CASE STUDY:

INTEL CORE I5 PROCESSOR

ROLL NO.	NAME	GR. NO.	CONTRIBUTION (Pg No)
27	Prasad Kiwalekar	11810177	6,7,8,15
28	Anirudh Kolwadkar	11810550	2,3,4,5,14
29	Punamtanvi Kshatriya	11810462	9,10,11,12,15
30	Atharva Mamidwar	11810100	13,14,15

INTRODUCTION

Core i5 is family of mid-range performance 64-Bit x86 processor designed by Intel for desktops and laptops. The Core i5 family was introduced by Intel in 2009, following the retirement of the Core 2 family. Core i5 microprocessors are positioned between the high-end performance Core-i7 and the low-end performance Core-i3. It is available as Quad-Core or Dual-Core. The processor

1. **Turbo Boost Technology** allows for automatic speeding up of the processor when the PC requires extra performance, thus giving you smart performance with a speed boost. This feature is however only available in select models of the Intel Core i5 processor-based systems.

2. **4g WiMAX wireless technology** can deliver great smart performance from internet speed which is four times faster than 3G.

3. **Intel HD Graphics technology** is included to provide excellent visual performance for rich color, sharp imaging, as well as life-like video and audio.

SPECIFICATIONS

The Core i5 processor is available in multiple speeds, ranging from 1.90 GHz up to 3.80 GHz, and it features 3 MB, 4 MB or 6 MB cache.

It utilizes either the LGA 1150 or LGA 1155 socket on a motherboard.

Core i5 processors are most often found as quad-core, having four cores. However, a select few high-end Core i5 processors feature six cores.

The most common type of RAM used with a Core i5 processor is DDR3 1333 or DDR3 1600, however, higher performance RAM can be used as well (if the motherboard supports it).

It is a 64 bit processor. The current I5 processor supports a 48-bit (64 TB) virtual address space and 52-bit (4PB) Physical address space.

CHALLENGES WITH I3 / NEED OF I5

For the most part, I5 gives faster CPU performance from the Core i5 parts over Core i3. Some Core i5 processors are dual-core and some are quad-core.

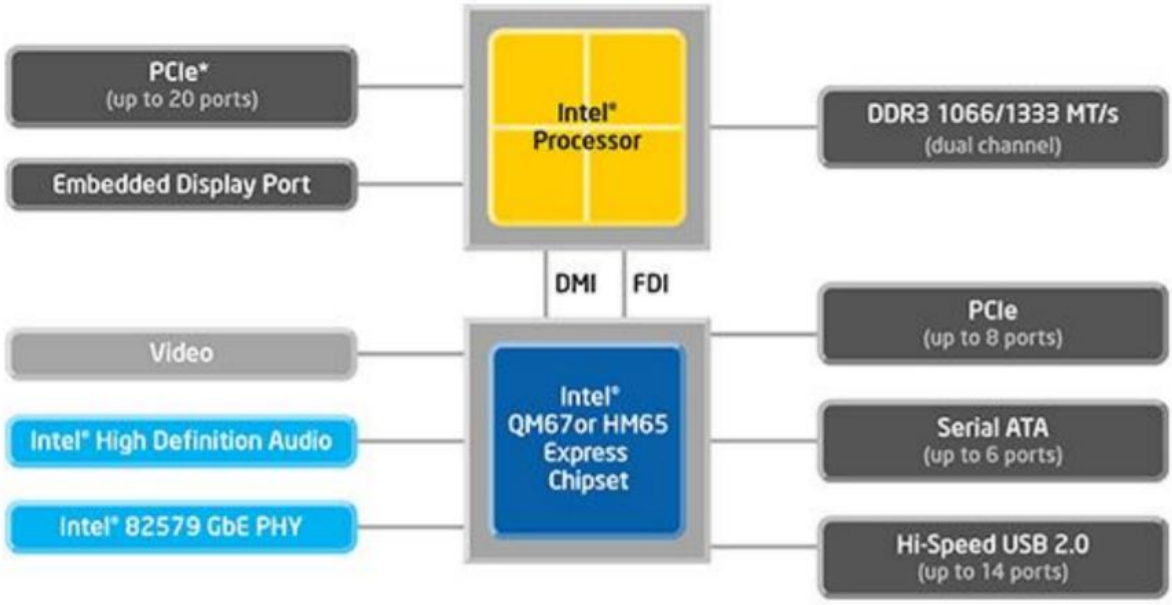
Most of the time, a true quad-core CPU will perform better than a dual-core processor, especially on multimedia tasks like video transcoding or photo editing. All Core i3 processor are dual core. Occasionally, an older Ivy Bridge processor like the Intel Core i3-3130M in a system that's the same price as system with a newer Haswell CPU like the Intel Core i3-4012Y.Systems equipped with the fifth-generation Broadwell processors are the newest, utilizing CPUs like the Core i3-5020U.

In general, the system will last longer with the newer processor, since the older CPU doesn't have a year or more worth of improvements in it. Within the same generation, the essential takeaway is that to get better performance in each generation, buy a processor with a higher model number (e.g., a Core i5-5020U should have generally better performance than a Core i5-4010U).

In addition to generally faster base clock speeds, Core i5 processors have larger cache (on-board memory) to help the processor deal with repetitive tasks faster. While editing and calculating spreadsheets, CPU shouldn't have to reload the framework the numbers sit in. This info will sit in the cache, so when you change a number, the calculations are almost instantaneous.

Larger cache sizes help multitasking as well, since background tasks will be ready for when you switch focus to another window. On currently available desktop processors, i5 CPUs have up to 6MB of L3 cache, while i3 processors have 3MB to 4MB.

