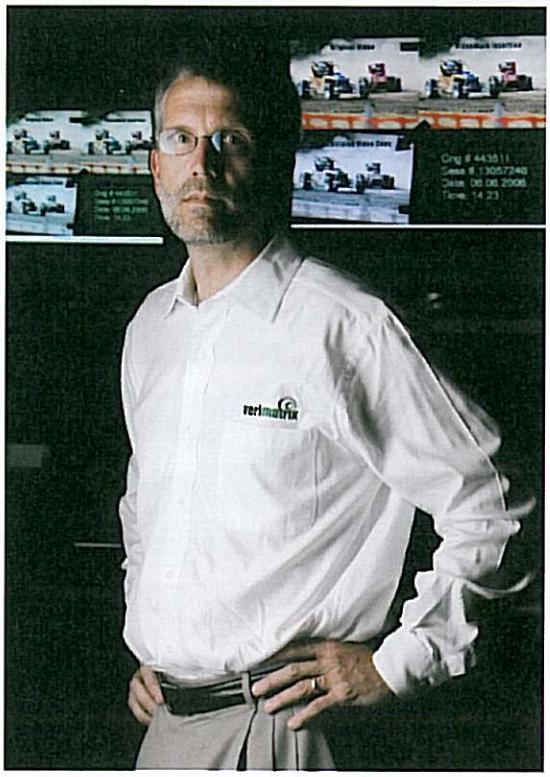
Delivering premium TV and movie services over IP networks does not require any compromises to the content owner's stringent security requirements, says Tom Munro, CEO of Verimatrix. Building on the trusted techniques that enable Internet banking, IPTV services can offer more advanced protection than traditional broadcast networks and enable a wide range of more advanced services, such as the ability to store movies and watch them later on TVs, PCs or mobile devices.

Securing your IPTV investment



Tom Munro: VideoMark leaves a secret record so it's possible to see whose set-top box was used to make pirate copies

Content owners are famously protective of their material. They're waging a worldwide war against piracy and they are understandably concerned that any new outlets for their material are protected against theft.

At the same time, telecom companies are launching IPTV services and seeking to make their services as attractive as possible to potential customers: they are, after all, competing against cable and satellite operators, as well as the traditional DVD rental store. They want to offer the best material, with a wide variety of payment options, and some novel extra value unique to this new medium.

Tom Munro, CEO of Verimatrix in California, understands the position precisely: "The absolute minimum threshold is that you have to have security in order to get attractive content," he says.

Attractive means both in financial terms and in terms of when you can offer the material to your customers — the release window, in Hollywood terms — compared with your rivals.

A key decision early on is whether to go for a hardware-based security system or a software-based approach, says Munro. "In the cable and satellite world, a typical security solution involves smartcards that need to be replaced as they're compromised or hacked."

But an IPTV network by definition is a two-way network, so a software solution based on Public Key Infrastructure (PKI) is ideal, he says. And this approach offers added security and flexibility: "You can upload new versions of the code to keep ahead of potential attacks: 'renewable security' is the industry buzzword."

Exactly the same sort of PKI system is used for Internet banking transactions, Munro points out. The security level offered by the Verimatrix VCAS solution "is quite comparable to internet banking protection", he notes.

An additional benefit of a software-only solution is the capability to expand the range of platforms that can be used for content delivery. "It is a competitive advantage for operators to deliver content to PCs and other devices, offering the option for subscribers to store it, and then enjoy it while they're on the move. But they can only offer these features with advanced security."

"The idea of place shifting or portable content is really in its infancy," says Munro. The standard approach for most IPTV operators is still for customers to connect a set-top box to the DSL network and watch content on their TV set, "just as you would with cable or satellite."

But it's changing, he says: "We are seeing the next generation of forward thinking operators preparing for three screens — the TV, the PC and mobile devices. We have customers using our flagship VCAS content security solution for set-top-boxes who are now deploying our secure ViewRight PC Player, and we're in development with a mobile solution."

The Verimatrix Video Content Authority System, or VCAS, is a suite of technologies designed from the ground up using modern two-way IP infrastructure, explains Munro. And the system has won numerous industry awards for its innovative features, including a recent IPTV World Series award,

Verimatrix has gained a strong foothold in IPTV because that's where the largest opportunities are for the company — and it has around 80 operators in this field, Munro says.

"Our business is very strong where IPTV is strong, which is primarily the developed markets in Asia and Western Europe, where high-speed DSL and fibre networks are available."

It's a global company and, despite its Californian roots, just 20% of its customers are in the US. "That

is because US networks are behind in terms of DSL penetration: the cable companies are very strong in the US," says Munro. "And housing density is a factor since it's easier to build in a dense urban environment than in suburban America."

