



# NEW INTEL® CORE™ X-SERIES PROCESSOR FAMILY

August 2017



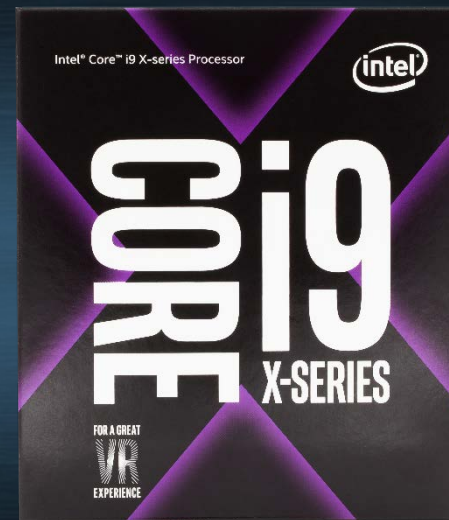
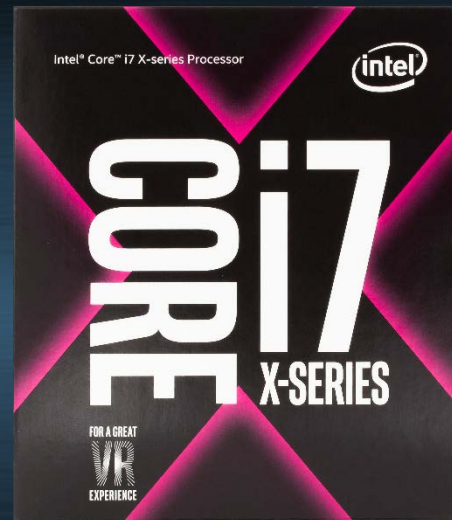
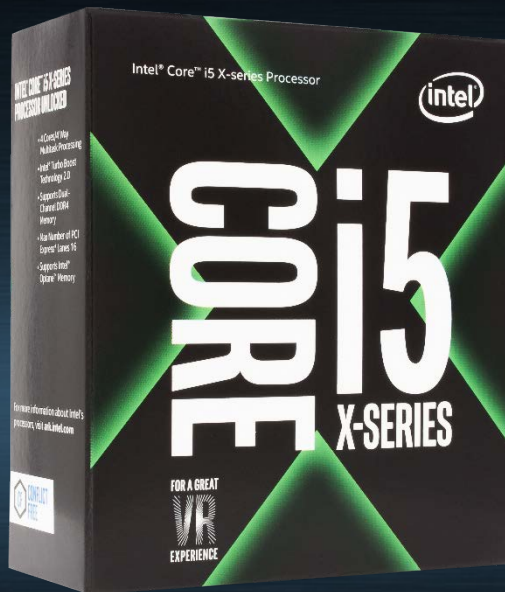
# DESKTOP PROCESSOR MARKET GROWTH

UP TO  
**20%**  
YEAR OVER YEAR

\*2015 to 2016 year-over-year change based on Intel® desktop unlocked processor revenue units



# INTRODUCING INTEL'S® MOST POWERFUL, MOST SCALABLE DESKTOP PROCESSOR



# NEW INTEL® CORE™ X-SERIES PROCESSOR FAMILY

The new Intel® Core™ X-series processor family is the ultimate desktop platform, delivering extreme mega-tasking power for today's demanding enthusiasts and creatives.

## EXTREME PERFORMANCE



## EXTREME MEGA-TASKING



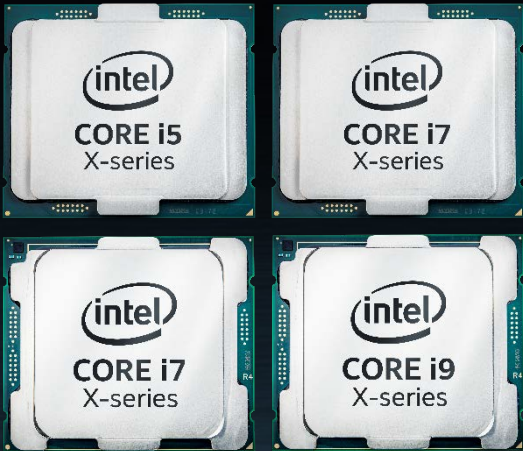
## THE ULTIMATE PLATFORM





# NEW INTEL® CORE™ X-SERIES PROCESSOR FAMILY

(Codename: Basin Falls)



## NEW and improved Intel® Core™ X-series processors for extreme enthusiasts

- Introducing the first Intel® Core™ Extreme Edition processor with 18 cores and 36 threads
- Most scalable high-end desktop platform ever with options for 18, 16, 14, 12, 10, 8, 6, and 4 cores
- Updated Intel® Turbo Boost Max Technology 3.0
- Rebalanced smart cache hierarchy
- Intel Core® X-series™ processor on new LGA 2066 socket
- Intel® X299 chipset with improved I/O capabilities

## EXTREME performance for single-thread and multithread computing

- Up to 15 percent faster multithread performance<sup>1</sup> than previous generation
- Up to 15 percent faster single-thread performance<sup>2</sup> than previous generation
- Massive 36-thread performance and quad-channel memory for content creation and extreme mega-tasking

