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Overview: Satellite Signal Security: Copyright Protection Korean DBS Content and Transaction Security

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SATELLITE SIGNAL SECURITY
Copyright Protection
Korean DBS Content and Transaction Security

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As a result of new developments in broadband communication, residential users, office workers and those who move from place to place have more ways to access the programming and services they want when they want them.

It is clear that modern media and telecom users want increased choices in content and in services, and they want whatever options they choose to be available in a form that is fast, convenient and easy to use.

Once users feel the satisfaction and power of having voice and video, audio and data packages at their fingertips, they tend to want more and more. Each new generation of consumers and producers expect greater and greater access to the content and services they like.

And it is also clear that, if those options are available within the reach of those consumers and they cannot acquire them legally, a certain percentage of them will find ways to get them illegally. In the conversion of media services and telecommunications to digital distribution, intellectual property of all types - especially entertainment content - is vulnerable to computer hacking, piracy and unauthorized use.

Current Realities

To understand modern satellite consumer behavior, it is helpful to explore several basic assumptions about media and telecommunications. These assumptions can be framed in the form of hypotheses to be tested.

Hypothesis No.1: The viewing public has more than one way to get electronic access to content. Among these options are broadband telephony (xDSL), cable (high-speed modems over fiber or coaxial copper), fixed wireless (MMDS and LMDS), mobile wireless (3G and Wi-Fi), satellite (DTH and IP-Sat), broadcast (digital radio and television), Internet (datacasting and streaming media on-demand), utility (IP over power lines), and the local home video store (CDs and DVDs).

Hypothesis No.2: The viewing public will be influenced by price, by selection, by convenience, and by quality. If the service is too expensive home viewers will look for an alternative service that is cheaper. If a competing service has the programs the viewer prefers, the viewer will abandon one provider and seek the other. If access is too difficult or programs are scheduled at times that are inconvenient, the viewer will seek another vendor. If the programs offered by competing vendors are of higher quality, the viewer will prove disloyal.

Hypothesis No.3: Media content will become more global; but media content will also become more personal. The viewing public of every country in the world will be better able to seek out the programs/experiences they prefer from the global media offered, but also from the local media. Local creation and local production will flourish everywhere.

Hypothesis No.4: As media channels and broadband telecom lines become bi-directional (2-way), users everywhere will be more in control of the content and the program schedule. Focus will be more on enabling users to create and share their own content and focus will be less on passive consumption. User control will force businesses to modify their technology investments and marketing plans.

Hypothesis No.5: Over time, the viewing public will abandon fixed-schedule appointment viewing for video on-demand. The personal digital video recorder (DVR) will create a crisis for program schedulers, for audience measurement services and especially for advertisers since viewers will be able to record programs of their choice and view them at any time they like, or not at all.

DBS Business Plans

Funding for DBS programming can be advertising or subscription based, or based on government, corporate or public sponsorship. Interactive television (ITV) and electronic commerce (E/M/T-commerce) can also provide a third or fourth revenue stream.

For DBS, advertising has been and will continue to be a dominant model for some time. But the future of this revenue source is threatened by technological innovations (channel surfing via remote control, DVR time shifting) and by increasingly fragmented audiences drawn to multiple competing services (Internet, cable, VOD over DSL and wireless).

Since the end of the Cold War, government, corporate and public support for broadcasting services has been in decline. The majority of DBS operations are commercial not government services. Subscription is the only predictable revenue source over the long term for any entertainment-based broadcasting service,

including DBS. In concept, subscription satellite is a simple strategy for DTH operators. Providers use their space-based platforms to make a lot of different programs and services available to a wide region. The users pay for those programs and services that are of interest to them.

In practice, managing a subscription-based DBS service presents some challenges. The viewing public must be financially able to pay and the satellite provider must be able to collect the money directly from the viewer based on programs and services consumed. In turn, the satellite provider must be equipped to deny programs and services to those users who have not paid.

ITV services are also a mangement challenge for DTH providers in terms of security. Credit card and personal information must be protected.

Program and Service Encryption

To manage a successful subscription service, the DBS satellite signal must be scrambled. Only for those persons willing to pay the asking price will the signal be unscrambled. DBS providers can now decrypt a single event or a single transaction, or give a paying customer access to a bundle of programs and services for one day, one month, one year, or on-demand.

The usual way to encrypt and decrypt the satellite signal is via an addressable decoder. The customer will purchase the receiving equipment (antenna and set-top box) from a consumer electronics store. The home receiver will come installed with an access device, called a smart card. The customer will register with a designated satellite provider and contract for programming and services. The satellite provider, who activates the card from a distant location, can turn on or off any specific program or service. Impulse buying, as with home shopping, pay-per-view programming and access to the local weather report using two-way satellite (DVB-RC) direct or via a telephone or cable return line, requires an extra level of consumer management and signal security.