ARCHITECTURE OF INTEL CORE I5



1. Chipset

It is divided into three main categories: those that use the PCI bus for interconnection (the 4xx series), those that connect using specialized "Hub Links" (the 8xx series), and those that connect using PCI Express (the 9xx series). The chipsets are listed in chronological order. Chipset used in i5 manufactured by Intel.

2. Embedded Display Port

Display Port is a digital display interface. The interface is primarily used to connect a video source to a display device such as a computer monitor, though it can also be used to carry audio, USB, and other forms of data. It allows both internal and external display connections, and unlike legacy standards where differential pairs are fixed to transmitting a clock signal with each output, the Display Port protocol is based on small data packets known as *micro packets* which can embed the clock signal within the data stream.

3. Serial ATA (up to 6 ports)

Advanced Technology Attachment [ATA] is an Interface standard for connecting storage devices like Hard Drive, CD-ROM or floppy drives to Motherboard interfaces. SATA host adapters and devices communicate via a high-speed serial cable over two pairs of conductors. In contrast, parallel ATA (the redesignation for the legacy ATA specifications) used a 16-bit wide data bus with many additional support and control signals, all operating at much lower frequency. To ensure backward compatibility with legacy ATA software and applications, SATA uses the same basic ATA and ATAPI command-set as legacy ATA devices.

4. Hi -Speed USB 2.0 (Up to 14 ports)

Universal Serial Bus (**USB**) is an industry standard developed in the mid-1990s that defines the cables, connectors and communications protocols used in a bus for connection, communication, and power supply between computers and electronic devices.

USB was designed to standardize the connection of computer peripherals (including keyboards, pointing devices, digital cameras, printers, portable media players, disk drives and network adapters) to personal computers, both to communicate and to supply electric power. It has become commonplace on other devices, such as smartphones, PDAs and video game consoles USB has effectively replaced a variety of earlier interfaces, such as serial and parallel ports, as well as separate power chargers for portable devices.

5. Intel High Definition Audio:

The Intel® High Definition Audio Specification describes an architecture and infrastructure to support high-quality audio implementations for PCs. The specification defines the register-level interface, physical link characteristics, and codec programming model, as well as codec architectural components. This specification is intended for hardware component designers, system builders, and device driver (software) developers. Implementation of the Intel® High Definition Audio Specification requires a license from Intel.

GENERATIONS OF INTEL CORE I5

1st Generation – Nehalem Microarchitecture

Nehalem was the microarchitecture for Intel's 45 nm process for desktops and servers as a successor to Penryn.

Model number	sSpec number	Frequency	Turbo	Cores	L2 cache	L3 cache	I/O bus	Mult.	Memory	Voltage	TDP	Socket	Release date	Part number(s)	Release price (USD)
Standard power															
Core i5-750	SLBLC (B1)	2.67 GHz	1/1/4/4[Note 1]	4	4 × 256 KiB	8 MiB	DMI	20×	2 × DDR3-1333	0.65–1.4 V	95 W	LGA 1156	September 2009	BX80605I5750 BV80605001911AP	$196
Core i5-760	SLBRP (B1)	2.8 GHz	1/1/4/4	4	4 × 256 KiB	8 MiB	DMI	21×	2 × DDR3-1333	0.65–1.4 V	95 W	LGA 1156	July 2010	BX80605I5760 BV80605001908AN	$205
Low power															
Core i5-750S	SLBLH (B1)	2.4 GHz	0/0/6/6	4	4 × 256 KiB	8 MiB	DMI	18×	2 × DDR3-1333	0.65–1.4 V	82 W	LGA 1156	January 2010	BX80605I5750S BV80605003213AH	$259

1st Generation – Westmere Microarchitecture

Westmere (WSM) was the microarchitecture for Intel's 32 nm process for desktops and servers. Westmere was introduced in 2010 as a process shrink of Nehalem which introduced a number enhancements. For desktop and mobile, Westmere was branded as 1st Generation Intel Core processors

Clarkdale (MCP, 32 nm dual-core)

Model number	sSpec number	Frequency	Turbo	GPU frequency	Cores	L2 cache	L3 cache	I/O bus	Mult.	Memory	Voltage	TDP	Socket	Release date	Part number(s)	Release price (USD)
Core i5-650	SLBLK (C2) SLBTJ (K0)	3.2 GHz	1/2[Note 1]	733 MHz	2	2 × 256 KiB	4 MiB	DMI	24×	2 × DDR3-1333	0.65–1.4 V	73 W	LGA 1156	January 2010	CM80616003174AH BX80616I5650	$176
Core i5-655K	SLBXL (K0)	3.2 GHz	1/2	733 MHz	2	2 × 256 KiB	4 MiB	DMI	24×	2 × DDR3-1333	0.65–1.4 V	73 W	LGA 1156	May 2010	CM80616003174AO BX80616I5655K	$216
Core i5-660	SLBLV (C2) SLBTK (K0)	3.33 GHz	1/2	733 MHz	2	2 × 256 KiB	4 MiB	DMI	25×	2 × DDR3-1333	0.65–1.4 V	73 W	LGA 1156	January 2010	CM80616003177AC BX80616I5660	$196
Core i5-661	SLBNE (C2) SLBTB (K0)	3.33 GHz	1/2	900 MHz	2	2 × 256 KiB	4 MiB	DMI	25×	2 × DDR3-1333	0.65–1.4 V	87 W	LGA 1156	January 2010	CM80616004794AA BX80616I5661	$196
Core i5-670	SLBLT (C2) SLBTL (K0)	3.47 GHz	1/2	733 MHz	2	2 × 256 KiB	4 MiB	DMI	26×	2 × DDR3-1333	0.65–1.4 V	73 W	LGA 1156	January 2010	CM80616004641AB BX80616I5670	$284
Core i5-680	SLBTM (K0)	3.6 GHz	1/2	733 MHz	2	2 × 256 KiB	4 MiB	DMI	27×	2 × DDR3-1333	0.65–1.4 V	73 W	LGA 1156	April 2010	CM80616004806AA BX80616I5680	$294

