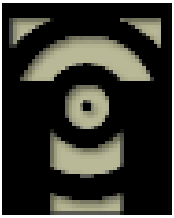




TargetTV

INTERACTIVE TELEVISION: WHAT IT IS & HOW TO DO IT



*An explanation of how iTV works and how
you can provide applications and services
to participate in the “next big thing”*



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WHAT IS iTV?

You already know some of this stuff. Let’s look at the chart to the right, which contains some of the classes of iTV; there will be others, some of which aren’t yet thought of by nudniks like me.

Before we get into that, though, let’s talk about some other things that are happening to television and how they relate to iTV, or not. The first is DTV (Digital TV). This is very important to understand. The cable that runs by your home (and I’m pretty sure one does because 99%+ of all US homes have what the industry calls “cable passed”) used to be analog and one-way. The cable has recently been upgraded, or soon will be, to support digital cable. This means that the cable itself has been upgraded from 550 MHz to probably 900 MHz¹ and is probably mostly fiber optic most of the way from the cable “head end”, which is where the programming signals get put on the cable. That cable can then support both analog and digital signals, and both together. The cable company wants and needs to convert more (eventually all) of its cable venue from analog to digital. So, is that DTV? Nope, it is digital cable. DTV is TVs that are digital-enabled. Virtually all the TVs in current use are analog. Confusing, no?

It gets worse. You may have a set top box (“STB”) provided by your friendly cable provider or from a satellite service provider. The STB sits between the cable or satellite and the TV, and once upon a time was needed to enable certain premium channels in the analog cable offering. Today, in order to receive digital cable channels on your analog TV, you will need a digital STB to convert

Enhanced Video Services

- Entertainment on Demand
- Personal Video Recorder

Web Content

- Walled Garden Content
- Web Browsing

Communications

- Telephony
- Instant Messaging
- eMail
- Chat

Enhanced Advertising

- Targeted Ads
- Program Integrated Ads
- Banners/Logos/Watermarks

-
- Ads with Click Now Offers

Transactions

- Television Commerce
- Information Requests
- Interactive Experiences
- TV Games
- Surveys/Votes

Viewership Measurement

- Anonymous & Aggregated
- Clickstream Tracking
- Content Viewership Tracking
- Anon. Behavior Tracking

¹ The MHz rating simply refers to the bandwidth, or the spectrum, of the signal carried on the cable. The FCC regulates what is carried in what portions of the spectrum.



the signal from digital to analog. So, once again, STBs are in your future. The digital STB is different, however. It is a key element in the offer of iTV services. I'll talk more about that later.

You may not know that the Federal Communications Commission has mandated² that all 1288 broadcasters in the US broadcast in digital by 2002, and that they give up their analog signals entirely by 2006. You will need some way to view digital signals, either through a DTV or through an STB.

Now here is the good news. Digital cable is really more than a way to deliver programming content to your TV. It is an *always on, very high speed, bi-directional broadband network*. That means cable modem for your PC, digital broadcasts, interactivity, web content, video and music on demand (i.e., whatever you want whenever you want it), and more. The crux of what we will talk about in this article is the use of this network and how you might provide applications or services through it.

The digitalization of the cable is very much about capacity. Whereas each analog channel consumes 6 MHz of bandwidth, the same bandwidth will carry six digital channels of equivalent display density. What is nice and horrid about a digital signal is that it is either perfect or off, no fuzziness, snow, or other degradations of the quality like you find in an analog signal.

Notice that I am talking mostly about cable here. There are good reasons for that. There are just over 102 million households in the US, and, like I pointed out before, almost all of them have cable passing by. About 70 million households subscribe to cable. About 12.5 million subscribe to satellite, about 3.5 million use either C-Band or other means, and the rest who view TV use over the air reception. Only cable has two significant features desirable for iTV: digital delivery and always-on bi-directional communication (i.e., a "back-channel"). Oh, you can get a telephone back channel for satellite, and sometime in the near future, a satellite direct back channel, but for now I'll talk mostly about cable iTV.