Signal Theft

In most societies, security of encrypted satellite signals is protected by law. Theft of an encrypted signal is an illegal activity. No matter how sophisticated are the technologies and passwords that make the satellite signals secure, however, hackers find equally sophisticated ways to illegally decode and acquire these signals. In some cases, the piracy of secure satellite signals is the act of a single clever individual by-passing DBS security for personal use; in the greater number of cases, signal hacking is a black market commercial activity sponsored by an organized piracy group.

Most DBS subscription-based systems control access to their signals through smart cards installed in the satellite receivers. The smart card resembles a removable plastic credit card but is actually a microcomputer with its own embedded software and memory. Programmed with a unique identification number for that receiver, the card reads information provided in the satellite signal to turn on specific programs and turn others off.

Computer hackers work hard to break each new security code developed by satellite operators, for there is a lot of money to be made selling reprogrammed cards (or selling reprogramming software and devices) that permit free access to movies, sports and pay per view events.

Signal protection is important because piracy reduces the potential number of legitimate subscribers to DBS services, thereby diminishing the revenues that could otherwise be produced, sometimes totaling tens of millions of dollars.

When users steal programming several things happen that are detrimental to the satellite enterprise. Content producers and program rights holders are deprived of the income needed to support a long production chain from content creation through final distribution. Loss of revenues limit the ability of providers to encourage the production of relevant and timely content and reduces the chance that end users will be able to access their favorite content at lower cost. A smaller revenue stream discourages investors in those technologies capable of giving end-users lower prices and greater choice. So piracy keeps satellite subscription costs artificially high.

Case Studies

Canada: There are two DBS providers in Canada licensed to provide encrypted subscription services: Star Choice and ExpressVu. Because the mass of Canadian citizens are clustered in the South along the border with the United States, the temptation is strong for some Canadian viewers to want to also access the spill over signals originating with the U.S. DBS providers DirecTV and EchoStar. But Canadian law "prohibits the decoding in Canada of any encrypted subscription programming signal, regardless of the signal's origin, unless authorization is received from the person holding the necessary lawful rights under Canadian law."[1]

In 2003, some 750,000 Canadians were thought to be using illegal satellite systems to watch pay TV programs originating in the U.S. When the Supreme Court of Canada reconfirmed in 2002 that the decoding of encrypted signals was unlawful, Canadian law enforcement agencies began seizing illegal equipment and leveling fines against violators.

The Canadians began an information campaign to justify to the public the reasons for the enforcement of the law. Canadian broadcasters estimated that the cost of black market satellite signal theft was costing them $450 million annually. Picking up the American signals meant that the competitiveness of Canadian broadcasting was undermined, making less funding available for Canadian producers, writers, artists, camerapersons, technicians and trades people. Canadian residents were warned that, if they were caught using the improper equipment, the service would be terminated and the equipment they had purchased would be rendered useless.[2]

United States: Beginning in 1996, when its first generation encryption system was hacked, the U.S.'s largest DBS provider DirecTV has taken an aggressive stand against signal pirates. Today, the company takes legal steps to prosecute businesses dealing in piracy equipment as well as residential users who purchased the devices.

Now owned by Rupert Murdoch's News Corp., DirecTV has about 12 million subscribers. It's approach to signal hacking has been to hire former FBI agents to uncover breeches of satellite security under the U.S.'s Digital Millennium Copyright Act. When violations have been found, equipment has been seized, mailing lists have been confiscated, web sites have been closed down and an electronic "cyber-strike" from space targeting illegal smart cards has been used to disable non-paying customers.[3]

DirecTV's security system gives it the ability to reprogram its subscriber smart cards remotely. By the same path, it has been able to search for and destroy illegal cards. By mid-2003, DirecTV had filed 8,700 lawsuits to protect against infringement of its signal security.[4]

EchoStar, the second largest U.S. DBS provider with some 9 million subscribers, does not talk publicly about its strategies to insure signal security. However, the company says it uses encryption technology that is periodically updated via satellite. These upgrades can only be received by paying customers. Like DirecTV, EchoStar employs people to monitor the Internet to look for evidence that its security codes have been broken.[5]

The World Wide Web has been the principal means by which the hacking community shares information and sells its smart card reprogramming equipment.

Thailand: A lot of pressure is being put on pay TV operators by the big Hollywood-type studios to protect the copyright of films. One of the Motion Picture Association's strategies for coping with cultural and intellectual property theft is to get the issue of copy protection on the agenda of international trade organizations.

