Quantifying the Financial Benefits of Cisco Visual Quality Experience

Executive Summary

Service providers are looking to video services for higher revenue and better margins than commodity bandwidth can deliver. Those who have added IPTV or other advanced video services are reporting increases in the average revenue per subscriber (ARPU) of US$20 per month and more, with total ARPUs reaching more than $100 per month, and the number of premium video on demand (VoD) downloads more than doubling year-over-year in some cases. With penetration rates for advanced video services often still below 30 percent, service providers who can cost-effectively deploy and support high-quality video services enjoy a revenue potential in the millions of dollars annually.

But providers who want to begin or expand video offerings using IPTV confront a number of financial challenges. These challenges arise from infrastructure limitations and their effect on video quality of experience (QoE), which is of paramount concern. QoE is the foundation of your reputation and your ability to attract new customers and retain existing ones.

It is difficult to make every part of the network video-ready, which limits revenue. In addition, quality degrades abruptly when too many video streams are called for: just one additional viewer can ruin the experience for everyone. Both these factors boost capital expenditures and promote overbuilding, and unused bandwidth garners no revenue. Poor video quality, whose source can be difficult and time consuming to track down, triggers help-desk calls and service calls, raising operating expenses (OpEx). The most damaging effect is the increased turnover that comes from falling customer satisfaction, especially because customers judge QoE across *all* services, whether triple or quadruple play. A poor video experience can cost you *all* of a customer's revenue. And, how much does it cost you to replace a lost customer?

Cisco® Visual Quality Experience (VQE) technology provides a suite of network innovations that helps service providers overcome these business challenges. This briefing summarizes how VQE helps you:

- Reduce capital expenses by getting more from both existing and new infrastructure investments.
- Decrease service operating expenses and reduce turnover by delivering a consistently superior video experience.
- Increase revenue and fuel growth by offering premium services, such as VoD.
- Reduce operating expenses by increasing service efficiency.

We briefly review the fundamental technologies of VQE and their benefits as background for three business scenarios, which are designed to show you how to quantify the potential revenue and savings opportunities that VQE offers. The results may surprise you; assuming a million-subscriber base, you may be able to:

- Boost annual revenue by up to $9 million by increasing your addressable market (Scenario 1).
- Post annual savings of up to $300,000 on avoided help-desk costs and up to $2 million in avoided service calls by improving video reliability (Scenario 2).
- Preserve over $3 million in revenue and avoid almost $1 million in acquisition costs by improving video QoE (Scenario 3).

The scenarios detail the models and assumptions behind these numbers, so you can align them with your own subscriber scale and cost structures to obtain a more accurate estimate.

How VQE Helps Carriers

Cisco VQE is part of the Cisco IP Next-Generation Network (IP NGN). It comprises server- and client-side components that cooperate to optimize your use of bandwidth, reduce error rates, improve user experience, and speed response to service-quality issues. VQE offers four key network innovations: Transparent Video Error Repair, Video Connection Admission Control (VCAC), Rapid Channel Change, and Visual QoE Monitoring. Together, these innovations deliver reduced capital and operating expenses, additional revenue opportunities, and higher customer satisfaction.

Although no technology is the only way to accomplish a given task, the alternatives to VQE can be almost as limiting to growth and revenue as the issues they address.

Transparent Video Error Repair extends the reach of video on your network by reducing the error rate. Errors are costly, because each video packet contains a lot of information. The loss of just one packet can result in a half-second or more of video artifacts such as pixilation, tiling, screen freezes, or even total loss of video and/or audio. If you are aiming to limit such artifacts to one every four hours of HDTV content, which is a typical goal, you will need an error rate on the order of one in a million.

Benefits: By reducing the error rate, Transparent Video Error Repair optimizes your use of existing bandwidth to increase your addressable market and to support new services. You get more from your infrastructure (lowering the need for additional capital expenses). You need to support fewer customer service calls (lowering operating expenses), and you enjoy reduced turnover from a higher perceived QoE.

How it works: Transparent Video Error Repair uses standards-based messages from the set-top box (STB) or other customer premises equipment to tell the server component to retransmit missing packets. Resequencing of the STB queue delivers the packet in the original order to maintain a flawless viewer experience; from beginning to end, the error repair process takes less than 100 ms. Transparent Video Error Repair also offers application layer forward error correction (FEC).