There are other things happening to confuse us even more. You hear about HDTV... is that what this is? Well, no. HDTV ("High Definition TV") is about the format and density of the broadcast signal and its display. You cannot view HDTV on a non-HDTV TV set, but you can view both "normal" and HDTV on an HDTV-enabled set. There are multiple standards for HDTV and you have to be very careful in selecting an HDTV set. The densities are 480, 720, or 1080 lines displayed either progressively or interleaved, compared with analog³ TV's 330 lines interleaved (actually 525 lines, the remainder of which are non-visual). The aspect ratio of HDTV is 16 x 9, as opposed to your standard TV's 4 x 3. The resolution of HDTV is up to six times that of standard TV, which also means the digital data content carried as signal is up to six times as much. As with all of DTV, only differences in pictures are sent, not the whole picture, so a lot less bandwidth is required. In scenes such as a talking head, very little bandwidth is consumed; in a basketball game, a lot more is required. Also, HDTV sound is much better, including Dolby 5.1 surround sound. HDTV is a digital phenomenon, so it is within the DTV realm. We won't be discussing more about HDTV in this article, though.

² Telecommunications Act of 1966, public law 104-104, from the bill S.652. "An original bill to provide for a pro-competitive, de-regulatory national policy framework designed to accelerate rapidly private sector deployment of advanced telecommunications and information technologies and services to all Americans by opening all telecommunications markets to competition, and for other purposes."

³ Analog TV in the US is defined by the NTSC ("National Television System Committee") standard, which has remained much the same for over 60 years, except for the adoption of the color standard in the 1950's.



Now, let's talk about iTV

iTV is about interactivity... some of which the consumer is aware of, and some of which they are not. But, content (either video or data) is being received to the STB and it is also being sent from the STB.

You have heard about some iTV products, such as WebTV or AOLTV. WebTV, offered by Microsoft, is available as a WebTV box and wireless keyboard, user-installed, that connects to the cable, TV, and telephone. It dials the WebTV service, for which a consumer pays \$29.95 per month in addition to the cost of the box, the cable line, and the telephone charges. One thing WebTV offers is web browsing... and herein lays the rub (or rubs).

Television content is designed to be viewed from a distance of 10 - 20 feet. Internet content is designed to be viewed from a distance of 1.5 - 2 feet. An analog TV is similar in density to the old CGA screen densities on PCs before VGA was introduced. So, web pages not specifically designed for TV look, er, crappy on TV. The graphics are the wrong size and density, colors are wrong, fonts are too small, pages are too wide and require horizontal scrolling, and so on. General browsing on television is a very, very poor experience. And it is not very "television like".

Also, both WebTV and AOLTV provide interactivity entirely through the telephone... it is a dial-up modem experience. So, if the WebTV button is pushed, the modem dials, logs in, and connects to the page. Not terribly bad if that is what is expected, but read on.

WebTV and AOLTV also support what is known as the ATVEF standard. This defines how an Internet URL can be embedded non-visually in video content, and how that can act as a trigger to cause the STB (e.g., WebTV) to offer an interactive experience to the consumer. The consumer can push a button to accept the offer, and then the modem is dialed, logged on, and content displayed. If the offer is, for example, more information on a Ford truck during its commercial, it may take until the Chevy commercial for the call to be made and the offer information HTML form to be displayed. Now, Chevy might not like its ad to be overrun by a Ford offer page, not to mention the potential confusion for the consumer

The thing about WebTV and AOLTV is that these set top boxes don't really address the use of digital cable or satellite for iTV. They are a simple mechanism to deliver web pages over dial-up lines to be displayed on a TV receiver.

Incremental Revenue

Today, the major cable carriage providers, generally known as MSOs ("Multi System Operators") are nearly or fully digital cable ready, and they are rapidly deploying digital set top boxes to deliver digital content to your analog TVs. There are about twelve million digital set top boxes installed in the US, and the MSOs are supplying large numbers of digital channels to utilize them, as are the satellite service providers. For example, if you subscribe to HBO on analog, you may get a single HBO channel; if you subscribe to HBO on digital, you get a half-dozen or so HBO channels. Comcast Cable, for example, provides over 175 channels, of which 45 are premium channels, plus over 40 channels of commercial-free, CD-quality music channels. But none of that is the real reason MSOs want to convert you to digital.

