



VIDEO ANALYTICS PLATFORM FOR BIG DATA



*Open and
Extensible*



*Integrates 3rd
Party Apps*



Cost Effective



*Real-time
Performance*

**AVIDBEAM
TECHNOLOGIES
CORP**

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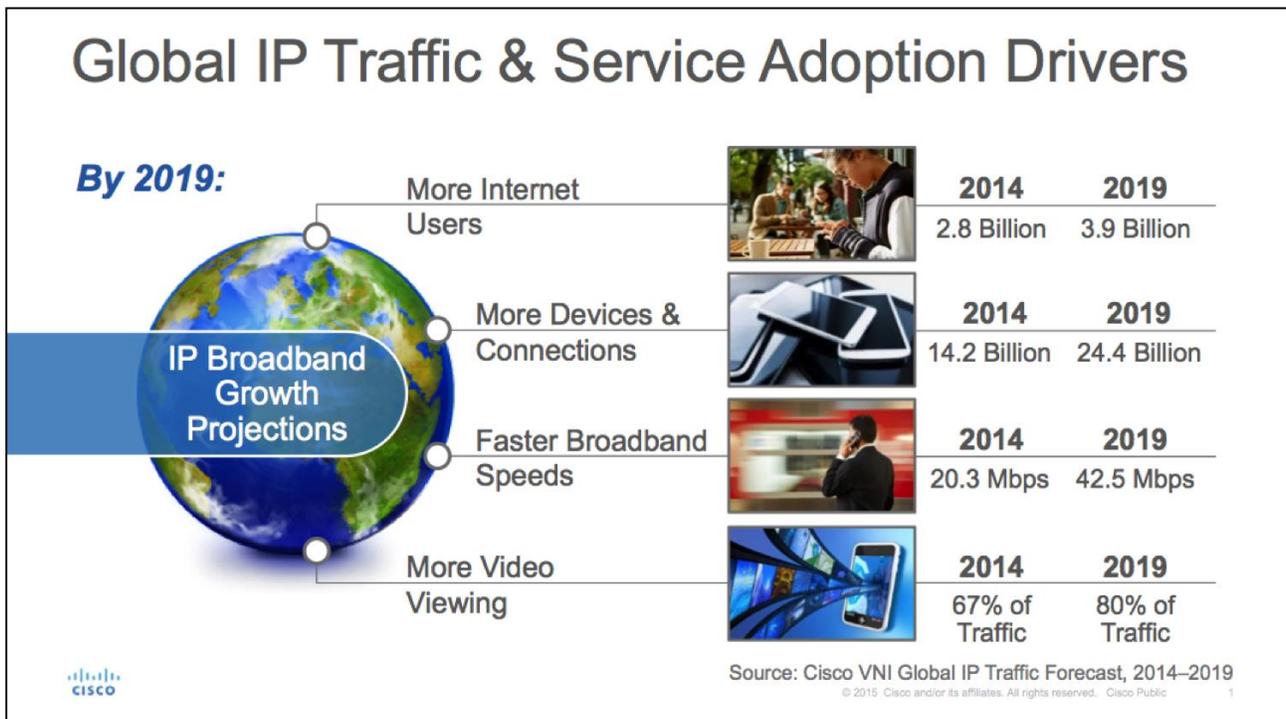
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The world is poised for new growth in global IP Traffic. With ever increasing numbers of media-active Internet users, devices and connections, and more and faster broadband, it is inevitable that video traffic will grow significantly. Much of the world’s data is now visual.

Is the next “Big Thing” the application of Data Analytics to Video?

Video data differs from more traditional data in that it is a continuous stream of non-discrete events. Video processing in general is costly and requires computational acceleration. Without that acceleration, video processing exhausts system memory and bandwidth resources. In addition, video processing requires continuous stream management to be effective. And post processing, in order to visualize results, often requires graphics mechanisms to efficiently render extracted structured data. The art of converting unstructured video data to a structured visual realization, and in a massively parallel context, is AvidBeam’s core competency.

AvidBeam extends Hadoop/Spark/Storm Cloud processing to video in an open platform. This new capability realizes cost-effective, commercially available Cloud-based real-time video processing on a massively parallel scale for the first time.