2nd Generation – Sandy Bridge Microarchitecture

2nd Generation mobile Core i5 processors were based on Sandy Bridge, an entirely new microarchitecture that provided higher performance at higher power efficiency along with many other improvements and changes. Those new models also integrate a higher performance GPU onto the same die as the microprocessor as well as introduced a new SIMD AVX instruction set extension as well as a number of new technologies.

Sandy Bridge (dual-core, 32 nm)

Model number	sSpec number	Cores	Frequency	Turbo	L2 cache	L3 cache	GPU model	GPU frequency	TDP	Socket	I/O bus	Release date	Part number(s)	Release price (USD)
Ultra-low power														
Core i5-2390T	SR065 (Q0)	2	2.7 GHz	4/8[Note 2]	2 × 256 KiB	3 MiB	HD Graphics 2000	650–1100 MHz	35 W	LGA 1155	DMI 2.0	February 2011	CM8062301002115	$195

Sandy Bridge (quad-core, 32 nm)

Model number	sSpec number	Cores	Frequency	Turbo	L2 cache	L3 cache	GPU model	GPU frequency	TDP	Socket	I/O bus	Release date	Part number(s)	Release price (USD)
Standard power														
Core i5-2300	SR00D (D2)	4	2.8 GHz	1/2/2/3[Note 2]	4 × 256 KiB	6 MiB	HD Graphics 2000	850–1100 MHz	95 W	LGA 1155	DMI 2.0	January 2011	CM8062301061502 BX80623I52300 BXC80623I52300	$177
Core i5-2310	SR02K (D2)	4	2.9 GHz	1/2/2/3	4 × 256 KiB	6 MiB	HD Graphics 2000	850–1100 MHz	95 W	LGA 1155	DMI 2.0	May 2011	CM8062301043718 BX80623I52310 BXC80623I52310	$177
Core i5-2320	SR02L (D2)	4	3 GHz	1/2/2/3	4 × 256 KiB	6 MiB	HD Graphics 2000	850–1100 MHz	95 W	LGA 1155	DMI 2.0	September 2011	CM8062301043820 BX80623I52320 BXC80623I52320	$177
Core i5-2380P	SR0G2 (D2)	4	3.1 GHz	1/2/2/3	4 × 256 KiB	6 MiB	N/A	N/A	95 W	LGA 1155	DMI 2.0	January 2012	CM8062301157400 BX80623I52380P BXC80623I52380P	$177
Core i5-2400	SR00Q (D2)	4	3.1 GHz	1/2/2/3	4 × 256 KiB	6 MiB	HD Graphics 2000	850–1100 MHz	95 W	LGA 1155	DMI 2.0	January 2011	CM8062300834106 BX80623I52400 BXC80623I52400	$184
Core i5-2450P	SR0G1 (D2)	4	3.2 GHz	1/2/2/3	4 × 256 KiB	6 MiB	N/A	N/A	95 W	LGA 1155	DMI 2.0	January 2012	CM8062301157300 BX80623I52450P	$195
Core i5-2500	SR00T (D2)	4	3.3 GHz	1/2/3/4	4 × 256 KiB	6 MiB	HD Graphics 2000	850–1100 MHz	95 W	LGA 1155	DMI 2.0	January 2011	CM8062300834203 BX80623I52500 BXC80623I52500	$205
Core i5-2500K	SR008 (D2)	4	3.3 GHz	1/2/3/4	4 × 256 KiB	6 MiB	HD Graphics 3000	850–1100 MHz	95 W	LGA 1155	DMI 2.0	January 2011	CM8062300833803 BX80623I52500K BXC80623I52500K	$216
Core i5-2550K	SR0QH (D2)	4	3.4 GHz	1/2/3/4	4 × 256 KiB	6 MiB	N/A	N/A	95 W	LGA 1155	DMI 2.0	January 2012	CM8062301213000 BX80623I52550K	$225
Low power														
Core i5-2400S	SR00S (D2)	4	2.5 GHz	1/3/7/8	4 × 256 KiB	6 MiB	HD Graphics 2000	850–1100 MHz	65 W	LGA 1155	DMI 2.0	January 2011	CM8062300835404 BX80623I52400S BXC80623I52400S	$195
Core i5-2405S	SR0BB (D2)	4	2.5 GHz	1/3/7/8	4 × 256 KiB	6 MiB	HD Graphics 3000	850–1100 MHz	65 W	LGA 1155	DMI 2.0	May 2011	CM8062301091201 BX80623I52405S	$205
Core i5-2500S	SR009 (D2)	4	2.7 GHz	1/5/9/10	4 × 256 KiB	6 MiB	HD Graphics 2000	850–1100 MHz	65 W	LGA 1155	DMI 2.0	January 2011	CM8062300835501	$216
Ultra-low power														
Core i5-2500T	SR00A (D2)	4	2.3 GHz	1/5/9/10	4 × 256 KiB	6 MiB	HD Graphics 2000	650–1250 MHz	45 W	LGA 1155	DMI 2.0	January 2011	CM8062301001910	$216

3rd Generation - Ivy Bridge microarchitecture

Ivy Bridge (IVB) was Intel's microarchitecture based on the 22 nm process for desktops and servers. Ivy Bridge was introduced in 2011 as a process shrink of Sandy Bridge which introduced a number of enhancements. Ivy Bridge became Intel's first microarchitecture to use tri-gate transistors for their commercial products.

