A new era of data management for distributed control rooms
The challenge

Data distribution is complex and continues to evolve with the growing demands of control rooms. This is particularly a concern with control rooms that have teams working together across more than one location - within the same or different buildings, locally or across vast geographies. Not only is it a challenge to collect and manage the myriad sources, but it’s also challenging to share data between sites to collaborate around the information.

How can a control room take data that originates in multiple formats, from multiple sources, and make it available - easily, efficiently and in a manageable format - to operators distributed across many locations?

In this brief, we will outline how AV sources, signals and network sources are changing and how systems need to adapt. We will also look at how a control room can be designed with scalability and secure data distribution in mind, while ensuring ease of use for the system operators.

Collecting and controlling data

Data originates in many formats. It may be supplied directly over a cable using a continuous signal or accessed across a network using various application protocols. Recently, the demand has grown to not only view multimedia and network sources easily, but also to manage the content on display using a keyboard and mouse. The following content sources are frequently used and need to be considered when determining a control room’s requirements for distributing, controlling and presenting the data.

Audiovisual sources
Video is a common data source, and audio can also be helpful for operators.

The resolution of these audiovisual sources has increased with the introduction of 4K or ultra-high-definition (UHD) video. This has changed the requirement to accept source content in resolutions as high as 3840 x 2160 for presentation on control room displays.

Control room displays can be used to present video and audio generated by servers, computing devices and audio visual devices.
Network sources

Software desktop capture tools offer an economical method for transporting and controlling low-motion data/graphic sources over a pre-existing network. Common screen capture protocols are available in open source applications, networked software applications and popular operating systems. They also support control of the source machine using a keyboard and mouse.

Use of IP cameras has also proliferated in many applications, particularly security and surveillance. The H.264 compression standard is ubiquitous in IP cameras, AV encoders and IPTV systems. Video processors must be able to adapt to the use of common protocols and unicast or multicast delivery platforms. A system called on to decode IP cameras must also be capable of efficiently interfacing with, and selecting from, possibly thousands of cameras.
System requirements for modern control rooms

In addition to the types of sources involved, system design is impacted by concerns for scalability, security, integration and ease of use.

Organizations that manage high-value processes, critical assets or public safety functions may distribute data to multiple departments, collaborating between different rooms, buildings on a campus or across a vast geography in real-time. It may also be necessary to present shared data on one or many video walls that support different organizational functions or in digital signage awareness displays that may be distributed across a facility.

IP networks represent an attractive platform for distributing AV data sources within control room operations. Networks reach everywhere in an organization, but segments of the network may be protected by firewalls, security appliances or restricted to use of unicast transport, rather than multicast which is popular for distribution applications. A system that transports real-time video and audio over a network must offer scalability in transporting content to many endpoint displays and operators, as well as extending content across segments that have more sophisticated transport restrictions such as encryption or unicast-only transport.

In meeting the specifications for a flexible, scalable, secure, integrated and easy-to-use control room system that will support a distributed operation, it is important to keep in mind that the system may require:

- Compatibility with multiple video, audio and control formats
- Capacity to interface with network based application servers or desktop capture applications
- The ability to expand over time or to manage more sources and displays, or deliver data to new locations
- An efficient method to distribute the content to displays and locations
- An easy-to-use configuration and control interface

An organization’s decision-making effectiveness can be dramatically enhanced by sharing operational data beyond a single room to functional groups in other rooms, buildings and remote locations.
The solution – Christie Phoenix

Christie® Phoenix® is uniquely designed to address the requirements of modern control rooms, allowing control room staff to manage their operations effectively and make critical decisions quickly within a distributed operation. Christie Phoenix is an open data distribution system that provides access and control over audiovisual data sources – securely, from anywhere, at any time, using standard IP networking technology.

It is a network-based video processing platform that accesses and controls the wide variety of AV and network sources used in control rooms. It securely and efficiently accesses and distributes all content over an IP network, making audiovisual data available to users and displays in many locations. The system is highly scalable by adding more nodes to support displays that increase in size over time, or when routing data to new and more locations. It’s also easy to manage using embedded control and client control software. As well, the Christie Phoenix system has been expanded to include the Christie Phoenix Quad-T encoder which supports four 4K signals.

Conventional video wall technique

Flexible Christie Phoenix platform

▲ Many video processors require additional hardware and appliances to support the variety of source requirements that exist in a control room.

▲ Christie Phoenix interfaces with the wide variety of AV and network source requirements that exist in a control room.
Christie Phoenix node

Each Christie® Phoenix® node accepts a wide variety of inputs to a system and can manage many sources on two displays:
- Encode – distribute and control a wide range of AV and networked sources with audio, and USB K&M up to 1920 x 1200 resolution across an IP network as H.264 video
- Decode – manage and present up to 12 sources per display node, serving one or two displays in a video wall array or individual screens
- Manage – present every source on video walls and displays, up to 128 displays per display
- Control – configure and manage the entire system

One Christie Phoenix node accepts a wide range of controllable sources into a Christie Phoenix system.