The idea of employing Big Data tools and Cloud-based platforms to scale computer vision algorithms is appealing. To achieve such a solution, AvidBeam has developed a platform that

can handle vast amounts of video or image input data, process that data in parallel and in the Cloud, using industry-standard open interfaces. The AvidBeam platform can configure any third-party computer vision algorithm of interest. The user suddenly has the ability to scale and operate on massive amounts of video or image data and produce results in real-time. The Big data tools have been customized to handle video processing natively. New modules have been developed to allow handling of video frames, accelerated startup of clusters and intelligent hardware mapping.

Hosting video processing solutions on AvidBeam platform has its advantages over regular hosting in the cloud. While the video processing application developer can create their own virtual machines and lease servers in the cloud to run their algorithms in the backend, they still lack the parallelism implementation, efficient use of Cloud resources and smart aggregation of streams at the backend which AvidBeam platform provides. The platform enables Big Data tools to handle video streams natively and efficiently. Video streams are divided into smaller chunks and distributed over available resources for parallel processing. Idle cameras will not have dedicated resources waiting for input to be processed, rather resources will be processing other non-idle cameras. With our smart motion detection technology, the platform can use available resources efficiently while maintaining timeliness of the application. The smart uploader and filter enables efficient aggregation of video input from the field to the command and control center. Stateless applications such as license plate recognition and face recognition can be processed with very high efficiency and at an enormous speed. Stateful applications such as path tracking can also be efficiently supported using load-balancing tools and effective balancing of resources.

AvidBeam has developed its own library of computer vision algorithms as a proof-of-concept exercise, while the intent is to enable third party computer vision algorithms. Examples of computer vision algorithms that can take advantage of such a platform include license plate and vehicle recognition, crowd, object and facial detection and recognition, medical image correlation and analysis, and many more.

Intelligent traffic management systems detect and recognize vehicles. There is interest in identifying and tracking vehicles in the case of crimes. Such a platform presents a view of traffic in real-time and helps security enforcement authorities identify criminal activity and stolen vehicles.

In commercial retail and relevant public settings, counting applications quantify customer traffic. Analytical heat maps and hot spots can be built to understand traffic flows. Retail shopping malls, sporting venues, and other similar large public venues can make use of traffic analytics.

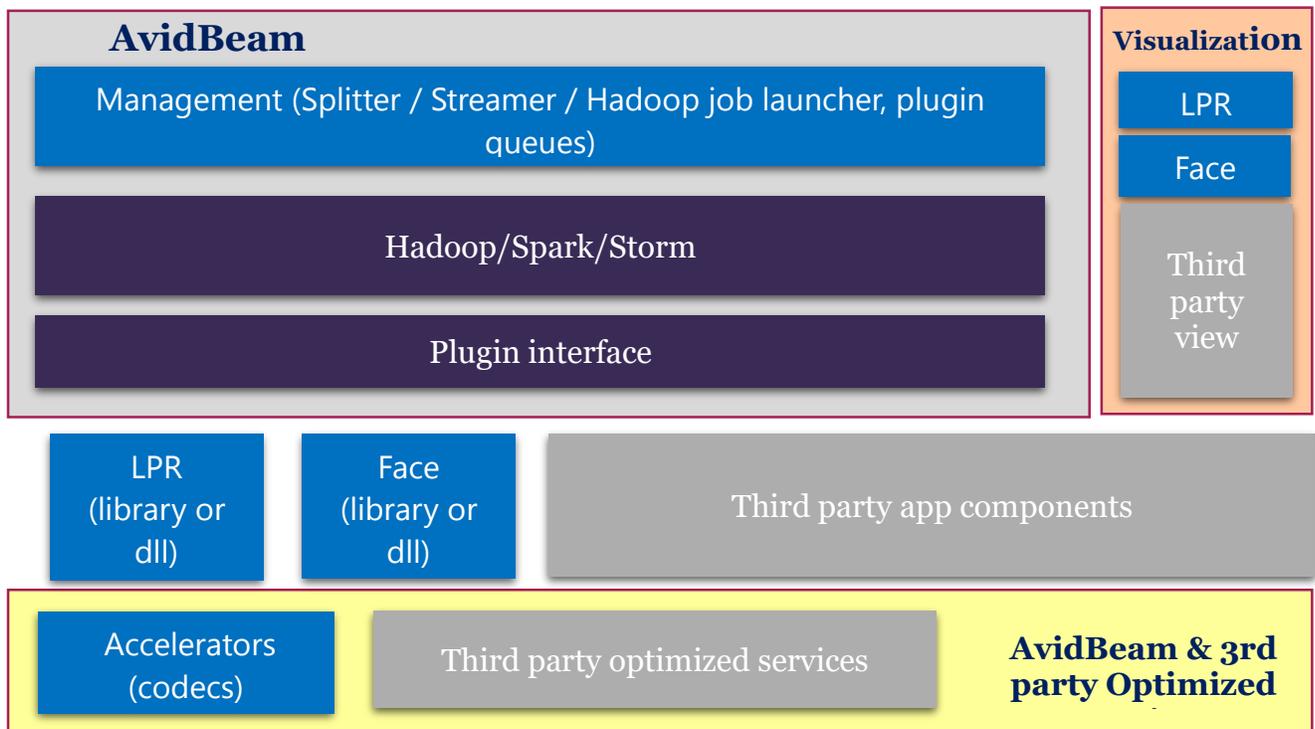
In the medical field, the applications appear endlessly promising. Comparing new images against a database of historical images in search of correlations and comparisons is