Alternatives: Transparent Video Error Repair is a unique Cisco IP NGN capability for which the only alternative is an extensive upgrade of your existing infrastructure. The resulting increase in capital expenditures would leave you with less available budget for initiatives that can bring in new customers.

Video Connection Admission Control (VCAC) helps ensure a good viewing experience by making sure that an additional viewer of a VoD stream will not compromise the video experience for everyone.

Benefits: You can accurately judge how much infrastructure investment you need to support your business plan, and confidently build out your subscriber base without overspending. You can also maximize revenues by selling VoD service to the maximum addressable market, or by offering higher levels of service at a premium price, such as guaranteeing a VoD stream to premium subscribers by prioritizing pay over free VoD.

Fewer interruptions to service for a greater number of customers will translate into fewer complaints and a higher perceived QoE, for decreased operating expenses and reduced turnover.

How it works: VCAC uses the communications between client and server components to deny access to a VoD stream if its addition would degrade the user experience, as determined by standards-based business rules, including subscriber priority.

Alternatives: Similar capabilities are available with other solutions, but they require additional policy servers deployed in the network, increasing both capital and operating expenses by comparison to the Cisco distributed VQE solution.

Rapid Channel Change helps service providers improve the viewing experience by reducing the time required to change channels, which in some cases can take from one to five seconds. For cable operators migrating to IP video, Rapid Channel Change can help them maintain the low channel change time that their subscribers expect.

Benefits: As with error repair, you get the benefits of a higher perceived QoE and fewer subscriber complaints: lower operating expenses and reduced turnover.

How it works: Rapid Channel Change provides a unicast burst of the new content requested by the STB, and maintains the existing multicast of the old channel until the new multicast stream is integrated into the STB queue. This provides a sub-second response time to channel-change requests.

Alternatives: Rapid Channel Change can be accomplished using other vendor solutions, but these require the deployment of more servers than VQE, because Cisco IP NGN distributes VQE capability throughout the network. Alternatives would raise your capital expenditures and, by increasing the management burden, boost operational expenses as well.

Video QoE Monitoring delivers proactive alerts that enable you to respond to service-quality issues before they overwhelm your help desk.

Benefits: You fix problems faster, make more efficient use of service resources, and handle fewer customer-service calls for lower operating expenses. Increased customer satisfaction reduces customer turnover. Video QoE Monitoring is the final link in the VQE revenue and profit equation.

How it works: Video QoE Monitoring uses the communications between client and server components to provide real-time awareness of video stream quality and track the performance of Transparent Video Error Repair. Per-subscriber Quality Monitoring narrows down the fault to access network or home network. Carriers can also monitor Rapid Channel Change performance.

Alternatives: Other monitoring solutions cannot deliver real-time video quality data. Without Video QoE Monitoring, you end up fixing problems only after they become widespread, stressing your help desk and other customer service resources and lowering your perceived QoE. Customer turnover rises, and customer acquisition slows.

Customer Scenarios

The following customer scenarios are merely a guide to help you make your own calculations; space is provided for you to plug in your own numbers. The data supplied for illustrative purposes is based on industry estimates and Cisco field experience. The choice of one million connected subscribers was chosen to make it easy to apply a simple multiplier to the figures given to quickly estimate your own potential revenue and savings benefits. It reflects the size of carriers such as AT&T, Verizon, Comcast, Time Warner Cable, Telmex, BT, Deutsche Telekom, and France Telecom, all of whom have multiple millions of video customers.

Number 1: Increase the Addressable Market to Increase Revenue

VQE may boost your revenues by up to $9 million dollars per million subscribers by increasing the number of customers to whom you can offer video services using your existing infrastructure. For a smaller provider with 250,000 subscribers, this increase still may represent over $2 million in increased revenue.