## ULTIMATE platform for gaming, VR, content creation and overclocking

- Up to 68 lanes of PCIe 3.0 on the platform to expand systems with fast SSDs, multiple discrete graphics cards and ultrafast Thunderbolt™ 3 technology
- Additional system performance and amazing responsiveness with Intel® Optane™ memory and Intel® Optane™ SSDs
- Fully unlocked processors deliver tuning flexibility for additional performance headroom

1 Based on SPEC\*int\_rate\_base2006 (n copy) comparing Intel® Core™ i9-7900X X-series processor (10C/20T) vs. Intel® Core™ i7-6950X Processor (10C/20T)

2 Based on SPEC\*int\_rate\_base2006 (1 copy) comparing Intel® Core™ i9-7900X X-series processor (10C/20T) vs. Intel® Core™ i7-6950X Processor (10C/20T)

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 complete information, visit <http://www.intel.com/benchmarks>.

# NEW INTEL® CORE™ i9 EXTREME EDITION PROCESSOR

Intel's first 18-core desktop processor

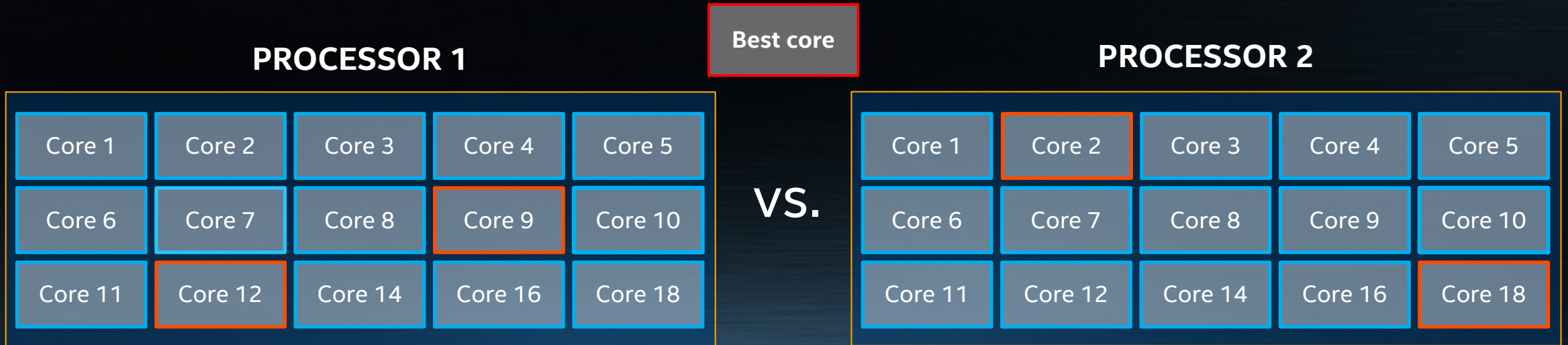
Intel's highest-performance processor for advanced gaming, VR and content creation

- New! 18 cores, 36 threads
- New! Teraflop CPU
- New! Support for Intel® Advanced Vector Extensions 512
- New! Intel® Optane™ memory
- Improved Intel® Turbo Boost Max Technology 3.0
- Support for LGA 2066 socket
- Up to 44 PCIe 3.0 lanes connected to the CPU and up to 24 connected to the PCH
- Four-channel DDR4-2666 memory support
- Fully unlocked for performance tuning
- Rebalanced Intel® Smart Cache hierarchy
- Intel® Hyper-Threading Technology (Intel® HT Technology)



For more complete information about performance and benchmark results, visit <http://www.intel.com/benchmarks>.

# IMPROVED INTEL® TURBO BOOST MAX TECHNOLOGY 3.0



Updated Intel® Turbo Boost Max Technology 3.0 improves **single- and dual-core** performance in the **new Intel® Core™ X-series processors<sup>1</sup>**

1. Only available on SKUs 7820X, 7900X, 7920X, 7940X, 7960X, 7980XE



# **NEW** INTEL® CORE™ X-SERIES PROCESSOR FAMILY

Intel's most powerful desktop processors for a new world of gaming and creation

## **CREATIVITY WITHOUT COMPROMISE**



## **UNRIVALED PC GAMING EXPERIENCES**



## **FREEDOM TO PUSH THE LIMIT**





# THE ULTIMATE PLATFORM FOR CONTENT CREATION

New Intel® Core™ X-series processor family

## EXTREME MEGA-TASKING

- Spend more time creating and less time waiting
- Edit, animate, render, transcode and more – simultaneously

## UNLEASH YOUR CREATIVITY

- The ideal platform for editing and rendering high-resolution 4K and VR video and effects
- Fast video transcode, image stabilization, 3D effects rendering and animation

## A FULL STUDIO IN YOUR PC

- Create and design on a bank of 4K monitors
- Enjoy multiple options for capture and input
- Output options include 3D and large-format printers

# MONSTER PLATFORM FOR PC GAMING

## BOOST PERFORMANCE

- Intel's best 4K gaming performance
- Support for two, three or four graphics cards
- Amazing single-threaded game play with the updated **Intel® Turbo Boost Max Technology 3.0**

