Intel – Trusted Platforms Overview

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Intel® Platforms

Business Desktop	• Built-in Manageability • Proactive Security • Energy Efficient Performance
Digital Home	• Performance • Energy Efficient • Connectivity • Ease of Use
Mobility	• Performance • Battery Life • Uncompromised Connectivity • Innovative Form Factor
Server	• Effective Virtualization • Optimized Power & Thermals • Reliable Data Intensive Computing

Agenda:

- It is an imperfect world
- Building the foundation in 2006
- The 2007 “Weybridge” Platform
- Solving the problems with Intel vPro™ technology
- Conclusions

Energy Efficient Performance

Today's Challenges

- Managing and Securing modern business clients is more challenging than ever
  - Zero day malicious exploits create scenarios that patching alone can't resolve
  - Layered security improves platform protection capabilities
  - Optimized platform architecture removes bottlenecks, but also introduces complexity
  - Damaged software or hardware can impair the ability to remotely repair a client

- Client PCs are not manageable when they need it most, i.e. HW or SW problem or turned "off".
  1. Desk-side visits & manual processes drive disproportionate share of IT costs
  - Intel IT: ~10-15% of help desk calls require desk-side visit, but drive ~50% of help desk costs
  2. Security threats increasing, time to respond decreasing but protections vulnerable to attack or user tampering
  - Time to exploit = 3 days; Time to vendor patch = 42 days

No single technology solves all of these problems!!

Intel's Platform Solution

- Utilize a set of technologies that work together to:
  - Enable innovative solutions to solve these problems
  - Create a new framework for a rich layered security architecture

Evolving Intel® vPro™ in 2007 – "Weybridge"

Intel Core™ 2 Duo

Bearlake Family Chipsets

Wolfdale CPU Support

Intel Trusted Execution Technology™

Windows Vista* Premium Logo

Intel® Active Management Technology 3.0

2007 Weybridge Platform

eSATA*, Expanded USB*, Intel® Rapid Recovery Technology

Enhanced Virtualization (VTd)

Reduced Chipset & Platform Power

Note: Certain features may be available only on particular SKUs

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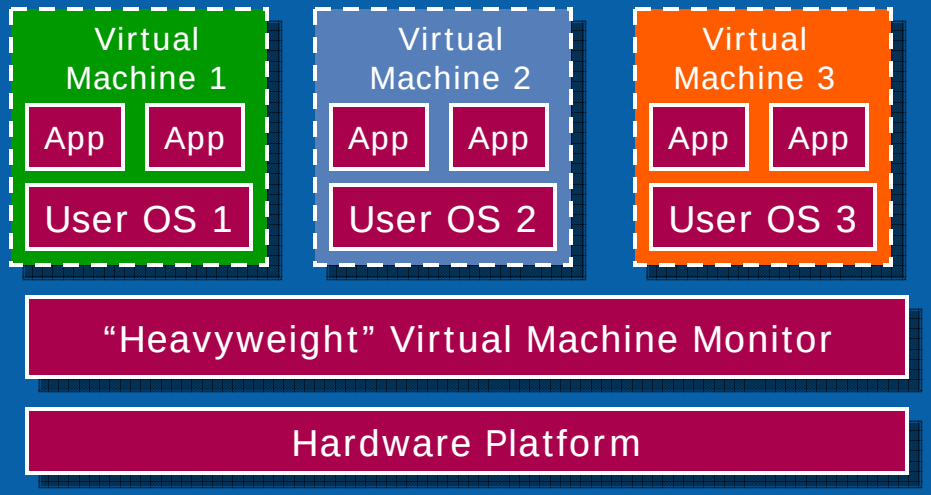
Intel® Virtualization Technology

