Professional service assurance for IPTV

Currently, IPTV faces key O&M challenges in three areas — network opacity, quality of service (QoS), and subscriber complaint handling. A solution that can comprehensively evaluate IPTV network performance and optimize service quality would fill an urgent need for streamlined, efficacious O&M.

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Challenges for IPTV O&M

ew services, especially streaming media, are placing greater demands on the network. IPTV would seem a perfect example, but a deeper analysis reveals that it is actually not a great burden, thanks largely to subscriber apathy. A large number of operators offer IPTV, but it excites no one anymore. It is one of those once-ballyhooed flavors now growing stale in the display freezer after months of sporadic tasting.

A great many operators released IPTV before their networks could deliver it as an “ooh-ahh” experience. Content catalogs were often limited to third-rate titles that most subscribers would not watch for free, while the image itself typically came across as blocky and dull on a 42-inch screen. In other words, IPTV could not compete with cable TV or physical media on any front, be it quality, selection, or price.

Today, thanks to industry advances (greater bandwidth, larger catalogs) and shifting consumer tastes (growing intolerance of commercials, decreasing willingness to “tune in next week”), IPTV would seem ready for its close-up; but it must be flawless this time to overcome the horror stories spread by early adopters. Certain O&M issues must be overcome for IPTV to be truly killer.

The primary hindrance is the fact that IPTV infrastructure has been thus far opaque. Operators cannot see the resources that are idling, lacking, or redundant. Without efficient resource leverage, at each & every stage, users now accustomed to Blu-ray quality video will keep complaining that their picture looks bad enough to qualify as UFO footage.

Another major hurdle has been a lack of KPIs that reflect IPTV quality of experience (QoE). For most operators, IPTV service is a car with no dashboard. New indicators are needed that both reflect actual user experiences and help operators analyze root causes of service disruptions and hindrances.

The third major drag on IPTV service thus far has been its sensitivity to packet drop/error, which is only increasing in the HD era, thanks to the compression efficiencies, bit rates, and refresh rates involved. According to DSLAM Forum TR126, seamless HD video transfer requires a ratio of packet loss/error below $10^{-7}$.

A step-by-step solution

Huawei offers an O&M facilitation solution (Huawei IPTV O&M) intended to meet all
solutions

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Huawei IPTV O&M also enables operators to monitor service quality in real time, assess it, rate performance for comparison, and locate faults in a quick, convenient and transparent manner. Operators can also customize indicators, calculation methods, and thresholds. This solution covers every phase of deployment, from network bearing assessment to network design to pilot-release assessment to commercial-release assessment.

Accurate network capacity assessment

Comprehensive assessment of network bearing capacity can include network equipment assessment, capacity assessment, and service simulation. For the former, Huawei IPTV O&M assesses the bearing capacity for layer-2 and layer-3 network equipment, as well as home IPTV networking equipment.

As for capacity assessment, this solution examines IPTV traffic modeling and available link bandwidth to determine numbers and locations of subscribers that the network can bear. Service simulation encompasses all DHCP, PPPoE, VoD, multicast service, and basic IPTV processes, yielding network MTU values and KPIs that are output along with service simulation reports that include recommendations for various scenarios.

Optimal network design

Huawei IPTV O&M aides the design of an optimal network that combines new services and technologies with legacy infrastructure. This process can include services such as basic network design, capacity and equipment planning/design, reliability design, service process design, and network evolution solution design.

Tailored short-term assurance services

The reward for an IPTV pilot launch is usually a surge of complaints; aside from the usual “squeaky wheel” logic that often drives such moaning, this can also stem from improper installation and less-than-responsive complaint handling by IPTV novices. If not properly resolved, these problems will greatly hinder service growth. Huawei helps by providing three to six months of short-term assurance services, customized for each operator. Said services can be divided into four areas – release organization, troubleshooting acceleration, efficacy testing, and staff training.

Commercial-scale assurance services

Service assurance is ongoing and may not get easier if there is rapid subscriber growth. Huawei helps out by deploying a cascaded indicator system fed by various probes, while a variety of tests, along with Huawei’s expertise pool, can also be leveraged continuously so that latent problems are nipped in the bud and QoE stays ahead of usurpers.

A series of IPTV video quality probes are employed that can accommodate a variety of scenarios, including mixed-vendor networking, QoE monitoring, timely onsite troubleshooting, and all-channel video monitoring.

These probes may be software- (PC, STB, network hardware) or hardware-based (external probes hung on network equipment). They function through video stream diversion or mirroring-based optical split, and can monitor 10Mbps to 1Gbps video streaming, so that E2E monitoring can be done for all channels.

As for fault location, Huawei IPTV O&M gives early warnings that help accelerate the troubleshooting process through its E2E probe...
deployment and customized indicator system. It also provides a robust and flexible detection toolkit, so that maintenance personnel can preset detection rules/thresholds templates, based on their own experiences. If a fault occurs, they simply need to start a combination of detections and a report will be output as soon as possible.

Huawei IPTV routers feature built-in iVSE video boards that work with the U2520 monitoring/control system to realize “visualized and controllable” user experiences. They also eliminate the pixelization that stems from packet loss/error.

With the RET retransmission mechanism, the user experience is guaranteed to remain unaffected, even if the packet loss/error ratio reaches twenty percent, while the FCC mechanism keeps the channel-switch interval below one second. More importantly, all the preceding monitoring and control functions are automated and visualized.

In addition, Huawei has conducted in-depth research into the systematic assessment of video quality, culminating in the vMOS algorithm, which takes into account a wide variety of factors, including original quality, impact from the network, application involved, and terminal involved, to better reflect subscriber QoE.

Real-world applications

This solution has been deployed by telecom operators worldwide. It effectively helps them solve evaluation and optimization problems during network revamping while providing strong support for the development of new IPTV services.

In the case of Etisalat (UAE), mixed-vendor networking was hindering transparency for both network capacity and service experience, while QoE monitoring and fault location across domains were non-existent.

Huawei provided a tailor-made IPTV evaluation and optimization solution that enabled E2E fault location from the STB to the head end; it reduced the time spent on fault location and daily checking by eighty percent, while IPTV QoE was also significantly improved.

For China Telecom Shenzhen, Huawei offered a customized solution that included systematic processes and methods for network-wide evaluation and optimization, and an Internet AV service quality assurance solution for IPTV.

Through static analysis of network traffic and the operator’s subscriber behavior model, this solution predicts service requirements for network bandwidth growth and thus sets the network indicator threshold model for long-term development.

It also provides comprehensive round-the-clock monitoring/control and assurance for IPTV service through dynamic network evaluation, which enables objective measurement of network bearing capacity and IPTV service operational status. China Telecom Shenzhen can now optimize its network continuously from, and it has seen significant improvements in its IPTV service experiences and network quality as well, which should guarantee it market competitiveness for years to come.

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