The real reason is incremental revenue, the siren song of the cable and satellite industry. Now get ready for alphabet soup. Sorry. First on the list for incremental revenue is more premium services. This is followed shortly by pay-per-view ("PPV") and its newer incarnation, Video on Demand ("VoD"). An enabling technology to support this also provides the Personal Video



Recorder (“PVR”). What this means is that, with PPV and VoD, you pay for the use of the content, just like renting a VHS tape from Blockbuster. Only with VoD, you decide what you view and when you view it. PPV is prescheduled on a given channel; VoD is available whenever you want to view it. So, how does that happen? Well, one way is to use PVR technology. PVR means there is a hard disk drive in the set top box, and for VoD the content is downloaded to the drive prior to the view. The idea is that the cable company, or satellite company, can broadcast the content in advance of need, and it gets stored on the hard drive until it may be needed or expires to be replaced. This broadcast happens at slow times when the bandwidth to do it is available. PVR also means that you can record to the STB without having a VCR. You can pause a live broadcast, go get a beer, and come back and resume the broadcast, skipping past commercials. Cool, unless you are an advertiser, who paid for the broadcast with an expectation of a given CPM (cost per thousand impressions), or a programmer, who funds the content from advertising revenues.

So, we have hit upon an iTV dilemma. On the one hand, the viewer has a richer experience because they gain control over what content they see or not (including ads); on the other hand, the advertising that pays for the content is in jeopardy because the viewer can skip over it. How do we resolve this dilemma? Well, we resort to a Chuck Thomas rule of life: The Consumer Always Wins in the Long Run. (Remember the Golden Rule: He who has the gold, rules?) We want control; we’ll get control. Inevitable. Then, how will programmers pay for the content we want to view? Advertising will change, and it will change in a big way.

Enhanced Advertising

Advertisers don’t want to change, even though they complain about the way things are now. But every study about consumer behavior shows that, given the opportunity, consumers will skip over ads more often than not. On our list of iTV, we see the category, Enhanced Advertising. There is a whole lot of stuff to this, and I will touch on only a little of it.

The first way advertising will change is that specific advertising will be targeted to specific consumer profile groups. We will talk later about how viewership will be measured and anonymously profiled. For now, understand that the general demographics of a neighborhood will be known, and the viewing habits of that neighborhood known. Advertisers will target different ads to different target groups that will respond better to the ads they view. There is even technology in the lab, patent pending, that permits a single video stream to contain multiple audio streams that can be targeted to different demographic clusters. So, the same SUV visual ad may have, alternatively, sound tracks that emphasize bigger, more efficient, faster, or better styled, all according to the audience preference pattern.

Another way of reaching the viewer is to not break the program content for a pod (the term advertisers use for a cluster of ads), but to place a banner ad somewhere on or around the programming. This is like what ESPN does with scores during games, when they slightly shrink the picture of the game, and place banners to the left and/or below with scores and advertising.

Yet another way for advertisers to respond is to embed the advertising in the content of the programming. For example, Fox Mulder drinks a Coca Cola, and comments on how good that tastes. Nothing really new, just expect more of it.

Advertisers and content producers will argue that they will need to keep traditional ad pods, and that the cable and satellite carriage providers must prohibit technologies that permit ad-skipping, but the consumer, not the provider, determines what will happen. And advertising has to change.



Telephony and Other Communications

The bi-directional broadband network that is digital cable sets the MSO up for a potential big win. That is telephony. Look, you have two wires and air coming into the home right now. The big battle going on in technology and the marketplace is for connectivity with the home and the home's network. The two wires are the telephone wire and the cable, and the air represents wireless. The phone company wants to provide Internet and entertainment as well as telephony; the cable company wants the same. Satellite and other wireless technologies want the same. Everyone wants to be the "the connectivity provider", along with all those incremental revenue streams for associated services.

Think about this: AT&T is breaking up into four entities: Wireless, Cable, Business Services, and Long Distance (however they are actually named). This breakup is due to the inevitable disappearance of long distance revenues. While the other three areas of AT&T are prospering, Long Distance is driving the value of AT&T stock down and they know it is non-recoverable. Hence, the breakup. Why are long distance revenues a dead duck? Because IP networking provides packetized voice through the Internet, and that is how you will eventually do long distance calling. You don't pay extra because the web page you display is from Romania; why should you pay extra because your phone packets are? Your local phone carrier should just pay an interconnect fee for service, like your ISP does. Duh.

By the way, if you read AT&T financials, you may think cable is not prospering because of the big investment required for the conversion from analog to digital. Cable companies are big capital plant companies. They bring in a ton of cash and amortize big capital investment (including acquisitions) to reduce taxes. Further, they are monopolies wherever their cable runs. How many places do you know that have two cable companies vying for the same subscriber? They are very active subscriber traders, however. You will read every week about MSO "x" trading subscribers with MSO "y", throwing other properties, such as sports teams or programming, in the deal. They are simply "clustering" their properties. Comcast, for example, has a super-cluster from Washington through New England, except for New York. And that helps them sell local ad insertions and provide local program content.