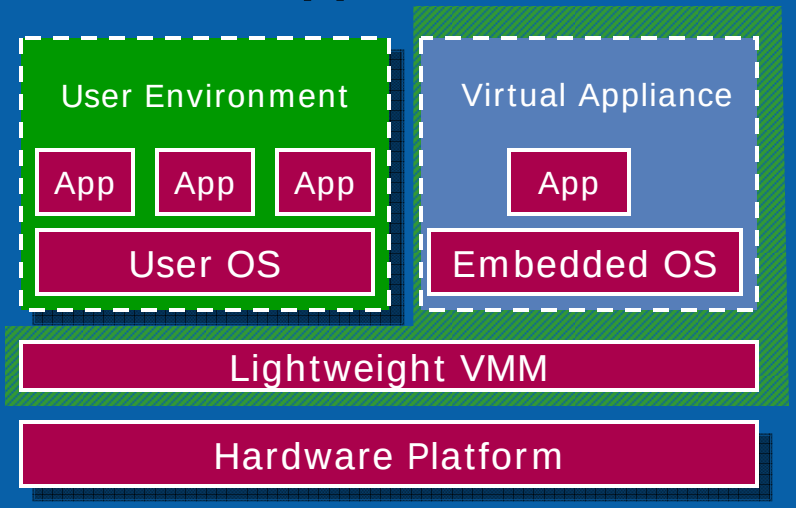
Traditional Virtualization



Full OS Partitions

- Full OS capability
- Multiple applications
- Full HW suite available
- Generally virtualized devices
- Maximum features and capability agility

