

# Building “IP Fluid” Cyber Centers

A Whitepaper for an Activu and ClearCube Solution

activu®



CLEARCUBE

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## Introduction

Initiatives to create dynamic Cyber Command Centers to respond to mission-critical situations are on all civilian and military agendas. Activu and ClearCube, both innovative technology companies with respective solutions that lead their technology sectors, present a turnkey “best in class” visualization and collaboration solution that empowers mission-critical operators with a dynamic flow of visuals and data over IP to increase their response efficiency to unprecedented levels.

### ***Activu Technology Overview***

Activu is the leading provider of highly secure, scalable and robust IP-based visualization and collaboration solutions for mission critical command and control center environments. Activu’s solution allows easy, instantaneous, real-time two-way sharing of practically any type of analog or digital information (video, voice, data, images, text, applications) across the network and across multiple geographically-dispersed display devices - from large video walls to mobile devices and smartphones in the field - to develop a common operational picture (COP), improve situational awareness (SA) and significantly improve the quality and speed of mission-critical decision-making.

Activu’s network-based architecture enables seamless information sharing between multiple agencies and stakeholders, with easy-to-use annotation and collaboration tools that foster constructive ideation and optimal decision-making. Moreover, Activu has deep design, customization and installation expertise honed through over 300 deployments in highly sensitive military, government, public sector and private facilities across the world.

### ***ClearCube Technology Overview***

ClearCube Technology leads the industry in high-performance, centrally hosted workstation solutions. ClearCube specializes in delivering vital computational resources to the desktop well beyond the limitations of legacy PC workstations. ClearCube offers a complete suite of host-based architectures -- from power users’ dedicated 1:1 blade PCs to Virtual Desktop Integration (VDI) and blended, flexible architectures, with a variety of end-point devices that support the full range of protocols and technologies. ClearCube customers gain higher availability, increased manageability and improved security within a smaller desktop footprint, and lower heat and noise emissions into the workspace. Like Activu, ClearCube too has a long list of successful mission-critical deployments with government and non-government agencies that have made it a leader in delivering innovative command center solutions.

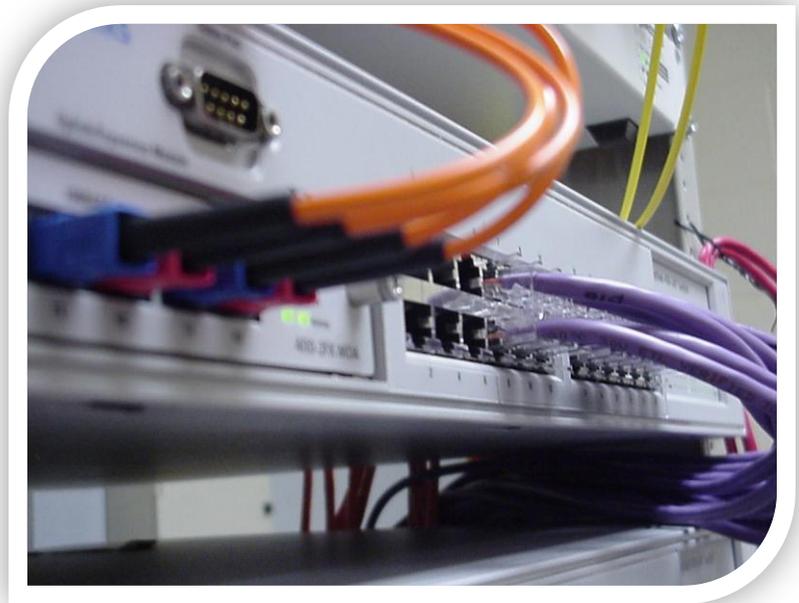
## Legacy, Obsolete Technologies & Solutions

### ***Visualization Solutions***

Control rooms and command centers for such mission-critical applications as defense, homeland security, traffic, rail, utility and network management, typically feature large, centralized wall displays

showing an aggregation of data and video, providing a common operating picture to improve decision-making and incident response.

