FreeBSD/embedded survey

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ARM

- Highlights
  - A good appearance of FreeBSD/arm in 8.0-RELEASE
  - Stability, maturity stage, still “almost” Tier-1
- HEAD support
  - At least 18 platforms (families) in sys/arm/conf
- Recent development
  - Samsung S3C2xx0 (Andrew Turner)
  - Cavium Econa CNS11xx (Yohanes Nugroho)
  - Texas Instruments DaVinci DM644x (Jakub Klama)
- Coming soon
  - ARMv6 support (among others: physical cache, h/w enforced coherency, SMP)
  - Marvell DOVE (Armada 500): DB-88F6781

MIPS

- Highlights
  - SMP machine-dependent code
  - Cavium Octeon support
  - RMI XLR/XLS support
- Recent development, next steps
  - *n32* and *n64* support started (toolchain improvements)
  - Cavium SDK-based Octeon port
  - New Octeon Ethernet driver
  - 32-bit binaries on 64-bit kernel

PowerPC

- Highlights
  - High end system-on-chip, legacy Apple
  - SMP
  - Functionally complete (or close), stable, used in production
- HEAD support
  - PowerPC Macintosh (G3, G4, G5)
  - Freescale PowerQUICCIII (MPC8541, 8548, 8555, 8572)
- Recent development
  - 64-bit support
- Coming soon
  - Freescale QorIQ P2020 (dual core) and P4080 (eight core)

PowerPC – 64-bit

- Highlights
  - Booting multiuser
  - Apple (G5) and IBM Cell simulator
  - Self-hosting, X works
- Environment
  - *powerpc64* build
  - Tight integration of 64- vs. 32-bit systems
  - Code shared under */sys/powerpc*, some *#ifdef __powerpc64__*
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  - Nathan Whitehorn (nwhitehorn@freebsd.org)
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Devsummit @ Antarctica (thanks Nathan!)

Pegasus Field in McMurdo sound, with Mt. Erebus in the distance

GSoC 2010 – embedded FreeBSD

- Reduced FreeBSD kernel size for embedded
- Port to Yeeloong
  - Loongson 2F-based netbook
  - MIPS
  - http://wiki.freebsd.org/SOC2010VladimirSerbinenko
- Generic DMA engine framework
  - DMA engines embedded in system-on-chip ARM as reference)
  - http://wiki.freebsd.org/SOC2010JakubKlama

Other

- NAND FLASH framework
  - Kernel APIs to abstract NAND controller, NAND chips and generic layer(s)
  - ONFI-compliant NAND chips simulator
  - Support for Freescale, Marvell and Samsung controllers
  - http://wiki.freebsd.org/NAND
  - Available in P4
- Flattened device tree (FDT) support
  - Configuration data for embedded systems
  - http://wiki.freebsd.org/FlattenedDeviceTree
- System/kernel build and configuration
  - Out-of-tree cross toolchain support
  - MACHINE and MACHINE_ARCH improvements (TBEMD project)