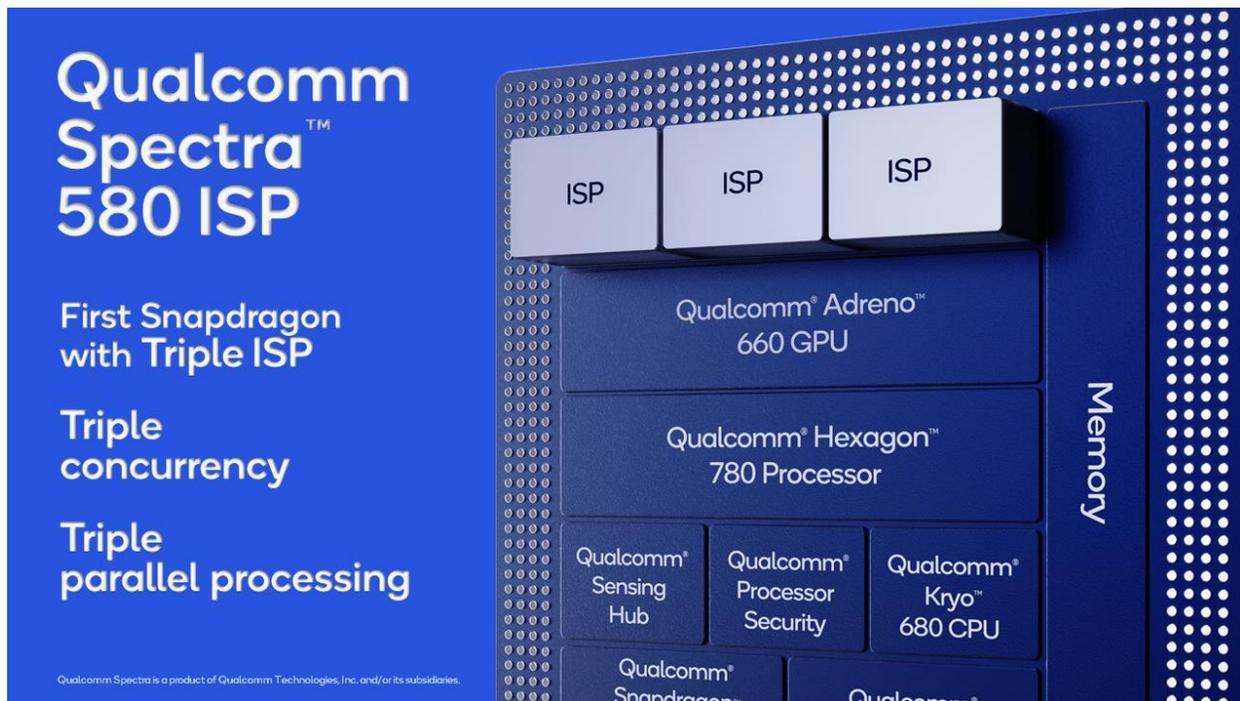


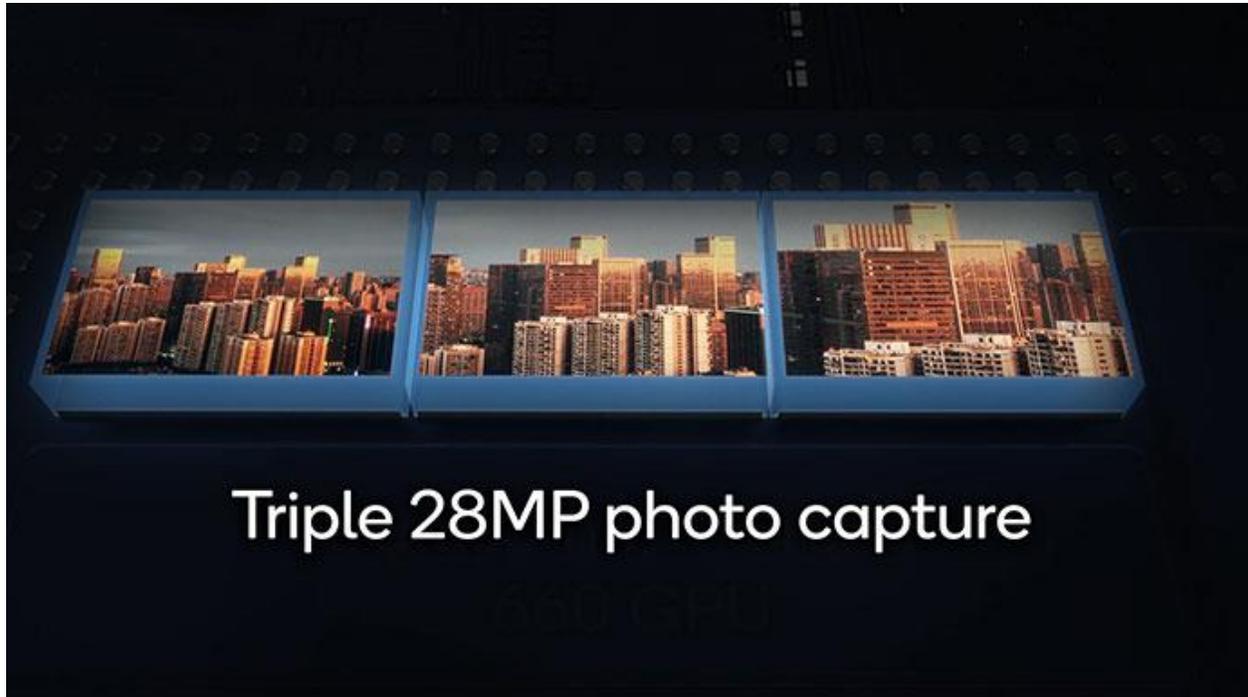
Triple down on the future of photography with Snapdragon 888

By Judd Heap, VP of Product Management, Qualcomm Technologies, Inc.



Qualcomm Technologies built its Qualcomm Spectra ISP to double down on the future of computational camera. Unlike most ISPs, when Qualcomm Spectra debuted five years ago, it was born a dual-ISP. In the new