Such large-scale visualization has traditionally been considered an audio-visual (AV) component of control room design, due to the large-sized and/or large amounts of connected display components typically utilized. However, advances in IT technology and the power of the network are resulting in a shift from AV to IT based visual information distribution within the control room and beyond: from a *circuit switched* to a *packet switched* architecture.



Traditionally, an architect, interior designer or GC would engage an AV consulting firm who might also provide acoustical and lighting design, or the client might directly engage a trusted AV integrator they have worked with for their general audio visual needs.

The resultant design and system would therefore typically be AV based, reflecting the focus and skillset of the consultant and/or integrator, with sources and displays hardwired together through an audio/video switch feeding a proprietary video wall processor to allow multiple sources to be simultaneously displayed.

And this legacy approach to control room visualization is still the norm despite a decade of availability and overwhelming evidence of the benefits of an information technology (IT) based approach to large-scale visualization.

In an IT approach, information sources, both video and data graphics based, are streamed over the network, avoiding the cost, complexity and distance limitations of a traditional audio visual hardware approach. Sophisticated network management software and collaboration tools allow information to flow wherever it is needed, safely and securely, including to and from the field and to/from other jurisdictions and commands, and allowing also for easy and effective collaboration between individuals, teams and sites.

### ***Centralization, Virtualization and Networking Solutions***

Workstation technology over the past 20 years left applications to rely on the processing power of end user workstations. IT managers also struggled with local desktop management, maintenance and security issues. End users often had to make multiple physical connections to perform their tasks, which

resulted in poor reliability, weak security and a multitude of difficult management problems. These problems, inefficiencies and limitations drastically hindered efforts to enhance collaboration capabilities and diminished the efficiency needed in critical operations centers.

Now, with the advent of desktop virtualization there is a growing opportunity to address and mitigate previous limitations; however, providing the performance necessary for the mission still remains a significant challenge. This is a challenge that ClearCube has overcome.

## Newer, State-of-the-art, Scalable, Future Proof Solutions

### ***Visualization and Collaboration***

With Activu, Cyber Center managers can advance the visualization paradigm by creating a network layer that puts their staff and agents at the center of the information ecosystem. With Activu, agencies can dynamically aggregate information from anywhere in the network and *visually integrate* it with other information feeds and sources onto display walls, panels, desktop PCs, laptops, handheld tablets, smartphones or any other fixed or mobile network connected devices. This consolidated visual information can be assimilated, analyzed and shared person-to-person, team-to-team, display-to-display and site-to-site to create a truly dynamic collaboration environment. Cyber Center personnel could also share this information with Activu’s new “Etime” system or with Activu’s TSC application. The power and value of this information sharing will be significantly enhanced once the “Etime” system is rolled out worldwide, as currently planned.



**Figure 1: Activu- Consolidated visual information can be assimilated, analyzed and shared person-to-person, team-to-team, display-to-display and site-to-site to create a truly dynamic collaboration environment.**

Activu gives system administrators and individual users a high degree of control and flexibility with role-based security and access rights (centrally administered within the Activu system) and the ability for each user to define his own information environment (a user defined operating picture) with flexibility to share information as permitted or as required based on rules, policies and procedures. This ensures a high level of system and application security and usage flexibility, and results in dramatically improved decision making that leads to more effective and efficient operations.

After its design, configuration and installation, Activu's Internet Protocol -based software suite can seamlessly mesh with a Cyber Center's dual SIPR network environment to provide complete connectivity between people and information, with full flexibility to configure and dynamically change what information is displayed at any point in time, on any display wall or individual device, in any physical location.

Activu has been designed, from the ground up, to be a network-based solution so there is no need for extensive cabling or hardware upon initial installation, nor extensive physical reconfiguration as and when requirements change. With centralized administration, new network elements such as users, information sources, display devices and locations can easily be added on. Activu also delivers remote monitoring via location-to-location synchronization and mirroring capabilities. The system can be configured to either remain static or flexible and changing based on the requirements and preferences of the Cyber Center and can adapt to situations or events as they occur.