## EXTREME MEGA-TASKING

- Game, stream, record and encode simultaneously
- Play your favorite game in 4K while broadcasting HD live streams around the world on **Twitch\*** and **YouTube\***
- **Record** with the highest quality 4K encode and post highlights in stunning 4K resolution

## IMMERSE YOURSELF

- Surround yourself with a **cockpit of monitors**, with support for up to four discrete GFX cards
- Power up to experience highly demanding **virtual reality** games





# OVERCLOCKING

New Intel® Core™ X-series processor family

## UNLEASH THE BEAST

New overclocking features:

- Intel® Advanced Vector Extension-512 (AVX-512) ratio offset
- Memory controller trim voltage control
- PEG/DMI overclocking

Continued support for:

- Per-core overclocking
- Per-core voltage
- Enhanced memory overclocking

## EXTREME TUNING

Overclocking simplicity:

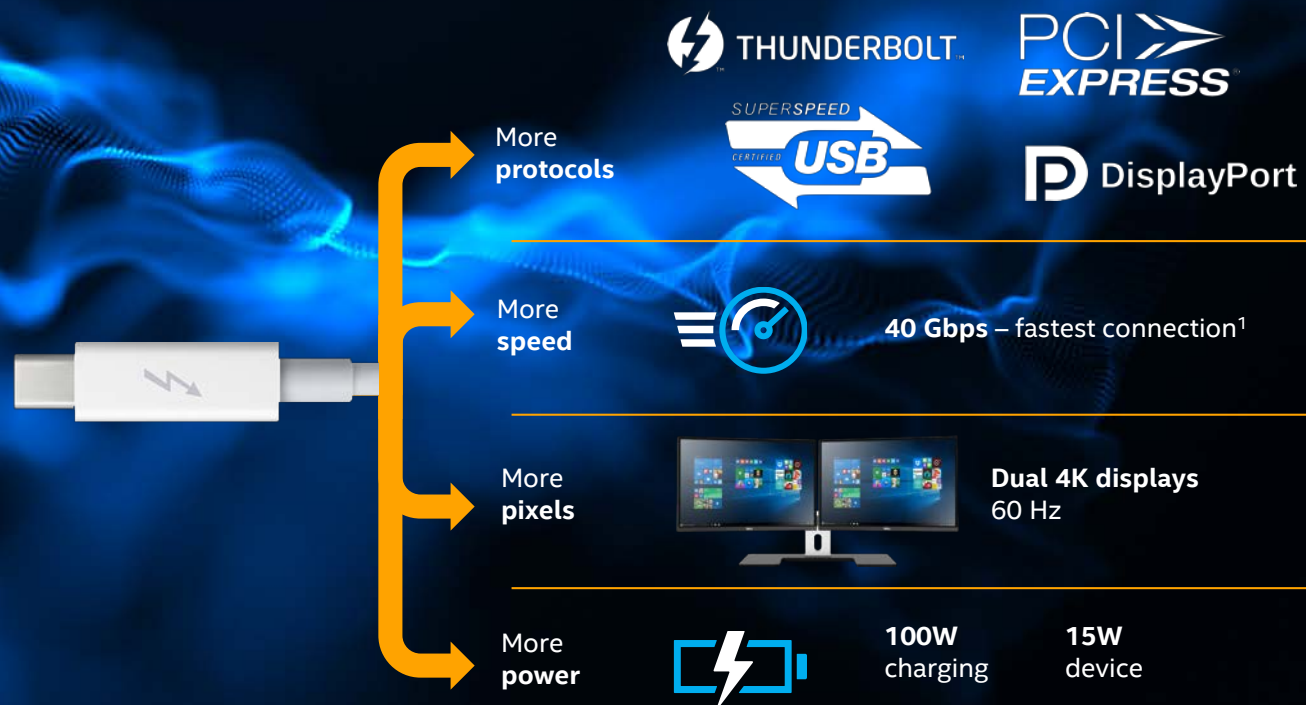
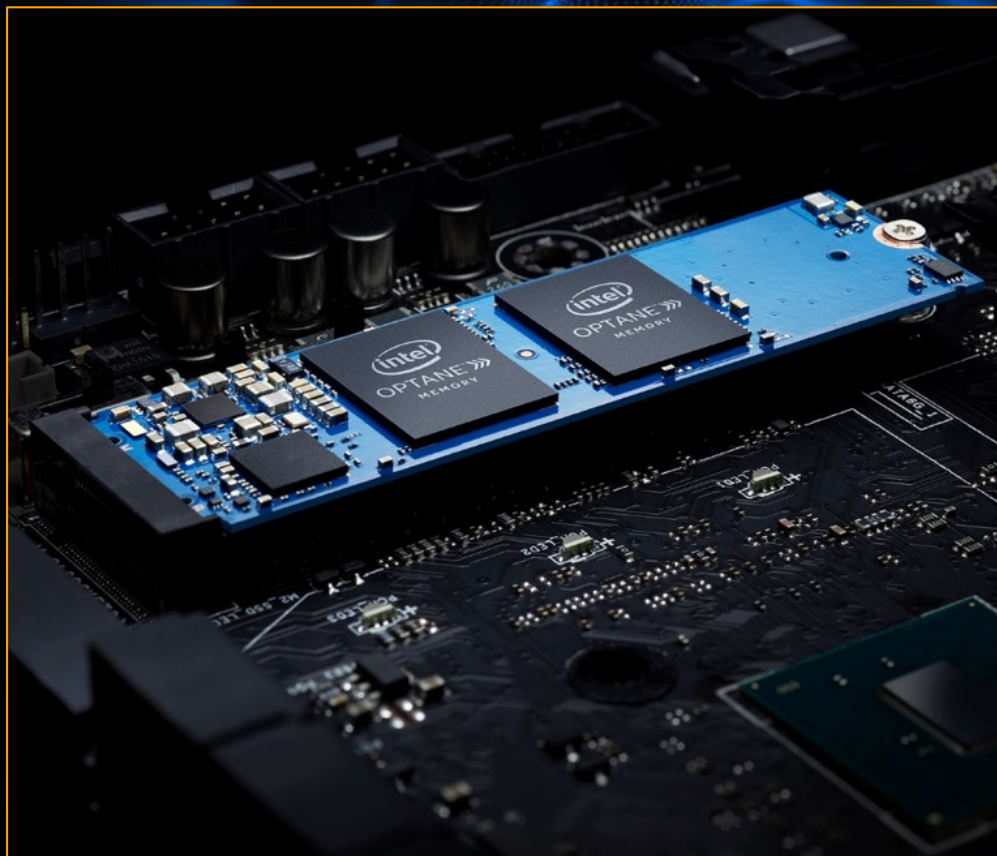
- Intel® Extreme Tuning Utility (Intel® XTU)
- Intel® Extreme Memory Profile 2.0 (Intel® XMP) technology

