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# BLACK BOX WHITEPAPER: BROADCAST AND POST-PRODUCTION TRANSITION TO VIRTUALIZATION

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LEAVE THE TECH TO US





## **BLACK BOX'S InvisaPC KVM FAMILY SUPPORTS EVOLUTION OF BROADCAST AND POST-PRODUCTION INDUSTRY**

Traditionally, the broadcast industry relied on a hardware-centric approach to production and playout. This typically included SDI-based servers and switches for live streaming and Avid workstations for editing in a centralized facility. KVM technology was a key component to this build-out model. It served as an initial mechanism to break the link of physical access to the device—essentially setting up the first step in virtualization of access. Ever since, KVM has formed an integral part of media facilities, allowing broadcasters to locate computers away from their production environments. On top of that, KVM technology enabled many users' access to multiple computers when they needed them—sharing resources in a “virtual access” manner. These improvements in operational workflow save broadcasters hours every day as well as increase resilience. Examples include switching to back-up resources easily and reducing costs, so that expensive machines/licenses can be shared. As the industry further embraces virtualization, KVM technology needs to follow suit and continue to provide this “virtual access” to physical resources as well as newer virtual resources. Broadcasters building out new infrastructure must consider this, even if they do not initially have virtualization in their plans. They need to both contemplate solutions that provide future-proofing as the world moves to virtualization, and support today's needs of virtual access to physical servers.

### **INDUSTRY IN TRANSITION**

The last few decades have witnessed the consolidation of local stations in the U.S. and across the world into groups. This has increased the proportion of stations that are owned and operated by major broadcast networks ABC, CBS, NBC and Fox, as well as broadcast groups such as Sinclair, Nexstar, and Tegna Media. The aggregation of stations allowed the owners to optimize operations. The first step was building a hub for master control operations. Most of the master control operations from the local stations were removed. This still required significant amounts of hardware, time and capital every time a station or channel was added.

Today, several broadcasters are now transitioning their master control operations—global programming playout, delivery, and network operations—to a unified IP cloud architecture. The move to leverage the “cloud” as a content storage and distribution platform with IP-connected COTS servers and software-defined workflows means “the virtual master control rooms” can be used to automate and deliver workflow processes and technologies in a more agile and scalable environment. Hence, broadcasters further reduce the need for traditional master control operations and task-specific hardware, helping to reduce capital expenditures. Basically, broadcast networks will run similarly to data-center-based systems common in IT.







At the core of this new model is virtualization which began in the 1960s for mainframe computers at IBM and re-emerged in the 2000s driven by VMware and Citrix. As a mechanism of logically dividing a server's resources (CPU, I/O, RAM), virtualization is utilized with multiple applications. The idea is to create an environment where independent applications, often a complete O/S such as Windows 7 or 10 containing all their applications, and/or services can appear to own the same server when, in fact, they share it.

The driving reason for this transition is the ability to roll out new channels, delivery methods, and formats quickly in response to viewer demand. The virtualized production model satisfies this need. Where software defines the production process, the cloud enables content storage/distribution. Commodity-priced IT hardware serves as the access and control interface. The traditional hardware-based TV production model, with its purpose-built facilities for each channel, does not offer this kind of speed or flexibility.

Transition to the "virtualized TV station" is underway. Disney/ABC Television is moving its TV channels to a cloud-based "virtual master control". The BBC has moved audio file storage, mixing, and playout into a single data center to provide local stations IP access to these centralized resources to create and transmit their on-air programming. Over the past five years, IP-based and cloud-based production models have evolved from being of little interest to broadcasters to becoming a top technology project as highlighted in Devoncroft's 2015 Big Broadcast Survey.

