

Overview

Company: Headquartered in Milford, Connecticut USA, with representative and support offices worldwide. Products are made in the USA, Trade Agreements Act (TAA) compliant, and comprise Commercial Off the Shelf (COTS) technology. Thinklogical is a subsidiary of Belden, Inc. (NYSE: BDC), a global provider of cabling and connectivity systems based in St. Louis, Missouri.

Products: Secure, high-performance signal extension and switching systems. Information Technology (IT), Audio Video (AV), Video Distribution System (VDS), Keyboard, Video, Mouse (KVM), and Video Teleconferencing (VTC) peripheral data integration and distribution systems for C2/C4ISR and related, video-rich application use cases.

Capability: The only mid-to-large scale fiber-optic IT, AV, VDS, KVM, and VTC signal management devices that are information assurance (IA) accredited to distribute *multiple* classifications (unclassified, coalition, secret, top secret, etc.) through a single switch, to distances up to 80km, without alteration or compression while maintaining near-zero (microsecond) added latency. Solutions enable instant situational awareness and faster decision-making and simplify C2 system management while reducing AV and IT infrastructure size and cost.

Accreditations: Common Criteria EAL4, Department of Defense Information Network (DoDIN) Approved Products List (APL), DoD Unified Capabilities Requirements (UCR), Cybersecurity (CS) Information Assurance (IA), Joint Interoperability Test Command (JITC) Interoperability (IO), DoD Risk Management Framework (RMF), Defense Information Systems Agency (DISA) Security Technical Implementation Guides (STIGs), Underwriters Laboratory (UL), NATO Information Assurance Product Catalogue (NIAPC) Evaluation Scheme: GREEN, and ISO compliant.

Executive Summary

Thinklogical, A Belden Brand, is a US-based manufacturer of secure, high-performance, networked, signal extension and switching infrastructure products designed for defense, intelligence, and homeland security applications. Systems enhance headquarters command and control/C4ISR, joint operations centers, secure VTC, UAV ground stations, air operations, naval ship combat information center, and simulation and training applications, among others.

Thinklogical systems allow organizations to access and distribute video-rich, multiple-classification information -- from any source to any authorized destination -- for increased collaboration, enhanced situational awareness and improved mission flexibility, quickly and securely.

Thinklogical's product portfolio comprises a wide range of uncompressed, high-bandwidth (up to 10Gbps) signal management solutions ranging from audio, video, KVM (keyboard, video and mouse), and USB extenders and matrix switching systems, as well as image processors, signal converters, and camera extension products.

Thinklogical extenders and matrix switches support all common AV and IT signal formats and interfaces, including: DVI, Dual-Link DVI, HDMI, DisplayPort, RGB, VGA, 3G/6G/12G SDI, , SD/HD/2K/UHD/4K, SMPTE standards 424M, 292M, 259M, 372M, 425 level A and B, PS/2, USB keyboard & mouse, USB HID/1.1/2.0/3.0 (2.0 at 480Mbps), USB C, FireWire 800, Analog Bi-Directional Stereo Audio (balanced & unbalanced), Digital Audio (AES3 & S/PDIF), 10/100 Ethernet, RS-232/422, and more.

Systems are information assurance (IA) accredited to the Common Criteria EAL4, NATO Information Assurance Product Catalogue (NIAPC) Evaluation Scheme: GREEN, TEMPEST SDIP 27 Level B, and U.S. DoD Defense Information Systems Agency (DISA) Joint Interoperability Test Command (JITC) Unified Capabilities Requirements (UCR) APL 2013. Thinklogical is certified to ISO 9001:2015.

Why Thinklogical?

Thinklogical enables defense and intelligence organizations to instantly transmit video-rich data to achieve faster situational awareness for decision making. Desired mission outcomes require reliable access to the right information at the right time.

Mainstream audio-visual and IT systems are not designed for secure command and control applications, and they are not designed or approved to manage several sources and types of information with multiple classification levels. Such organizations typically maintain separate and parallel air-gapped data infrastructures – one for each classification or network – to accomplish what Thinklogical provides in a single IA-accredited system. Thinklogical allows agencies to be more flexible, efficient, and productive, reducing IT and AV system complexity, and lowering the overall total cost of ownership. Thinklogical systems can...