Qualcomm Snapdragon 888 5G Mobile Platform, Qualcomm Spectra is getting a big upgrade.

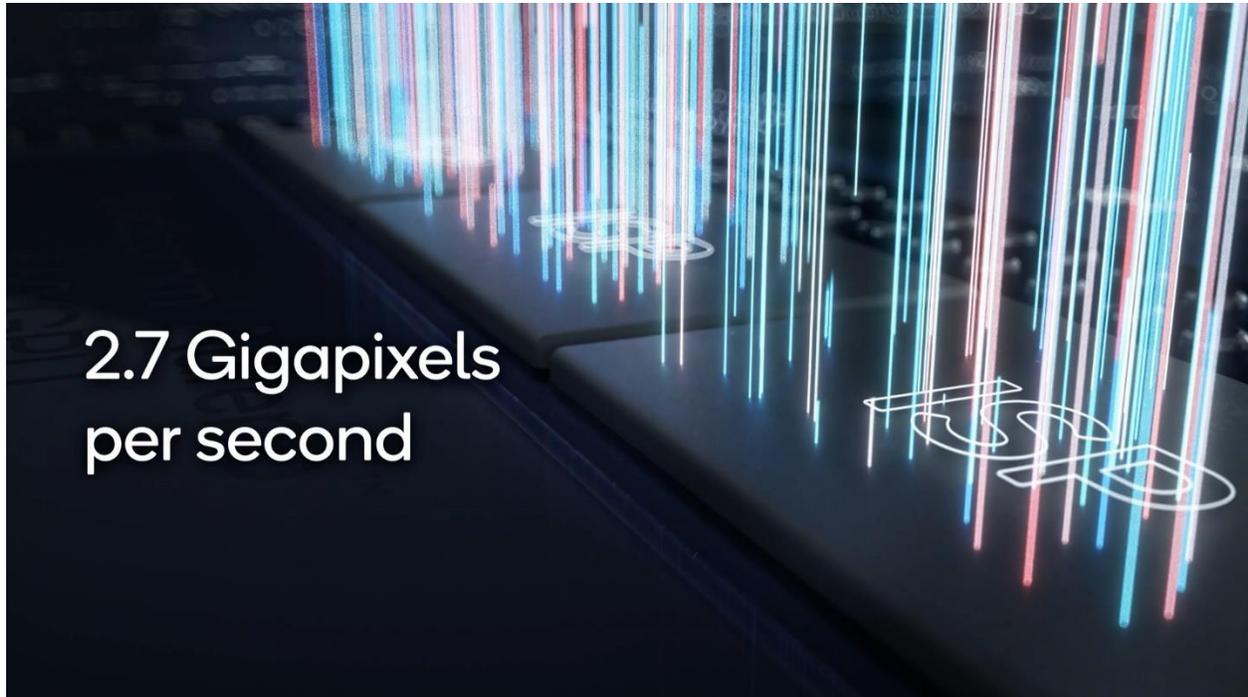
Snapdragon 888 will triple down on the future of computational photography. Qualcomm Spectra 580 is the first Qualcomm Spectra with a triple ISP. The triple ISP will take professional image quality to the next level – it delivers triple camera concurrency and triple parallel processing.



