

Samba ARMed and Ready

Running an Active Directory DC on 2 Watts



- Introduction
- Hardware
 - Beagle Board
 - Alternatives
- Software
 - Ubuntu Linux
 - Samba
- Performance

- ❑ Computational biology grad student
 - ❑ Protein design
- ❑ Wine Developer since 2005
 - ❑ Authentication
 - ❑ Networking
- ❑ Samba Team member since 2007
 - ❑ ID mapping / winbind
 - ❑ Embedded Samba

- ❑ 32bit RISC architecture
- ❑ Low-power, low-cost
- ❑ Widely used in consumer electronics
 - ❑ Smartphones/PDAs
 - ❑ Handheld gaming consoles
 - ❑ Routers / NAS boxes

Why Bother?

- ❑ Low power consumption
 - ❑ Keeps the power bill down
- ❑ Fan-less and Quiet
 - ❑ Office or home use
- ❑ Low unit cost
 - ❑ Active Directory server for < €150/\$200
 - ❑ No license costs
- ❑ Mobile

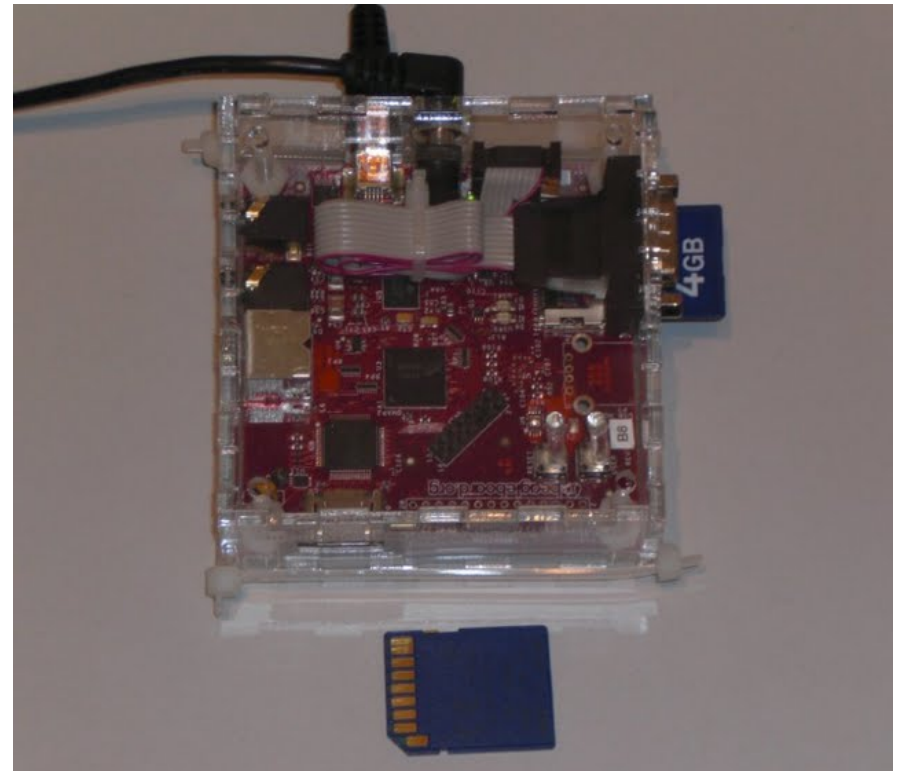
Hardware

Hardware Used

- ❑ Beagle Board
- ❑ Powered USB hub
- ❑ USB ethernet controller

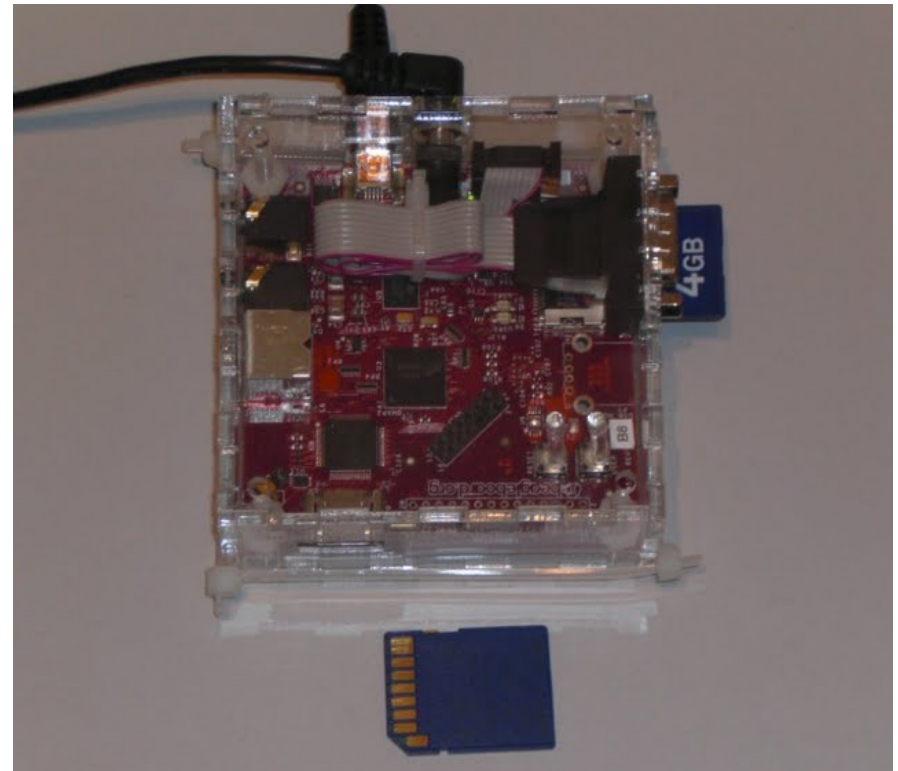
Beagle Board

- ❑ **B**udget-friendly
- ❑ **E**asy to use
- ❑ **A**lways-on
- ❑ **G**reen IT
- ❑ **L**ight-weight
- ❑ **E**xtensible via USB



Beagle Board

- ❑ 8cm x 8cm (3"x3")
- ❑ 128/256 MB RAM
- ❑ 500 mA / 5 V
- ❑ SD/MMC/SDIO slot
- ❑ Serial port
- ❑ **No** ethernet



- ❑ Powered USB hub
