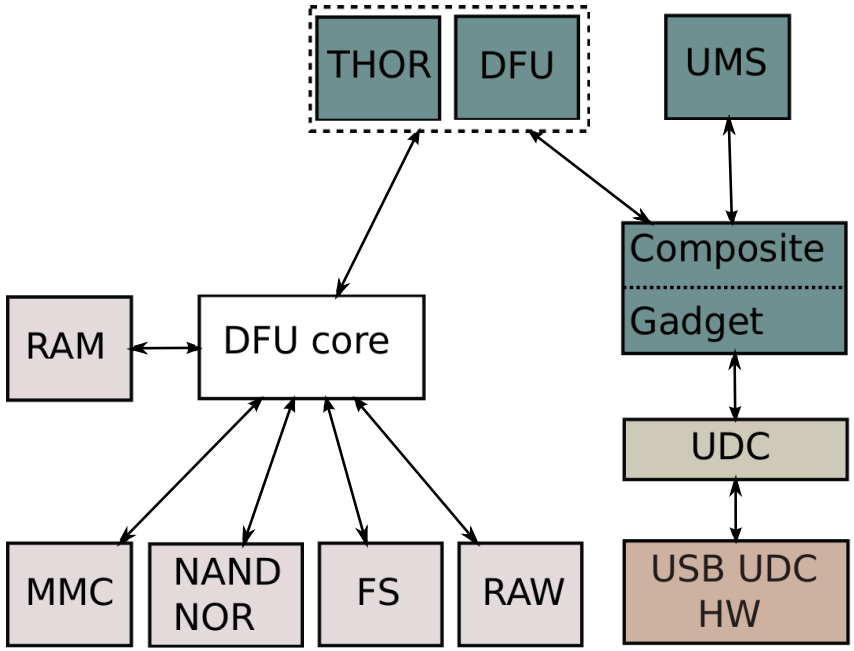
Solution:

- Reuse established Linux composite API (2.6.36)
- Reuse available Linux gadgets (like Mass Storage)