## Security

Activu has designed and implemented multi-level visualization and collaboration solutions for the Defense and Intelligence community, Homeland Security, Emergency Management, civilian agencies, as well as for Network and Security Operations Centers.

The Activu solution provides secure, segregated multi-level network display solutions that have been certified and accredited. With Activu, the Cyber Center can assign and centrally administer role-based security and access rights and specify interfaces, functionality and source access for individuals and user groups based on security clearances and agency guidelines. Activu understands that system security is of profound importance and has built in advanced security algorithms to deliver a secure 24/7 environment for collaboration, content management and device control in a multi-level environment.



## Security Summary

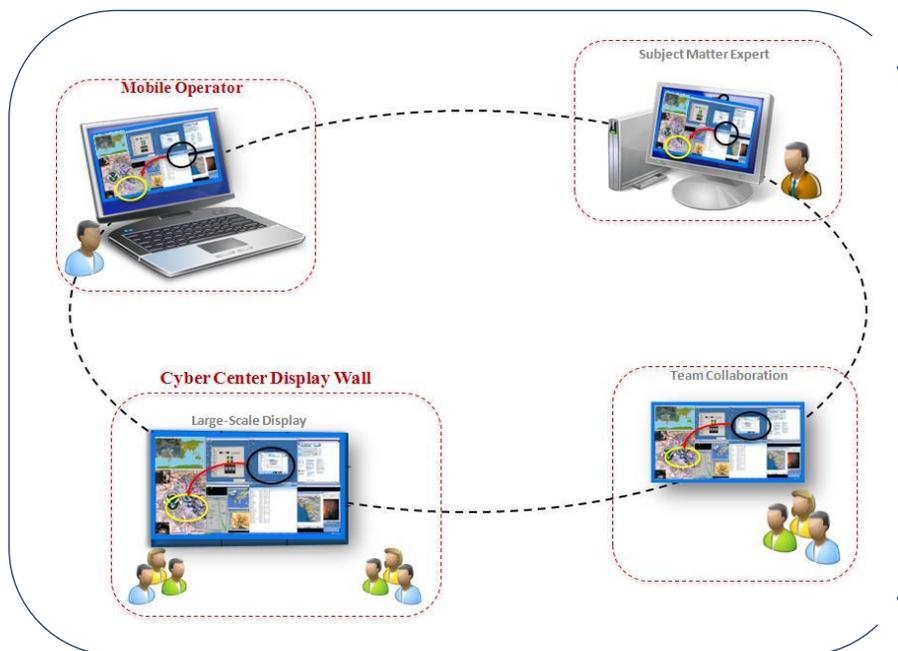
The visualization and collaboration solution proposed in this whitepaper meets FIPS Encryption standards:

- 192-bit Triple DES encryption between Activu SW modules
- 256-bit AES encryption between Agent & System server
- 160-bit SHA-1 hash password protection
- Net-centric: runs in single and multiple segregated LAN/WAN network environments
- Content mirrored in other locations for remote monitoring purposes
- Network isolation capability

- Strong password enforcement for users
- Windows authentication
- Centrally defined and administered role-based security policies
- Real-time action logging by individual user
- Display wall zone control
- Save system database files to network drive for added back-up security

### Activu's TeamShare Collaboration Module

**TeamShare™** is Activu's peer-to-peer collaboration environment that allows individuals and groups to share, discuss, annotate and edit screen content from desk to desk and site to site. TeamShare creates a virtual dynamic shared workspace that can be displayed on any desktop, panel, wall display or mobile device. Individuals or teams, regardless of location, can view graphics, video streams and webpages, jointly work on MS Office documents, use shared whiteboarding tools for discussion, strategizing and clarification, and save and print information as needed. At their discretion, authorized users can push images, content and data to other display devices on the network such as video walls or LCDs for review or sharing.