Instant messaging, email, and chat are other potentially big items for iTV. The USPS delivers 630 million pieces of mail each day. Pretty impressive, until you think of the **4 billion** emails delivered *each day* in the US. AOL serves close to 700 million Instant Messages per day among its 27 million subscribers. AOLTV wants its subscribers to watch TV and concurrently chat and IM during the programming, using the TV/STB instead of a computer.

Transactions

We are all now well trained as TV viewers. We know how to operate the TV and we trust it (at least for what it is). It has been in the family since before our birth. The average American watches in excess of seven hours a day of TV. (Some say this is why we are so average.)

Suppose you are watching TV and a public service announcement ("PSA") comes on to talk about breast cancer. You listen with interest and want more information. An address for more information comes on the screen... even a URL. Do you get up, get a pencil, write it down, and then either write or browse for more information? If it were an 800 number, do you jot the number down, get up and phone? Nope. Too much effort is required. Whew.

Television viewing is a passive experience. You just sit on the couch with the remote in your hand, and watch. You may munch on a snack, or sip on a beer, but that is about as much effort you'll put into it. Without the remote, how much channel surfing do you think would go on?



If, however, while you were watching, a little semi-transparent logo appeared in the upper right corner of the screen with a “?” to indicate an “Info Offer”, and all you had to do is click your remote’s “Info” button, you might do that. Then, using your address from the Cable or Satellite service provider, a message is sent automatically to request more information about the PSA.

This also works for advertisements. You see the Ford Explorer ad with the Info logo, click your Info Button, and, presto, you get a brochure in the mail.

Now, going a step further, you see a Domino’s Pizza commercial with a Buy Offer logo, and you click the remote’s Buy button. An options selection banner appears at the bottom of the screen and you select mushrooms and sausage, medium, and thin crust. Then a PIN banner appears and you enter your PIN, and receive confirmation. The pizza then arrives in thirty minutes, already charged to your credit card. You do have to get off your keyster to answer the door.

This is known as an “impulse buy”, and it is a very television-viewing-like experience. No web browsing, no user-initiated searching or knowledge required, other than “I want to do this” and an authorization code (presumably so the baby sitter doesn’t charge a diamond tennis bracelet from QVC to your account).

While eating your Pizza, you watch “Who Wants to Be a Millionaire?” and a Game Offer logo appears. You click your acceptance and play the game with your remote, choosing A, B, C, or D. You instantly know if you are correct, and you know your score. You prove how smart you are.

Later, you listen to the Presidential debate, and you respond to a Survey Offer, selecting your candidate and scoring their performance. You get an instant update of the overall voting response. Beginning to get the idea? There is a lot of interactivity in your future. Or you can just watch the TV.

What did all this cost you? Presumably, the Info Button stuff was free, paid for by the advertiser, who paid the MSO or Satellite service provider a fee for displaying the offer and a per response fee for Info requests. Similarly, the advertiser paid an offer fee for Buy offers, and transaction fees and/or a percentage of transaction for orders. You may get charged a monthly service access fee for interactive games and surveys, and probably pay per game show and per survey or vote. Each of these fees is generally small. Remember what the farmer said: “Little pigs get fed; big pigs get eaten”.

Viewership Measurement

Since the STB is a programmable device and it is on a bi-directional network, one of the long-term problems of advertisers and programmers is solved: who is watching what? Until now, the currency of television advertising has been Nielsen Media, whose ratings are used to price media buys. They do this through 5,000 People Meters measuring viewership in the US. But, there are 50 DMAs and over 1,100 call signs... how can 5,000 meters provide an accurate measure? The truth is, they can’t, at least beyond the big four (NBC, ABC, CBS, and Fox). If a call sign like the Food Channel or Discovery or Nick or History is generating a sub-1% of active viewers in a given market (likely), Nielsen can record maybe one viewer watching that channel in a DMA.

Digital STBs permit real-time collection of viewer click-streams for reporting of aggregate and anonymously profiled behavior reporting. Anonymity is important because viewership privacy must be protected. Second-by-second behavior of a group within a demographic cluster during a Budweiser ad on ESPN versus on Fox, as well as the real viewership the advertiser received, will improve the efficiency of advertising and ad placement.