Ivy Bridge (dual-core, 22 nm)

Model number	sSpec number	Cores	Frequency	Turbo	L2 cache	L3 cache	GPU model	GPU frequency	TDP	Socket	I/O bus	Release date	Part number(s)	Release price (USD)
Ultra-low power														
Core i5-3470T	SR0RJ (L1)	2	2.9 GHz	4/7[Note 2]	2 × 256 KiB	3 MiB	HD Graphics 2500	650–1100 MHz	35 W	LGA 1155	DMI 2.0	June 2012	CM8063701159502	$184

Ivy Bridge (quad-core, 22 nm)

Model number	sSpec number	Cores	Frequency	Turbo	L2 cache	L3 cache	GPU model	GPU frequency	TDP	Socket	I/O bus	Release date	Part number(s)	Release price (USD)
Standard power														
Core i5-3330	SR0RQ (E1)	4	3 GHz	1/1/2/2[Note 2]	4 × 256 KiB	6 MiB	HD Graphics 2500	650–1050 MHz	77 W	LGA 1155	DMI 2.0	September 2012	CM8063701134306 BX80637I3330	$182
Core i5-3340	SR0YZ (E1)	4	3.1 GHz	1/1/2/2	4 × 256 KiB	6 MiB	HD Graphics 2500	650–1050 MHz	77 W	LGA 1155	DMI 2.0	September 2013	CM8063701399700 BX80637I3340 BXC80637I3340	$182
Core i5-3350P	SR0WS (E1)	4	3.1 GHz	1/1/2/2	4 × 256 KiB	6 MiB	N/A	N/A	69 W	LGA 1155	DMI 2.0	September 2012	CM8063701392600 BXC80637I3350P BX80637I3350P	$177
Core i5-3450	SR0PF (E1)	4	3.1 GHz	2/3/4/4	4 × 256 KiB	6 MiB	HD Graphics 2500	650–1100 MHz	77 W	LGA 1155	DMI 2.0	April 2012	CM8063701159406 BX80637I3450 BXC80637I3450	$184
Core i5-3470	SR0T8 (N0)	4	3.2 GHz	2/3/4/4	4 × 256 KiB	6 MiB	HD Graphics 2500	650–1100 MHz	77 W	LGA 1155	DMI 2.0	June 2012	CM8063701093302 BX80637I3470	$184
Core i5-3550	SR0P0 (E1)	4	3.3 GHz	2/3/4/4	4 × 256 KiB	6 MiB	HD Graphics 2500	650–1150 MHz	77 W	LGA 1155	DMI 2.0	April 2012	CM8063701093203 BX80637I3550 BXC80637I3550	$205
Core i5-3570	SR0T7 (N0)	4	3.4 GHz	2/3/4/4	4 × 256 KiB	6 MiB	HD Graphics 2500	650–1150 MHz	77 W	LGA 1155	DMI 2.0	June 2012	CM8063701093103 BX80637I3570	$205
Core i5-3570K	SR0PM (E1)	4	3.4 GHz	2/3/4/4	4 × 256 KiB	6 MiB	HD Graphics 4000	650–1150 MHz	77 W	LGA 1155	DMI 2.0	April 2012	CM8063701211800 BX80637I3570K BXC80637I3570K	$225
Low power														
Core i5-3330S	SR0RR (E1)	4	2.7 GHz	1/2/4/5	4 × 256 KiB	6 MiB	HD Graphics 2500	650–1050 MHz	65 W	LGA 1155	DMI 2.0	September 2012	CM8063701159804	$177
Core i5-3335S	SR0TJ (E1)	4	2.7 GHz	1/2/4/5	4 × 256 KiB	6 MiB	HD Graphics 4000	650–1050 MHz	65 W	LGA 1155	DMI 2.0	September 2012	CM8063701277200	$194
Core i5-3340S	SR0YH (E1)	4	2.8 GHz	1/2/4/5	4 × 256 KiB	6 MiB	HD Graphics 2500	650–1050 MHz	65 W	LGA 1155	DMI 2.0	September 2013	CM8063701387400 BX80637I3340S	$182
Core i5-3450S	SR0P2 (E1)	4	2.8 GHz	3/4/6/7	4 × 256 KiB	6 MiB	HD Graphics 2500	650–1100 MHz	65 W	LGA 1155	DMI 2.0	April 2012	CM8063701095104 BX80637I3450S	$184
Core i5-3470S	SR0TA (N0)	4	2.9 GHz	3/4/6/7	4 × 256 KiB	6 MiB	HD Graphics 2500	650–1100 MHz	65 W	LGA 1155	DMI 2.0	June 2012	CM8063701094000	$184
Core i5-3475S	SR0PP (E1)	4	2.9 GHz	3/4/6/7	4 × 256 KiB	6 MiB	HD Graphics 4000	650–1100 MHz	65 W	LGA 1155	DMI 2.0	June 2012	CM8063701212000	$201
Core i5-3550S	SR0P3 (E1)	4	3 GHz	3/4/6/7	4 × 256 KiB	6 MiB	HD Graphics 2500	650–1150 MHz	65 W	LGA 1155	DMI 2.0	April 2012	CM8063701095203	$205
Core i5-3570S	SR0T9 (N0)	4	3.1 GHz	3/4/6/7	4 × 256 KiB	6 MiB	HD Graphics 2500	650–1150 MHz	65 W	LGA 1155	DMI 2.0	June 2012	CM8063701093901	$205
Ultra-low power														
Core i5-3570T	SR0P1 (E1)	4	2.3 GHz	6/7/9/10	4 × 256 KiB	6 MiB	HD Graphics 2500	650–1150 MHz	45 W	LGA 1155	DMI 2.0	April 2012	CM8063701094903	$205

