Intel Transparent Computing

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Agenda

• Intel SSG PSI Role
• UEFI Backgrounder
• Engagement in Transparent Computing
Intel SSG PSI Role

• Platform SW Infrastructure, PSI is part of Intel Software and Services Group with over 10 years history and global developer centers in US and Shanghai

• PSI team created EFI (Extensible Firmware Interface) which is a cross platform interface standard between hardware and software technology, to replace the legacy BIOS (Basic Input/Output System)
  – UEFI (Unified EFI) standard is based on EFI (www.uefi.org)
  – Implemented on IA32, X64 and IA64 architectures

• UEFI technology has been wildly adopted, 50% of platforms in the market based on UEFI code we developed.
  – All notebook based on Intel platform
  – Most Apple products using EFI code

• Close to 100 PSI engineers working on UEFI. Team published over 300 patents.
UEFI - Industry BIOS Transition

**Pre-2000**
All Platforms BIOS were proprietary

**2000**
Intel invented the Extensible Firmware Interface (EFI) and provided sample implementation under free BSD terms

**2004**
tianocore.org, open source EFI community launched

**2005**
Unified EFI (UEFI) Industry forum, with 15 members, was formed to standardize EFI

**2010**
Over 160 members and growing!
Major MNCs shipping; UEFI platforms crossed 50% of IA worldwide units; Microsoft UEFI x64 support in Server 2008, Vista and Win7; RedHat and Novell OS support
UEFI & Transparent Computing

UEFI Helps Transparent Computing
Separate SW & HW
Engagement in Transparent Computing

- Started Collaboration with Prof. Zhang from TsingHua University in 2006
  - Provided solution based on UEFI to Prof. Zhang for Transparent Computing research
- Working with local Industry on proof of concept, usage model and market opportunity
- Join Transparent Computing Alliance
  - Promote and contribute to Transparent Computing Alliance
  - Use our key learning from UEFI to apply to Transparent Computing Alliance
Thank You
Backup
Architecture overview

TC client

TC server

SAAS
TC Client overview

Keep balance between performance (H/W) and transparency (virtualization)

- Platform Independent Firmware = UEFI + LVMM + SOS + SOS apps/drivers
- LVMM hooks the IDE and NIC access, all other H/W access pass through to hardware
- LVMM/SOS converts IDE and NIC requests to network packet and send to remote server via NIC
- Server is responsible for network packet handling and OS image management
TC server architecture

TC network

TC client

TC system administrator

TC server

System mgmt agent

Network scheduler

Virtual disk management

Block I/O handler

Delta 1

Delta 2

Delta N

BASE Image
Usage example (eclassroom) ---
migrate the same OS to different HW platforms

Student in e-classroom: learning course
Teacher at office: prepare the courses
Student at library: browser internet
Student at home: do homework with same software environment as the e-classroom