IaaS Success Blueprint with Intel and Parallels

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Software and workloads used in performance tests may have been optimized for performance only on Intel microprocessors. Performance tests, such as SYSmark and MobileMark, are measured using specific computer systems, components, software, operations and functions. Any change to any of those factors may cause the results to vary. You should consult other information and performance tests to assist you in fully evaluating your contemplated purchases, including the performance of that product when combined with other products.

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Relative performance is calculated by assigning a baseline value of 1.0 to one benchmark result, and then dividing the actual benchmark result for the baseline platform into each of the specific benchmark results of each of the other platforms, and assigning them a relative performance number that correlates with the performance improvements reported.


Intel® Virtualization Technology requires a computer system with an enabled Intel® processor, BIOS, virtual machine monitor (VMM) and, for some uses, certain platform software enabled for it. Functionality, performance or other benefits will vary depending on hardware and software configurations and may require a BIOS update. Software applications may not be compatible with all operating systems. Please check with your application vendor.

Hyper-Threading Technology requires a computer system with a processor supporting HT Technology and an HT Technology-enabled chipset, BIOS and operating system. Performance will vary depending on the specific hardware and software you use. For more information including details on which processors support HT Technology, see here.

Intel® Turbo Boost Technology requires a Platform with a processor with Intel Turbo Boost Technology capability. Intel Turbo Boost Technology performance varies depending on hardware, software and overall system configuration. Check with your platform manufacturer on whether your system delivers Intel Turbo Boost Technology. For more information, see http://www.intel.com/technology/turboboost

No computer system can provide absolute security under all conditions. Intel® Trusted Execution Technology (Intel® TXT) requires a computer system with Intel® Virtualization Technology, an Intel TXT-enabled processor, chipset, BIOS, Authenticated Code Modules and an Intel TXT-compatible measured launched environment (MLE). Intel TXT also requires the system to contain a TPM v1.s. For more information, visit http://www.intel.com/technology/security. In addition, Intel TXT requires that the original equipment manufacturer provides TPM functionality, which requires a TPM-supported BIOS. TPM functionality must be initialized and may not be available in all countries.

Intel® AES-NI requires a computer system with an AES-NI enabled processor, as well as non-Intel software to execute the instructions in the correct sequence. AES-NI is available on Intel® Core™ i5-600 Desktop Processor Series, Intel® Core™ i7-600 Mobile Processor Series, and Intel® Core™ i5-500 Mobile Processor Series. For availability, consult your reseller or system manufacturer. For more information, see http://software.intel.com/en-us/articles/intel-advanced-encryption-standard-instructions-aes-ni/

Intel processor numbers are not a measure of performance. Processor numbers differentiate features within each processor series, not across different processor sequences. See http://www.intel.com/products/processor_number for details. Intel products are not intended for use in medical, life saving, life sustaining, critical control or safety systems, or in nuclear facility applications. All dates and products specified are for planning purposes only and are subject to change without notice.

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Intel and Parallels Cloud Solutions

Build solutions today to enable IT agility tomorrow

• Intel Cloud Vision

• Trusted computing with Parallels Automation system and VMware ESXi

• Saving power and deploying unified networking with Microsoft and Parallels Healthcare Community Cloud Automation

• Linking SMBs to cloud service providers via on-premise servers
Cloud 2015 Vision

Federated
Share data securely across public and private clouds

Automated
Dynamically Allocate Resources

Client Aware
Optimizing services based on device capability

Open, Interoperable Solutions Essential
From Vision to Action

**IT and Service Providers**
Define and Prioritize IT Requirements

**Products and Technology**
Take Advantage of New Capabilities in Intel® Platforms

**Intel® Cloud Builders**
Utilize Proven Reference Solutions to Ease your Deployments

**Helping IT on Path to Cloud 2015**
Open Data Center Alliance
Independent organization of global IT leaders

Participate in the Alliance to influence IT usage roadmap

www.opendatacenteralliance.org

Intel® Cloud Builders
Proven Solutions on IA

www.intel.com/cloudbuilders
Open Data Center Requirements

**Secure**
Reduce the risk, increase the compliance and manage hybrid usage models

**Efficient**
Optimizing technologies to decrease energy, human and physical asset consumption

**Simplified**
Simplify data center operations to reduce cables, complexity and cost

**Key Intel Products & Technologies**

**Intel® AES-NI**
- Up to 7X faster encryption/decryption

**Intel Trusted Execution Technology**
- Enhance security via platform trust

**Intel Expressway Cloud Access 360**
- Identity protection for cloud

**Intel® Node Manager & Data Center Manager**
- Manage & reduce power, improve density

**Intel Xeon-based storage**
- Efficient, high-performance storage

**Intel® Ethernet 10GbE**
- Higher performance
- Lower power
- Unified networking

Intel® Xeon®-based platforms are foundation for efficient, high performance clouds on path to Cloud 2015