## PEACE OF MIND

Upgrade option for overclockers:

- Performance tuning protection plan

# INTEL® TECHNOLOGIES WORK TOGETHER FOR OPTIMAL PERFORMANCE



<sup>1</sup> As compared to any other connection to the PC



# INTEL® LIQUID COOLING TS13X

## HIGH-PERFORMANCE THERMAL SOLUTION FOR ENTHUSIASTS

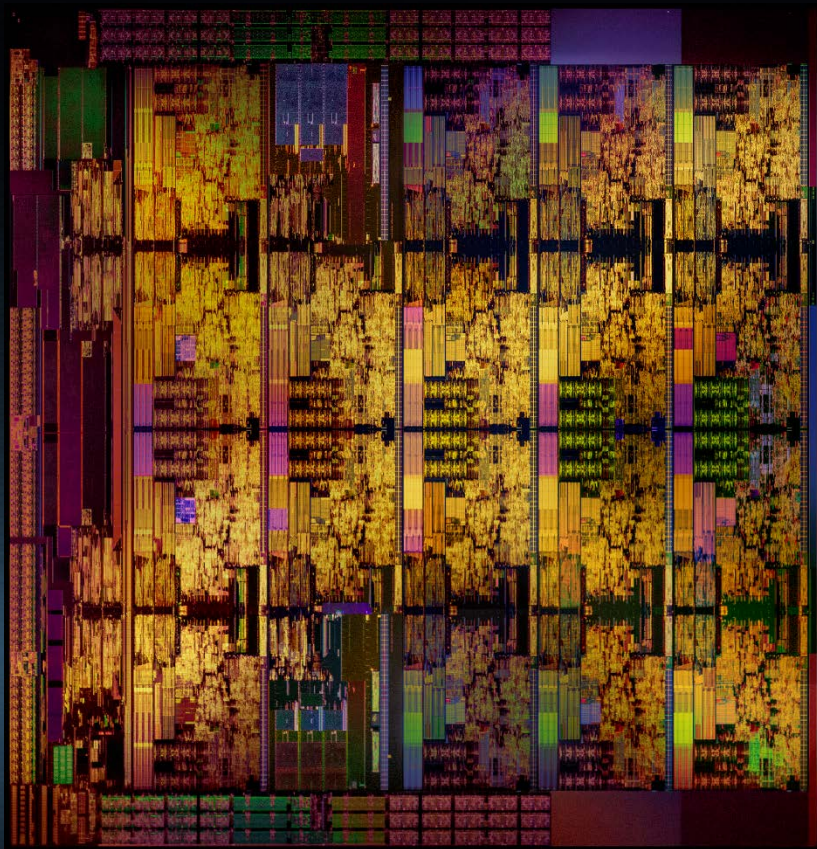
Separate boxed SKU available from distribution and at retail



Fan speed	800–2,200 RPM (four-wire PWM)
Fan dimensions	120 mm x 120 mm x 25 mm
Fan CFM	73.84 CFM
Unit noise level	21 dBA @ 800 RPM 35 dBA @ 2,200 RPM
Radiator dimensions	150 mm x 118 mm x 37 mm
Pump Z height	31 mm
Total thermal solution weight	820 grams
Cooling liquid	Propylene glycol
Thermal interface material	Dow Corning® TC-1996

