Introduction

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Introduction

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## Revision History

<table>
<thead>
<tr>
<th>Date</th>
<th>Revision</th>
<th>Description</th>
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<tbody>
<tr>
<td>May 2014</td>
<td>003</td>
<td>Changed the title and the product branding. No technical updates.</td>
</tr>
<tr>
<td>December 2013</td>
<td>002</td>
<td>Updated with the Intel® Xeon® processor E5-2658 v2 and the Intel® Xeon® processor E5-2648L.</td>
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<tr>
<td>August 2013</td>
<td>001</td>
<td>Initial release.</td>
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Introduction

This document provides power data for Intel® Xeon® processor E5-2600 v2 product family while running real-life applications. This document is complementary to the specifications published in the product datasheet.

The Application Power Guidelines should be used for reference only. The power data provided in this document are not design points or specifications and should not be used as such.

The specifications contained in this document complements documents in the Reference Documents table. Additional information about Applications Power Guidelines is provided in the Related Documents table.

1.1 Related Documents

Table 1. Related Documents

<table>
<thead>
<tr>
<th>Document Title</th>
<th>Document Number/Location</th>
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<tbody>
<tr>
<td></td>
<td>appl-power-guideline-paper.pdf</td>
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1.2 Reference Documents

Table 2. Reference Documents

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<thead>
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<th>Document Title</th>
<th>Document Number/Location</th>
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<tr>
<td>Intel® Xeon® Processor E5-1600 v2/E5-2600 v2/E5-4600 v2 Product Families - External Design Specification (EDS) - Volume One Electrical, Mechanical and Thermal Specifications - Volume 1 of 3</td>
<td>475257</td>
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<tr>
<td>Intel® Xeon® Processor E5 v2 Product Family External Design Specification (EDS) - Volume two: Registers -- Volume 2 of 3</td>
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<td>Intel® Xeon® Processor E5 V2 Product Family- External Design Specification (EDS) - Volume Three - Functional Description – Volume 3 of 3</td>
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<td>Intel® Xeon® Processor E5-1600/2600/4600 and E5-1600 V2/2600 V2/4600 V2 Product Families - Thermal / Mechanical Design Guide</td>
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NOTE: Contact the local Intel representative for the most recent revision of these documents.
### 1.3 Terminology

#### Table 3. Terminology

<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
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<tr>
<td>APG</td>
<td>Application Power Guidelines</td>
</tr>
<tr>
<td>ECC</td>
<td>Error-Correcting Code</td>
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<tr>
<td>SKU</td>
<td>Stock Keeping Unit</td>
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<tr>
<td>TDP</td>
<td>Thermal Design Power</td>
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2 Application Power Guidelines

The Application Power Guidelines (APG) values listed in this document are intended to reflect the nominal use conditions. Factors such as temperature, platform configuration and other variables can influence the values. Specific information about the platform, benchmarks, temperatures, etc., is provided in this document to enable a repeatable power measurement. Since Application Power Guidelines are provided on limited applications and SKUs, it is expected that users understand these values and apply them in their own use cases.
2.1 Application Power Guidelines for the Intel® Xeon® Processor E5-2658 v2

Figure 1 indicates the Application Power Guidelines for various embedded applications for the Intel® Xeon® processor E5-2658 v2 with a 95W TDP specification.

Figure 1. Application Power Guidelines for the Intel® Xeon® Processor E5-2658 v2

Table 4. Application Power Guidelines for the Intel® Xeon® Processor E5-2658 v2

<table>
<thead>
<tr>
<th>Application/Benchmark</th>
<th>Processor Power (W)</th>
<th>Junction Temperature (°C)</th>
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<tbody>
<tr>
<td>Idle with C-states Enabled</td>
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<td>34</td>
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<td>Idle with C-states Disabled</td>
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<tr>
<td>L3FWD</td>
<td>54.51</td>
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<td>IPsec</td>
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<td>45</td>
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<td>SPECint* 400</td>
<td>66.1</td>
<td>47</td>
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<tr>
<td>SPECfp* 416</td>
<td>72.2</td>
<td>49</td>
</tr>
<tr>
<td>Power Thermal Utility Tool</td>
<td>81.0</td>
<td>55</td>
</tr>
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</table>

NOTES:
1. 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. For more information go to http://www.intel.com/performance.
2. Configuration details are listed in Section 3 Configuration and Disclaimer.
Source: Intel internal testing as of November 2013.
2.2 Application Power Guidelines for the Intel® Xeon® Processor E5-2648L v2

Figure 2 indicates the Application Power Guidelines for various embedded applications for the Intel® Xeon® processor E5-2648L v2 with a 70W TDP specification.