compelling. Endoscopy, ultrasound, and GAIT (Glucosamine/chondroitin Arthritis Intervention Trial) analysis videos have been mentioned by various practitioners. The AvidBeam platform enables the analysis of these videos in a timely fashion and with Cloud resources that are available and cost-effective. It could enable the visualization of patient information in a timely and unprecedented manner to accelerate physician decision-making and treatment plans.

The AvidBeam platform employs open source Big Data tools: Hadoop, Spark and Storm. It streamlines video input into the platform using AvidBeam developed modules. Our own computer vision algorithms along with third party algorithms are plugged into the platform.

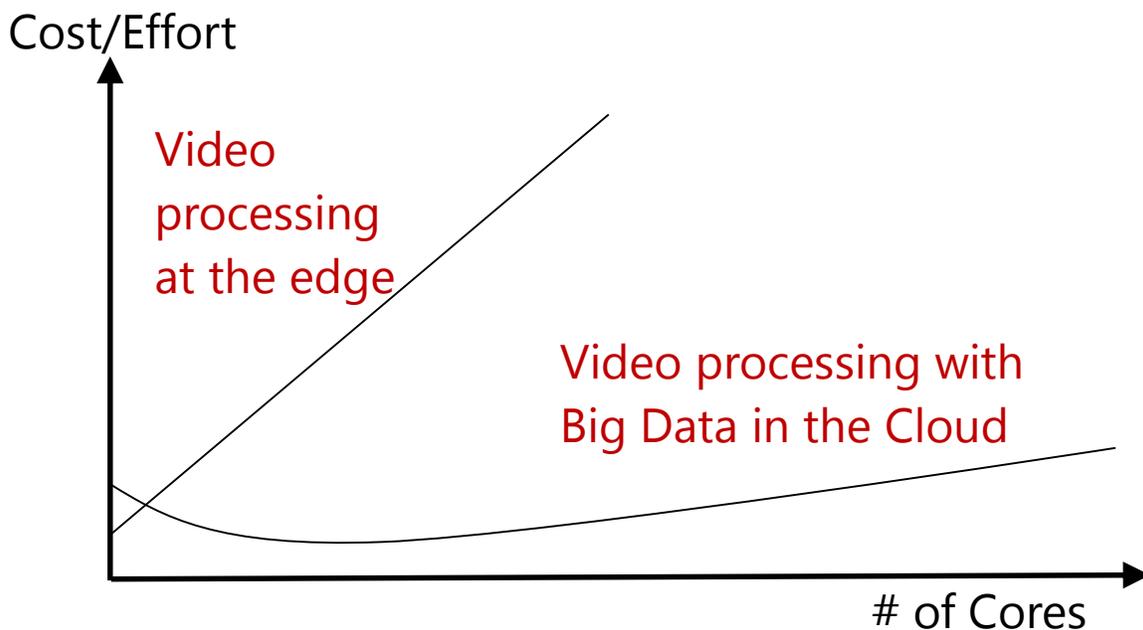
Third-party computer vision algorithms use simple APIs provided by AvidBeam to plug their modules into the platform. Once the module is plugged in, video files, streams and images can be processed, and structured results often are instantly available. The results are visualized using AvidBeam provided visualization tools or third party tools. Also important to note is the ability to add third-party libraries that make use of hardware accelerators and primitives.