4th Generation – Haswell

Haswell (**HSW**) is Intel's microarchitecture based on the 22 nm process for mobile, desktops, and servers. Haswell, which was introduced in 2013, became the successor to Bridge. For desktop and mobile, Haswell is branded as 4th Generation Intel Core processors. For server class processors, Intel branded it as Xeon E3 v3, Xeon E5 v3, and Xeon E7 v3.

Haswell-DT (dual-core, 22 nm)

Model number	sSpec number	Cores	Frequency	Turbo	L2 cache	L3 cache	GPU model	GPU frequency	TDP	Socket	I/O bus	Release date	Part number(s)	Release price (USD)
Ultra-low power														
Core i5-4570T	SR14R (C0) SR1CA (C0)	2	2.9 GHz	4/7[Note 2]	2 × 256 KiB	4 MiB	HD Graphics 4600	200–1150 MHz	35 W	LGA 1150	DMI 2.0	June 2013	CM8064601466203 CM8064601481905 BX80646I54570T BXC80646I54570T	$192
Ultra-low power, embedded														
Core i5-4570TE	SR17Z (C0)	2	2.7 GHz	3.3 GHz	2 × 256 KiB	4 MiB	HD Graphics 4600	350–1150 MHz	35 W	LGA 1150	DMI 2.0	June 2013	CM8064601484301	$192

Haswell-DT (quad-core, 22 nm)

Model number	sSpec number	Cores	Frequency	Turbo	L2 cache	L3 cache	GPU model	GPU frequency	TDP	Socket	I/O bus	Release date	Part number(s)	Release price (USD)
Standard power														
Core i5-4430	SR14G (C0)	4	3 GHz	0/1/2/2[Note 2]	4 × 256 KiB	6 MiB	HD Graphics 4600	350–1100 MHz	84 W	LGA 1150	DMI 2.0	June 2013	CM8064601466802 BX80646I54430 BXC80646I54430	$182
Core i5-4440	SR14F (C0)	4	3.1 GHz	0/1/2/2	4 × 256 KiB	6 MiB	HD Graphics 4600	350–1100 MHz	84 W	LGA 1150	DMI 2.0	September 2013	CM8064601464800 BX80646I54440 BXC80646I54440	$182
Core i5-4460	SR1QK (C0)	4	3.2 GHz	0/1/2/2	4 × 256 KiB	6 MiB	HD Graphics 4600	350–1100 MHz	84 W	LGA 1150	DMI 2.0	May 2014[dc]	CM8064601560722 BX80646I54460 BXC80646I54460	$182
Core i5-4570	SR14E (C0)	4	3.2 GHz	2/3/4/4	4 × 256 KiB	6 MiB	HD Graphics 4600	350–1150 MHz	84 W	LGA 1150	DMI 2.0	June 2013	CM8064601464707 BX80646I54570 BXC80646I54570	$192
Core i5-4590	SR1QJ (C0)	4	3.3 GHz	2/3/4/4	4 × 256 KiB	6 MiB	HD Graphics 4600	350–1150 MHz	84 W	LGA 1150	DMI 2.0	May 2014[dc]	CM8064601560615 BX80646I54590 BXC80646I54590	$192
Core i5-4670	SR14D (C0)	4	3.4 GHz	2/3/4/4	4 × 256 KiB	6 MiB	HD Graphics 4600	350–1200 MHz	84 W	LGA 1150	DMI 2.0	June 2013	CM8064601464706 BX80646I54670 BXC80646I54670	$213
Core i5-4670K	SR14A (C0)	4	3.4 GHz	2/3/4/4	4 × 256 KiB	6 MiB	HD Graphics 4600	350–1200 MHz	84 W	LGA 1150	DMI 2.0	June 2013	CM8064601464506 BX80646I54670K BXC80646I54670K	$242
Core i5-4690	SR1QH (C0)	4	3.5 GHz	2/3/4/4	4 × 256 KiB	6 MiB	HD Graphics 4600	350–1200 MHz	84 W	LGA 1150	DMI 2.0	May 2014[dc]	CM8064601560516 BX80646I54690 BXC80646I54690	$213
Core i5-4690K	SR21A (C0)	4	3.5 GHz	2/3/4/4	4 × 256 KiB	6 MiB	HD Graphics 4600	350–1200 MHz	88 W	LGA 1150	DMI 2.0	June 2014	CM8064601771803 BX80646I54690K BXC80646I54690K	$242
Low power														
Core i5-4430S	SR14M (C0)	4	2.7 GHz	1/2/4/5	4 × 256 KiB	6 MiB	HD Graphics 4600	350–1100 MHz	65 W	LGA 1150	DMI 2.0	June 2013	CM8064601465803	$182
Core i5-4440S	SR14L (C0)	4	2.8 GHz	1/2/4/5	4 × 256 KiB	6 MiB	HD Graphics 4600	350–1100 MHz	65 W	LGA 1150	DMI 2.0	September 2013	CM8064601465804 BX80646I54440S	$182
Core i5-4460S	SR1QQ (C0)	4	2.9 GHz	1/2/4/5	4 × 256 KiB	6 MiB	HD Graphics 4600	350–1100 MHz	65 W	LGA 1150	DMI 2.0	May 2014[dc]	CM8064601561423	$182
Core i5-4570S	SR14J (C0)	4	2.9 GHz	3/4/5/7	4 × 256 KiB	6 MiB	HD Graphics 4600	350–1150 MHz	65 W	LGA 1150	DMI 2.0	June 2013	CM8064601465605 BX80646I54570S	$192
Core i5-4590S	SR1QN (C0)	4	3 GHz	3/4/5/7	4 × 256 KiB	6 MiB	HD Graphics 4600	350–1150 MHz	65 W	LGA 1150	DMI 2.0	May 2014[dc]	CM8064601561214 BX80646I54590S	$192
Core i5-4670S	SR14K (C0)	4	3.1 GHz	3/4/5/7	4 × 256 KiB	6 MiB	HD Graphics 4600	350–1200 MHz	65 W	LGA 1150	DMI 2.0	June 2013	CM8064601465703	$213
Core i5-4690S	SR1QP (C0)	4	3.2 GHz	3/4/5/7	4 × 256 KiB	6 MiB	HD Graphics 4600	350–1200 MHz	65 W	LGA 1150	DMI 2.0	May 2014[dc]	CM8064601561313 BX80646I54690S	$213
Ultra-low power														
Core i5-4460T	SR15J (C0)	4	1.9 GHz	4/5/7/8	4 × 256 KiB	6 MiB	HD Graphics 4600	350–1100 MHz	35 W	LGA 1150	DMI 2.0	March 2014	CM8064601561827	$182
Core i5-4590T	SR1H3 (C0) SR156 (C0)	4	2 GHz	6/7/8/10	4 × 256 KiB	6 MiB	HD Graphics 4600	350–1150 MHz	35 W	LGA 1150	DMI 2.0	May 2014[dc]	CM8064601481927 CM8064601561826	$192
Core i5-4670T	SR14P (C0)	4	2.3 GHz	6/7/8/10	4 × 256	6 MiB	HD Graphics	350–1200 MHz	45 W	LGA 1150	DMI 2.0	June 2013	CM8064601466003	$213