Piracy of satellite signals - especially theft of pay TV programming - has flourished in Thailand. According to Cahners Business Information, some 300 pirate cable operators and about one million pirate cable households are paying US$10 per month in subscriptions. Where pirate operations have been shut down by police, as many or more have opened for business since the demand for this product is high and money can be made when fees need not be paid to copyright holders.[6]

The dominant pay TV provider in Thailand is United Broadcasting Corporation offering 48 channels, including 6 free-to-air services and 13 educational channels. In 2003, UBC's subscribers numbered about 420,000, close to the estimated financial break-even point of 450,000 subscribers. But UBC says its paying subscribers are not growing; rather the numbers are declining. This is due largely to signal theft and the discounted prices being offered by the illegal operators that rely on UBC delivered content.

UBC has appealed to US programmers to help reduce pay TV piracy in Thailand by lobbying to get intellectual property protection on the agenda of trade talks between the US and Thailand. This strategy is thought to be a more visible and perhaps practical way to get the attention of the Thaksin Shinawatra government.

France: Paris-based Thales is a large electronics company in the business of providing infrastructure and transaction security for IT and related services. Canal Plus Group has selected Thales" DTV Security Service platform, ThalesCrypt, to secure and protect its satellite feeds. ThalesCrypt offers a modular end-to-end solution that includes a scrambler, a receiver/descrambler and rights management software that Canal Plus will use in the distribution of its programming to authorized cable head-ends.[7]

WorldSpace: Digital satellite broadcaster WorldSpace has developed a plan to increase revenues by expanding its audio and multimedia broadcast business to include electronic transactions and services. Many of the value-added services under consideration by Worldspace, such as e-commerce, e-health and e-education, will be subscription-based and will require that signal security procedures be added to its current free-to-air broadcast services.

WorldSpace has entered into a security contract with WISeKey, a technology and software vendor with the tools for protecting data exchanged among business partners and providing for digital identification. The WISeKey infrastructure supports interoperability within a global network of Registration Authorities in

more than 100 countries that will permit WorldSpace to address the communication needs of both private and public organizations within the large footprint of its regional satellites. WorldSpace satellites are particularly well positioned to provide services to Africa, the Middle East, Asia and Europe.[8]

Lessons for Korean DBS

The sole direct broadcast satellite provider in Korea is SkyLife, a commercial business sponsored and managed by the government-owned Korea Broadcasting System (KBS), the recently privatized national telephone and telecommunications service Korea Telecom (KT), the Munhwa Broadcasting Corporation (MBC), and others in a consortium called the Korea Digital Satellite Broadcasting System (KDSB).

SkyLife was launched in March 2002. Two years later, the DBS provider could boast in excess of one million subscribers. SkyLife is principally a Pay-TV subscription service but is also advertising supported. In 2003, it initiated Korea's first interactive TV service (offering home shopping, banking, games, weather reports and daily news on-demand) and in 2004 launched the country's first HDTV service.

The exceptional growth of the DBS provider, indeed the very existence of the consortium of private companies and public agencies that serve as its shareholders and appoint its management team, is a direct outgrowth of Korea's new Broadcast Law of 2000. The Broadcast Law serves to not only provide for deregulation and privatization of media and telecommunication sectors, but also to seek accelerate development of Korea as a knowledge society.

DBS springs from national policy in Korea giving priority to those activities that enhance economic development, support Korean culture , and provide for a more balanced development of national media, whether broadcast, cable or satellite.

In Korea, protection of the satellite signal is thought of as a matter of national priority in Korea for the reasons that a successful DBS service will be a major contributor to: 1) insuring quality programming distributed nationwide; 2) stimulating locally originated content and content production; 3) adding value to products and services and increasing consumer choices; 4) building future-oriented jobs and providing for job training; 5) positioning Korea more directly in the path of the global super highway.

REFERENCES

1. "Satellite Piracy: Government of Canada to Propose Legislative Amendments," Industry Canada, September 5, 2003, www.ic.gc.ca/.
2. "Buyer Beware: Industry Canada Cautions Canadians Against Buying Illegal Satellite Systems," Industry Canada, December 17, 2002, www.ic.gc.ca/.
3. Kevin Poulsen, "DirecTV Attacks Hacked Smart Cards," The Register, January 25, 2001, www.theregister.co.uk/.
4. Kevin Poulsen, "DirecTV Dragnet Snares Innocent Technies," The Registrer, July 17, 2003, www.theregister.co.uk/.
5. Meg McGinty, "DBS Smarts From Hack Attacks," Inter@ctive Week, February 14, 2000, pp.1-2.
6. "Trading Floors: US Programmers May Have More Success Eliminating Pay-TV Piracy in Thailand," Cahners Business Information, Television Asia, October 2003, www.lexis-nexis.com/.
7. "France: Canal Plus To Use Thales Encryption System," British Broadcasting Corporation, December 12, 2003, www.lexis-nexis.com/.
8. "WISeKey Partners With WorldSpace.com," PR Newswire Association, Inc., October 16, 2003, www.lexis-nexis.com/.