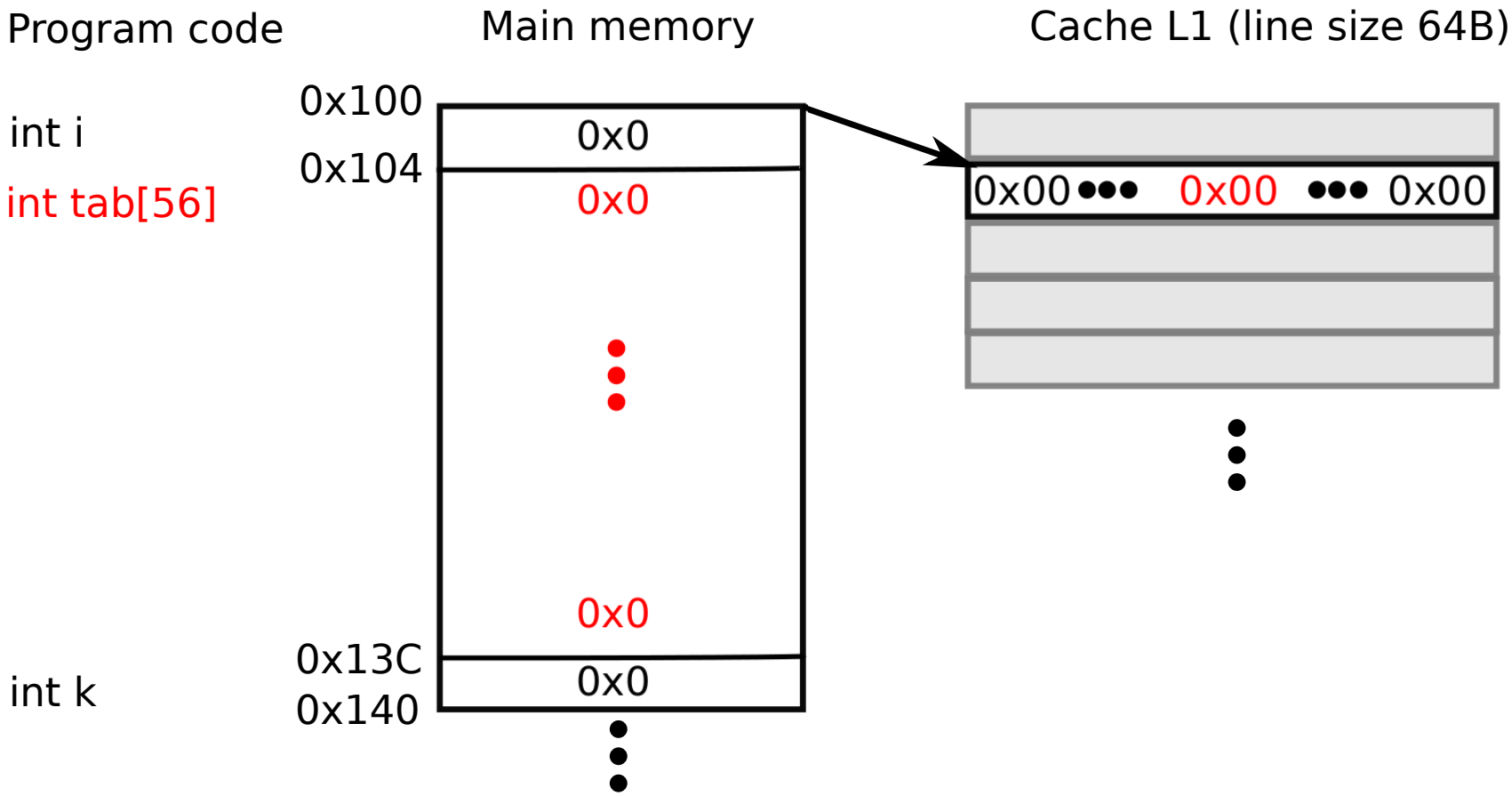


L1 cache

Motivation:

- Reduce time needed for start of a system

L1 cache - Problem



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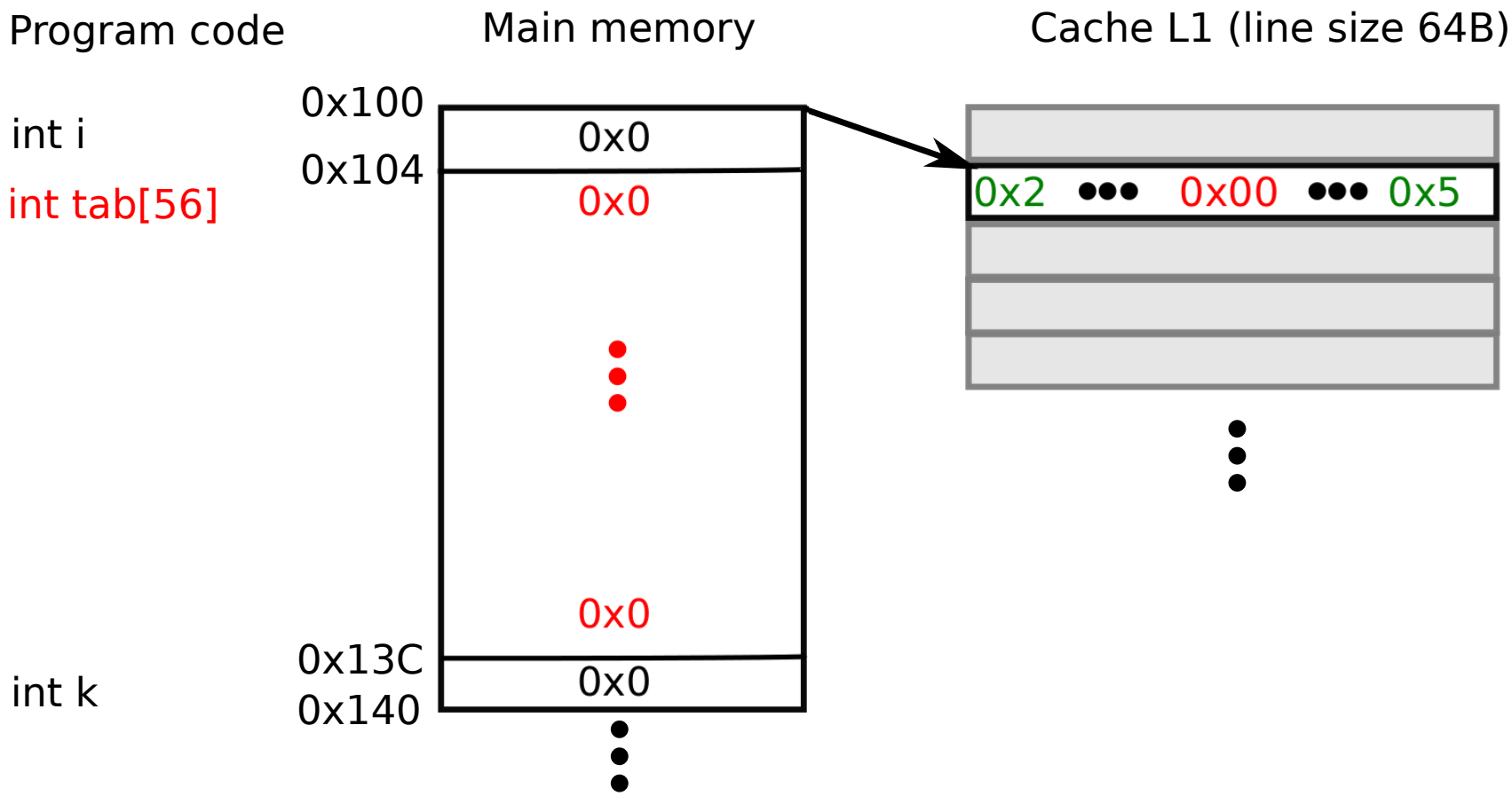