Compatible with socket 2011/1366/115X  
Estimated retail pricing \$85–\$100

# NEW DIE MAP FOR INTEL® CORE™ X-SERIES PLATFORM



## INTEL® CORE™ I9-7980XE PROCESSOR DIE MAP

14 nm tri-gate 3D transistors



# NEW INTEL® CORE™ X-SERIES PROCESSOR

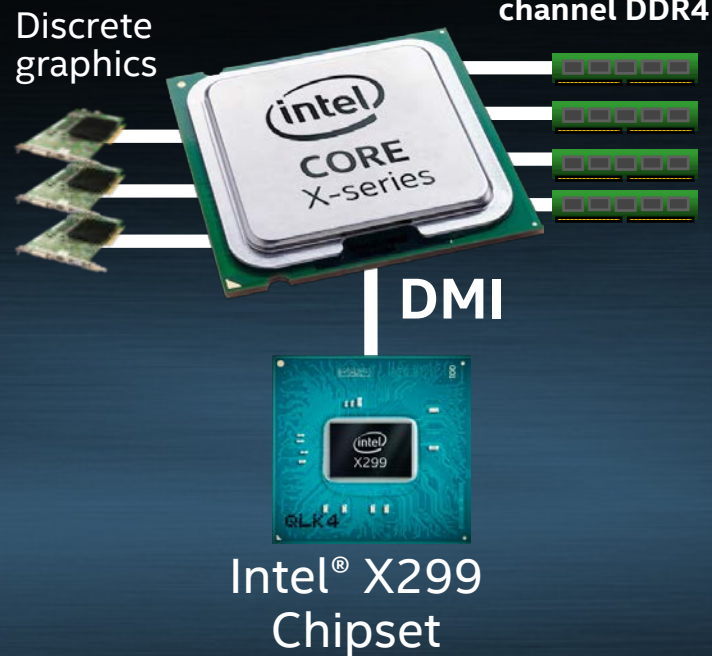
More core options:  
18, 16, 14, 12, 10, 8, 6, and 4

Rebalanced Intel® Smart  
Cache hierarchy<sup>1</sup>

Intel®  
Turbo Boost Technology

Intel® Hyper-Threading  
Technology  
(Intel® HT Technology)

Skylake-X and Kaby Lake-X  
processors



Update: Intel® Turbo Boost Max  
Technology 3.0<sup>2</sup>

Support for overclocking with  
extreme edition and “X” SKUs

Integrated memory controller:  
Up to four channels DDR4 2666<sup>2</sup>

Up to 44 lanes PCIe 3.0  
connected on the CPU and up to 24  
connected on the PCH

Power = 140W<sup>3</sup>  
Socket: LGA 2066

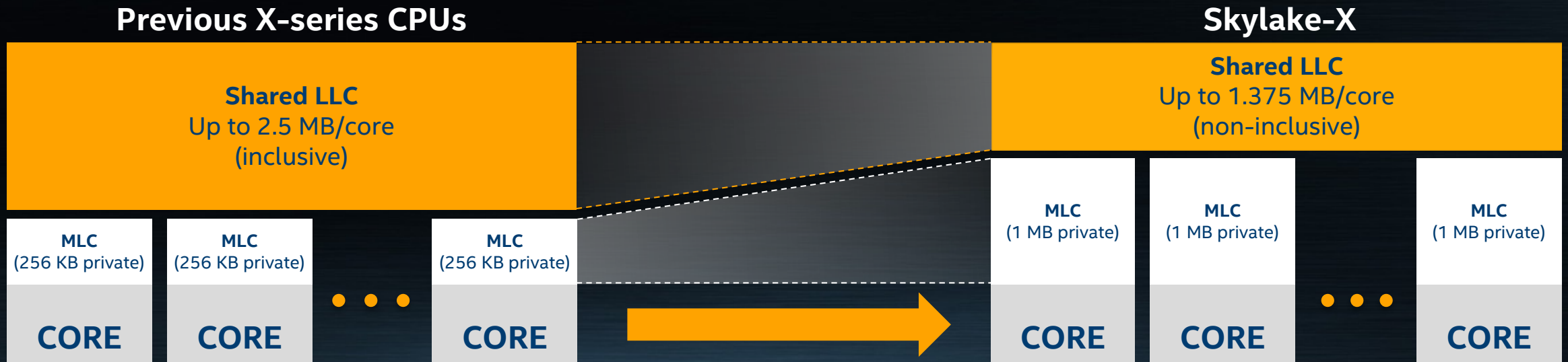
See product specifications for features supported on the SKUs

1. Rebalanced cache hierarchy. See next slide for details

2. Only available on SKUs 7820X, 7900X, 7920X, 7940X, 7960X, 7980XE

3. On SKUs 7800X, 7820X and 7900X. 7640X and 7740X SKUs have 112W TDP

# REBALANCING THE CACHE HIERARCHY<sup>1</sup>



- Shift cache balance from shared-distributed to private-local by enlarging MLC
- Shared LLC retained to benefit shared data and to enable capacity balancing

