BOINC and Virtualization

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BOINC & Virtualization

• Work began at CERN in 2006 (DLG + others)
  – Chose VMware Player over (k)QEMU, etc.
  – Proved feasibility and built a working prototype
  – Continued project at Univ. Extremadura

• Work continued at CERN in 2007 (DW)
  – Succeeded to build a VM for full Athena environment
  – Reduced size of VM image by mounting runtime libraries over AFS
How it works

Boinc SERVER

VMware Image

GNU/Linux
Boinc Client

PC Client

VMware
Boinc Client
Wrapper

• Let's you execute any legacy application
• Handles:
  - suspend/resume/quit/abort
  - reporting CPU time
  - loss of heartbeat from core client
• Does not handle:
  - Checkpointing
Wrapping the Wrapper

- The wrapper has some problems
- In GNU/Linux it doesn't end in the right way
- In MS Windows it doesn't run bat files
- So we have to create a new wrapper for the wrapper
- The new wrapper is called “starter”
- We have two versions:
  - GNU/Linux version
  - MS Windows version
Starter in GNU/Linux

- This application will be started by the original wrapper
- More less is the same application
- Creates a fork for running the legacy application
- The new wrapper will run a program called: “worker”
- The best feature in GNU/Linux is that worker could be a script
Starter in MS Windows

• This application will be started by the original wrapper
• Creates a Windows-fork for running the legacy application
• It will read a file called “image” where you must write the name of the VMware image
• You cannot run a Bat file, if you try it you will get a client error
Vmware@Home

• Boinc will be the back-end for serving the VMWare images
• The Clients will have a pre-installed VMWare Player software and a Boinc client
• The Boinc client will download the images from the server and start the VM
• The images could have what ever you want: your own scientific environment
BOINC & Virtualization

• Work accomplished at CERN in 2008 (PB)
  – Established collaboration with the CernVM Project
  – General interface to all CERN physics software
  – Size of VM images now optimized and cached locally
  – Able to build VMs for full ATLAS, LHCb, ALICE (and soon CMS) environments and tested a VM with full Athena environment
  – Included an interface to physics groups’ production chain (tested with ATLAS Panda job management)
BOINC & Virtualization

• Work remaining at CERN in 2008 (DW)
  – Improve Wrapper’s handling of VMware VM’s:
    • Cleanly Start, Stop, Suspend, Restart guest VM’s from host OS (using VIX API available for VMware Server).
    • Monitor host OS resources of guest VM’s (for BOINC credit)
    • Possibly extend to Sun VirtualBox VM’s with their API