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1. Oracle 11.2.0.2 with TDE, time takes to decrypt a 5.1 million row table with AES-256 CBC mode on Intel® Xeon® X5680 processor (3.33 GHz, 36MB) optimized with Intel® Performance Primitives crypto library (IPP) vs. Intel® Xeon® X5570 processor (2.93 GHz, 36MB) without IPP. Time measured is per 8KB of data and shown as decryption processing rate in MB/CPU second. For more information on performance tests and on the performance of Intel products, visit [http://www.intel.com/performance](http://www.intel.com/performance). Performance tests and ratings are measured using specific computer systems and/or components and reflect the approximate performance of Intel products as measured by those tests. Any difference in system hardware or software design or configuration may affect actual performance. Buyers should consult other sources of information to evaluate the performance of systems or components they are considering purchasing. For more information on performance tests and on the performance of Intel products, visit [Intel Performance Benchmark Limitations](http://www.intel.com/performance).
Parallels Trusted Compute Pools for Public Cloud VPS Services*
PoC Reference Architecture on Intel® Xeon® Processor 5600 Series Servers

Architectural Considerations when building the cloud
• TXT enforces control through measurement, memory locking and sealing secrets
• TXT helps prevent:
  • Attempts to insert non-trusted VMM (rootkits)
  • Reset attacks designed to compromise platform secrets in memory
  • BIOS and firmware update attacks

Public Cloud Trusted Compute Pools PoC*
• Built on Intel TXT enabled servers running VMware ESXi VMM technology
• Will enable premium Trusted VPS offerings to be sold as a Parallels Automation subscription

* Requires future VMware APS package to be development
Intel® Virtualization & Security Technologies
Establishing the Foundation for More Secure Clouds

**Isolate**

*Intel® VT & Intel® TXT*
protects VM isolation and provides a more secure platform launch

- VM 1
- VM 2

*Intel® TXT*
ensures platform launch with known configuration

**Enforce**

*Intel® TXT*
establishes “trusted” status to enable migration based on security policy

- VM 1
- VM 2

**Encrypt**

*Intel® AES-NI*
delivers built-in encryption acceleration for better data protection

Intel® TXT: How it Works

Intel® TXT Enabling Status

Intel® TXT Platform Req’ts
Parallels & Microsoft Healthcare Community Cloud Automation
Hyper-V Reference Architecture on Intel® Xeon® Processor 5600 Series Servers

Architectural Considerations when building the cloud
- Benefits of using Intel® 5600 Series Based Platforms and SSDs
- Building a Unified Network Infrastructure using Intel® 10GE Ethernet
- Microsoft Policy-Based Power Management with Intel® Node Manager
- Jolex Power Management Solution using Node Manager

Unified Network
- Same ubiquitous Enterprise Class Ethernet Adapter Everywhere
- VMDq - Virtual Machine Device Queues improve performance with lower CPU Utilization
- NAS, iSCSI and FCOE

Deployed Infrastructure Solution

Microsoft Business Productivity Products
- Lync
- SharePoint
- Exchange

Microsoft Infrastructure Products
- Windows Server 2008 R2
- System Center

Parallels Automation
- Control Panels
- Billing Automation
- Operations / Provisioning Automation
- Application Packaging/Catalog
- Compliance

Branded Customer Facing Solution

Intel Server Platforms

McAfee
Intel® Policy-Based Power Management

Improve Efficiency

- **Challenge**
  - Pressure on reducing power consumption, improving datacenter efficiency, reducing costs

- **Solution**
  - Active data center power management

**Intel® Intelligent Power Node Manager**

- Monitors and reports system power
- Caps system power to policy
- Dynamically adjusts P & T-states

**Microsoft System Center**

- Scales Intel Node Manager functions to rack level
- Usage:
  - Fill Rack with new servers, cap peak power
  - Lower Power state for applications not used overnight
  - Reduce power in data center hot spot and move workloads to other servers
Simplify with Intel® 10GbE

**Consolidate** Multiple GbE Connections onto Intel® 10GbE

- **GbE Server Connections**
  - 45% Reduction in Power per Rack
  - 80% Reduction in Cables and Switch ports
  - 15% Reduction in Infra-structure Costs

**Unify** Different Traffic Types onto Intel® 10GbE

- **10GbE Server Connections**
  - 2x Improved Bandwidth per Server

**Simplify** + **Reduce TCO** + **Prepare for the Cloud**

Intel 10GbE—the #1 selling 10GbE Controller²

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Ethernet consolidation source: Intel 10GbE ROI Calculator. This ROI calculator is a cost comparison for a highly virtualized solution, using multiple 1GbE connections versus a dual port 10GbE implementation. [http://www.event-management-online.de/LAD/calculator.aspx](http://www.event-management-online.de/LAD/calculator.aspx). See back up foils for additional details.