- *Deliver* 100% accurate audio, video, and data information from any data source to any destination instantaneously.
 - Enhance real-time collaborative workflows through “any-to-any” switching and sharing of video and data; any information source can be delivered to any workstation, SCIF or leadership enclave, conference room or video wall as authorized, enabling faster analysis and situational awareness.
- *Enable* authorized access to any network at any level of classification; streamline workflow and reduce information sharing complexity. Seamless collaboration with other authorized users occurs using simple keystrokes and mouse movements.
- *Provide* uncompressed, high-bandwidth signal transmission without altering or modifying the source signal or data in any way.
- *Create* adaptable configurations to meet changing mission requirements without re-cabling or moving hardware. Immediately increase or decrease security classification of a workstation and/or entire C2 center based on mission requirements or personnel access permissions.
- *Increase* the cyber security profile and reduce insider threat by moving computers and clients from the workspace to a secure IT server room - eliminate user access to systems, hard drives, and USB ports.
 - Consolidating and move computers (and other IT hardware such as VDI clients and VTC codecs) from the floor to the IT server room also enables resource pooling and system sharing, resulting in more flexible information access, reduced hardware and software license costs, lower maintenance, and other network management savings.

US DoD and NATO Approved and Deployed in Highly Secure Facilities

Users include all branches of U.S. DoD, U.S. intelligence community, NATO, allied and partner nations. Installed and activated with ATOs (authority to operate).

NEXT-GENERATION INFORMATION SYSTEMS FOR NAVAL SHIPS

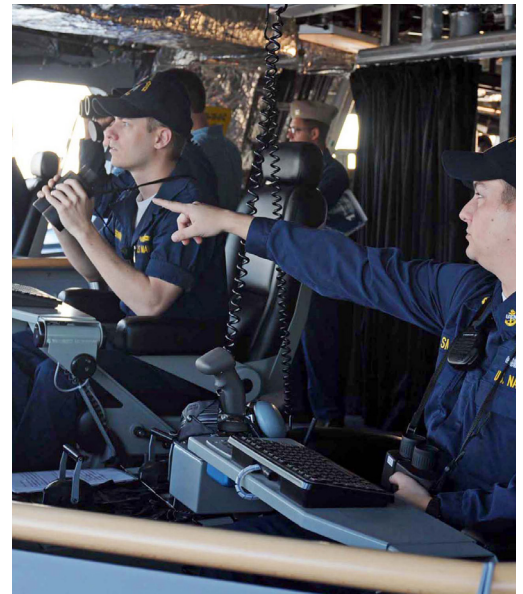
ENHANCING MISSION READINESS WITH IMPROVED INFORMATION ACCESS

The proliferation of multi-domain intelligence, surveillance, and reconnaissance (ISR) information has changed the landscape of naval strategic thinking. Real-time analysis of ISR information has influenced the form and function of naval system design, transforming modern navy ships into flexible collaboration platforms better able to support dynamic mission requirements.

WHAT IS THE CHALLENGE?

The video and data distribution infrastructure technology used in ship's Combat Information Centers (CIC) and Integrated Weapon System (IWS) rooms has not kept up with the expanding, information-driven mission. The configuration of traditional CIC and IWS operator stations -- each hard-wired for specific functions -- limits collaborative workflows and dynamic data analysis. These "siloes" legacy stations are inflexible and require significant staffing requirements to support the various dedicated operations.

There is also an increased need for getting access to multiple classified systems from the bridge, and ideally incorporate the bridge information into the CIC and IWS systems. If access to networks at multiple classifications is specified, legacy operator stations often cannot support this capability. If they do, the resulting makeshift system typically violates standard Information Assurance (IA) best practices for data protection and security by requiring the use of vulnerable VDI clients and/or clumsy manual desktop KVM (keyboard, video, mouse) switches to move between classifications at the station.



THE THINKLOGICAL SOLUTION

Next-generation, fiber-optic naval CIC and IWS systems based on Thinklogical video and signal distribution technology results in multi-function consoles that can easily and seamlessly connect to the combat management system, the IWS, and all other computer systems on board, including that of the bridge. Since the Thinklogical solution is certified to handle all types of data and classifications through a single switch, information can be easily distributed to and displayed on individual consoles as needed, or all at the same time, regardless of classification, with just a simple keystroke command. This multi-purpose system allows for greater situational awareness and flexible station reconfiguration for any role a ship has during an operation.



WHAT WERE THE RESULTS?

The next-generation system design from Thinklogical creates stateless, video-driven operator consoles, and delivers unparalleled flexibility in how commanders can staff, configure, and interact with the CIC and other ship systems. With the open, “any-to-any” switching architecture and “all glass,” video-driven console infrastructure enabled by Thinklogical, commanders can quickly re-assign any task to any console, providing a rapid response to the changing tactical needs of the ship. In addition, critical information can be accessed and analyzed more quickly, turning information in to knowledge and leading to faster and better-informed decisions.