HOW BIG IS THE MARKET?

If you were to listen to the industry gurus and prognosticators like Forrester Research or the Gartner Group, iTV is going to be huge. Forrester says that by 2005, television commerce will produce \$3.5 - \$9 billion in increased revenues to the MSOs, and enhanced ads will provide another \$4 billion. If you calculate the total commerce in retail sales behind those numbers, it is large.

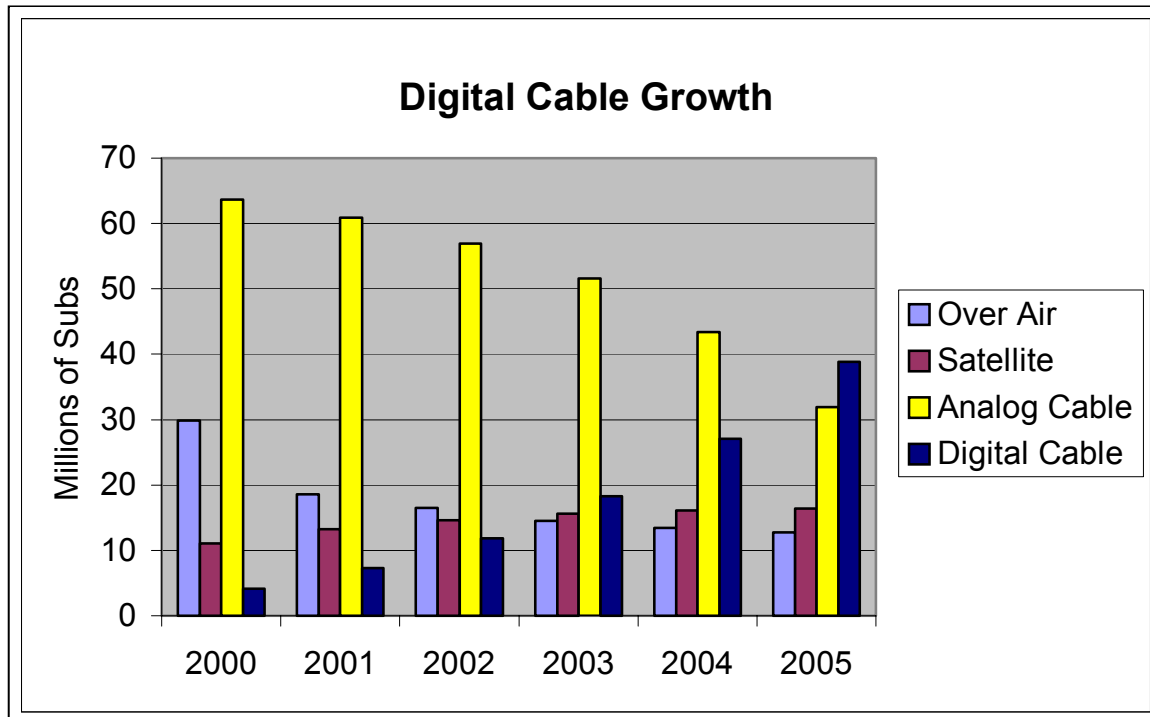


Chart from Cable World Magazine, "MSOs Report Digital Sub Growth", K.C. Neel, August 14, 2000

The market leader for television commerce without a buy button is QVC, which does about \$3.5 billion per annum in retail sales over the television, but that is sales that result from a 7x24 live retail selling program which requires the consumer to call an 800 number to make a purchase. Other similar networks, such as HSN, total another \$1.5 billion, or so.

Gartner Group has said that they expect MSOs to generate an incremental \$227.60 per month per participating subscriber through iTV services⁴. They break out this revenue as:

- \$83.66 in interactive program guide advertising
- \$44.76 in shopping revenue
- \$75.90 in non EPG ads from interactive information services
- \$3.98 from streaming VoD
- \$2.02 from email

Note that most of this is not paid for directly by the subscriber, but by the advertiser.

