

# **Taking High Resolution Video to the Cloud**

## **Smart Compression**

**Compression by a further 90% on top of all other compression methods**

**WITHOUT LOSS OF IMPORTANT DETAIL**

**from**

**iOmniscient**

## Smart Compression from iOmniscient

### Overview:

New Cameras have increasingly high resolution. Today it is impractical to transmit video from a large number of high resolution video streams to the Cloud with the internet bandwidth that is available today even in most advanced countries.

You then have a choice.

You can transmit and record your video in the resolution of the camera - which requires an enormous amount of bandwidth and storage (and of course one needs fibre or other ultra high bandwidth network)

Or

You can transmit and record at a lower resolution which means that you have lost the detail that their cameras can provide. That is a waste – why deploy high resolution cameras if one cannot take advantage of that resolution.

The new patented Smart Compression from iOmniscient solves this dilemma for you.

It records every face, license number and significant event that is seen in the camera in high resolution while the rest of the video is recorded at low resolution. In every single frame of the video you never miss anything that is important. Equally you don't waste bandwidth and storage on anything that is unimportant.

To enable Cloud Computing with high resolution cameras one needs enormous bandwidth to stream the video. With iOmniscient's Smart Compression you can stream very low resolution video even while some parts of the video (eg important details such as the face or license plates or key events) are retained in high resolution. In other words within the video itself, faces can be streamed at high resolution and the rest would be at low resolution. This allows you to stream at low bandwidth while still transferring all the important information.

This system has the advantage of saving over 90% of the network bandwidth and storage needed. If your previous system could store video for 6 months, the Smart Compression will enable you to store video for 60 months (5 years) using the same amount of storage. Or looking at it another way you need only 10% of the storage you previously required.

## The Issues:

Consider a user who installs a 2 mega-pixel camera. He can record the video at 2 mega-pixels or he could reduce the image size and record at 1xCIF (equivalent to 0.1 megapixel).

If he records at 2 megapixels (mp), it takes an enormous amount of storage and requires significant bandwidth for transmission. However, much of this resource is wasted as the network will be transmitting and the recording system will be recording a lot of useless information continuously because he does not wish to miss the small amount of important information that may be there.

If he records at 1xCIF he loses the detail which he might need for investigation in the future and hence has got little benefit from using 2 mp cameras.

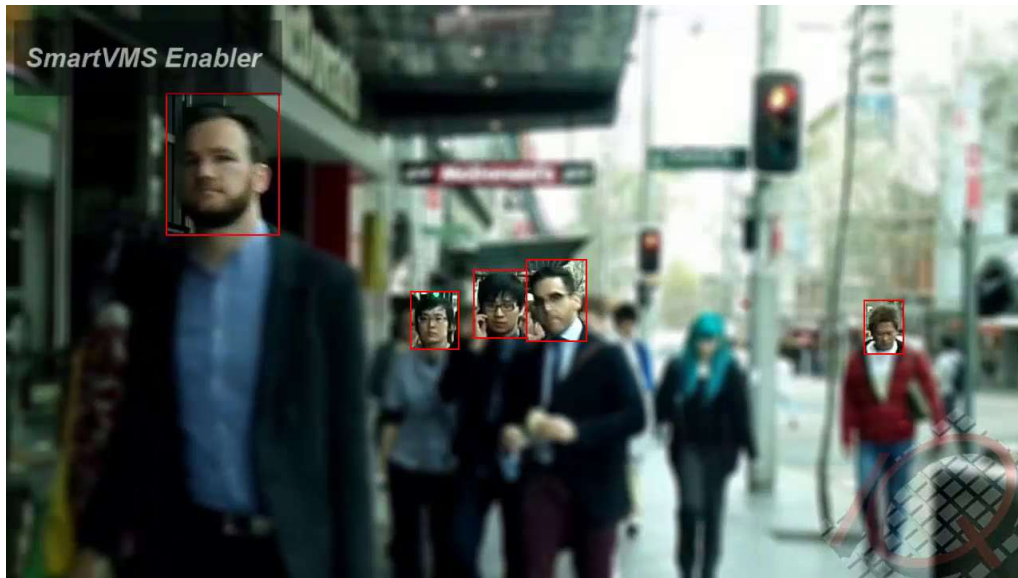
## The Solution – Smart Compression

iOmniscient's Smart Compression is an internationally patented technology that enables the user to save enormous amounts of network bandwidth and storage by transmitting and recording only the important details at high resolution and the rest at a lower resolution (even down to 1xCIF).

What is important?

The User can decide what information is important to him. He may want to capture the detail of every person or vehicle that enters the scene or he may want to be selective and only capture the details of persons or vehicles that exhibit certain behaviours (eg only people who fall down or only blue vehicles that have an accident).