**Figure 2: Activu- Visual information and distributed interactions are all aggregated and displayed in the visual context in real-time**

TeamShare sessions operate in two modes: Teamwork and Presentation. In Teamwork mode, all participants can control the content shared during the session and actively engage in whiteboarding. In Presentation mode, participants have view-only capabilities while the presenter controls session content.

## Peer-to-Peer Collaboration Summary

- Share content among individual users and groups - within the organization, with field staff and with outside agencies
- Add, resize, reposition and remove live sources
- Select sources from the resource explorer of the TeamShare window
- Work together on applications, documents and web pages
- Annotate, across the group, with multi-user white boarding
- Text chat between operators in a TeamShare session
- Touch/Multitouch capable
- Two modes: Teamwork and Presentation

## ClearCube Solution

For mission-critical operations centers, ClearCube offers Blade PC workstations that consist of a dedicated Blade PC housed in a rack mount chassis in a data center. The Blade PC plugs into the customer's IP network and seamlessly connects with a Zero Client at the desktop. This desktop zero client is free from issues related to operating systems, local memory for image management and processing or patches and updates because all of this is handled at the Blade PC level. Furthermore, ClearCube offers hardware and software layer protections against any USB thumb drive or other storage device introducing or removing data from that workstation. The host Blade PC is configured to specifically address the needs of the analyst or executive position it supports and its architecture includes a dedicated video graphics processing unit (GPU) that delivers optimum high definition, full 60 frames per second performance on up to 4 monitors, based on user needs.