 - ❑ Supplies power to Beagle board
 - ❑ Provides additional USB ports
- ❑ USB Ethernet controller
 - ❑ USB2.0 interface (480 Mbit/s)
 - ❑ Provides 10/100 Mbit/s Ethernet
 - ❑ Fast enough for SOHO use

- ❑ Sheeva Plug
 - ❑ Faster processor, 512 MB RAM
 - ❑ Gigabit ethernet onboard
 - ❑ 3 A / 5 V
- ❑ Gumstix Overo
 - ❑ Similar to Beagle Board
 - ❑ Expansion card provides WiFi
 - ❑ 250 mA / 4 V

Software

- ❑ Linux
 - ❑ Ubuntu 9.04 “Jaunty Jackalope”
- ❑ Samba
 - ❑ Samba4
- ❑ DNS server
 - ❑ ISC Bind

Ubuntu “Jaunty Jackalope”

- ❑ General Linux distribution
 - ❑ Thousands of software packages
 - ❑ Wide range of applications
- ❑ Supports ARM out of the box
 - ❑ No need to compile packages yourself
- ❑ No official Beagleboard kernel (yet)
 - ❑ Community kernels available

- ❑ Bootstrap on PC
 - ❑ rootstock script sets up root filesystem
 - ❑ Partition and format SD card
 - ❑ Copy kernel and filesystem to SD card
- ❑ Boot beagle
 - ❑ Configure networking
 - ❑ Update system

rootstock: <https://launchpad.net/project-rootstock>

- ❑ Ångström
 - ❑ Special embedded distribution
 - ❑ Designed for handhelds and NAS boxes
 - ❑ Recommended by Texas Instruments
- ❑ Android
 - ❑ Special embedded distribution
 - ❑ Designed for mobile phones
- ❑ And many others...