High hit rate on low-latency MLC increases performance

LLC= Last-level cache; MLC = Midlevel cache

1. Not available with SKUs 7640X and 7740X



# INTEL® X299 CHIPSET

Redefines the enthusiast desktop experience

## INCREASED SYSTEM RESPONSIVENESS

Intel® Optane™  
memory ready<sup>1</sup>

Faster throughput times  
with DMI 3.0<sup>2</sup>

## IMPROVED I/O CAPABILITIES

30 total high-speed I/O lanes  
with increased port  
flexibility:

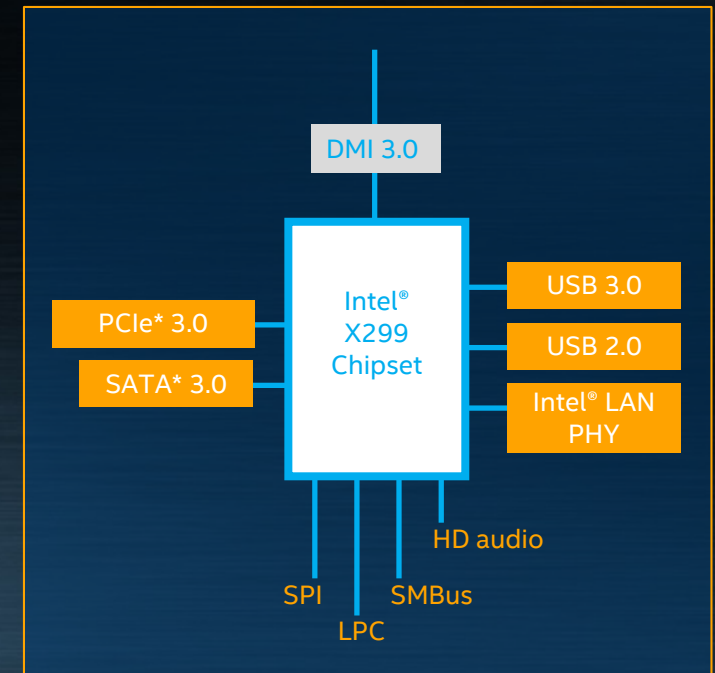
- Up to 24 PCIe 3.0 lanes
- Up to 8 SATA 3.0 ports
- Up to 10 USB 3.0 ports

Up to three Intel® Rapid  
Storage Technology PCIe 3.0  
x4 storage support

Supports Intel® Ethernet  
Connection I219  
(Jacksonville LAN PHY)

## ULTIMATE SCALABILITY

New Socket R4 (LGA  
2066) – compatible with  
all new Intel® Core™  
X-series processors  
(4C–18C)



1. Compared to HDD alone.

2. Compared to Intel® X99 Chipset.

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>.

# INTEL® CORE™ X-SERIES PROCESSOR PARTNERS

Genuine 捷元

NCIX

DIGITALSTORM



天猫 TMALL.COM

ORIGIN

ASRock



GIGABYTE™

msi™



Komputronik



pcspecialist

ASUS®

acer



Available at  
amazon



SCAN®

GTUNE | mouse

MSY Technology



ALIENWARE™



Lenovo™



EVGA

Not a comprehensive list of customers and partners

Other names and brands may be claimed as the property of others.



# UNLOCKED INTEL® CORE™ X-SERIES PROCESSOR FAMILY

Processor number <sup>1</sup>	Base clock speed (GHz)	Intel® Turbo Boost Technology 2.0 frequency <sup>2</sup> (GHz)	Intel® Turbo Boost Max Technology 3.0 Frequency <sup>3</sup> (GHz)	Cores/ threads	L3 cache	PCI express 3.0 lanes	Memory support	TDP	Socket (LGA)	RCP Pricing (1K USD)
i9-7980XE <b>NEW</b>	2.6	4.2	4.4	18/36	24.75 MB	44	Four channels DDR4-2666	165W	2066	\$1,999
i9-7960X <b>NEW</b>	2.8	4.2	4.4	16/32	22 MB	44	Four channels DDR4-2666	165W	2066	\$1,699
i9-7940X <b>NEW</b>	3.1	4.3	4.4	14/28	19.25 MB	44	Four channels DDR4-2666	165W	2066	\$1,399
i9-7920X <b>NEW</b>	2.9	4.3	4.4	12/24	16.5 MB	44	Four channels DDR4-2666	140W	2066	\$1,199
i9-7900X <b>NEW</b>	3.3	4.3	4.5	10/20	13.75 MB	44	Four channels DDR4-2666	140W	2066	\$999
i7-7820X <b>NEW</b>	3.6	4.3	4.5	8/16	11 MB	28	Four channels DDR4-2666	140W	2066	\$599
i7-7800X <b>NEW</b>	3.5	4.0	NA	6/12	8.25 MB	28	Four channels DDR4-2400	140W	2066	\$389
i7-7740X <b>NEW</b>	4.3	4.5	NA	4/8	8 MB	16	Two channels DDR4-2666	112W	2066	\$339
i5-7640X <b>NEW</b>	4.0	4.2	NA	4/4	6 MB	16	Two channels DDR4-2666	112W	2066	\$242

1. Intel processor numbers are not a measure of performance. Processor numbers differentiate features within each processor family, not across different processor families.