Haswell-H (MCP, quad-core, 22 nm)

Model number	sSpec number	Cores	Frequency	Turbo	L2 cache	L3 cache	GPU model	GPU frequency	TDP	Socket	I/O bus	Release date	Part number(s)	Release price (USD)
Core i5-4570R	SR18P (C0)	4	2.7 GHz	3/3/5/5[Note 2]	4 × 256 KiB	4 MiB	Iris Pro Graphics 5200	200–1150 MHz	65 W	BGA-1364	DMI 2.0	June 2013	CL8064701508603	$255
Core i5-4670R	SR18M (C0)	4	3 GHz	4/5/6/7	4 × 256 KiB	4 MiB	Iris Pro Graphics 5200	200–1300 MHz	65 W	BGA-1364	DMI 2.0	June 2013	CL8064701508403	$276

5th Generation – Broadwell Microarchitecture

Broadwell (BDW) is Intel's microarchitecture based on the 14 nm process for mobile, desktops, and servers. Introduced in early 2015, Broadwell is a process shrink of Haswell which introduced several enhancements. For desktop and mobile, Broadwell is branded as 5th Generation Intel Core processors. For server class processors, Intel branded it as Xeon E3 v4, Xeon E5 v4, and Xeon E7 v4.

Broadwell-H (quad-core, 14 nm)

Model number	sSpec number	Cores	Frequency	Turbo	L2 cache	L3 cache	GPU model	GPU frequency	TDP	Socket	I/O bus	Release date	Part number(s)	Release price (USD)
Core i5-5575R	SR2AK (G0)	4	2.8 GHz	3/3/5/5	4 × 256 KiB	4 MiB	Iris Pro Graphics 6200	300–1050 MHz	65 W	BGA-1364	DMI 2.0	June 2015	FH8065802483402	$244
Core i5-5675C	SR2FX (G0)	4	3.1 GHz	3/3/5/5	4 × 256 KiB	4 MiB	Iris Pro Graphics 6200	300–1100 MHz	65 W	LGA 1150	DMI 2.0	June 2015	CM8065802483201 BX80658I55675C	$276
Core i5-5675R	SR2AJ (G0)	4	3.1 GHz	3/3/5/5	4 × 256 KiB	4 MiB	Iris Pro Graphics 6200	300–1100 MHz	65 W	BGA-1364	DMI 2.0	June 2015	FH8065802483401	$265

6th Generation – Skylake Microarchitecture

Intel released the desktop Skylake Mid-range processors in late 2015. All desktop Core i5 models utilize the LGA-1151 socket which is used for most of the Skylake desktop lineup.