- ❑ Opening Windows to a wider world for 17 years
- ❑ SMB/CIFS/SMB2 file services
- ❑ Current: 3.4.1, released 2009-09-01
- ❑ Providing NT4-style domain controller
- ❑ Member server in Active Directory domains

- ❑ Active Directory Domain Controller support
- ❑ Alpha 8 released June 19th 2009
- ❑ Active Directory components usable
- ❑ File / print services need work

- ❑ Compile sources (tarball, git)
- ❑ Call `./setup/provision`
 - ❑ Sets up databases
 - ❑ Creates related config files
- ❑ Set up DNS
 - ❑ Zone file created by provision

- ❑ Different per distribution
 - ❑ Ubuntu: Copy over files to `/etc/bind/`
- ❑ Problem: bind memory usage
- ❑ Alternatives
 - ❑ dnsmasq
 - ❑ Own implementation

Samba4 Demo

- ❑ Join Win2k3 member
- ❑ Join Samba 3 member
- ❑ Create user via MMC
- ❑ Enumerate users on Samba 3 member

- ❑ Samba 3: File / print services
 - ❑ Tried and true
 - ❑ Grown code
- ❑ Samba 4:AD domain controller
 - ❑ Clean design
 - ❑ Focus on new technology
- ❑ Combine to get production-ready AD DC
 - ❑ “Best of”
 - ❑ Code name: Franky

Samba “Franky” Setup

- ❑ Grab sources from `git://git.samba.org/samba.git`
- ❑ Compile Samba 3 with `--enable-developer=yes`
 - ❑ Merged Samba 3 / Samba 4 build
 - ❑ `pdb_ads` glue code
- ❑ Provision Samba 4 as described
 - ❑ As domain controller
 - ❑ “`server services = ldap, cldap, kdc`”

Smba “Franky” Setup (cont.)

- ❑ Set up Samba 3
 - ❑ Different smb.conf file!
 - ❑ As domain controller
 - ❑ “passdb backend = pdb_ads”
- ❑ Setup DNS as described

Performance Data

Power Consumption

System	Idle (W)	Load (W)
AMD Athlon64 3000+	75	105
Intel Core2 Quad	109	180
Mac Mini G4	20	40
ThinkPad R52	27	50
Beagleboard	4	7
ShevaPlug	6	9

Benchmark Data

Test (in ~ cycles per minute)	Win2003 Server (Virtual Machine)	Samba4 (Virtual Machine)	Samba4 (Beagleboard)
kinit - kdestroy	510	1430	100
join - leave	70	90	10
User add - delete	90	110	12
Group add - del	90	160	22
LDAP search indexed	70	120	40
LDAP search wildcard	200	340	100
LDAP search not indexed	220	360	100

- ❑ Suitable for small setups
 - ❑ Slow operations not done often
- ❑ Affordable Active Directory setup
- ❑ Some optimization might help

Possible Use Cases

- ❑ “Mobile Workgroup” servers
- ❑ Home office set-top box
- ❑ Couple with OpenChange for email appliance
- ❑ Replicating DC for branch offices
- ❑ ...

- ❑ Optimize for resource saving
- ❑ Facilitate DNS setup
- ❑ Web configuration frontend

Thank You

- ❑ Samba Team blog <http://news.samba.org/developers/>
- ❑ Kai's tech blog <http://kblin.blogspot.com/>
- ❑ Kai's Beagle page http://kblin.org/projects/home_server
- ❑ Samba Embedded wiki page
http://wiki.samba.org/index.php/Samba_Embedded