Triple concurrency for triple capture

Most flagship smartphones come with at least three rear cameras, each with a different lens – ultrawide, wide, and telephoto. Triple concurrency enables users to capture video from three different cameras at the exact same time – all in 4K HDR quality. The same is true for photos too – Qualcomm Spectra 580’s triple ISP can capture three photos at the exact same time at 28 megapixels each.

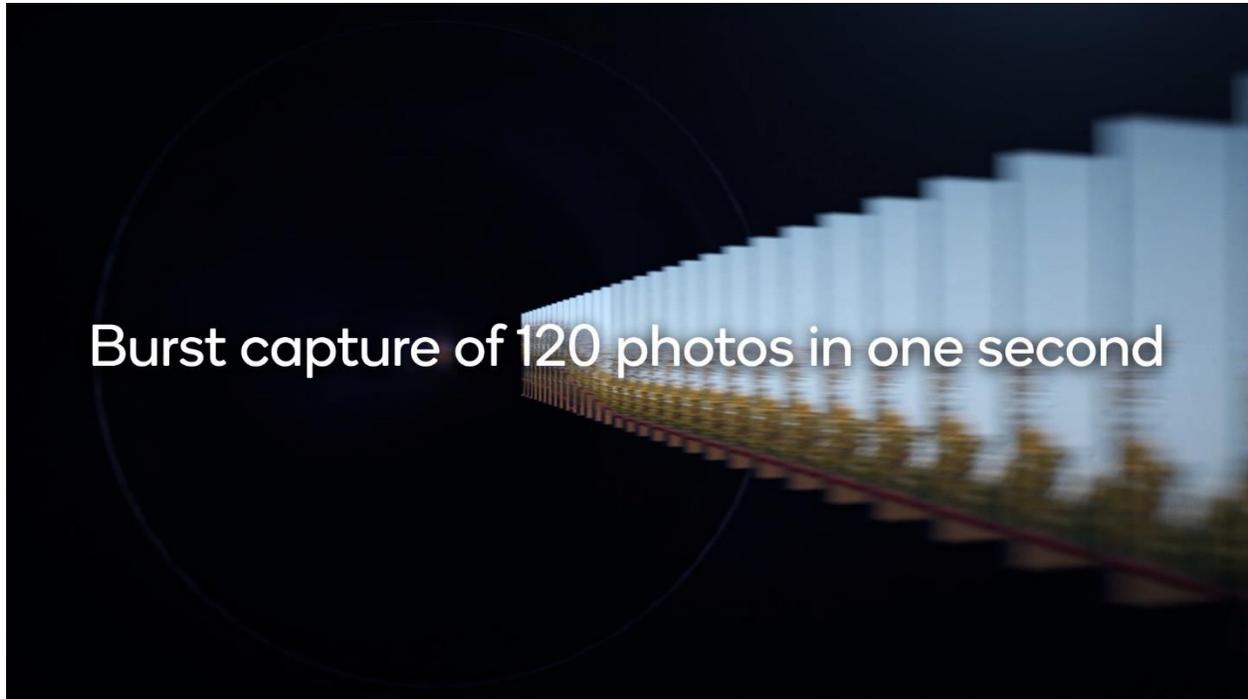
Triple concurrency will also provide even smoother transitioning when zooming between cameras. For example: When you started shooting with your wide-angle camera on a dual ISP, we had to guess if you were going to zoom in to your telephoto or zoom out to your ultrawide. Now, with triple concurrency, we no longer need to guess. We can run all three cameras in the background and instantly switch to the camera you choose.