Still images
- BMP
- JPEG
- TIFF
- PNG

Unicast H.264 sources
- RTSP
- MPEG2-TS
As many as 32 unicast H.264 sources can be transcoded by each node and multicast within a Christie Phoenix system

Source resolutions from 1024 x 768 up to 1920 x 1200

Two networked desktop sources
- Virtual Network Computing – VNC
- Remote Desktop Protocol – RDP
- Application sessions from Microsoft Server

Networked sources are transcoded for use by any Christie Phoenix node in the system

Up to 12 freely-sized sources can be presented on the two displays served by a single Christie Phoenix node.
Create video wall arrays using multiple Christie Phoenix nodes.
Christie Phoenix Quad-T encoder

The Christie® Phoenix® Quad-T encoder increases system scalability, offering four inputs. It makes Christie Phoenix systems future-proof for AV signals supporting 4K/UHD resolution signals.

- Encode sources with resolutions up to 3840 x 2160 with audio and USB K&M
- Expand system source scalability quickly using four inputs per Quad-T encoder

Use a secure, isolated network switch, or leverage an existing LAN or an enterprise network, to transport Christie Phoenix sources wherever you need them.

- Distribute - deliver content anywhere using IP for transport and control
- Multicast - efficient scalable distribution over a LAN or network switch

Each Christie Phoenix Quad-T encoder can supply four 4K/UHD sources with audio and USB keyboard and mouse control to a Christie Phoenix system.

A Christie Phoenix system distributes content efficiently on a switch or LAN using network multicast transport. Unicast streaming is available to extend sources between independent Christie Phoenix systems, or as a method to segment content between video walls.

- Unicast - extend AV sources to distant client desktops or independently controlled Christie Phoenix systems across network segments that require use of unicast transport

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### IP network

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### Four signals from AV source devices:

- HDMI
- Embedded stereo audio
- USB keyboard and mouse

Each HDMI signal supporting resolutions up to 3840 x 2160

Signals are synchronized if they originate from the same device and have the same resolution.

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### Christie Phoenix Quad-T encoder diagram

- PC, workstation or other AV sources
- Server or image source with four HDMI outputs

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- HDMI
- Embedded stereo audio
- USB keyboard and mouse

Each HDMI signal supporting resolutions up to 3840 x 2160

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### Christie Phoenix system distribution diagram

A Christie Phoenix system distributes content efficiently on a switch or LAN using network multicast transport. Unicast streaming is available to extend sources between independent Christie Phoenix systems, or as a method to segment content between video walls.

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### Video wall

- Video wall one, room one
- Video wall two, room two
- Video wall

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### glacier white

- Room, facility or campus
- Remote site
- Switch or LAN
- IP network
Configuration software and client control

Easily configure and manage everything in the system using Christie® Phoenix® web manager. Access sources and control the system from desktop PCs using the Christie Phoenix desktop client, or control the system from an external system using the Christie Phoenix API.

- Configure - using the embedded Christie Phoenix web manager
- Access and control - source data is efficiently transported over networks using H.264 streaming using the Christie Phoenix desktop client
- Control - from an external control system using the Christie Phoenix API

A Christie Phoenix system is configured from an embedded web page, and programmed and controlled using easy-to-use Christie Phoenix desktop client software. It can be managed from a third-party control system using the Christie Phoenix API.

Christie Phoenix API
- Interface with control systems
- Control layouts and select sources
- Query Christie Phoenix for system updates

Christie Phoenix web manager
- Embedded web page
- Configure AV and network sources
- Manage displays and video wall configurations

Video wall one, room one

AV control systems, servers or PCs

Switch or LAN

Christie Phoenix desktop client
- View sources
- Create layouts and windows treatments
- Control video walls and displays
- Interact and manage source content
- Detect, import and manage PTZ on ONVIF-compliant IP cameras
Summary

Christie® Phoenix® is a powerful network-based video processor designed to address the challenges faced by control rooms and applications that must leverage the use of data on distributed displays and operating areas. It has the flexibility and scalability to interface with and control a wide range of control room sources, and distribute that data effectively over IP networks. A control room system that includes Christie Phoenix can benefit from the cost-effectiveness of transporting sources over a secure, isolated LAN or it can provide broad access to the data, making content accessible to distant displays served by Christie Phoenix nodes or users with the Christie Phoenix software client.

Questions?

If you have questions, or if you’d like to speak to a Christie representative, please contact us. We have a network of industry specialists who can address your detailed questions and help you make your technology investment decision with confidence.