If one is trying to recognize people, the Smart Compression unit only needs to maintain the face of the person in High Resolution. If the rest of the image is transmitted/ stored in a lower resolution it will not negatively impact the recognition of the person.



How smart can the Smart VMS Compression be? As smart as the user wants it to be. As the provider of the world's most comprehensive multimedia analytics capability, iOmniscient can help to detect and recognize events with varying levels of intelligence including with its patented technology for crowded and complex scenes. For details visit iOmniscient's website.

## Benefits

The main benefit of the iOmniscient's Smart Compression is the enormous saving in Storage and Network Bandwidth. For a 2 megapixel camera the saving can be enormous. To make this tangible, if the normal cost of storage required to record the video is \$20,000 it could be reduced to \$2,000.

**Example:**

**An airport has 3,000 cameras, each with a resolution of 2 megapixels. It will require 8,500 terabytes of storage for recording 30 days of video using H.264. If the video is not stored at a resolution of 2 megapixels they will lose all the detail.**

**The iOmniscient Smart Compression will allow the airport to store the video at whatever resolution they like (e.g. at 1xCIF) without losing the detail because the detail will still be recorded at a high resolution.**

**The average cost of storage today is US\$300 per terabyte. With Smart Compression the airport will save around 90% of the storage – a saving of US\$2.3m – which can be used to purchase intelligence that makes the system more useful and the user more productive.**

In environments where only low bandwidth networks (e.g. 3G wireless systems) are available, the Smart Compression can still transmit providing the user with the important information at high resolution.

In this case the analytics and compression must be performed at the Edge using a Super Edge device of the types shown below.

Today our software is implanted on these devices and they can help to make any existing camera smart. This strategy has been employed to ensure that the software is camera agnostic and widely available. There is no technical constraint to embedding the software in the camera itself (though this has not been done for strategic reasons).

**Wired**



**Wireless**



**Ruggedized for outdoor use**

### **Edge devices embedded with iOmniscient's Smart Compression.**

The table below shows the savings in network bandwidth that can result from transmitting only the important information at high resolution and the rest at a lower resolution.

#### **Bandwidth Savings:**

<b>Camera Resolution</b>	<b>Frame Rate</b>	<b>Compression Format</b>	<b>Bandwidth Calculation</b>
2 megapixel	15FPS	H.264	<b>5.51 MBit/s</b>
With Smart Compression	15FPS	H.264	<b>0.55 MBit/s</b>

**Note: that only unimportant information is transmitted at low resolution. Important information would still be transmitted at the maximum resolution of the camera.**

## Who will benefit from using Smart Compression?

1. Users who have a limited bandwidth (such as Wi-Fi) to transmit large amounts of video across networks. iOmniscient's Smart Compression makes Cloud Computing possible for video from high resolution cameras.
2. Users who want to adopt the latest Multimedia analytics (video, smell and sound) but have a limited budget. They can actually implement intelligent systems at virtually no cost using Smart Compression. (Refer to the whitepaper on Implementing Intelligent Systems at Zero Incremental Cost).
3. Users who want to achieve operating efficacy particularly in CCTV networks where adding more manpower for monitoring is ineffective.
4. VMS manufacturers who can use components of iOmniscient's Smart Compression to make their own VMS smarter.

## How does it Work?

The Smart Compression determines the parts of the video input that are important based on the comprehensive video analytics provided by iOmniscient. This could be several seconds of video or even areas of interest within a single image (e.g. just the face of a person or a License Plate) which is maintained by the software in higher resolution.

The rest of the video is compressed to a lower resolution to whatever level is required (eg 1 xCIF).

