Hewlett Packard Enterprise

Solution overview

HPE Virtual Headend Manager (VHM)

Simplify headend operations—save cost and time to market

Gain freedom from vendor lock-in and proprietary legacy appliances. Unleash the power of automation and orchestration.

Headends are evolving toward fully orchestrated cloud solutions

Increasing competitiveness through the orchestration of video delivery platforms
Barriers that have made it difficult to enter into the media & entertainment market in the past now have been removed. Aggressive over-the-top (OTT) video streaming providers have changed the way consumers watch content. They are offering innovative, cost-competitive multiscreen on-demand video services with exclusive content, whereas service providers in developed markets are facing increased churns, slowing growth in IPTV revenue and decreasing profitability. Transforming existing video delivery systems and operations with virtualization and orchestration results in increased agility, which can enable content service providers (CSPs) to offer flexible service bundles, reduce cost, and accelerate innovation. Service providers are using Network Functions Virtualization (NFV) and Software Defined Networking (SDN) in their networks—these technologies can be extended to video processing to bring the same benefits enjoyed by the IT and Communications industries. **HPE VHM** enables the virtualization and orchestration of the media functions enabling one click channel deployment and channel failover in the cloud; it implements the "TV Channel Media Service" of HPE 5G Core Network Reference Architecture. Content providers reduce time to market (TTM) for new services, increase operational efficiency, and reduce cost.

Increase business agility and reduce cost

Lower time to market, incremental investments, and increased purchasing power
In a virtualized headend, the addition of new services or channels can be accomplished quicker as it becomes a matter of automated software configuration. It also enables the shift from a traditional model where appliances had to be purchased at project outset and amortized over multiple years to a model where resources are consumed on demand. The vendor-agnostic unified management layer allows the use of best-in-class solutions for each function, eliminating black boxes and avoiding vendor lock-in, placing the **CSP** in a better negotiating position.

Open architecture

Avoiding vendor lock-in
HPE VHM is designed with an end-to-end open architecture.

- Commercial off-the-shelf (COTS) hardware
- CPU-based processing (no need for specialized acceleration cards)
- OpenStack® private cloud supporting Queens and Newton releases
- Integration of functions through REST APIs

This gives the content providers freedom of choice to produce their channels with the vendors/products that make the most sense for their TV network, and eliminate an ecosystem of legacy, proprietary or appliance-based technology.

HPE VHM—Orchestrating Media functions as a plug-in

Virtualize the video headend and launch channels in minutes
HPE Virtual Headend Manager offers resource management, configuration, and monitoring capabilities for virtualized media functions that are part of a Video headend. This enables video operators and broadcasters to instantiate **live linear and OTT channels**, reducing the required time to configure and launch a new channel within minutes, compared to weeks or months with manual headend operations.

Power of choice through an open, vendor-agnostic framework
As a holistic manager of pre-integrated media functions, HPE VHM removes the hurdle of dedicated resource pools or appliances for specific vendors.

HPE VHM also eliminates the need of proprietary controllers, by offering one single interface for the management of a TV channel that is comprised of multiple media functions from different vendors.

The solution has been designed to run on an OpenStack Cloud, based on standards-based Commercial off-the-shelf (COTS) hardware, ensuring complete openness of the whole solution stack.

- Transcoders, probes, and multiplexers from different vendors as pre-integrated plug-ins.
- Dynamic allocation of resources for deployment of virtual video/media functions.
- Integrated fulfillment and assurance (self-healing).
- Complete openness through open APIs.

94%[1]

Reduction of channel deployment time due to automation and orchestration.

50%[2]

CAPEX savings in the disaster headend compared to appliance-based environments.

30%[3]

CAPEX savings per HD channel in the main headend compared to appliance-based environments.

HPE VHM implementation in a European content service provider's TV network proved the following Channel deployment and CAPEX savings metrics.

Unified management console

Removing the necessity to configure applications through proprietary interfaces
HPE VHM provides a unified console to configure, control, and monitor the media functions (transcoders, probes, multiplexers) from integrated vendors, available as a graphical user interface (GUI) or API (REST). This gives the content provider the flexibility to launch a live TV Channel from a series of functions provided by a variety of applications chosen by the CSP. Even with a variety of providers' applications to manage, the single unified management console integrates and simplifies the management of the multiple functions with this single tool.

Shared infrastructure platform for all the integrated components and versions
In addition, the standardized COTS private cloud architecture removes the necessity to maintain dedicated resource pools. The creation of Channels using different formats (SD, HD, UHD) or codecs (MPEG-4 AVC or HEVC) can be done using a single pool of shared resources, which increases the sustainability of investments in the infrastructure. The shared pool of compute resources can be reused as technology evolves and new standards are defined.

Manage the full lifecycle of a channel

Definition, deployment, configuration, monitoring, and decommissioning
HPE VHM is the single tool to manage the complete lifecycle of live linear channels and OTT content. From a single console the operator can:

- Define channel input, output, and transcoding parameters using a simple modular profile or track template configuration
- Instantiate virtualized resources
- Apply the configuration of respective virtual media functions
- Configure changes throughout the channel lifecycle
- Monitor the end to end service; including the application, the service configuration, and the virtual infrastructure
- Upgrade running transcoding instances minimizing downtime using Smart Upgrade functionality and taking advantage of spare instances
- Decommission virtual functions and release resources for reuse.