Intel® 82599 10 Gigabit Controller and Intel® Ethernet X520 Server Adapter; Intel® 10GbE Adapter: #1 MSS per Dell’Oro Q3’10 Ethernet Report
Intel + Microsoft + Parallels SMB Cloud Solution

Parallels cloud service providers
• 5000+ Service Providers offering cloud services (worldwide)
• Delivering: Web Presence/Web applications, Email services, IaaS services, and SaaS applications
• Enabling Intel EPSD VARs/System Builders to
  • Become affiliate resellers
  • Offer white-label cloud services
  • Directly become cloud service providers
• Cloud service subscription revenue sharing driven via Parallels SBSSe Add-in & Parallels Partner Locator
  • Links SBSSe server → VAR → SP

Parallels Cloud services delivery systems

Microsoft* SBS Essential 2011
• Remote Access
• Identity Protection
• Backup
• File & Print Sharing
• Windows Server Platform

Parallels S1200KP Storage

Open-E* or Microsoft* Storage Server

Parallels cloud service providers
• 5000+ Service Providers offering cloud services (worldwide)
• Delivering: Web Presence/Web applications, Email services, IaaS services, and SaaS applications
• Enabling Intel EPSD VARs/System Builders to
  • Become affiliate resellers
  • Offer white-label cloud services
  • Directly become cloud service providers
• Cloud service subscription revenue sharing driven via Parallels SBSSe Add-in & Parallels Partner Locator
  • Links SBSSe server → VAR → SP
Summary

• Cloud 2015: Federated, Automated, Client Aware

• Intel delivering leadership technologies to enable cloud solutions that address IT challenges on path to Cloud 2015

• Participate in the Open Data Center Alliance to get early access to Alliance materials and influence usage roadmap
  - www.opendatacenteralliance.org/join-us

• Put Intel® Cloud Builders reference solutions to work to make it easier to deploy & optimize cloud infrastructure
  - Enable more efficient, secure, simplified datacenters & client aware clouds
  - www.intel.com/cloudbuilders/library
Key Industry Trends

*Increasing requirements meet fixed budget realities*

**Escalating Demands**

- More Users
  - >1 billion more netizen’s¹
- More Devices
  - 15 billion connected devices²
- More Data
  - >1,000 exabytes Internet traffic³

**Compounding Challenges**

- Security
- Storage
- Mission Critical Availability
- Networking
- Power & Space Limitations

**Diverse Environments**

- Management
- Compute
- Storage
- Network
- Mgmt
- Unified Network
- Storage Arrays
- Security
- Network
- Storage
- Compute
- Datacenter Facilities

- Discrete
- Virtual
- Cloud

**IT Spending Pressures**

- Enhance Existing Capabilities
- Innovation or New Capabilities

**IT Industry is at a Great Inflection Point**

1. IDC “Server Workloads Forecast” 2009. 2.IDC “The Internet Reaches Late Adolescence” Dec 2009, extrapolation by Intel for 2015
2. ECG “Worldwide Device Estimates Year 2020 - Intel One Smart Network Work” forecast
3. Source: [http://www.cisco.com/assets/cdc_content_elements/networking_solutions/service_provider/visual_networking_ip_traffic_chart.htm](http://www.cisco.com/assets/cdc_content_elements/networking_solutions/service_provider/visual_networking_ip_traffic_chart.htm) extrapolated to 2015
4. Source: Gartner IT Key Metrics Data 2010
IT Transformation to Cloud

Key IT Challenges
- Pressure on costs
- Security
- Efficiency
- Manageability
- Vendor Lock-In

*Intel Helping IT in Evolution to Cloud 2015*
Future Cloud Data Center Architecture

- **Automation**: Dynamic workload placement, Common policy & asset management
- **Efficient Performance**: Better performance/$/Watt, Improved instrumentation & control
- **Trust and Compliance**: Trusted compute pools, Secure migration & federation
- **Networking**: Unified fabrics, Cost-effective network scaling
- **Storage**: Scale-out shared storage, Proximity based storage

Enable secure, efficient, and simplified cloud data centers that allow IT flexibility & choice
Intel® Cloud Builders
Proven Solutions on IA