⁴ Source: Gartner Group, as quoted in Cable World Magazine "The Big Picture", June 26, 2000



You may compare iTV to the Internet. iTV is in its infancy and a lot of the services and the technology to support them is just being invented. US Consumer reaction and participation with iTV is unknown, although limited measurement of limited trials is encouraging to those intending to offer iTV services. There have been comparisons of the growth of the Internet over the growth of telephones and televisions. Remember, there are 2.5 televisions for every household in the US and we have had over 60 years to get used to TV. There will be no similar set of hurdles that Internet users had to face:

- Getting connected (iTV is always connected)
- Speed of connection (iTV is broadband)
- Complication of setup (no computer to buy/install; no modem; no software to install)
- Learning to navigate (obvious navigation with already-familiar infrared remote control)
- Having to search for what is wanted (iTV is impulse oriented)
- Vendors waiting for consumers to come to them (the Offer goes to all who are enabled)

Note that web browsing on iTV does introduce a learning curve and is a non-impulse activity.

By 2004, then, there will be over 40 million digital cable subscribers in the US as a target audience, plus 12 million satellite subscribers. This represents about half of the US households, and provides a tremendous market potential.



HOW CAN I CREATE ITV APPLICATIONS AND SERVICES?

The first question is, do you want to address the installed market or the coming market? To answer, let's look first at what is installed now and then at what is coming.

The Installed Base of Digital STBs

There are about 10 million installed digital STBs in cable systems in the US, predominantly of two model groups:

1. General Instruments (division of Motorola) DCT 2000 and related models
2. Scientific Atlanta Explorer 2000 and related models

This is the first real generation of digital set top boxes, and they suffer from the limitations early models of a new thing generally have. These include insufficient program memory, insufficient video memory, lack of processor speed, limited ability to support multiple independent applications, and a limited API in the OS and middleware. The GI, for example, supports 6.8 MB of memory, total.

The Explorer 2100, which is shipping at a rate of 500,000 units/month and will continue at that pace throughout 2001, comes equipped with two levels of resident software. The OS is PowerTV from the company of that name, and the middleware is SARA (Scientific Atlanta Resident Application). Both PowerTV and SARA provide an API. All STBs seemingly need a resident EPG (Electronic Program Guide), and SARA is that for the Explorer 2000 family.

An aside about the EPG. *Henry Huang's Gemstar absorbed TV Guide, along with its patents for EPGs, a while back. These guys religiously and litigiously protect what they feel is their intellectual property. Others have gone to great lengths to work around the roadblock that this has become. For example, Adelphia, Charter, Comcast, and Cox invested in Worldgate Communications for their development of TV Gateway. This was not so much for any new technology, in the author's view, as a way for the MSOs to bully Gemstar into not suing an alternative EPG supplier, since Gemstar needs to make nice with the major MSOs for access to their cable networks.*

To develop an application on an Explorer 2100, you will need a development model of the 2100 and a development PC (e.g., Windows NT or 2000), minimally. That is the good news; not too complicated. The bad news is, how do you test your development? You need a cable head end setup and some TVs and STBs to test with. The head end is: (a) expensive... at least \$250-300k; and (b) complex to setup... you will need a broadcast engineer who knows what he is doing.

The software development is not unlike any embedded software development. Embedded software is that which controls devices, like the retinal scanner at an ATM, or the anti-skid system on a car. For the Explorer 2000, the development is done in C++ using a development environment provided by PowerTV, which is a customized version of the Cygnus open software development environment from Red Hat. The development is done on the PC, and is cross-compiled for the Sparc chip in the STB, and loaded in the STB.

This is not like developing a billing system. You have to be able to understand extracting data from the broadcast VBI (Vertical Blanking Interval) scan line and how to format a UDP message.