Yet Verimatrix is agnostic about the access network, he adds. Its customers use both DSL and fibre: "As long as it's an IP stream we can provide security for it, and this also extends to the new IP-based standards on wireless networks."

The company is careful to call itself a content security company versus a conditional access or digital rights management (DRM) company. Its position is that better security and more transparent usage rights can be combined as a layered content protection solution, a "more sophisticated level of content security".

The video content is encrypted as early in the distribution network as possible, so that the content is fully encrypted as it is transmitted across the network right down to the set-top box or other client device. "The IP set-top boxes contains a software element that does the decryption. That means we've managed to securely pass this through the access network where it might be intercepted and redistributed if it weren't properly secured."

The security doesn't stop there, though. "We have a second software element in the set-top box that imprints an invisible forensic watermark on the video, called VideoMark. If the video is captured and illegitimately redistributed, the embedded mark lets us know the last legal recipient of the content. Think of it as a licence plate that we attach to every video stream that exits the set-top box."

VideoMark changes a few pixels on every frame "and this allows us to recover an image later that tracks back to a database record". So if a bunch of DVDs appear on a market stall it's possible to see whose set-top box was used at the end of the IP stream. "We can see who the subscriber was, and we can even see the date and time of day the image was recorded."

The process works whether you use a sophisticated video capture system or just a camcorder according to Munro. "You can't prevent video being captured, but VideoMark provides the tools to trace the source of even highly manipulated copies and enable the operator to take appropriate action."

Is this something the telcos will tell their end users, in order to deter attempts at piracy, or does he think they will keep it quiet and use the information should there be a problem with copyright theft?

"This is the operator's decision," says Munro. "It's dictated by local law as much as anything else. The typical pattern is that they'll make it known that this feature exists in order to prevent piracy, not to be punitive. That's the most valuable way to use the technology: to let people know it is traceable, so its keeps honest people honest."

Verimatrix was founded in 1999 by Ross Cooper, who developed an original solution to secure the distribution of music. At that time Napster and the other music sharing sites were exploding and frankly the problem got bigger than the solutions. The content owners didn't react quickly enough to prevent the music entering the pirated domain.

But the battle has not been lost for video, notes Munro. "We realised in 2001 that we have an architecture that's ideal for protecting video content distribution across an IP network. And we've since seen the rise of IPTV as a business model and telcos getting into the video market, offering a triple-play service to compete with cable and satellite."

The company won its first customer in 2003 and "in the last couple of years we've seen a dramatic rise in the number of operators entering the business."

Verimatrix is active with NTT's On Demand TV IPTV project in Japan. "We're in Belgacom in Belgium and KPN in the Netherlands, among other tier one telcos." In fact, Verimatrix is currently ranked the global number one leader of IPTV content protection by analyst firm MRG. The ranking is based on the number of global operator deployments and total number of supported subscribers on a global basis.

Verimatrix sells both via systems integrators and to operators directly, although Munro admits that at this early stage in the development of IPTV many operators have not been able to build up in-house expertise.

In Munro's experience, operators are aware of the need for high security in the design of their IPTV systems: "At the point where they start looking for content they become aware of the requirements," he says.

Verimatrix puts significant resources into its partnership strategy. "VCAS interoperates with an enormous variety of partners within IPTV platforms to eliminate any barriers to an operator making an independent decision on different components. It enables them to build a best-of-breed solution to solve its own particular market issues."

So Verimatrix has integrated with "more than 70 different models of set-top boxes," he adds: "All the leading middleware, and the leading IP streamers, and so forth. It's been a tremendous effort, but it is paying off for our customers."

This is especially critical because the IPTV industry is still at an early stage in setting standards for integration. "We are active in standards groups, and there are draft standards being developed but so far there are no commonly implemented interfaces between many of the systems." So it has not been a simple matter of working with a set of APIs, he notes.

But how does a telco, and just as importantly a content owner, know that a security system lives up to its claims? "All of our solutions are independently audited," says Munro.

Verimatrix uses Telcordia to test its system thoroughly to give content owners assurance that their movies and TV programmes are securely protected. "Telcordia uses, 'ethical hackers' who can expose any weaknesses in the system and test the assertions we make about the level of security. There are a few auditing firms deemed acceptable by the studios and Telcordia is one of them."

He is excited about the prospects for IPTV, a market that is right at the start of its development "that has no incumbents," he says. "Our goal is to be there when the operator goes live for the first time. It's an open field and we're well into the development phase: there are 7.5 million IPTV subscribers in the world and we see that number doubling in the next year. The business case for IPTV has been made." ■