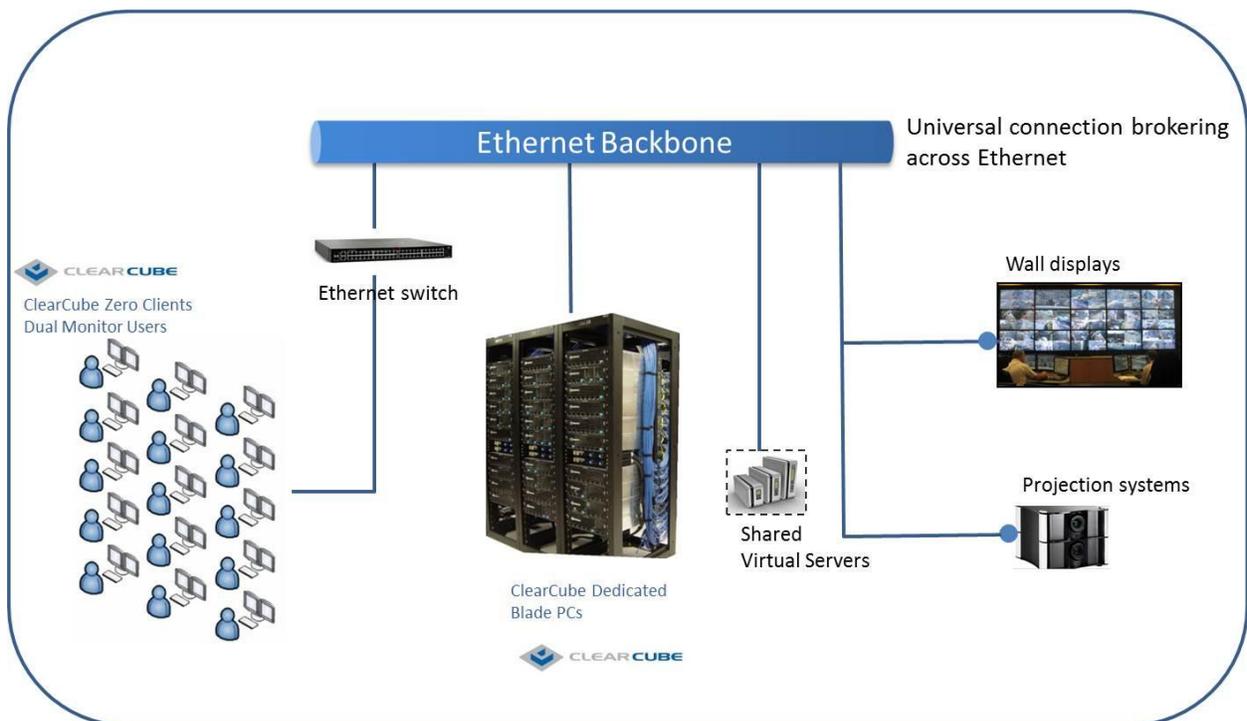


Figure 3: ClearCube IP Fluidity Conceptual Diagram

Command centers significantly rely on clear high definition visuals because much of their source data is in graphical forms such as video streams, satellite images, maps and photos. And ClearCube's Blade PCs play an important role in enhancing visual performance. This is where operators realize the power of the Blade PC solution because each Blade, with a 1:1 CPU/GPU ratio, is dedicated to one zero client and delivers full application and graphical processing power to operator screens and simultaneously, through Activu's software distribution engine, to large scale visualization devices, video walls and distributed clients such as tablets, desktops and smartphones at various command center or field locations.

Environments deploying Blade PC technology experience higher availability of systems, greater physical and data security, improved operational performance and improved ergonomics with less heat and noise. In addition, Blade PCs offer a smaller equipment footprint, lower IT operational costs and easier management. This centralized architecture

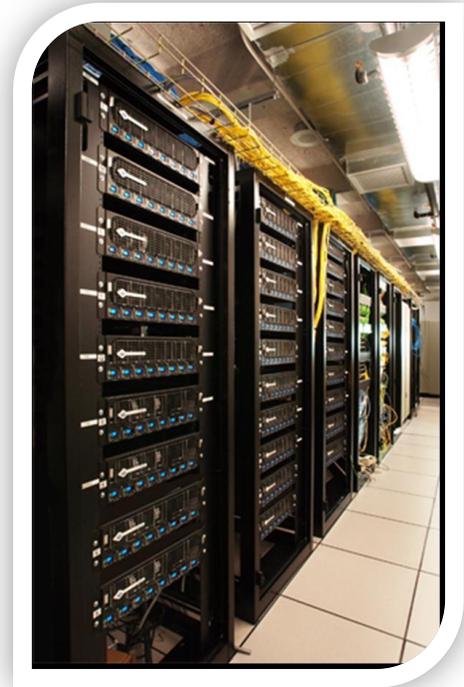


Figure 2: ClearCube Dedicated Blade PCs

**CLEARCUBE**

## High Performance PCoIP Zero Clients

- Copper connected
- Fiber connected
- Copper connected with Smart Card Reader
- DB-9/DB-25
- Integrated VPN
- Fiber connected with SIPRNet token reader

Figure 5: ClearCube Zero Client product family

helps IT departments by delivering simplified high availability administration and ease of access to infrastructure components. When physical support is necessary, the need to enter and disrupt end user workspaces is also eliminated. From a security perspective, desktop clients contain no data at rest as they are ASICS-based devices with no OS or storage memory on board. Therefore, loss of zero client equipment does not result in loss of data.

ClearCube's zero clients feature integrated CAC and SIPR token readers and both copper and fiber media interfaces, and so deliver a full set of alternative access capabilities to fit the customer's network infrastructure.

Centralization initiatives are driven by organizations that want to remove PCs from the work area to improve ergonomics, reduce noise and heat, increase security by placing the computers in a data center, and achieve greater management efficiencies by centrally locating workstations in the data center. These organizations also want to retain the familiarity and features associated with dedicated PCs: high performance, application compatibility and no additional learning curve. ClearCube provides the benefits of virtualized servers while retaining centralized Blade PCs for power users, senior leadership and specialized 3D graphics applications. ClearCube delivers the best of both worlds – virtualization's higher availability, lower ownership costs and better flexibility along with centralization's benefits that minimize deployment risks because IT support staff is familiar with dedicated PC architectures.