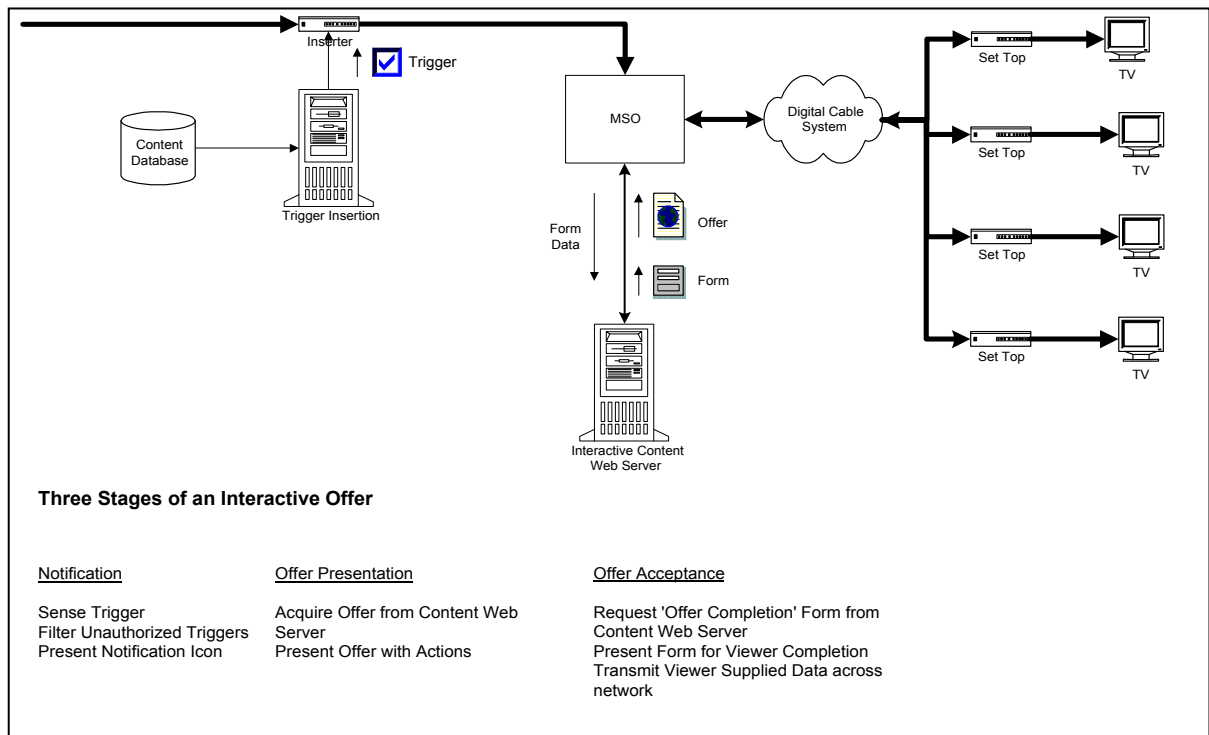
You have to understand the architecture of the overall system in which your application will run. You have to have a relationship with the MSO to get it deployed. Finally, you have to be able to process the load of the application. What if your application were deployed to a million homes and nobody used it until the Super Bowl and then 200,000 folks requested the winning team's hat all at once?

This, in fact, is like rocket science. You have to have a lot of capital, a specific knowledge base, and lots of industry presence. And you will be entering into an arena that has a limited future, as newer, more powerful STBs arrive, and industry standards permit development with tools you are familiar with and a much lower cost of entry.

The Next Generation of Digital STBs

Beyond the first fifteen to twenty million first generation digital STBs, digital STBs will be far easier and less expensive to develop for. In the first place, you will not have to develop any software for the STB itself, nor any for the head end. You will simply provide web and application server-based solutions. This is for both web-like content browsing on the TV and for transactional services. Cool, eh? Yep, you can do this.

The new STBs will work like WebTV on steroids. First, it will not require a telephone line; it will use the cable or satellite back-channel directly. Secondly, you will not have to subscribe to WebTV or any other third party to get interactive services; you will have them through your cable or satellite service provider. With the potential FCC Open Access regulations, which have been formulated for the Time Warner/AOL merger, your provider may have to provide you with a choice of ISP, if you wish to have an ISP. If you don't want to browse the web on your TV, you may not need any ISP to interact otherwise with your TV.



ATVEF Graphic by Tom Brown of TargetTV

So, how does this work? Remember the description of the ATVEF standard, which provided for triggers to be embedded in the broadcast signal, which were actually URLs. When the content



was displayed, the trigger displayed an offer in an HTML window on the TV. The consumer could accept the offer of interactivity, and if that happened, the URL string was linked to and HTML content was displayed from the URL's server.

There you have it. You can create a web server-based solution to offer and interact with the consumer. Your interaction may be in the form of traditional web-browsing, hopefully with content reformatted for television viewing, or in the form of an interactive dialog through HTML banners (windows) that don't interfere with TV viewing. You can even incorporate the "tv:" object to invoke a TV window within your HTML page.