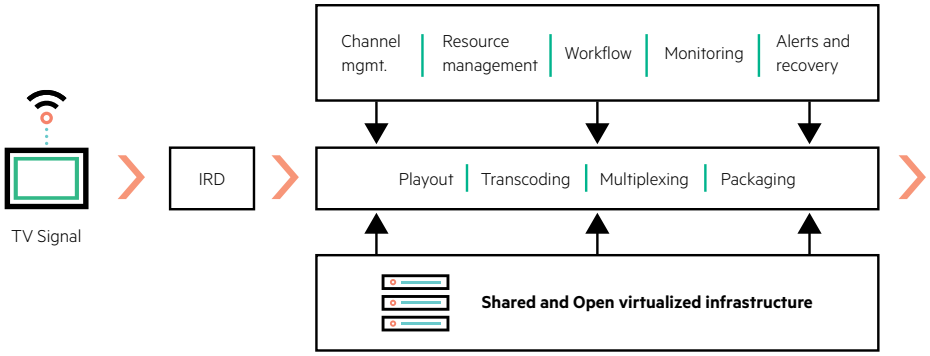
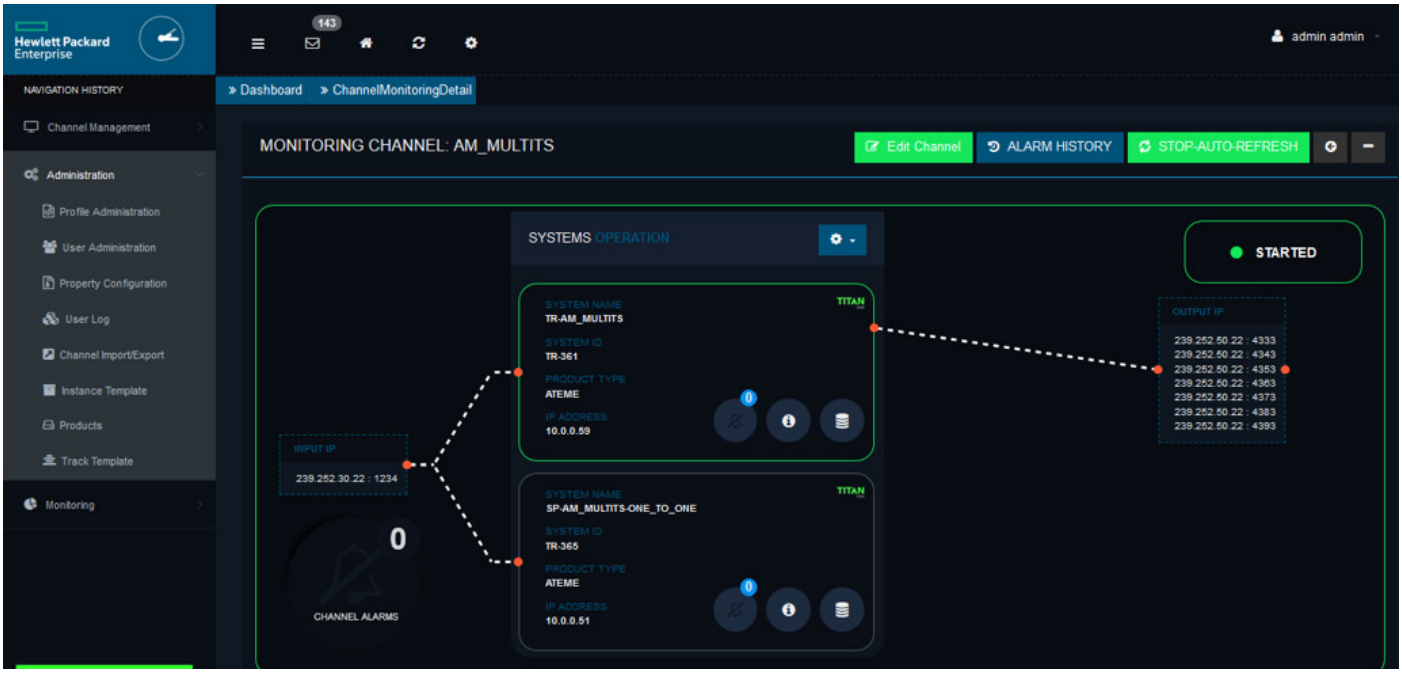


Figure 1. HPE Virtual Headend Manager boosts service agility and performance

[1] Channel deployment time: We managed to roll out a new line-up in two days, what typically took 4–6 weeks before. That's one of the points that is mentioned by the customer in the introduction of the testimonial video.

[2] CAPEX Savings in Disaster headend: this is based on the business case calculation for the customer.

[3] CAPEX savings per HD Channel: Also based on the Business case calculation for the customer.



Zero packet loss

Live media processing in flawless virtual networks

Live media processing is one of the most challenging workloads to run in a cloud environment, due to carrier-grade network and service availability requirements combined with multicast traffic and complex, existing appliance-based environments. Within the VHM solution, HPE provides a reference architecture to configure and utilize OpenStack as the underlying private cloud that ensures a flawless virtualized network. With OVS-DPDK, NUMA awareness and CPU pinning features, a high-level control is provided guarantying low packet loss even for multicast environments and provide dedicated resources and performances to processing nodes. This is the basic requirement to ensure the same quality and performance is achieved from a virtualized headend as experienced with legacy appliances. By utilizing the standard OpenStack components, you can eliminate the requirement for proprietary virtual switches.

Automated failover and self-healing

Integration of fulfillment and assurance to ensure maximal service availability

After a live channel has been deployed as a chain of media functions, HPE VHM monitors the health of the virtualized infrastructure as well as the health of the overall service by utilizing video quality probes. If one of the components in the processing chain reaches threshold or fails, HPE VHM recognizes the failure and invokes auto-corrective actions. For channels that have been deployed in high-available mode either 1+1 or N+M, HPE VHM automatically fails over the processing session to the backup instance, and if necessary restages failed virtual machines to automatically restore the desired state.

Learn more at
hpe.com/us/en/solutions/media-entertainment-digital-tv.html

a00039300ENW, August 2019, Rev. 1