Figure 2. Application Power Guidelines for the Intel® Xeon® Processor E5-2648L v2

<table>
<thead>
<tr>
<th>Application/Benchmark</th>
<th>Processor Power (W)</th>
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<tbody>
<tr>
<td>Idle with C-states Enabled</td>
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<td>Idle with C-states Disabled</td>
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<td>SPECint* 400</td>
<td>46.8</td>
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<tr>
<td>SPECfp* 416</td>
<td>51.2</td>
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<tr>
<td>Power Thermal Utility Tool</td>
<td>56.9</td>
<td>39</td>
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NOTES:
1. 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. For more information go to http://www.intel.com/performance.
2. Configuration details are listed in Section 3 Configuration and Disclaimer. Source: Intel internal testing as of November 2013.
Values presented represent a typical or average processor SKU and do not guarantee a customer will achieve these exact values for each silicon sample. These values are not intended to replace TDP, nor are they intended to be used for reliability assessments. Individual test results may vary.

Software and workloads used in performance tests may have been optimized for performance only on Intel processors. 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.

### 3.1 APG Configuration

The results presented in this document are collected on a single sample. The data has not been post processed to account for part-to-part variation.

- **Platforms:**
  - Platform 1: Intel® Xeon® processor E5-2658 v2 with Intel® C600 Series Chipset
  - Platform 2: Intel® Xeon® processor E5-2648L v2 with Intel® C600 Series Chipset
- **BIOS Rev:** RML327.
- **Memory:** Samsung® DDR3 1867 MHz 2Rx4 ECC, 2DPC, 8GB/DIMM for L3FWD and IPsec workload, and Micron® DDR3 1333MHz 1Rx8 , 2DPC, 4GB/DIMM for all other benchmarks.
- **Operating Systems:** Linux* Fedora* 16 (kernel 3.4.11-.fc16.x86_64) and Linux* Ubuntu*11.10 (kernel 3.10.1), Windows* 7 64-bit Professional and Linux* Host Red Hat* 6.3 (kernel 3.3.1).
- **Linux* Fedora* 16 Software:** Layer 3 Forwarding (Intel® DPDK*-1.4.0.28).
- **Linux* Ubuntu* Software:** CPU2006.1.2 (400.Perlbench for CINT (SPECint*) and 416.Gamess for CFP (SPECfp*) with AVX binaries. ICC Compiler version 13.1.
- **Window* 7 Software:** Intel® Power Thermal Utility v2.3.1.
- **Linux* Host Red Hat* 6.3 (kernel 3.3.1) - Guest Image - 6WINDGate-3.36.0-SDS-INTEL64-RHEL6.2-DPDK-v1.3.0__crypto-multi-buffer (Virtualized Intel® Multi-Buffer Crypto for IPsec benchmarks using AES128-CBC+HMAC-SHA1 with Tunnel Mode).
- **Intel® Hyper-Threading Technology enabled, Intel® Turbo Boost Technology disabled, and C-States enabled except when running Layer 3 Forwarding (L3FWD) and Internet Protocol Security (IPsec), VT-d enabled for IPsec, and Enhanced Intel SpeedStep® Technology and ACPI was disabled for IPsec.
3.2 Additional Information

- In case of conflict the datasheet supersedes this document.
- Temperature values are mean temperatures measured through the duration of the test.
- APG configuration is provided for repeatability of the test.
- SPEC* CPU2006 is an industrial standard benchmark designed to provide performance measurements that can be used to compare compute-intensive workloads on different computer systems. SPEC* CPU2006 test on Intel microprocessors are measured using particular, well-configured systems. These results may or may not reflect the relative performance of Intel microprocessor in systems with different hardware or software designs or configurations (including compilers). Buyers should consult other sources of information, including system benchmarks, to evaluate the performance of systems they are considering for purchase. For more information about SPEC* CPU2006, please visit www.spec.org/cpu2006/. The SPECint* benchmark used in this test is 400.Perlbench. The SPECfp* benchmark used in this test is 416.gamess.
- The Intel® Data Plane Development Kit (Intel® DPDK) provides Intel architecture-optimized libraries and NIC drivers in Linux* that allow developers to support data plane packet processing. The Intel® DPDK was used to run 10G Layer 3-Forwarding using 4x Intel® Ethernet Converged Network Adapter X520-SR2 with 64-byte packets. The L3 Forwarding application is a simple example of packet processing using the Intel® DPDK. The application performs L3 forwarding.
- IP Security (IPSec) is a suite of security protocols that operates at layer 3 in the TCP/IP layering model. It provides security functionality in the form of confidentiality and authentication for the IPv4 and IPv6 layers. IPSec operates at layer 3, therefore, it can provide this protection to all higher-level, layer traffic (including application traffic) that traverses the internet. This test configuration used AES-128 encryption with HMAC SHA-1 authentication in Tunnel Mode and Intel® Data Protection Technology- Advanced Encryption Standard New Instructions (AES-NI).
- Power Thermal Utility tool (PTU) and Thermal Analysis tool (TAT) are developed by Intel to generate TDP-like workloads on a system, “non-Disclosure Agreement (NDA) required.”
- The Idle Power reported above occurs while displaying the Ubuntu* Linux* desktop screen.