Skylake-S (quad-core, 14 nm)

Model number	sSpec number	Cores (threads)	Frequency	Turbo	L2 cache	L3 cache	GPU model	GPU frequency	TDP	Socket	I/O bus	Release date	Part number(s)	Release price (USD)
Standard power														
Core i5-6400	SR2BY (R0) SR2L7 (R0)	4 (4)	2.7 GHz	4/5/6/6	4 × 256 KiB	6 MiB	HD Graphics 530	350–950 MHz	65 W	LGA 1151	DMI 3.0	September 2015	CM8066201920506 BX80662I56400 BXC80662I56400	$182
Core i5-6402P	SR2NJ (R0)	4 (4)	2.8 GHz	4/5/6/6	4 × 256 KiB	6 MiB	HD Graphics 510	350–950 MHz	65 W	LGA 1151	DMI 3.0	December 2015	CM8066201920509 BX80662I56402P BXC80662I56402P	$182
Core i5-6500	SR2BX (R0) SR2L6 (R0)	4 (4)	3.2 GHz	1/2/3/4	4 × 256 KiB	6 MiB	HD Graphics 530	350–1050 MHz	65 W	LGA 1151	DMI 3.0	September 2015	CM8066201920404 BX80662I56500 BXC80662I56500	$192
Core i5-6600	SR2BW (R0) SR2L5 (R0)	4 (4)	3.3 GHz	3/4/5/6[8]	4 × 256 KiB	6 MiB	HD Graphics 530	350–1150 MHz	65 W	LGA 1151	DMI 3.0	September 2015	CM8066201920401 BX80662I56600 BXC80662I56600	$213
Core i5-6600K	SR2BV (R0) SR2L4 (R0)	4 (4)	3.5 GHz	1/2/3/4	4 × 256 KiB	6 MiB	HD Graphics 530	350–1150 MHz	91 W	LGA 1151	DMI 3.0	August 2015	CM8066201920300 BX80662I56600K BXC80662I56600K	$243
Low power														
Core i5-6400T	SR2BS (R0) SR2L1 (R0)	4 (4)	2.2 GHz	3/3/5/6	4 × 256 KiB	6 MiB	HD Graphics 530	350–950 MHz	35 W	LGA 1151	DMI 3.0	September 2015	CM8066201920000 BXC80662I56400T	$182
Core i5-6500T	SR2BZ (R0) SR2L8 (R0)	4 (4)	2.5 GHz	3/3/5/6	4 × 256 KiB	6 MiB	HD Graphics 530	350–1100 MHz	35 W	LGA 1151	DMI 3.0	September 2015	CM8066201920600 BXC80662I56500T	$192
Core i5-6600T	SR2C0 (R0) SR2L9 (R0)	4 (4)	2.7 GHz	6/6/7/8	4 × 256 KiB	6 MiB	HD Graphics 530	350–1100 MHz	35 W	LGA 1151	DMI 3.0	September 2015	CM8066201920601 BXC80662I56600T	$213
Low power, embedded														
Core i5-6500TE	SR2LR (R0)	4 (4)	2.3 GHz	?/?/?/10	4 × 256 KiB	6 MiB	HD Graphics 530	350–1000 MHz	35 W	LGA 1151	DMI 3.0	September 2015	CM8066201938000	$192

Skylake-H (quad-core, 14 nm)

Model number	sSpec number	Cores (threads)	Frequency	Turbo	L2 cache	L3 cache	GPU model	GPU frequency	TDP	Socket	I/O bus	Release date	Part number(s)	Release price (USD)
Core i5-6585R	SR2QR (N0) SR2TY (N0)	4 (4)	2.8 GHz	?/?/?/8	4 × 256 KiB	6 MiB	Iris Pro Graphics 580	350–1100 MHz	65 W	BGA 1440	DMI 3.0	May 2016	JQ8066201926704 JQ8066201926706	$255
Core i5-6685R	SR2QS (N0) SR2TZ (N0)	4 (4)	3.2 GHz	?/?/?/6	4 × 256 KiB	6 MiB	Iris Pro Graphics 580	350–1150 MHz	65 W	BGA 1440	DMI 3.0	May 2016	JQ8066201926705 JQ8066201926707	$288

7th Generation - Kaby Lake Microarchitecture

7th generation Core i5 processors, models which were introduced by Intel in early 2017, are manufactured on Intel's improved 14 nm process "14nm+" which allowed for higher clock speeds at similar voltage levels. Very few minor features were introduced in the 7th Generation Core i5 models, including improved GPU support for 4K playback via native hardware acceleration. All models incorporate a 600-series integrated graphics processor which is largely identical to their 6th generation 500-series counterparts.

Kaby Lake-S (14 nm)

Model number	sSpec number	Cores (threads)	Frequency	Turbo	L2 cache	L3 cache	GPU model	GPU frequency	TDP	Socket	I/O bus	Release date	Part number(s)	Release price (USD)
Standard power														
Core i5-7400	SR32W (B0)	4 (4)	3 GHz	3/3/4/5	4 × 256 KiB	6 MiB	HD Graphics 630	350–1000 MHz	65 W	LGA 1151	DMI 3.0	January 2017	BX80677I57400 BXC80677I57400 CM8067702867050	$182
Core i5-7500	SR335 (B0)	4 (4)	3.4 GHz	2/2/3/4	4 × 256 KiB	6 MiB	HD Graphics 630	350–1100 MHz	65 W	LGA 1151	DMI 3.0	January 2017	BX80677I57500 BXC80677I57500 CM8067702868012	$192
Core i5-7600	SR334 (B0)	4 (4)	3.5 GHz	4/4/5/6	4 × 256 KiB	6 MiB	HD Graphics 630	350–1150 MHz	65 W	LGA 1151	DMI 3.0	January 2017	BX80677I57600 BXC80677I57600 CM8067702868011	$213
Core i5-7600K	SR32V (B0)	4 (4)	3.8 GHz	2/2/3/4	4 × 256 KiB	6 MiB	HD Graphics 630	350–1150 MHz	91 W	LGA 1151	DMI 3.0	January 2017	BX80677I57600K BXC80677I57600K CM8067702868219	$242
Low power														
Core i5-7400T	SR332 (B0)	4 (4)	2.4 GHz	4/4/5/6	4 × 256 KiB	6 MiB	HD Graphics 630	350–1000 MHz	35 W	LGA 1151	DMI 3.0	January 2017	BX80677I57400T BXC80677I57400T CM8067702867915	$182
Core i5-7500T	SR337 (B0)	4 (4)	2.7 GHz	4/4/5/6	4 × 256 KiB	6 MiB	HD Graphics 630	350–1100 MHz	35 W	LGA 1151	DMI 3.0	January 2017	BX80677I57500T BXC80677I57500T CM8067702868115	$192
Core i5-7600T	SR336 (B0)	4 (4)	2.8 GHz	7/7/8/9	4 × 256 KiB	6 MiB	HD Graphics 630	350–1100 MHz	35 W	LGA 1151	DMI 3.0	January 2017	BX80677I57600T BXC80677I57600T CM8067702868117	$213