Challenge	Not all of your lines are clean enough to carry video.		
Solution	Transparent Video Error Repair. With VQE's real-time error correction, there are fewer artifacts or interruptions in service over a larger part of your existing copper infrastructure.		
How to Quantify	Example		Plug In Your Own Data Here
Number of connected subscribers	1,000,000		
	x		
Percentage increase in subscribers who can access video resulting from VQE error repair	5%	50,000 more potential customers	
	x		
Takeup rate for video services	15–25%	7500 to 12,500 more video subscribers	
	x		
Potential additional revenue per new video subscriber	$40–60		
	=		
Potential revenue increase	$300,000–$750,000 per month	$3.6–$9 million annual revenue increase	

Number 2: Improve Video Reliability for Operating Expense Savings

VQE can improve your video reliability by minimizing network outages and reducing problems with congestion. Fewer help desk calls can mean reducing operating expenses by $300,000 per million subscribers, and reduced service calls can save up to $2 million per million subscribers. For a smaller provider with 250,000 subscribers, this benefit represents a savings of over $500,000.

Challenge	Maintaining video QoE is expensive but critical for successful competition against cable and satellite providers.		
Solution	Video QoE Monitoring enables your staff to more closely monitor the network and fix problems more quickly, before the problems cause major interruptions or widespread dissatisfaction. You have fewer help-desk calls and service calls.		
How to Quantify	Example		Plug In Your Own Data Here
Fewer Help Desk Calls			
Number of connected subscribers with potential access to video services	1,000,000		
	x		
Subscription rate	20%	200,000 subscribers	
	x		
Percent of subscribers who generate at least one trouble ticket	20%	40,000 help desk calls	
	x		
Average cost of help-desk calls caused by service interruptions	$25–30	$1–1.2 million annual OpEx	
	x		
Percent reduction in help-desk calls achieved through QoE monitoring	25%		
	=		
Potential annual help-desk operating expense savings	$250,000–300,000		

Fewer Service Calls			
Number of help-desk calls caused by service interruptions	40,000	Annual, from above	
	x		
Percent of help-desk calls that result in a service call	50%	20,000 service calls annually	
	x		
Average cost of service call	$250–400	$5–8 million annual operating expenses	
	x		
Percent reduction in service calls	25%	Tracks percent reduction in help-desk calls above	
	=		
Potential annual service-call OpEx savings	$1.25–2 million		

Number 3: Improve Video QoE to Preserve Revenue and Avoid Acquisition Costs

By raising the quality of experience for subscribers, VQE helps keep customers happy and reduces turnover, which runs between 1 and 2 percent for the typical wireline carrier. The potential result: over $3 million in revenue preserved and almost $1 million in acquisition costs avoided. A smaller provider with 250,000 subscribers might, nonetheless, realize $750,000 in revenue preserved and almost $500,000 in acquisition costs avoided.

Challenge	Subscribers frustrated by too-frequent video artifacts and slow channel changing are more likely to change providers.		
Solution	VQE's network innovations boost customer satisfaction and prevent video QoE issues from dragging down your overall perceived quality of experience.		
How to Quantify	**Example**		**Plug In Your Own Data Here**
Number of connected subscribers with potential access to video services	1,000,000		
	x		
Subscription rate	20%	200,000 subscribers	
	x		
Percent reduction in turnover (subscribers canceling service each month)	0.1%	2400 annually	
	x		
Average revenue per video subscriber	$1320	$110/month	
	=		
Potential revenue preserved (annual)	$3.1 million +		
Average cost of acquiring a new subscriber	$400		
	x		
Turnover (from above)	2400		
	=		
Potential customer acquisition costs avoided	$960,000		

Summary

Cisco Visual Quality of Experience delivers capital and operating expense savings, additional revenue opportunities, and higher customer satisfaction for reduced turnover with four network innovations: Transparent Video Error Repair, Video Connection Admission Control (VCAC), Rapid Channel Change, and Visual QoE Monitoring.

With VQE, you do not have to build more network than you need because you can make optimal use of your existing infrastructure to support new video offerings, reducing your capital expenditures. VQE also helps you avoid over-subscription to VoD services, which can degrade the viewing experience for every subscriber.

With better visibility of the issues that can cause video interruptions, you can manage the customer experience proactively to reduce your operating expenses. Your help desk gets fewer calls, you make fewer site visits and service calls, and you make better use of your network and customer service staff.

VQE also offers additional revenue opportunities by increasing your addressable market using your existing infrastructure. It gives you greater flexibility to add new services to meet customer demand and differentiate yourself from the competition.

Finally, VQE helps you maintain a high perceived video quality of experience and customer satisfaction, reducing turnover and making it easier to attract new customers.

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