Virtual Appliance Model

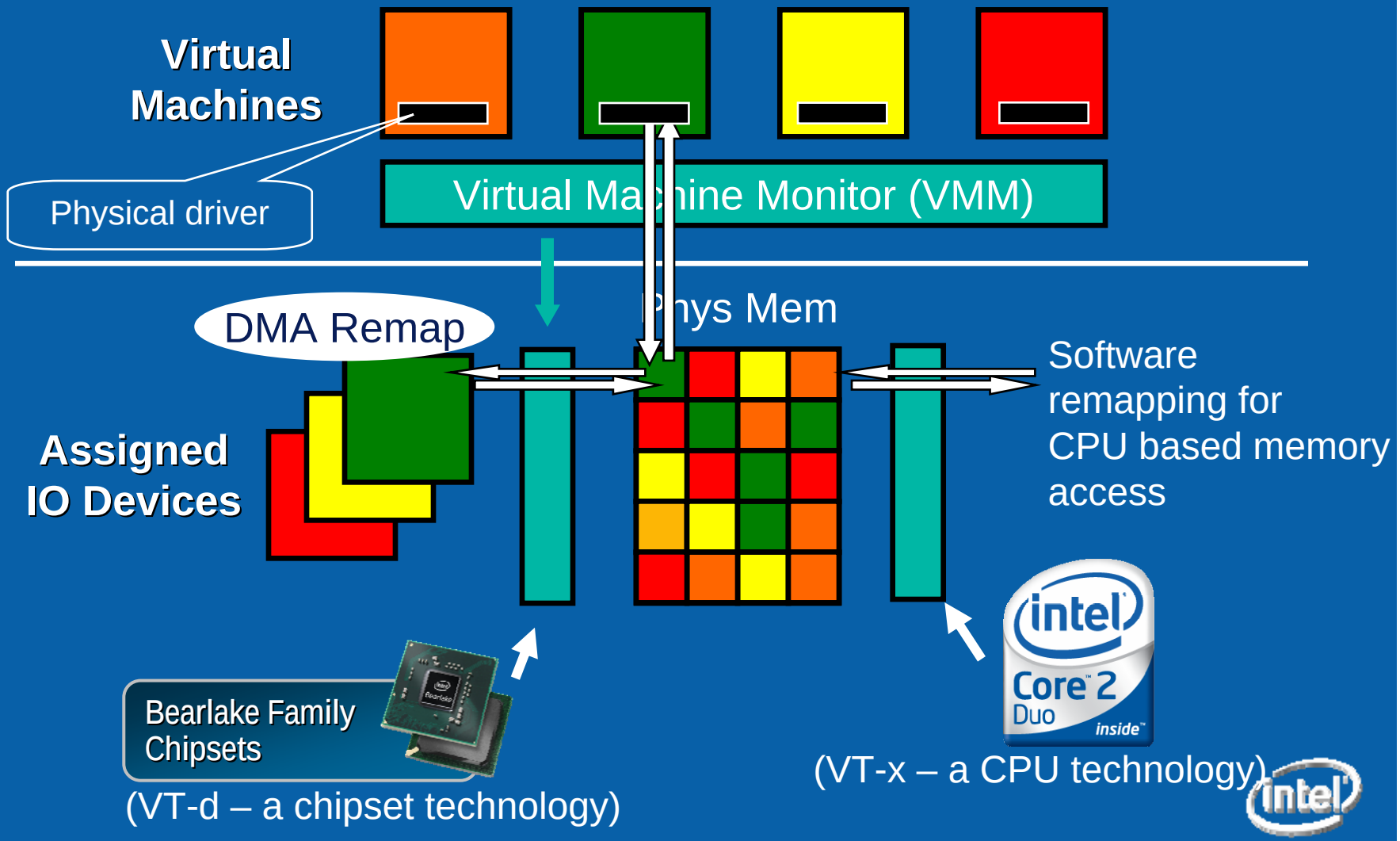


Virtual Appliance Partitions

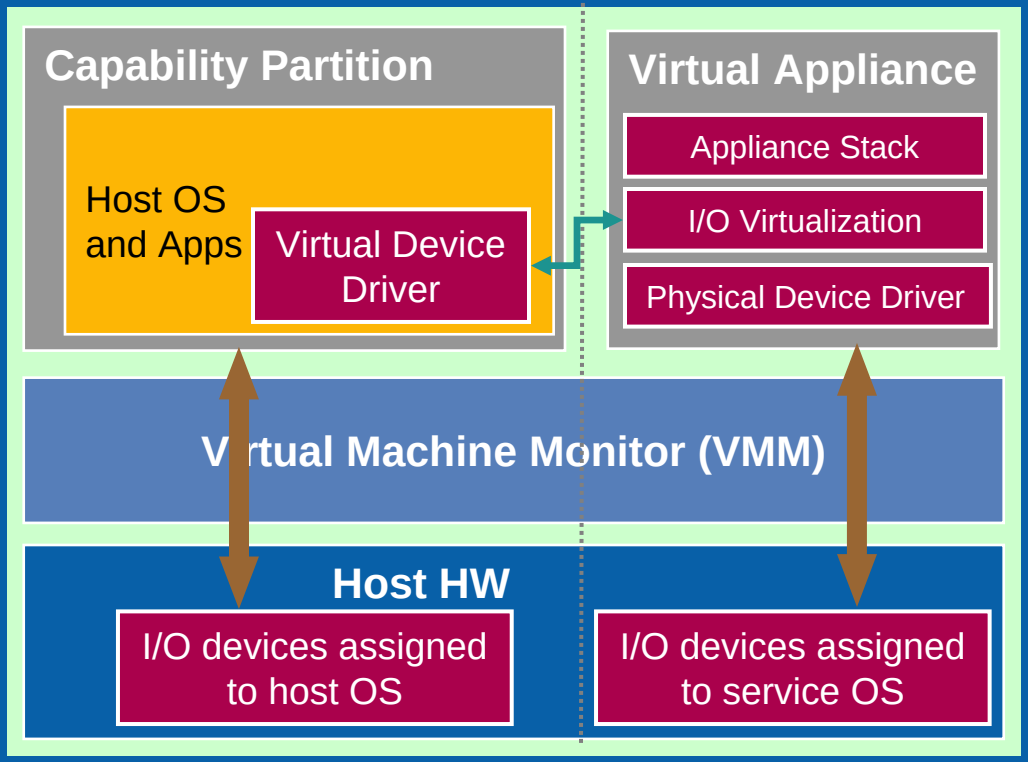
- Generally headless
- Fixed/specific function
- Low OS profile
- Minimal management cost
- Minimal platform resource utilization
- Minimal true/virtual HW mapped
- OS state/power independent