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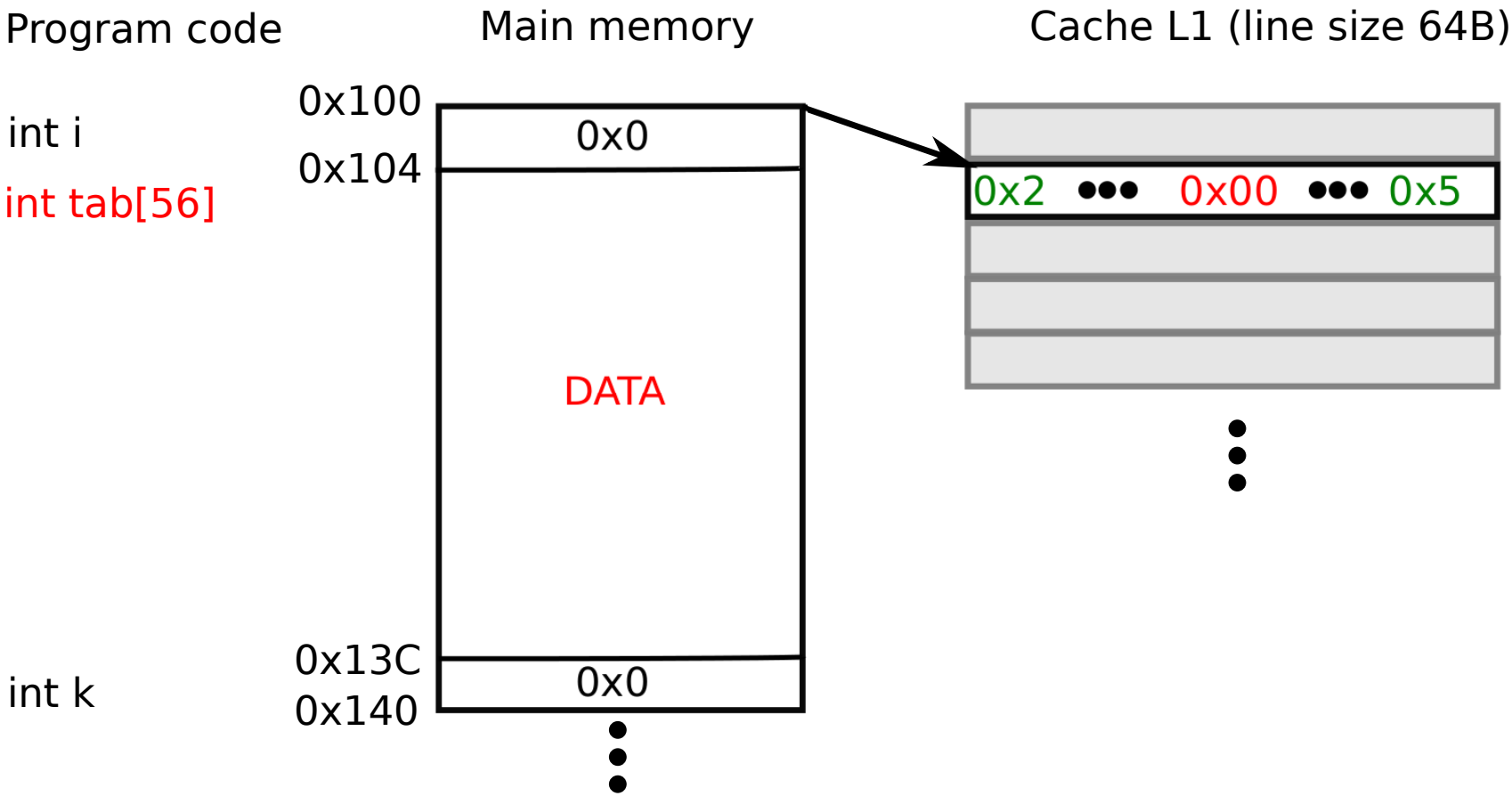