Infrastructure as a Service / Cloud Resource Mgmt

Acer* eDC Cloud Smart Portal
Fujitsu PRIMERGY* with VMware vCloud*
Fujitsu PRIMERGY* BX Blade Server
Cloud On-Boarding with CloudSwitch*
Cloud On-Boarding with Citrix NetScaler*
HP ProLiant SL* & Enomaly* Elastic Computing Platform
Huawei SingleCLOUD*
IBM CloudBurst*
Inspur* IaaS
Joyent SmartDataCenter*
Microsoft System Center VM Manager Self-Service Portal 2.0*
Microsoft RDS VDI* & HP ProLiant*
Neusoft Aclome* Cloud
Nimbula* Cloud OS & Nimbula Director*
Novell* Cloud Manager
NTT DATA BIZXAAS* Full OSS Cloud Solution
Oracle* Optimized Solution for Enterprise Cloud
Parallels* Elastic IT Solution Developer
Cloud
Powerleader Power Rack Server* with Microsoft*
Red Hat* Cloud Foundations
StackIQ Rocks+ Management Software
Tarox* Cloud Design with VMware
Ubuntu* Enterprise Cloud
Univa UD*
VMware vCloud Director*

Cloud Security

Cloud Gateway Security on Intel Expressway
Dell* & Enomaly*: Cloud Platform Security
Enhanced Cloud Security: HyTrust* & VMware*
Parallels* Trusted Compute Pools
Power Mgmt & Security with Intel & OpenStack*
EMC* Secure Cloud On-Boarding for Mission-Critical
VMware* Enhanced Server Platform Security

Cloud Efficiency

Dell* & VMware* Policy Based Power Management
JouleX Energy Management Solution*
Manage Data Center Carbon Footprint with Dell, Intel, and JouleX*
Microsoft System Center* Policy based Power Mgmt

Cloud Storage/Networking

Cisco* Virtualized Multi-Tenant Datacenter
EMC* Atmos* Scale-out Storage Usage Models
EMC*, Intel & Oxygen* Cloud
NetApp* & Red Hat*: 10GbE iSCSI & FCoE
NetApp* & VMware ESX*: 10GbE iSCSI & FCoE
NexentaStor* Scale-out Storage
Storage I/O Control: 10GbE Intel® Ethernet
with VMware vSphere 5.0* SIOC

Client-Aware

Client Aware: RES Virtual Desktop Extender*
Balanced Compute Model with NetSuite* & Gproxy Design*

www.intel.com/cloudbuilders

Solutions to Make it Easier to Build & Optimize Cloud Infrastructure

* Other names and brands may be claimed as the property of others
Intel® Advanced Technologies

Security

Data Protection
- Advanced Encryption Standard—New Instructions

- Intel® AES-NI

Platform Security
- Trusted Execution Technology

- Intel® TXT

Resilience

High Availability
- Mission Critical Class Reliability, Availability, and Serviceability

- Advanced RAS

Service Delivery

Virtualization
- Near-Native VM Perf. & Seamless VM Migration

- Intel® VT (CPU, Chipset, and I/O)

Performance

Automatically Adapt to the Workload

- Intel® Hyper-Threading

- Intel® Turbo Boost

Power

Processor Power
- Integrated Power Gates and Automated Low Power States

System Power
- Intel® Intelligent Power Node Manager

Data Center Power
- Intel® Data Center Manager

Different Technologies Optimized for Different Needs
Network I/O Control and Storage I/O Control

Handle Contention on Unified Networks

Resource Management Using Network I/O Control

Figure 12. Shares values assign the relative importance to various types of traffic flows.
• Hypervisor Boots in Trusted Manner (using Intel TXT)
• Platform determined as Trusted and placed in Trusted Compute Pool
• Cloud User specifies Trusted Compute Pool when deploying Vm
Isolate – Intel® Trusted Execution Technology (TXT)

TXT enforces control through measurement, memory locking and sealing secrets

Allows greater control of launch stack and enables isolation in boot process

TXT helps prevent:
- Attempts to insert non-trusted VMM (rootkits)
- Reset attacks designed to compromise platform secrets in memory
- BIOS and firmware update attacks

Makes Platform More Robust Against Software-based Attacks
Enforce – HyTrust* Appliance

A virtual appliance that provides **unified access control**, policy enforcement, and audit-quality logging for the administration of virtual infrastructure.

- Allows “tagging” of hosts, virtual servers, appliances, switches, etc.
- Rules written to determine relationships among tagged objects
- Eliminates possibility of unwanted changes (e.g. powering down core switch, moving test/dev server into production, etc.)
- Capability to assess and remediate misconfigurations in order to harden hosts

*The Only Solution to Pro-actively Control and Audit Virtualization Platform*
Ubiquitous Data Protection with AESNI

1. Secure transactions used pervasively in ecommerce, banking, etc.

2. Full disk encryption software protects data automatically during saving to disk

3. Most enterprise applications offer options to use encryption to secure information

Full-disk encryption protects data on hard disks

Secure transactions on Internet and Intranet

Application-level encryption for automation and granularity

Currently implemented in Windows* 7 client, Redhat* (apache), Windows* 2008 R2(IIS)

Allows Broader Use of Encryption for better protection Of Business Information Assets