Make Virtualization Applicable to Mainstream

VT-d Direct I/O Overview



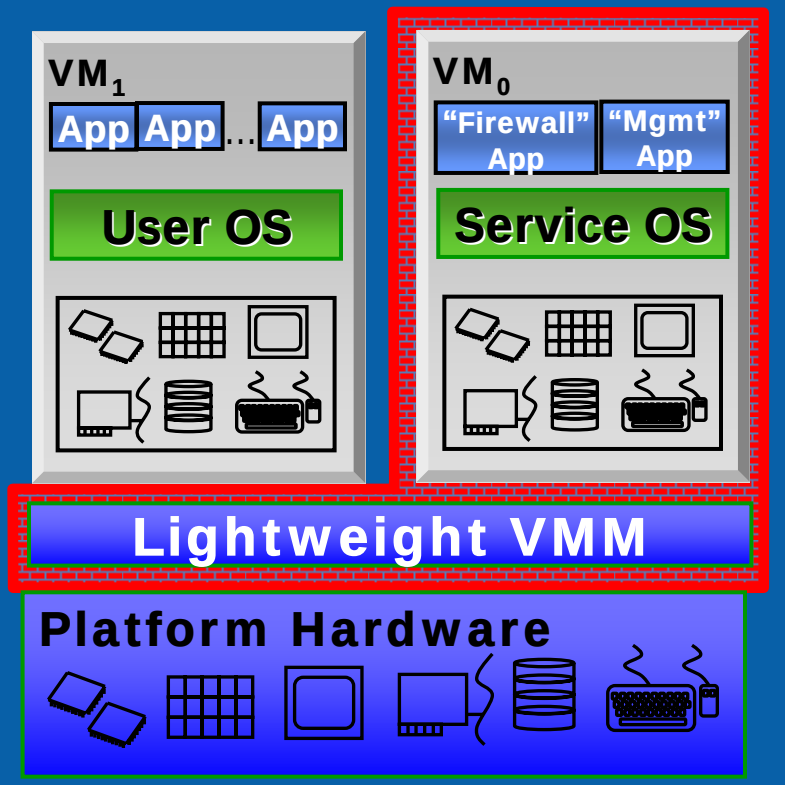
VT-d : DMA based Protection and Remapping for Virtual Appliances



- VT-d enables
  - Flexible memory management by VMM
  - Un-modified device drivers to run in both partitions
  - Contain DMA errors across partitions
  - Allows enforcement of independent security policies for each partition

Intel Trusted Execution Technology™ Introduced on Weybridge for Increased Security

- Codename LT extends Intel® VT capabilities of partitions and isolation to increase security using
  - Measured launch and a chain of trust to generate a secure partition
  - Trusted Platform Module (TPM) for Secure Storage of measurements and Signed reporting



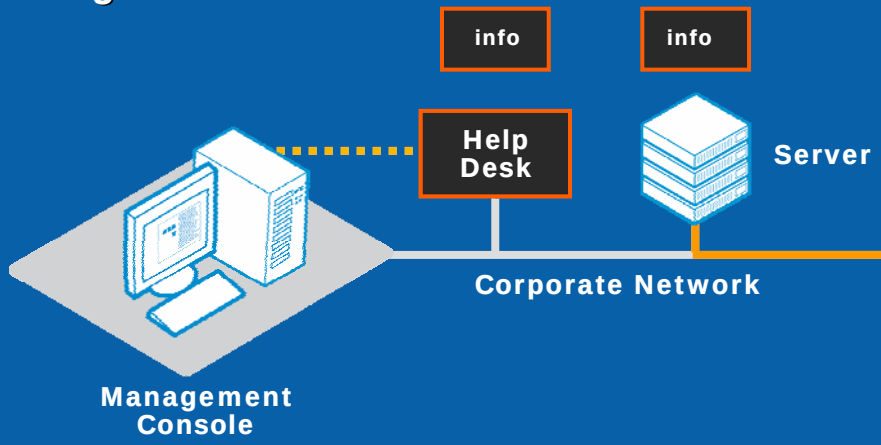
Intel® Active Management Technology Overview