Kaby Lake-X (14 nm)

Model number	sSpec number	Cores (threads)	Frequency	Turbo	L2 cache	L3 cache	GPU model	GPU frequency	TDP	Socket	I/O bus	Release date	Part number(s)	Release price (USD)
Core i5-7640X	SR3FR (B0)	4 (4)	4 GHz	0/1/1/2	4 × 256 KiB	6 MiB	N/A	N/A	112 W	LGA 2066	DMI 3.0	June 2017	BX80677I57640X BXC80677I57640X CM8067702868730	$242

8th Generation – Coffee Lake Microarchitecture

8th Generation-core based on the Coffee Lake microarchitecture were introduced in early 2018. Those parts offer are manufactured on Intel's third generation 14 nm++ process which allowed for higher clock frequencies.

FEATURES OF INTEL CORE I5

As i5 processors are more advanced as compared to the i3 or all the previous versions of the processors. It has lot of features that deals the advanced technologies in a very respectable way. Some of the basic key Intel i5 features are as follows:

1. Basically i5 processors are introduces to do the intelligent networking and enhance the performance of the working for gaming, faster procession, reliable data transmission, etc.
2. One of the important feature of the i5 processors is that it automatically manages the power supply where needed and does not break the speed and the performance of the system.
3. i5 processors allows the user to enjoy the heavy applications with the higher rate such as HD video composing, composing a music and many more.
4. i5 provides the opportunity to the users to use the system with multi-tasking.
5. i5 processor is able to increase the memory of the system and help users to work with the high bandwidth and great performance.
6. i5 processors have ability to run two multitasking processors together generally called as dual processors.
7. i5 processors can increase the working performance of the system efficiently.
8. Turbo boost technology of i5 processors is the key beneficial feature of the i5 processors that allow the users to do their regular and important working with the help of heavy applications.
9. An i5 processor also consists of Hyper Threading technology that enables the users for multitasking and improves their business or working by working on the two different tasks at the same time.

ADVANTAGES OF INTEL CORE I5

1. Core i5 CPUs tend to have higher clock speeds overall.
2. Core i5 CPUs deliver greater performance.
3. Intel core i5 chips are excellent for gamings and heavy editing tasks.

DISADVANTAGES OF INTEL CORE I5

1. Intel i5 processor lacks hyper threading and is usually clocked lower at stock.
2. Intel Hyper-Threading uses multithreading technology to make a processor appear to have more cores than it physically has to the operating system and applications.
3. Hyper-Threading is used to increase performance at multithreaded tasks, such as a user running several programs simultaneously, but there are other tasks that take advantage of Hyper-Core i5.
4. Hyper-Core i5 uses Hyper-Threading to make a dual-core CPU act like a four-core chipset, but if you have a Core i5 processor with four true cores, it won't have Hyper-Threading.
5. Intel i5 processor is costlier than Intel i3 processor.

COMPARISON BETWEEN CORE i3, i5 AND i7

Specifications	Core-i3	Core-i5	Core-i7
Application processor	Entry level	Mid range	High end
Number of cores	2	2 to 4	2 to 4
Frequency rane	2.93 to 3.06 GHz	3.2 to 3.46 GHz	2.8 to 4 GHz
Turbo boost	Not Supported	Supported	Supported
Hyper threading	Supported	Not Supported	Supported
Cache	3 to 4 MB	3 to 8 MB	4 to 8 MB
Number of threads	4	4	8
Size	32 nm silicon	32 to 45 nm silicon	32 to 45 nm silicon
Graphics	Low	Mid-range	Best
Price	Low	Mid-range	Expensive
Example	i3-540	i5-660, i5-750	i7-920

REFERENCES

[1] http://en.wikipedia.org/wiki/core-i5

[2] http://edition.cnn.com/2012/09/28/tech/processorsin detail

[3] http://www.dvice.com/archives/2012/08/lifi-ten-ways-i.php

[4] http://www.good.is/posts/forget-wifi-it-s-lifi-internet-through-lightbulbs

[5]http://www.lifi.com/pdfs/techbriefhowlifiworks.pdf

[6]http://www.ispreview.co.uk/index.php/2013/01/tiny-led-lights-set-to-deliver-wifi-style-internetcommunications.html

[7] http://groupivsemi.com/working-lifi-could-be-available-soon

[8] Haas, Harald (July 2011)."Wireless data from every light bulb". TED Global .Edinburgh ,Scotland.

[9] Tony Smith (24 May 2012)."WTF is... Li-Fi? Optical datatransfer's new leading light?".The Register. Retrieved 22 October 2013.

[10] Visilink, —Visible Light Communication Technology for Near Ubiquitous Networkingll White Paper, January 2012.