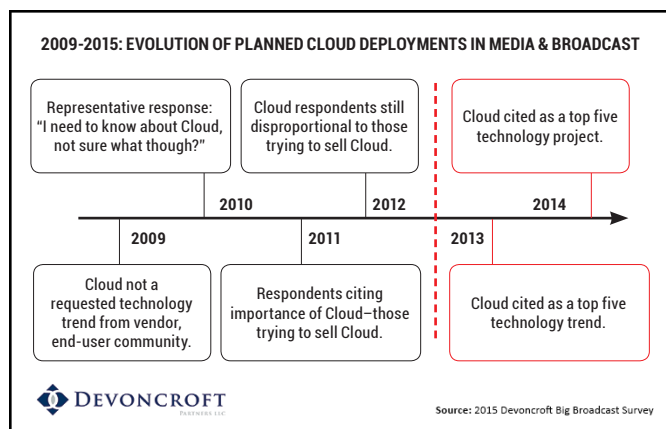


FIGURE 1 - EVOLUTION OF PLANS FOR CLOUD IN BROADCAST 2009-2015



## OBSTACLES TO OVERCOME

While there is a compelling business case for IP-based virtualized broadcast production, there are significant obstacles in moving completely to this new model. SDI is a proven technology today but, there are significant technical issues in creating an end-to-end virtualized/IP production and playout system that works. For example, there is a lack of industry-supported standards for virtualized production over IP. SMPTE's 2022-6 standard is a good start, but it is not sufficient to create a fully functional end-to-end solution. Similar to the transition from Analog/SD to Digital/HD-SD, the transition to a virtualized IP model will take an estimated three to five years. Many in the field estimate that it will take between five and ten years for SDI in broadcasting to end.

The fact that TV production and playout will be distributed over IP and become software-driven doesn't mean that the old ways of doing things will suddenly disappear. The model is changing the bit flow across networks, but the workflow process will not change significantly. Content creation and editing will still require high-performance access to workstations that KVM provides today. Additional access to virtual machines will be needed to manipulate files, much of which will be on virtualized servers and playout lists. These different resources, physical and virtual, will need to be accessed by operators in a transparent and similar manner to optimize efficiency and control. This is what the Black Box **InvisaPC** delivers—seamless integration of the physical and virtual worlds. It allows many users to access multiple computers or virtual desktops over IP.

This provides media professionals with improved workflows and an innovative technology with which they can completely reconfigure their infrastructures. Access to physical and virtual machines gives broadcasters a new level of flexibility.

## InvisaPC IN THE NEWSROOM

During peak times in newsrooms and galleries, we often see large teams working together on specific tasks to ensure a live broadcast runs smoothly. The Black Box **InvisaPC** enables broadcast teams to access the resources they need when they need them, working across multiple computers and virtual desktops from a single interface. During off-peak times, we see much smaller teams managing live broadcasts. These teams will still have access to all the equipment used during busier moments from a single location, ensuring an uninterrupted, high-quality live broadcast. Alternatively, equipment, both physical and virtual, can be re-assigned to a different event through a few mouse clicks.

## InvisaPC FOR POST PRODUCTION

Media professionals have been trying to move the noisy, heat-generating machines they need to create their content outside of the editing suite to create the best environment possible without compromising performance.



**InvisaPC** boasts industry-leading performance; with no moving parts, it is noiseless with no need for cooling, letting media professionals work in the best-possible environment.

It is essential that post-production teams can reconfigure suites for many different uses or to extend productions across multiple rooms and even buildings. Often, staff members want to access in-house assets while working remotely. They need to work collectively and securely. Maintaining a single point of storage and managing access centrally has become a priority for many post-production facilities. **InvisaPC** not only accomplishes this but does so instantaneously. Managers gain remarkable flexibility and, because the suite does not have to close for any period of time, no potential revenue is lost.

## InvisaPC IN THE STUDIO

Although the fast-paced, ever-changing studio environment can be challenging, **InvisaPC** meets the needs of AV and user interfaces. Providing access to multiple physical and virtual machines from a single monitor allows broadcasters to change set-up from one production to the next quickly. With **InvisaPC**, routing and re-routing AV, multi-casting content, as well as adding and removing screens and interfaces, is easy.

