



CANONICAL

Ubuntu ARM knowledge

December 8th 2011

David Mandala
ARM Team Manager

Contents



- The Start
- Today
- Unique issues around ARM server
- ARMv8 64 bit ARM Server
- Ubuntu Core
- Convergent Devices
- Links



- First Started working on Ubuntu ARM in October 2008
 - Derived from Debian, but made significant compilation changes to improve speed:
 - ARM EABI
 - ARMv7 (ARMv5t, ARMv6 was available in early releases of the ARM port [jaunty, karmic])
 - Vector Floating Point (vfp)
 - Thumb2 instruction set (where possible) for smaller binaries
 - NEON (in Libraries only)
 - SMP support
- First release in April 2009 (9.04) supporting the Freescale iMX51 development
 - 6 Ubuntu ARM releases to date, released every 6 months with the rest of Ubuntu



- Latest current release October 2011 (11.10)
 - Supports consumer development platforms
 - First technical preview release of Ubuntu Server on ARM
 - Very large application base, ready to install
 - More than 17,000 application source packages in Ubuntu
 - More than 35,000 binary application packages ready to install
- Ubuntu Precise Pangolin (being worked on as we speak)
 - Added new ARM architecture ARM hard float (ARMhf)
 - Ubuntu leading the way, first commercial OS compiled for ARMhf, we are working with ARM, and Linaro to set the standard
 - Better use of hardware registers in ARMv7 hardware, which makes all applications a little faster
 - Faster rendering of fonts and other floating point intensive tasks
 - Future proofing, all ARMv7 hardware guaranteed to have floating point



- Ubuntu Precise Pangolin
 - Ubuntu is now multiarch clean, this is actually useful for several things
 - On Ubuntu x86 as a developer you can install exactly the same packages in the same directory space as will be found on your ARM hardware
 - You developing software for the ARM platform, cross-compiling it from your x86-64 desktop system. You install all of the build-dependencies as armhf packages, builds your package, and test it directly on your desktop running it under qemu via binfmt-misc.
 - This makes sure that path dependencies are exactly the same on the development system as well as the target system, no more errors due to incorrect paths
 - The multiarch directory scheme required in order to make library packages co-installable will be a target for FHS/LSB standardization in the future
 - Canonical is leading the way in standardization efforts around ARMhf
 - Allows installing both 32 bit and 64 bit Ubuntu OS on the same machine at the same time (more about this later)



- Ubuntu Precise Pangolin
 - ARM Server will have it's second release with 12.04
 - We are working with major ARM SoC vendors to validate ARM server workloads and to sort out issues that come from the extremely high density of ARM servers
 - Validate 32 bit server loads
 - Web
 - Database
 - Hadoop
 - Membase
 - MapReduce
 - Search Indexing
 - LXC
 - OpenStack

Unique issues around ARM server



- ARM servers are very high density, on the order of 72 servers per rack unit (U) or even higher, so systems management becomes even more important than ever. When you are looking at more than 3,300 servers in one 19" rack, density becomes a real issue.



Unique issues around ARM server (continued)



- Some of these servers will require a minimum of 3 ip addresses per server so you use a lot of IP addresses quickly. On the order of 10,152 or more in a single standard 47U 8' tall rack, this translates to: Six racks of servers will exhaust most of a class B IP address space (65,536 ip addresses)!
- This presents some challenges to manage deployments, so we have validated Canonical tools to help make it easier both from deployment to management:
 - Juju
 - Multi system application management tool
 - Orchestra
 - Manage hardware OS deployment (bare metal and virtual machines)
 - Landscape
 - Systems monitoring and management



- ARMv8 64 bit ARM servers are coming
 - Canonical is working actively with ARM limited so that Ubuntu will be the first OS running on ARMv8 hardware
 - Canonical is working to standardize ARMv8 UEFI booting
 - This likely will take some time, we have lots of experience booting u-boot and other methods of booting ARMv7 systems, they will still work if need be.
 - Canonical has been actively involved with unifying the ARM kernel tree, we continue to support a single unified Linux kernel
 - We will support ACPI on ARM as well as flattened device tree (FDT)
- Of course the management tools that run on 32bit ARM today will run on 64bit ARM tomorrow



- Ubuntu will allow management of your applications to get best use of RAM and power characteristics of the ARM cpu. The big draw to ARM servers clearly is much lower power consumption compared to other platforms
- Ubuntu is now multi-arch, you can easily run both the 32 bit and 64 bit ARM applications on the same 64bit ARM machine at the same time.
 - This allows you to make best use of system resources, balance RAM and power usage to delivery needs
 - Not all applications running on a 64 bit system need to actually be 64bit, many applications don't use more then 4 gigs of RAM
 - Smaller 32bit binary save about ½ the memory space and load quicker
 - Allows you to select the appropriate sized application for best RAM and power usage. Clearly certain applications need to be 64bit (Databases, Java applications) but others can do everything needed in the smaller address space of the 32bit binaries



- Ubuntu Core is a minimal rootfs for use in the creation of custom images for specific needs
 - Good for developing products from, it's the smallest Ubuntu footprint starting point
 - Available for ARM, and x86 both 32bit and 64bit
 - Smallest instance of Ubuntu that when combined with a Ubuntu kernel and a boot method will result in apt-get working
 - Delivers a functional user-space environment, with full support for installation of additional software from the Ubuntu repositories, through the use of the apt-get command
- Ubuntu Core is not a super small run-in-memory embedded distribution; it is the smallest implementation of Ubuntu that enables one to install other packages



- There are lots of separate devices out there today
- Canonical has experience working with Android and Ubuntu running on the same device at the same time.
 - Boots as an Android phone
 - Switches Ubuntu to the active display when docked
- Ubuntu Phone, TV, Notebook
 - Announced at Ubuntu Developers Summit October 31st 2011
 - Early stages, work is being done on Unity to accommodate from small screen to very large screen
 - Can have a single mobile device that is the device that when docked drives devices with the correct screen layout
 - See Mark Shuttleworth's presentation at the October UDS.

Update and Links

- <http://www.ubuntu.com/arm>
- <http://www.canonical.com/arm>
- <https://wiki.ubuntu.com/arm>
- <http://www.canonical.com/engineering-services/ubuntu-core>
- <https://wiki.ubuntu.com/Core>
- <http://design.canonical.com/2011/11/ubuntu-phone-tablet-and-tv-discussion-opened/>
- <http://www.youtube.com/watch?v=0bOwyGYTMv8&feature=youtu.be&t=24m42s>
- <https://wiki.ubuntu.com/UbuntuTV/Designs>
- <https://wiki.ubuntu.com/UbuntuPhone/Designs>



CANONICAL

Thank you

Questions ?