2.7 Gigapixels
per second

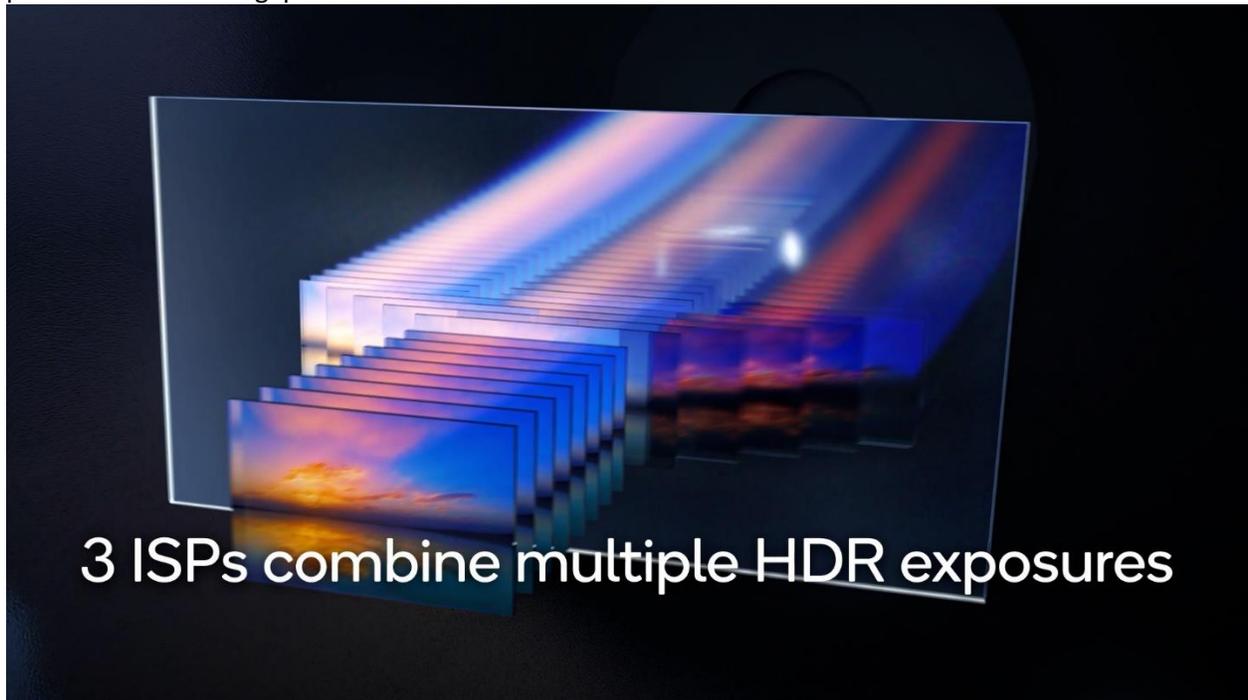
Enhanced architecture for speed, image quality, computer vision and HDR

Qualcomm Spectra 580 is more than just a triple ISP. It features architecture improvements for speed, image quality, computer vision, and upcoming staggered HDR image sensors. It's 35% faster than our previous generation and we can now capture 2.7 Gigapixels per second.



Burst capture of 120 photos in one second

That speed is also used to achieve astounding burst photography. In just one second, we can capture 120 photos – all at 12 megapixels.



3 ISPs combine multiple HDR exposures



HDR capture

Qualcomm Spectra 580's architecture is designed for image sensors called staggered HDR. They will be debuting in smartphones soon and have the potential to dramatically enhance HDR video quality.