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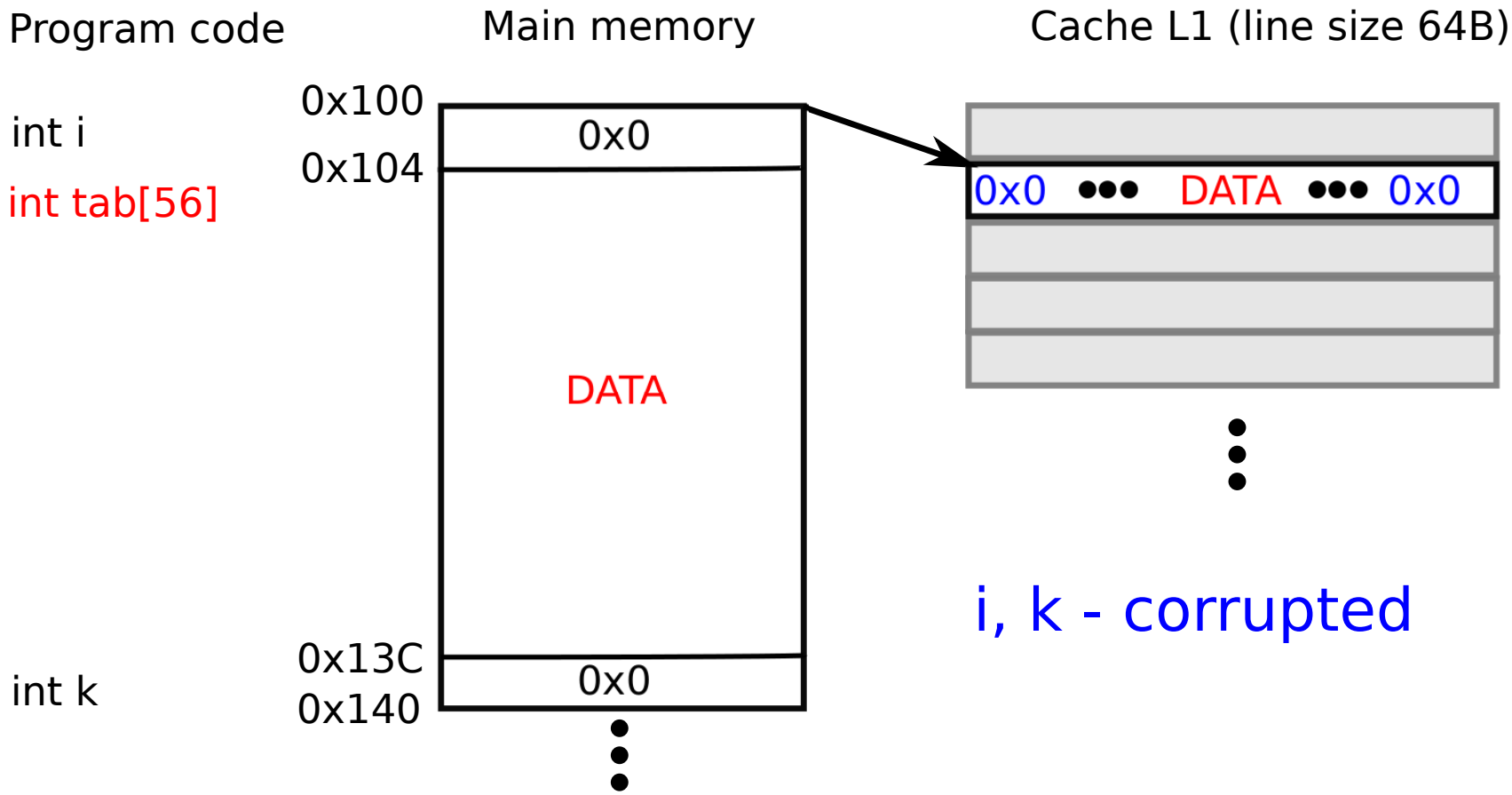

L1 cache - Solution

- memalign()
- *_CACHE_ALIGN_BUFFER()

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Outcome:

- Normal u-boot operation (booting kernel) - speedup ~16%

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- Simple hierarchy
- Support for I2C, SPI, Big/Little endian, byte, half-word and word transfers
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Solution:

- PMIC v3.

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Outcome:

- Transmission speed improved from 9 MiB/s to 27 MiB/s

Cooperation with community

Social interaction

- Promptly reply to e-mails
- Even when you are buried in work give a firm deadline when you will review patches
- "Keep calm and be patient" - do not get easily angry

Code review

- Send patches early (as RFC) to receive more feedback
- Provide detailed documentation
- Include test scripts for your code
- Prepare patches for mailing list by using patman and buildman

Benefits

- Cooperation with the community does work in the long term
- Code developed by one company is reviewed, tested and enhanced by others
  - DFU: community contribution: 37%
  - PMIC v2: community contribution: 68%
- Less effort is needed to maintain common code

Future plans

- Send patches for multiplatform u-boot
- Development of PMIC v3
- Complete switch to driver model

Discussion

Q & A

Thank you!