See [intel.com/products/processor\\_number](https://www.intel.com/products/processor_number) for details.

2. Refers to the maximum dual-core frequency that can be achieved with Intel® Turbo Boost Technology 2.0.

3. Refers to the maximum dual-core frequency that can be achieved with Intel® Turbo Boost Max Technology 3.0

# INTEL® CORE™ X-SERIES GENERATIONAL PLATFORM COMPARISON

Brand	New Intel® Core™ X-series processor/ Intel® X299 chipset		Intel® Core™ X-series processor/ Intel® X99 chipset	Intel® Core™ X-series processor/ Intel® X99 chipset
Processor family (year)	SKL-X 2017	KBL-X 2017	BDW-E 2016	HSW-E 2014
CPU cores	18, 16, 14, 12, 10, 8, and 6	4	10, 8, and 6	8 and 6
Intel® Turbo Boost Max technology 3.0	Yes <sup>1</sup>	No	Yes	No
Shared cache	Up to 24.75 MB <sup>2</sup>	Up to 8 MB	Up to 25 MB	Up to 20 MB
PCIe lanes off of processor	Up to 44 (7800X & 7820X have 28) <sup>3</sup>	16	Up to 40 (6800K has 28) <sup>3</sup>	Up to 40 (6800K has 28) <sup>3</sup>
Discrete GFX configurations	2x16/4x8 <sup>4</sup> of gen. 3 on processor	1x16/2x8 of gen. 3 on processor	2x16/4x8 <sup>4</sup> of gen. 3 on processor	2x16/4x8 <sup>4</sup> of gen. 3 on processor
Memory	Four-channel DDR4 2666 <sup>1</sup>	Two-channel DDR4 2666	Four-channel DDR4 2400	Four-channel DDR4 2133
TDP	165W, 140W	112W	140W	140W
Socket	LGA 2066	LGA 2066	LGA 2011-v3	LGA 2011-v3
Unlocked	Yes	Yes	Yes	Yes

1. Not available on all SKUs.
2. See rebalancing cache hierarchy slide for details.
3. Motherboards must be Thunderbolt™ technology ready.
4. Requires additional system clocks to be provided by third-party components.





# DESKTOP FAMILY FOR ENTHUSIAST EXPERIENCES



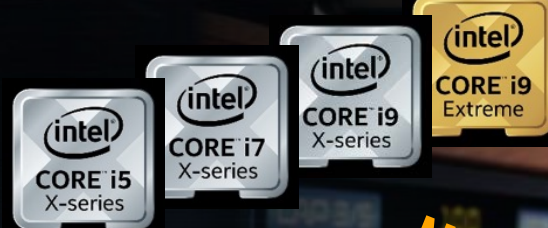
## MAINSTREAM PERFORMANCE

- 77xx/76xx/75xx
- Four cores
- Up to 24 PCIe\* lanes
- Two memory channels
- Premium UHD/4K content
- Intel® Optane™ memory ready and support for Intel® Optane™ SSDs



## UNLOCKED PERFORMANCE

- 7700K/7600K
- Four cores
- Up to 24 PCIe lanes
- Two memory channels
- Premium UHD/4K content
- Intel® Optane™ memory ready and support for Intel® Optane™ SSDs



## EXTREME PERFORMANCE

- 7980XE/7960X/7940X/7920X/7900X/7820X/7800X/7740X/7640X
- Core options: 18, 16, 14, 12, 10, 8, 6, and 4
- Up to 44 PCIe lanes
- Up to four memory channels unlocked
- Updated Intel® Turbo Boost Max Technology 3.0
- Intel® Optane™ memory ready and support for Intel® Optane™ SSDs