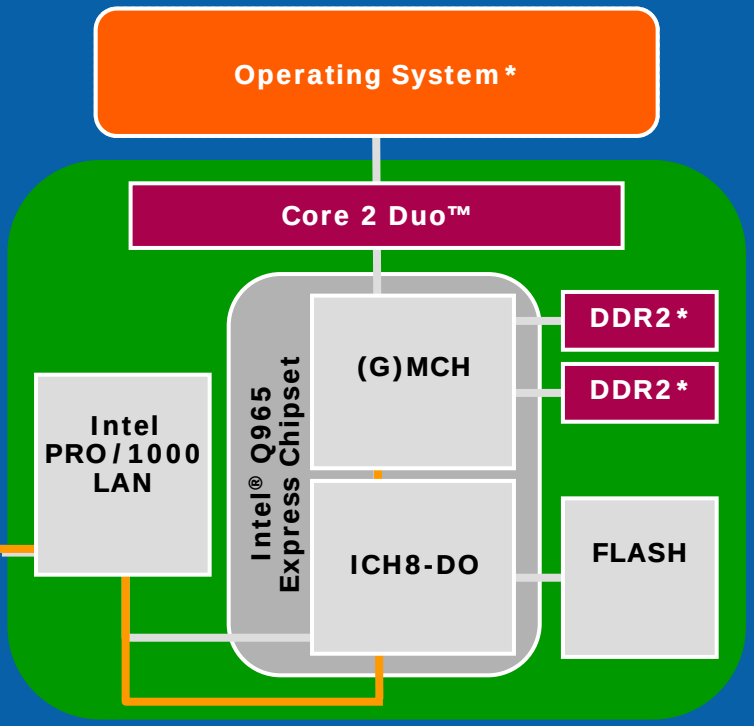
- Provides Built-in Manageability and Proactive Security for networked computing resources
- Enables maintenance and repair of systems using out-of-band
  (OOB) management capabilities even if the system is powered
  off or the OS is down
- Helps secure networks by:
  - Proactively blocking incoming threats
  - Reactively containing the spread of threats
  - Ensuring critical software agents are present
  - Keeping installed software versions up to date
  - Enabling popular third-party management consoles and security applications in use today

[1] Intel® Active Management Technology requires the platform to have an Intel® AMT-enabled chipset, network hardware and software, connection with a power source, and a network connection.

Intel® AMT 06 Architecture Overview

- **Discover**
  - Enhanced non-volatile memory storage
  - Out of Band access
- **Heal**
  - Provisioning & remote control
  - Hardware Diagnostics
- **Protect – System Defense: Filtering features**
  - Capability to allow, disallow, rate-limit packets based on 5-tuple IP Protocol Filter
  - Filters programmed by remote console
  - Filtering in hardware for LAN
  - Agent Presence