There is no head-end cost or engineering to worry about, and no specialized STB development effort. What is the catch? You will have to have your trigger embedded in the content (ad or program content), and insure that the MSO or satellite service provider does not strip the trigger from the content. And they might just strip it, because it is unsure right now as to whether they can or not under the current regulations. The trigger lives in VBI line 21, sharing that scanning line with Closed Captioning data and with V-Chip data, and the regulations clearly indicate that those cannot be stripped. The permissibility of stripping ATVEF data is debatable. The MSO might tell you that data in the VBI they don't recognize or know about is stripped to reduce noise in the signal. Hmmm. Maybe.

The ATVEF Specification

A consortium of broadcast and cable networks, television transport operators, consumer electronics companies, and technology companies created the ATVEF Specification to define a common specification for enhanced television programming.

It was determined that existing web standards, with minimal extensions for television integration, provide a rich set of capabilities for building enhanced TV content. The specification can be found at <http://www.atvef.com/>.⁵

A key design goal was to provide a single solution that would work on both analog and digital video systems, as well as networks with no video at all. The specification supports transmission across terrestrial (over the air), cable, and satellite systems, and the Internet. It will also bridge between networks; e.g., data on an analog terrestrial broadcast must easily bridge to a digital cable system. This design goal was achieved through the definition of a transport-independent content format and the use of IP as the reference binding. Since IP bindings already exist for each of these video systems, ATVEF can take advantage of this work. The standard defines two transports: one for broadcast data and one for data pulled through a return path.

ATVEF includes support of:

- HTML 4.0
 - ECMAScript
 - DOM 0
 - CSS 1
 - MPEG2 and MPEG4
 - Images: png and jpg
 - Audio: basic
- Note: ECMAScript + DOM 0 is equivalent to JavaScript 1.1

Some ATVEF-Standard Examples

1. How to place TV in a web page (using <OBJECT> and tags)
The OBJECT and IMG tags are used to place the TV picture in a web page, for example:

```
<object data="tv:" width="60%" height="60%">  

```
2. How to place TV in a web page that uses tables (using <TABLE> tags)

⁵ This description of the ATVEF standard is based on a paraphrase from the ATVEF website; the examples are also from that site. QVC is listed by ATVEF on the site as an adopter of the standard.



SHOW ME THE MONEY!

Now for another dilemma: if the standard were successful, that is, if all 100+ million homes in the US had an ATVEF-compliant TV, then broadcasters, programmers, advertisers, or others with an interest in embedding ATVEF triggers in broadcast content would not need to deal whatsoever with the cable MSO or the satellite service relative to the interactive experiences of television viewers on their cable networks. So, while Motorola/General Instruments has envisioned an ATVEF-compliant DCT 5000 in most cable homes, it may not be to the MSO's perceived self-interest. The MSO wants to be paid for the iTV activity on their network. They want a fee per or percentage of each transaction. They believe that it is their network and they deserve this. Consumers and iTV services providers, of course, may believe that in the long run this is a debatable posture and that they (the MSO) are simply infrastructure. They are like the telephone company... does the phone company get a piece of each transaction transmitted over its lines? Of course they do not. Would they if they could? Of course they would.

The industry needs the open standard and the transactions to flow freely. The MSO wants to play gatekeeper, and while they do, they will prevent broad and open deployment of iTV services. They will deploy only what they can control and keep a piece of. The World Wide Web has achieved its growth and impact based on open standards and open access. Your ISP charges you an access fee, and does not charge those with whom you do business a transaction fee. Uh, unless they are AOL, who merely has 24 million subscribers and who charges for their "keywords".

iTV can become a tremendous source of enhancement to television viewers and a vast market for a broad spectrum of services. The market is an infant, and you can become a part of it. Imagine doing web commerce development in 1995. Get on the roller coaster for another fun ride.



Chuck Thomas is Vice President and GM of TargetTV, for QVC, Inc. TargetTV is QVC's iTV arm. QVC is the fourth largest TV network in the US in terms of revenue, the largest TV retailer in the world, and is the world's largest 7x24 live broadcaster. QVC also has the #1 Forrester Research Power Ranking Internet site for general merchandise. QVC has sold as over 600,000 jewelry items in a single day, and fulfilled all of them within three days. Just prior to Christmas, QVC sold over 21,000 Gateway computers worth over \$40 million in a day, and that was just one of many items featured that day. QVC is majority owned by Comcast, with AT&T (through Liberty Media) also owning a significant share. QVC is in the lineup of about 98% of all cable subscribers in the US, and also has local presence in the Canada, the UK, Germany, Japan, and Mexico.

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