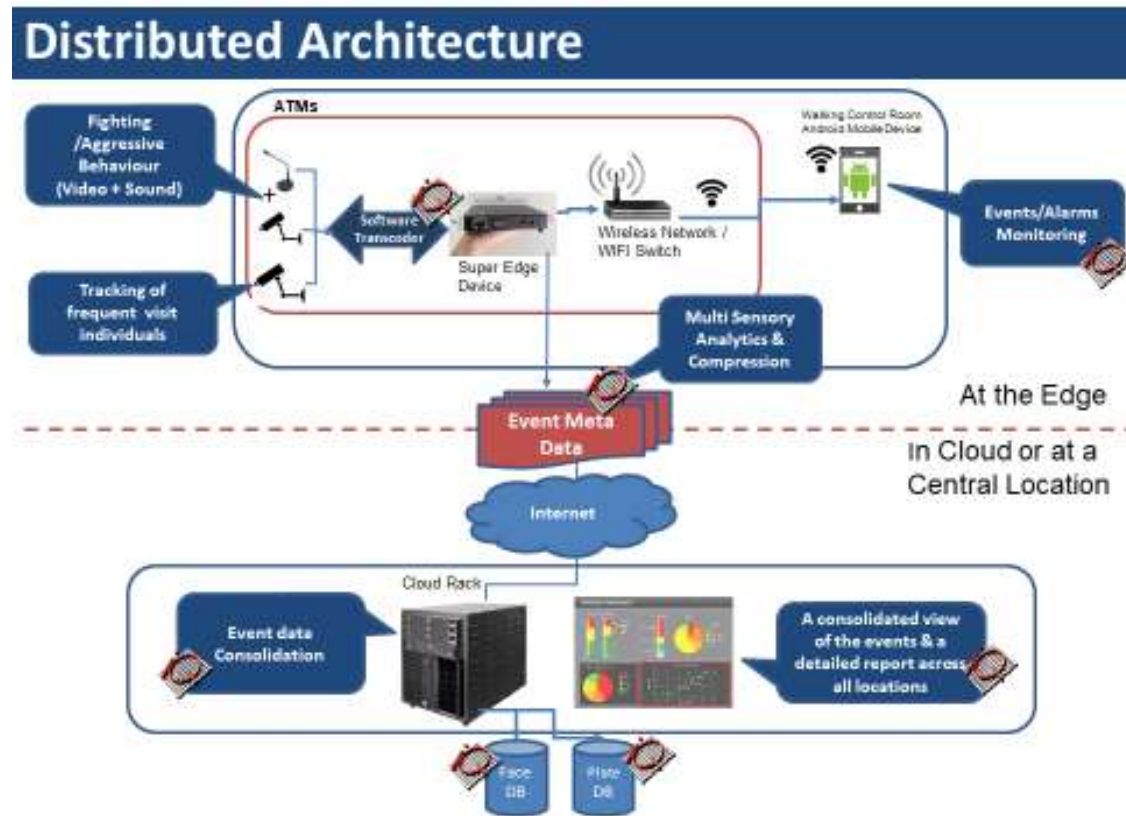
An inbuilt Transcoder ensures that input video in any format, resolution or frame rate is transformed into the format, resolution and frame rate required for recording in the VMS.

The entire system only works reliably because of the very robust and sophisticated Video Analytics from iOmniscient.

The video can then be stored on ANY VMS. A unique feature of the system is that the information recorded in the VMS can be viewed continuously with the faces, plates etc at high resolution with the rest in low resolution.

Alternatively, important information on key events can be displayed independently at the desired higher resolution. The results can be portrayed on dual monitors with the low resolution video being displayed separately from the components of the image in high resolution.

## Architecture:



In a distributed design, the Smart Compression can be deployed on a Super Edge device close to the camera resulting in a saving of both storage and network bandwidth.

Hybrid designs are of course possible.



## Can the video be used for evidentiary purposes?

Yes. Today video compressed using compression techniques such as MJPEG, MPEG4, H.264 and H.265 are already accepted as being of evidentiary quality even though the video is being compressed. They use techniques such as having I frames and P frames where some frames are transmitted whole while in others one sends changes since the last whole frame.

In iOmniscient's Smart Compression one is merely compressing the same video more intelligently without in any way modifying the original video.

## Don't other suppliers have similar Smart Compression?

No. Some supplier have attempted to emulate iOmniscient's smart compression by compressing certain areas in the image at different resolutions. So they can draw an area of interest around a door and the whole area of the door can be recorded in high resolution and the rest in low resolution. The recording in high resolution will continue even if no one is walking through the door.

Others have attempted to use motion to determine what to compress. So if there is motion in the image the moving part can be left in high resolution and the left in low resolution.

However to recognize a person one does not need to see their shoe laces in high resolution - only their face. Only iOmniscient can do this.

## Why is this offering unique to iOmniscient?

To be effective the Smart Compression concept requires 2 key capabilities.

1. It requires the Smart Compression to separate out the important parts of the video from the less important ones – a concept patented by iOmniscient.
2. It requires a robust ability to determine what is important. For this, iOmniscient has the most advanced analytics systems in the industry including the patented ability to recognize people IN A CROWD and detect behavior IN A CROWD.

### **How much does iOmniscient's Smart Compression cost?**

Almost nothing. The savings in storage is so huge that today a user can implement a system with advanced video analytics and the savings in storage alone would pay for the intelligent software – hence the value proposition is that with this technology a user can implement a smart system at a lower price than he could implement a standard recording system.

### **Can any VMS system be made Smart?**

Yes. While iOmniscient offers its own VMS, it is also integrated with most of the major VMS systems available in the market.

The Smart Compression and Intelligence can be added to any existing VMS system to make it smart.