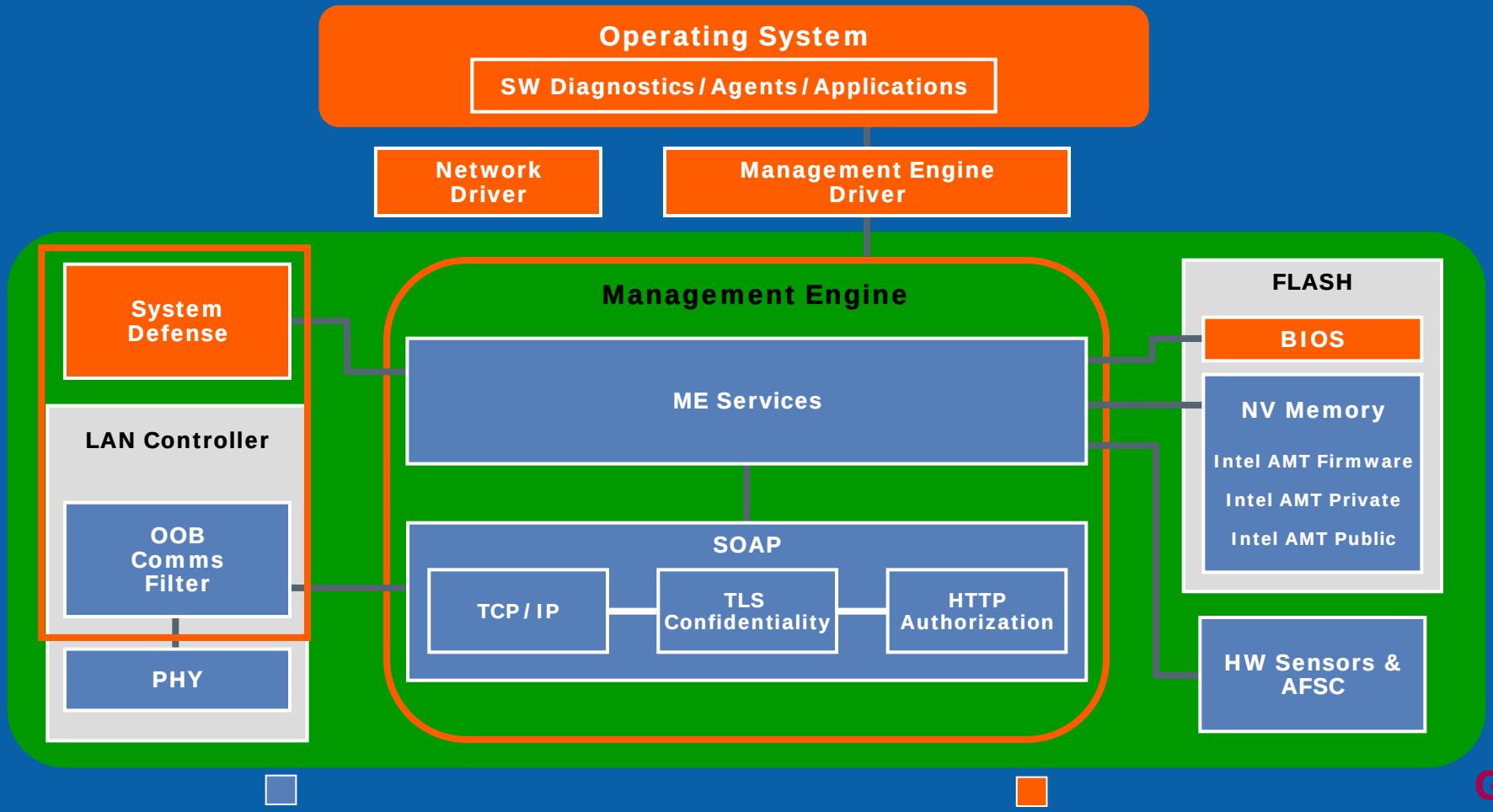




Intel® Active Management Technology

Major Intel® AMT Components

OOB Communication, Management Engine, Nonvolatile Memory



Go

Intel® Active Management Technology
Usage Cases

- Remote Asset Inventory
- Hardware and Software Inventory
- Remote Diagnostics and Repair
- Encrypted, Remote Power-on and Update
- Agent Presence Checking
- Hardware-based Isolation and Recovery

Intel® AMT Core Attributes
Advantage over S/W Solutions

- **OS and HDD-Independent**
  - Runs outside the context of the OS
  - Works the same way regardless of the installed OS
  - Immune from OS configuration issues
- **Highly-Available OOB Remote Management**
  - Provides remote management capabilities in all system power and health states
  - Runs on auxiliary and battery power (mobile)
  - Wired and wireless network support (2007)
- **Tamper-Resistance**
  - Intel® AMT agent bound to the PC and configured by IT
  - Resistant to end-user modify/disable
  - Network and Host I/F Security

