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Open Source & Linux Organization  
<http://linux.corp.hp.com>

## In Search of Collaboration

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# Agenda

- Introduction
- Scalability Collaboration – Lee Schermerhorn
- Virtualization Collaboration – Al Stone
- Gcc Collaboration – Shin-Ming Liu
- Offline discussion

# Introduction

- Goal
  - To stimulate collaborations on Linux and/or Itanium
    - In advancing the understanding of Itanium
    - In identifying and solving the performance barriers
    - In identifying and creating new technologies
- Process
  - Presenting areas of interests
  - Short discussions
    - Questions
    - Your ideas (Short and Sweet)
  - Offline discussions
  - Proposals
    - Evaluation, selection and funding agreements
  - Collaboration begins



# Itanium Scalability Collaboration

# Scalability & Performance Collaboration Opportunities

- Application Developers/End Users:
  - report perceived scalability bottlenecks and performance anomalies
  - collaborate to collect more information with performance tools, data collection scripts and/or instrumented kernels
  - test proposed patches
- Kernel/Systems Researchers:
  - collaborate to develop performance tools, kernel instrumentation, kernel patches [new algorithms, ...]
  - measure effects of proposed kernel modifications

# Virtualization Collaboration

# Enlightening Xen 3.0.2+

## – **High Priority:**

- **Domain Migration**
  - *bigger, better, faster*
- **Enterprise-tested quality, e.g.:**
  - *extensive tests/infrastructure for testing*
  - *correctness of MCA/CMC/CPE/INIT support/recovery, FPSWA handling*
- **Hotplug support**
  - *e.g., guest VM support, CPUs, memory via balloon driver*
- **Others:**
  - *cluster file systems for dom0 (e.g., GFS)*

# Enlightening Xen 3.0.2+

## – *Just Slightly Lower Priority:*

- *Performance tuning:*
  - *...is always welcome*
- *SMP support*
  - *connect to save/restore/migrate*
- *Debugging the VMM*
  - *pdb immature, gdbserver only with domU*
  - *prefer a single, mature solution for VMM and all kernels*
- *Tools to characterize device performance*
  - *e.g., correlating/understanding all disk I/O across all domains*

## Enlightening Xen 3.0.2+

- ***Would be really nice:***
  - ***New and interesting devices, full- or para-virtualized***
- ***Questions? Suggestions? Ideas?***
  - ***Al Stone <ahs3@fc.hp.com>***

# GCC Collaboration

# Progress since October 2005

- Released GCC 3.4.5, 4.0.2, 4.0.3, & 4.1
- Checked in 15 GCC & 4 binutil patches
  - Bug fixes
  - Fortran I/O library
- Participated in LTO design discussion
- Submitted a patch to improve floating point division scheduling
- Autoconf and libtool work

# GCC Focus Area

- Code Generator Enhancements for Itanium:
  1. New GRA tuning for Itanium
  2. Performance tuning in Modular Scheduler, to make use of data dependence analysis result
  3. Modular Scheduler tuning, to utilize flow sensitive alias information from TREE-SSA
- Link Time Optimization in priority orders
  1. Create in-memory Binary IR with all required API
  2. Create binary IR files reader/writer
  3. Adopting new in-memory Binary IR in all existing inter-procedural optimizations
- OpenMP library
  1. Performance tuning for Itanium, take advantage of multi-thread/multi-core
  2. Enhancements to OpenMP allowing cell local memory specification

# Let's TALK!!!