The entire process appears seamless to the computer vision algorithm programmer. The programmer with no knowledge of Cloud parallelism or Big Data tools can quickly scale an algorithm with minimal effort. AvidBeam software has done the “heavy-lifting” of comprehending Cloud, Big Data, and parallel computing tools and infrastructure. Once the application API references are inserted, the programmer configures the platform via user interfaces to set parameters required for the operation of his or her video processing. The output is visualized and reports made available to the user.



There are many advantages to using the AvidBeam platform. First, replicating the infrastructure that Big Data tools use to process a large number of videos or images simultaneously is extremely expensive from an effort and cost perspective. This effort also grows rapidly as the amount of parallel processing grows. With Big Data tools, we can scale quickly to an enormous number of files and streams. Importantly, as the number of processing cores increase, the cost and effort continue to remain low.

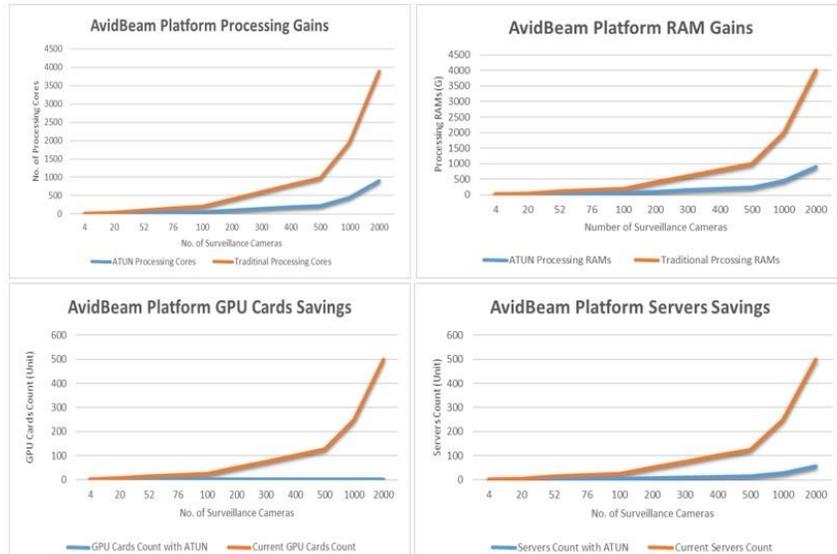
The platform exhibits outstanding performance on cost and resource management levels. Existing Cloud infrastructure from Amazon, IBM, and other Cloud server vendors, can be used – there is no local long-term investment by an organization to test and deploy video Big Data parallelism.



To probe further on the performance numbers, we examined a couple of applications to show the cost savings AvidBeam platform could achieve over conventional methods of computer vision processing. We experimented with a license plate recognition vendor using their legacy method versus the platform and results were astounding.

- ❖ ~100 Camera Deployments
AvidBeam Atun Saves:
 - 68% of the processing cores
 - 76% of the processing RAMs
 - 100% of the GPU Cards
 - 88% of the servers count

- ❖ >500 Camera Deployments
AvidBeam Atun Saves:
 - 70% of the processing cores
 - 78% of the processing RAMs
 - 100% of the GPU Cards
 - 89% of the servers count



Based on the above graphs, it is obvious that the vendor could save more than 70% of the current processing power, 65% of the hardware cost and, and 84% of the TCO (Total Cost of Ownership) once they migrate to AvidBeam platform. These performance numbers can be replicated across video processing computer vision solutions.

In summary, AvidBeam has introduced a pioneering video analytics platform that enables video analysis using Big Data tools such as Hadoop, Spark and Storm. The platform is Open and Extensible to make possible video analytics cost-effectively and in real-time. It allows third party algorithms to plug into the platform with minimal effort, and so enables immediate access to Big Data tools and Cloud hosting for all the computer vision community.

AvidBeam employs unique components to tailor Big Data tools for Video Analytics enabling what may be called “4-D Scalable Video Analytics Technology”