## **Joint Activu & ClearCube Solution**

### ***Cyber Command Centers Need IP Fluidity***

Activu and ClearCube's IP-centric solution brings an unprecedented level of flexibility and productivity to the Cyber Command Center work environment. Activu/ClearCube technologies add the freedom and flexibility of *IP Fluidity*<sup>™</sup> to the work environment. The backbone concept of IP Fluidity is that data connections can be "brokered" (or routed) to and from information sources. IP Fluidity changes the IT intelligence game by breaking cumbersome chains of physical connections and by untethering valuable content from fixed data sources so visual data can flow to wherever it can best create visual value.

With IP Fluidity, data consumers can roam with confidence to other places within the command center room, to other rooms, to other floors, to other buildings and to the field, secure in the knowledge that active data and visualization will follow. By utilizing ClearCube zero clients that have no operating systems, no storage, no memory and no local data, intelligence workers can connect securely from any desktop location. And with Activu technology, visual information that needs to be displayed on video walls or projection panels can come from any network source and be routed to any network location. As a result, organizations are no longer physically tethered by specific cable runs to information and visual sources but can still enjoy full access to them. In a nutshell, the combined Activu/ClearCube IP Fluidity solution is designed to deliver significant productivity benefits to new Cyber Command Centers.

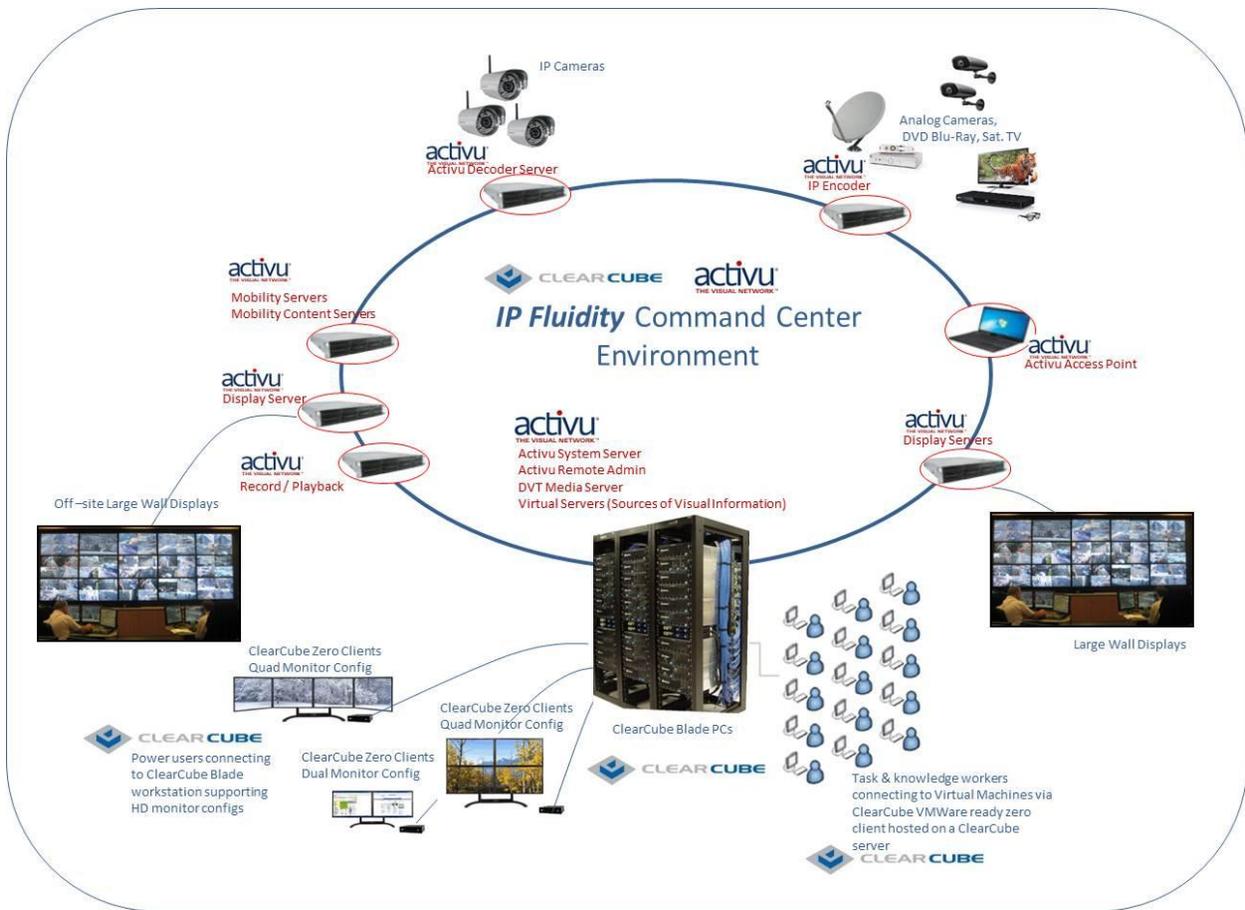


Figure 6: Network Environment with “IP Fluidity” comprised of Activu and ClearCube Technology solutions.

Command Centers are dynamic work environments with demanding mission-critical requirements. “Old school” distributed PCs with hard-wired visual presentation devices create significant barriers to fluid work flow and present users with the following challenges:

1. Access to data on distributed PCs is not flexible, forcing end users to be physically located near the PC to access its data.
2. Placing data on distributed PCs is not secure. Sensitive data at the end points of the network can be removed, stolen, tampered with, or contaminated.
3. Visual data using non-IP-based audio-visual equipment is not routable, is hampered by specific cable run connections with distance limitations, and is therefore extremely limiting.

The combined solution proposed here addresses each of the challenges listed above by capitalizing on advanced innovations, as follows:

1. Allows end users to use any ClearCube zero client device at any location to access secure data that is delivered across the network from centrally located and centrally managed Blade PCs.