## InvisaPC FOR DISASTER RECOVERY

In response to a catastrophic event, **InvisaPC** facilitates a fast transition from the primary site to the disaster recovery site. Here, typical master control systems operate on virtual machines running on common COTS server hardware.

InvisaPC provides access to disaster recovery systems through virtual machines either directly via the DR facility network or remotely across the company WAN. The ability to interface to the DR systems remotely can prove invaluable, particularly during the transition of services to the DR facility and restoration at the end of the event.







## WHAT MAKES InvisaPC UNIQUE?

With multiple managed transmitter and receiver units, **InvisaPC** integrates KVM switching and virtual desktop technology. The receiver connects to the “remote” physical PC over a TCP/IP network or a virtual desktop using standard remoting protocols. The transmitter converts the video, audio, and USB connection of a PC or workstation to a format that can be connected and controlled over a TCP/IP network. **InvisaPC** units have built-in management that support deployments of up to 32 devices. The addition of the **InvisaPC** manager enables thousands of devices to be deployed and adds advanced capabilities to the system.

The user has the same experience with the **InvisaPC** as if directly sitting at the PC. Black Box’s advanced compression technology delivers low latency and low bandwidth to allow

flawless operation, even over standard corporate networks. Multiple keyboard, mice, and headsets can be connected to the receiver with other USB devices such as scanners, printers, and smart phones.

**InvisaPC** provides the ability to future-proof a deployment even if virtualization is not needed immediately. Whether a new virtualized master control room is on the agenda or not, customers often desire to move legacy applications or service to virtual machines to protect their existing investments and minimize any porting cost as old hardware goes obsolete. **InvisaPC** provides the unique ability to repurpose KVM to support these new virtualized workloads as well as physical resources.

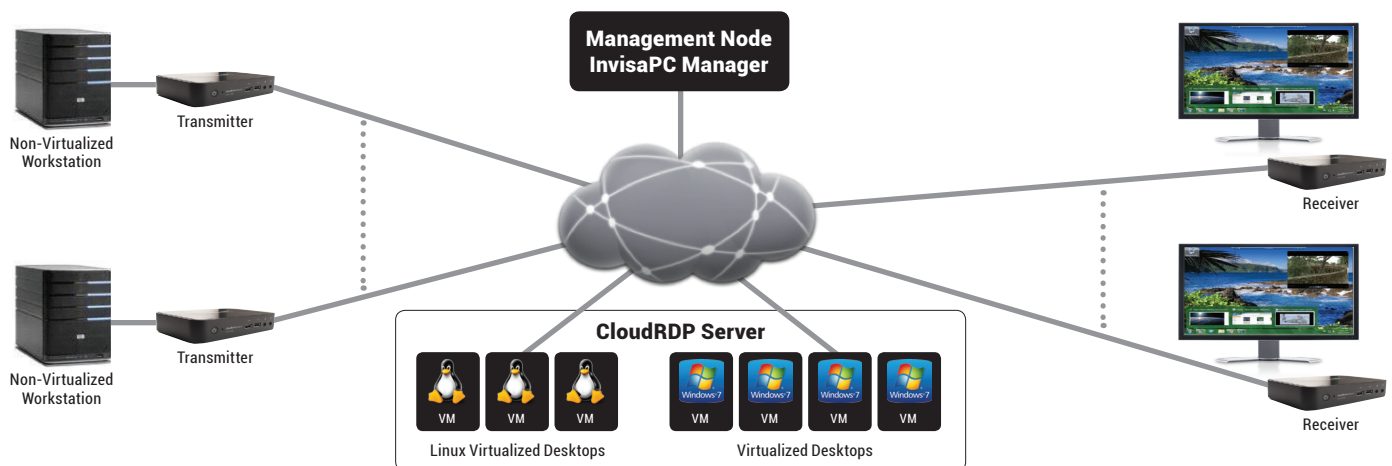


FIGURE 2 - EXAMPLE OF InvisaPC DEPLOYMENT