Intel AMT Capabilities

Advantage over H/W (WoL & ASF) Solutions

Capabilities	WoL	ASF 2.0	Intel® AMT
OOB Mgt (Any OS/power state)	Booting Only	Boot/reboot and alerts	Boot/reboot, alerts, event log, and remote control, redirection
Remote Control	Remote Boot Only	Remote Boot/Reboot w/boot options	Remote boot/reboot w/ boot options, Serial Over LAN, IDE redirection
Event Alerting	No	Yes (1 Client, no filtering)	Yes (Broadcast to 16 clients, filter only desired events)
3rd Party Non-Volatile Storage	No	No	Yes
Event Logging	No	No	Yes, including filters
Remote Reboot	No	Yes (PXE)	Yes (PXE or IDE-Redirect)
Asset Information	No	No	Yes
Remote BIOS Update	No	No	Yes
Secure Communications	No	Simple authentication - no encryption	SSL 3.1/TLS encryption, HTTP Digest/Negotiate authentication
Connection Protocol	None	RMCP	SOAP/HTTP (web browser access)
Layer 4 Stack	Registered packet	UDP	TCP (preferred routing protocol)
Firmware Updates Utility	No	No	Yes
System Defense / Agent Presence	No	No	Yes
System Defense /NOC Filters	No	No	Yes

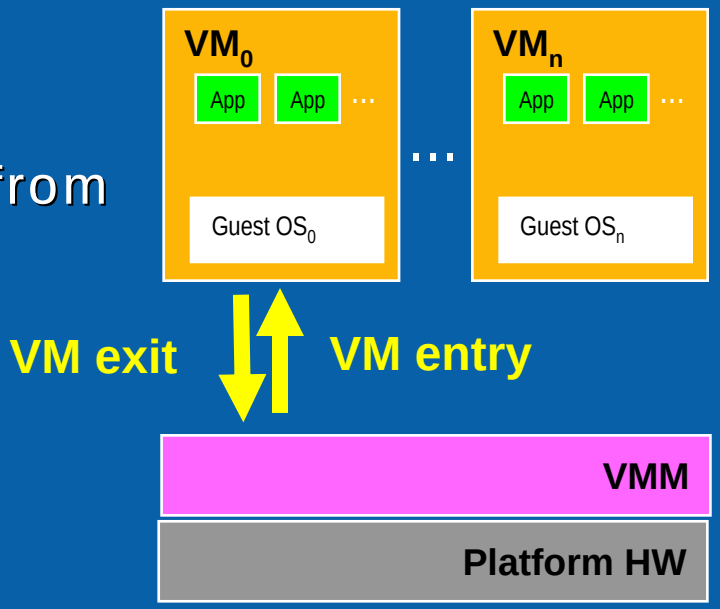
Conclusion

- Solving yesterday's problems with enhancements to yesterday's solutions is not sufficient to address the challenges of tomorrow
- We are well underway to redefining the PC
  - Radical new hardware that enables distinct technologies that work together being launched in 2006 and 2007
  - New class of solutions that solve problems in new ways are starting to emerge
  - Barriers to innovation are being cleared for ISVs
  - This is just the beginning – new innovations to come for the 2008 platform and beyond– stay tuned…


intel
Leap ahead™

Intel® Virtualization Technology Mode Transitions

- VM entry (VMLAUNCH/VMRESUME)
  - Transition VMM ➔ Guest
  - Enters VMX non-root operation
  - Loads Guest state and Exit criteria from VMCS
- VM exit (VMEXIT)
  - Transition Guest ➔ VMM
  - Enters VMX root operation
  - Saves Guest state in VMCS
  - Loads VMM state from VMCS
  - May be triggered by many causes
    - E.g. Accessing CPU MSRs



Intel® Virtualization Technology Operation with VMCS