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Carestream Delivers Fast Access to Clinical Imaging from the Cloud

Overcoming network latency and bandwidth challenges on the way to giving healthcare providers a cloud-based, FDA-compliant enterprise imaging solution

Fast diagnoses save lives and minimize uncertainty for patients, so doctors and physicians need on-demand access to critical information wherever they are and on multiple form factor devices.

Carestream's Clinical Collaboration Platform already delivers medical images from magnetic resonance imaging (MRI) and computerized tomography (CT) scans, as well as nuclear medicine and any other images generated across the enterprise, direct to doctor's mobiles, tablets and PCs. When it decided to pilot rendering these high-resolution images on the server side rather than client side, to accommodate a cloud-based model, it turned to Intel® Xeon® Platinum 8168 processors and Intel® QuickAssist Technology (Intel® QAT) to do so without compromising performance.

Carestream's cloud challenge

Changes to the way healthcare providers are compensated for their services – with a fresh emphasis on patient outcomes rather than hospital visits – are driving many to seek technologies that can make recording and handling data more efficient. As a result, the industry has broken free of its relative inertia when it comes to the cloud, and organizations are embracing the benefits of lower cost and centralized management with the same vigor seen in other sectors.

The challenge for Carestream lies in creating a cloud service offering that is at least equal to, if not better, than an on-premise solution. When handling images for which the United States' Food and Drug Administration (FDA) agency sets high quality requirements, this meant overcoming the latency and bandwidth challenges associated with increasing the distance between the client and compute resources.

Some service providers have got around this by establishing data centers close to customers, or building customer-specific deployments, but Carestream wanted to create a true server-side, FDA-compliant standard imaging service offer for clinical readings. To do this, it needed to shift the hard work of rendering images to its servers rather than client-side devices, before compressing the files to minimize demands on bandwidth and neutralize high latency during transmission. With less data per image, but no reduction in quality, its customers would only need devices with high-quality displays to receive the same high level of services.

The solution: Hardware-based compression

To ensure Carestream can quickly provide images to the doctors that need them, when they need them, image compression must be highly efficient and fast, while also being lossless to meet the FDA rules. During the testing against various software solutions, a hardware-based deployment combining Intel QAT and Intel Xeon Platinum 8168 processors running on commodity servers performed optimally[1].

Carestream engaged Intel early when establishing its proof of concept and the two worked closely together to optimize the deployment for this specific use case.

Intel QAT is an ideal solution for both cloud and storage purposes because it offers data compression and decompression acceleration, implemented with more efficient hardware The Intel Xeon Platinum 8168 processor are the foundation for secure, agile cloud data centers. With uncompromising security and exceptional processing performance, these processors are built for mission-critical, real-time analytics, machine learning, artificial intelligence and multi-cloud workloads. With trusted, hardware-enhanced data service delivery, this processor family delivers monumental leaps in I/O, memory, storage, and network technologies to harness actionable insights from our increasingly data-fueled world.

Lossless data compression in record time

To successfully move its services to the cloud full-time, Carestream must overcome network latencies by compressing the data it sends to customers, while ensuring that compression is FDA compliant. Achieving this with such high-resolution images requires many compute cycles.

With Intel QAT, hardware compression time was 23.8 times faster compared to testing on an lgzip* software implementation[1], allowing Carestream's server-side rendering to serve more end devices per server and more images per device. The resulting reduction in latency will also improve the user experience, while putting the solution in the cloud means customers' technical resources can be directed away from maintenance of on-premise systems.

For Carestream, central management of its services and data in the cloud will allow it to respond quickly to customer demand, as well as offer more customized services. Its solution is heavily integrated with Microsoft Windows* and Windows Server*, and the Intel® technology can be optimized for both Microsoft and Linux platforms.
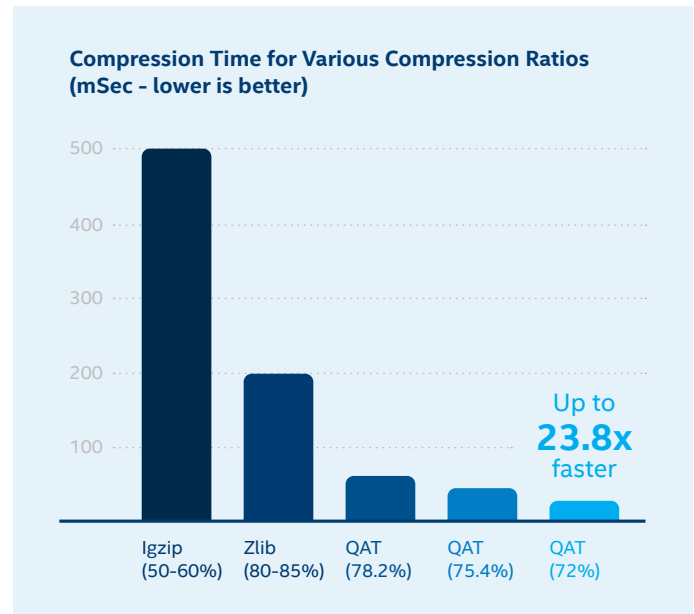
Compression Time for Various Compression Ratios (mSec – lower is better)

Figure 1 File compression with Intel® QuickAssist Technology was up to 23.8x faster during testing[1]

Foundations for the future

With Intel QAT, Carestream's trial has been able to overcome the latency and bandwidth challenges that all organizations face when trying to provide data-intensive services via the cloud. At the same time, its proof of concept has established Intel® Xeon® Scalable processors as the right foundation for an efficient, server-side, FDA-compliant imaging service.

Looking ahead, the company will continue its collaboration with Intel to trial the solution on the latest Intel® Xeon® Scalable processors, which offer enhanced benefits for cloud and storage, among others, and it is targeting a 2018 launch of its zero-foot-print diagnostic viewer for radiologists.

Learn More

Learn more about how Intel and Carestream can help you make the most of medical imaging data. Talk to your Intel or Carestream Health representatives, or visit us on the Web:

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About Carestream Health

Carestream is a worldwide provider of medical imaging systems and IT solutions; X-ray imaging systems for non-destructive testing; and precision contract coating services for a wide range of industrial, medical, electronic and other applications—all backed by a global service and support network. Its comprehensive family of web-based and cloud-based solutions for enterprise imaging, along with its "one-workstation" philosophy of radiology user interface design and reporting, empower health organizations to optimize productivity and maximize investments. Within the broad Carestream product line, Carestream Vue Cloud services offer is a fully managed, strategic solution to deliver new ways for clinicians to collaborate, resulting in better patient care.

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