Staggered HDR image sensors output separate long, medium, and short exposures. In the same time that today's image sensors capture one image, staggered HDR can capture three images, all with detail in different parts – bright or dark – of the scene. Qualcomm Spectra 580's triple concurrency can merge all of these images together to bring you one final image with incredible dynamic range. This technique has been available for photo capture. But for the first time on Snapdragon you'll be able to capture 4K HDR with computational HDR.

Photo capture will also get new HDR capabilities with 10-bit color depth. Snapdragon 845 debuted 10-bit color depth for video capture, known as 4K HDR. It could capture 4K HDR video in the HLG and HDR10 formats. Snapdragon 855 added 4K HDR video capture in HDR10+ format and Snapdragon 865 added video capture in the Dolby Vision format.

Qualcomm Spectra will be able to capture photos in 10-bit color depth in the HEIF format. With Snapdragon 888 you'll be able to capture photos in over a billion shades of color.

Frames per second

Displays at 120Hz have become the new norm in premium smartphones. These displays made gaming much more immersive and now we can use them to make the camera better.

Previously Snapdragon has captured and displayed video at 24, 30 and 60 fps. Like Snapdragon 865, Snapdragon 888 devices will be able to capture 4K at 120 fps. Now they will also be able to play them back at 120fps, for hyper-smooth video playback.

Artificial intelligence for autofocus and autoexposure.

The basics of a professional-quality photo start with 3A – autofocus, autoexposure, and auto white balance. All three of these must be correct if you want extreme sharpness, dynamic range, and great color.

Qualcomm Technologies puts massive amounts of time and resources into refining our 3A. Qualcomm Spectra 580 will debut our 10th generation of 3A algorithms and it is the first time that 3A will be powered by AI. This will take professional quality images to the next level.

Our new Saliency Auto Focus and Auto Exposure engines are incredible. They were built using virtual reality (VR) headsets equipped with eye tracking. We trained the Saliency Auto Focus and Auto Exposure neural nets by showing people images in VR and tracking their eyes to see which part of the image they focused on. With 3A, image accuracy will be better than ever.



Artificial intelligence for breakthrough camera experiences.

The Snapdragon 888 camera experience is more than just Qualcomm Spectra. We have an entire separate Qualcomm AI Engine that we tap into. Using the Qualcomm AI Engine, we can enable new experiences as shown by [Arcsoft](#).

Arcsoft will bring new meaning to the term “point and shoot.” In the past, point and shoot wasn’t that. You had to select what you wanted to focus on, then zoom in and out to constantly frame the action. This is no more thanks to the Triple ISP always capturing video, Arcsoft will use Qualcomm Spectra 580 and our Qualcomm AI Engine to track and zoom in and out automatically – delivering on a true point and shoot experience.

Qualcomm Spectra 580 debuts our new triple ISP that is packed with breakthrough camera experiences. The breakthrough speed, computational HDR for video, low light architecture, and much more will turn your next Snapdragon 888 smartphone into a professional quality camera.

Learn more about Qualcomm camera technology at: <https://www.qualcomm.com/products/cameras>

AI Image Enhancements
Morpho

Triple ISP + AI
ArcSoft

4K @ 120 FPS video capture
4K @ 120 FPS video playback

AI for 3A
AI for Auto Focus AI for Auto Exposure Advanced Auto White Balance

Low Light Architecture
Capture photos in 0.1 lux



Camera Highlights 



Qualcomm Snapdragon, Qualcomm Spectra, and Qualcomm AI Engine are products of Qualcomm Technologies, Inc. and/or its subsidiaries.

Qualcomm Spectra 580 ISP
First Snapdragon with Triple ISP 
Triple Concurrency and Triple Parallel Processing
Professional image quality

Gigapixel speed
2.7 Gigapixels per second 35% faster 12MP at 120FPS

Triple ISP
Triple 4K HDR Video Capture Triple 28MP Photo Capture Perfect smooth zoom

Architecture for Staggered HDR Image Sensors

4K HDR Video Capture with Computational HDR 
10-bit HDR HEIF for Photo Capture 

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