Cross-Platform Rexx

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Overview

• Rexx in a virtual machine
  – then …
  – … and now

• Virtual machines and Linux

• Virtual I/O
Acknowledgements

• Mark Miesfeld – ooRexx for Debian Linux, and much patient help

• Michael Saunby – ARM ooRexx & x11vnc

• Rick McGuire – quick fix for CALL, etc.

• … and lots of others on RexxLA and Maemo mailing lists, etc.
Rexx 1979

- Rexx was first written on a IBM S/370 mainframe, running CMS (Cambridge or Conversational Monitor System)

- CMS was a single user operating system

- It ran in a *virtual machine*, under the ‘Control Program’, CP …
CP and CMS
CP and CMS and RSCS

CMS

CMS

CMS

CMS

RSCS

CP
... or Linux
Virtual Machines

• Buzzword: “Virtualization”

• VMs allow running many different operating systems on the same machine
  – e.g., for testing, software development …

• Many varieties of VMs, including emulation (software emulation of a machine, not necessarily the same as the host)
Acorn System 1 emulator

• The Acorn system 1; a 6502-based machine:

http://www.cary.demon.co.uk/acorn/
Acorn System 1 emulator

- Emulator for the 6502-based machine, on Windows:
Windows

• Single user operating system, running directly on hardware (originally DOS-based, now on NT base)

• Now has many free VM options, including
  – Virtual PC (Microsoft)
  – QEMU (open source, better on Linux)
  – VMWare (EMC subsidiary)
VMWare on Windows

- Several versions:
  - Player (free) for running existing virtual machines
  - Server (free) for creation, customization, and running of virtual machines
  - Workstation and ESX Server

- VMWare Player is sufficient for what I need, and is less resource-hungry than Server
VMWare on Windows

(Demo)
VMWare on Windows

ubuntu Linux

Ethernet …
USB …
Display/KB/Mouse …
Sound …
Disks …

Windows XP
ubuntu on VMWare setup

- VMWare ‘Virtual Appliance’ (775MB)
  - http://www.vmware.com/vmtn/appliances/directory/693
- Startup (boot), set user and password
- Set time/zone
- Don’t install VMWare Tools update
  - if you do, do not accept default screen 800x600
- For sound, add to the .vmx file:
  ```
  sound.present = "TRUE"
  sound.virtualDev = "es1371"
  sound.fileName = "-1"
  sound.autodetect = "TRUE"
  ```
ubuntu on VMWare setup

• Ethernet may need ‘NAT’ if inside firewall
  – ‘ifconfig’ command should show an eth0 or eth1 device
  – test with Firefox

• For ooRexx, download ooRexx-zzzz-3.1.2.deb
  – just click on the file to install
  – can then run foo.rex with the command (in Terminal):
    rexx foo.rex
ubuntu on VMWare setup

- Accessing shared disks can be tricky
  - Lots of bad information on the Internet
  - Use Places – Connect to Server – Windows Share, or Places – Network Servers to browse windows network to the shared disk/directory

- Install Samba file system (‘smbfs’) using app. manager or Synaptic (full Samba is not needed)

- Mount the share so it’s part of Linux file system…
ubuntu on VMWare setup \[4\]

- Make an empty directory under Linux home:
  - `mkdir public`

- Set the super-user bit on smbmnt \[sic\]:
  - `sudo chmod u+s /usr/bin/smbmnt`

- Mount the Windows share as ‘public’:
  - `smbmount //MFC4/public public`
  - (the smbmount has to be re-done after boot)
Why Rexx on Linux?

- Same reasons as anywhere else, of course, but I have a specific application
  - Speleogroup website (http://www.speleogroup.org) contains ‘expedition logs’, written up on location – nowadays using Wiki notation
  - Wiki is converted to HTML using a (large) Rexx program (2000+ lines)
Previous technology

- NEC 780 Handheld PC (£70 on eBay)
  - running BREXX on Windows CE  [640 x 240]
  - edit, convert, and display single page only
2007 technology

• Nokia N800 Internet Tablet ($400)
  – runs Maemo (Debian) Linux
  – ARM processor
  – 800 x 480 display (4” touch-screen)
  – WiFi, Bluetooth, and USB connectivity
  – Camera
  – 2 SD card slots
  – Opera web browser, Video, MP3, etc.
  – 3 hours per charge, several days on standby
2007 technology

Nokia N800 with SU-8W Bluetooth keyboard
Speleogroup on N800

• Plan A: single page edit and view
  – too easy

• Plan B: port GoServe web server and MemoWiki to the N800
  – almost too hard
Porting to ARM Linux

- **GoServe** – many changes to details of sockets; weird problems with pthreads, etc.
  - single-thread for now, but it works

- **ooRexx** – 3.1.1 had a link problem; tried to build 3.1.2 for Debian on ARM
  - partly successful build
  - currently using Michael Saunby’s 3.1.2 with workaround (copied `/usr/lib/ooRexx` files to `/usr/lib`)
Building and debugging for ARM?

• Could do it all on the real device
  – a bit fiddly and slow, even with Bluetooth KB
  – no one else does that, so no C compiler port

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  … more virtual machines!
VMWare on Windows

- ubuntu Linux
  - Scratchbox x86
  - Scratchbox ARM

- Windows XP
Scratchbox VM

• Runs the same Linux as the N800

• Uses GCC for compile, running on x86, with cross-compile to ARM (emulated using QEMU)

• Many programs run OK in the ARM ‘box’, but the emulation is not perfect
  – e.g., cannot issue commands from ooRexx, but this works just fine on the real device
Scratchbox on ubuntu Linux on Windows

(Demo)
What’s a Wiki?

• From “wiki wiki” — Hawaiian for *quick*

• Allows the creation and editing of web pages using only a browser
  – makes it easy to add links between pages
  – has shorthand for markup

• MemoWiki is written in Rexx (see RexxLA symposium 2005)
Browser & Web Server

…. on the same computer (address is http://127.0.0.1)
Testing and running

• Running and testing on the actual device is essential
  – a big help is more virtualization:
    x11vnc  VNC (Virtual Network Computing), a virtual display
  – another Michael Saunby port
  – and it’s good for demos, too …
MemoWiki on the N800

(Demo)
Questions?