# NEW INTEL® CORE™ X-SERIES PROCESSOR FAMILY

*What's new ...*

## UNPRECEDENTED SCALABILITY



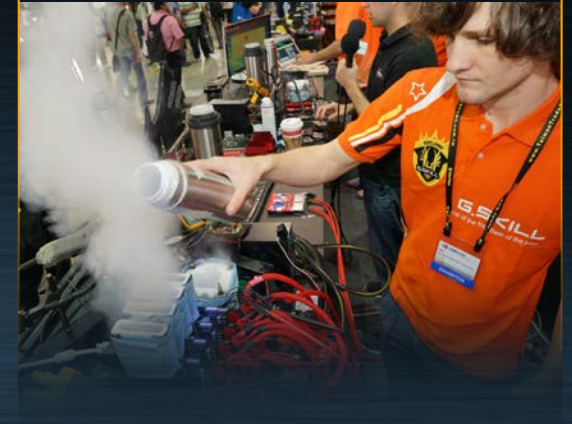
## EXTREME PERFORMANCE



## EXTREME MEGA-TASKING



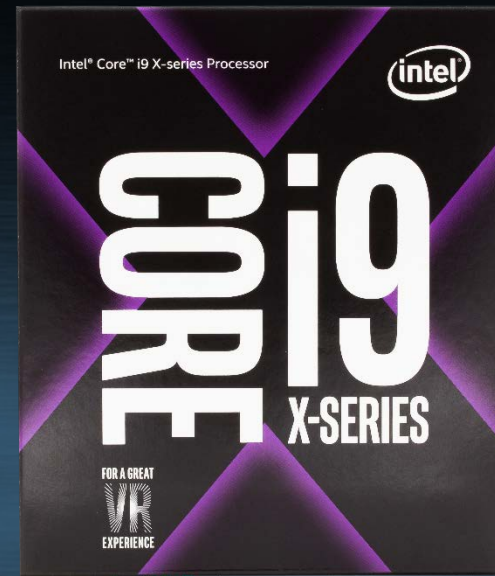
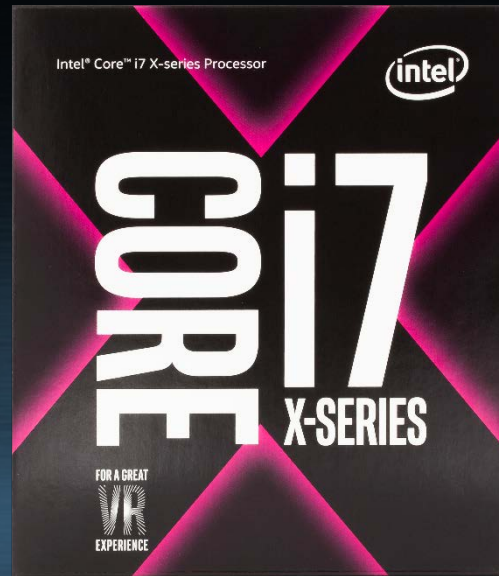
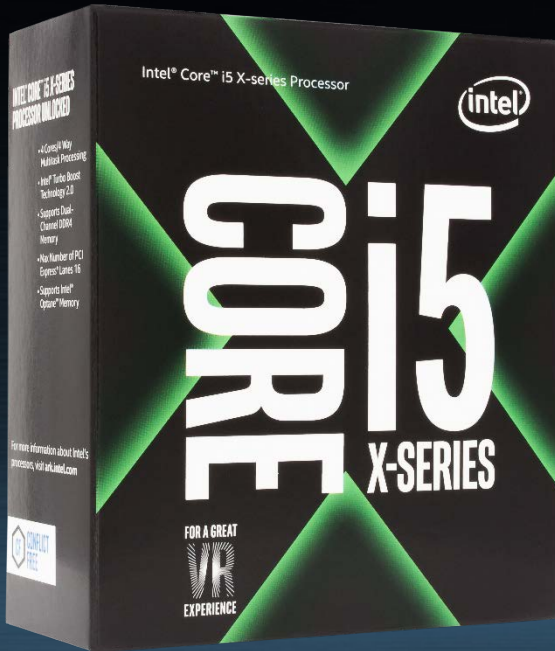
## NEW OVERCLOCKING FEATURES





# UNLOCKED INTEL® CORE™ X-SERIES PROCESSOR FAMILY

## RETAIL PACKAGING



Intel® Core™ i9 X-series processor  
Intel® Core™ i7 X-series processor  
Intel® Core™ i5 X-series processor

Intel® Core™ i9 Extreme Edition processor

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- Warning: Altering PC clock or memory frequency and/or voltage may (i) reduce system stability and use life of the system, memory and processor; (ii) cause the processor and other system components to fail; (iii) cause reductions in system performance; (iv) cause additional heat or other damage; and (v) affect system data integrity. Intel assumes no responsibility that the memory, included if used with altered clock frequencies and/or voltages, will be fit for any particular purpose. Check with memory manufacturer for warranty and additional details.
- Tests measure performance of components on a particular test, in specific systems. Differences in hardware, software or configuration will affect actual performance. Consult other sources of information to evaluate performance as you consider your purchase. For more complete information about performance and benchmark results, visit [intel.com/benchmarks](https://www.intel.com/benchmarks).
- Configurations: Intel® Core™ i7-6950X Processor (3.0GHz up to 3.5GHz, 10C/20T, 25MB, 140W TDP) measured on - Motherboard: ASRock X99M Extreme4, Memory: 4x8GB DDR4-2400, Storage: Intel 750 PCIe SSD -400GB, OS: Windows\* 10 (RS2) , Graphics: Nvidia GTX 1080Ti (Driver 22.21.13.8205), BIOS:BIOS P3.20 , Intel® Turbo Boost Max Driver Version 1.0.0.1029, System Power Management Policy: Balanced –and– Intel Core™ i9-7900X Processor (3.3GHz up to 4.5GHz, 10C/20T, 13.75MB, 140W TDP) measured on – Motherboard: Gigabyte X299, Memory: 4x8GB DDR4-2666, Storage: Intel 750 PCIe SSD- 400GB, OS: Windows\* 10 (RS2), Graphics: Nvidia GTX 1080Ti (Driver 22.21.13.8233), BIOS:BIOS F5H , Intel® Turbo Boost Max Driver Version 1.0.0.1029, System Power Management Policy: High Performance

All data measured on version: v1.0.0.1025 driver software and subject to change.

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