2. Gives end users intelligent roaming capability. For example, an end user can suspend an application session, physically move from one zero client location to any other zero client

location (perhaps to converse with another end user about the information or task at hand) and immediately resume the previous application session at the new zero client location while maintaining all security rights and privileges at that new zero client.

3. Provides stateless secure zero clients with no local data so that, when powered off, no data remains in the work area.
4. Provides zero client devices with policy-based USB lockout which blocks end users from using USB drives, CDs or portable storage devices to download sensitive information or upload malware and viruses.
5. Gives end users the ability to move visual display images and data streams across physical boundaries to other command centers, executive conference rooms (using Activu's Etime solution), training centers, field desktop or mobile locations, and dispatch centers.
6. Enables robust collaboration where teams can share visual information and data without being physically present next to each other.

Both companies and technologies complement each other in delivering IP Fluidity to the command center environment. Implementing one technology without the other provides some of the benefits but weakens the overall impact of IP Fluidity. Cyber Command Centers need the ability to access, display and share data and visuals without unnecessary limitations, which this combined solution provides in a secure, flexible, cost effective, scalable and future-proof manner.

## Summary

The combination of Activu and ClearCube innovations and technologies, with their common network-based framework, meets the forward-looking needs of "best-in-class" mission-critical information centers. The ability to fluidly share information with other partner agencies (at the primary agency's sole discretion) enhances security, operator performance, situational awareness and collaborative decision making with a common operating picture, and therefore significantly improves the speed and quality of decision-making and impactful response. Activu and ClearCube's staff are committed to developing innovative, cost effective technologies. Our solutions are already successfully at work, 24/7, in multiple mission-critical environments across the U.S. and in U.S. facilities overseas. With our joint solution, we look forward to making a small but vital contribution in helping the customers in its various missions in the U.S. and abroad to make the world a safer, more secure place, now and in the future.