INFORMATION ASSURANCE WHEN IN PORT

To ensure data protection, multi-classification systems on naval ship’s bridge, CIC and IWS must be secured when in foreign or civilian ports. To accomplish this with legacy systems, the high-class hardware such as VDI clients and desktop KVM switches are typically physically removed and locked in storage.

IA-accredited signal extension and restricted matrix switching products from Thinklogical helps minimize the requirement to remove hardware for data security when in port, as the actual computing and data sources are now locked away in a secure IT room. Thinklogical extenders are designed with no hard drives or solid-state memory to interact with the signal. No data or other information is stored within the extender; it essentially becomes a stateless terminal when it is disabled. In addition, Thinklogical extenders are not considered a Controlled Cryptographic Item (CCI) and therefore do not need to be removed from bridge or CIC and secured when in civilian port.

“Everything is in one space, which allows for a lot of flexibility, and a greater expanse of situational awareness. With the open architecture we are able to re-assign any task to basically any console that we have up here on the bridge.* We’re still just scratching the surface in terms of how flexible we can actually be.”

- Commander, US Navy Littoral Combat Ship (Independence-variant)

*LCS has bridge and CIC combined in one area.

This, combined with the capabilities of Thinklogical’s secure matrix switches to restrict where information is switched to, based on predetermined parameters, provides for instant resetting of operator stations from classified to unclassified (or blank) with a single keystroke by administrator, eliminating the requirement to remove hardware from the bridge or public areas for security reasons.

SAVE RACK SPACE AND REDUCE SYSTEM COMPLEXITY

Thinklogical’s patented, “any-to-any” switching technology is signal/format/protocol agnostic and supports all common AV and IT interface types. Additional data security, space savings and improved workspace ergonomics can be obtained using Thinklogical’s unique Integrated Client Transmitter. The ICT combines a full-featured Intel PC processor with a high-performance KVM extender, all in a compact ¼ RU module form factor.

With it, computing resources and accompanying cabling can now be removed from the operator station and chassis mounted and racked in secure IT server room. Computer I/O is extended to operators via Thinklogical matrix switches and KVM receivers over fiber optic cabling with no loss of video resolution or peripheral performance, and with the ability to switch data to any operator station required.

KEY FEATURES

- Multiple identical “stateless” operator stations
- NATO approved for switching of all classifications up to NATO secret
- “All glass,” video-driven data presentation
- Fiber cabling: lightweight, secure, high bandwidth
- Compute resources removed and back racked for security and easier maintenance
- Secure “any-to-any” switching of all signal types
- No compression of data; up to full 4K@60hz 30-bits-per-pixel (4:4:4) color video, uncompressed
- Low latency provides smooth and accurate trackball, joystick, and mouse control

BENEFITS

- More productive ergonomics
- Adaptable, flexible, scalable
- Full redundancy and resiliency
- Pooling of resources possible, reducing the computing resource per classification needed
- Access to all networks, classifications on any position
- Instant situational awareness
- Improved collaboration
- Fewer staff required to operate stations

REPRESENTATIVE INSTALLATIONS

- U.S. Navy Littoral Combat Ships (Independence-variant)
- Royal New Zealand Navy ANZAC Frigates
- Royal Norwegian Navy Frigates

BEST PRACTICES IN OPERATION CENTER DESIGN

ENABLE INSTANT SITUATIONAL AWARENESS AND MITIGATE THE INSIDER THREAT



AN ENVIRONMENT WITHOUT THINKLOGICAL...

OBSTRUCTS INSTANT SITUATIONAL AWARENESS

- Desks are “siloe” with limited hardwired network access
- Switching is restricted to computers at the desk, prohibiting collaboration with other desks or the video wall
- Cannot share control of a computer (keyboard, video and mouse) required for true collaboration
- Changing classification level requires bringing down room, enabling IT access, and moving equipment (time consuming)
- Desks are cluttered, hot, noisy and distracting, creating unproductive and inefficient work environment
- Computer failure results in desk being unavailable until IT can repair or replace
- Shorter system operational life, lower availability of equipment vs. back-racking compute resources in a secure IT environment

FACILITATES THE INSIDER THREAT

- Networks computers and cabling are not air-gapped according to IA directives
- Hard drives, USB ports and network cables are accessible to user, facilitating accidental or intentional data breach or hacking



AN ENVIRONMENT WITH THINKLOGICAL...

ENABLES INSTANT SITUATIONAL AWARENESS

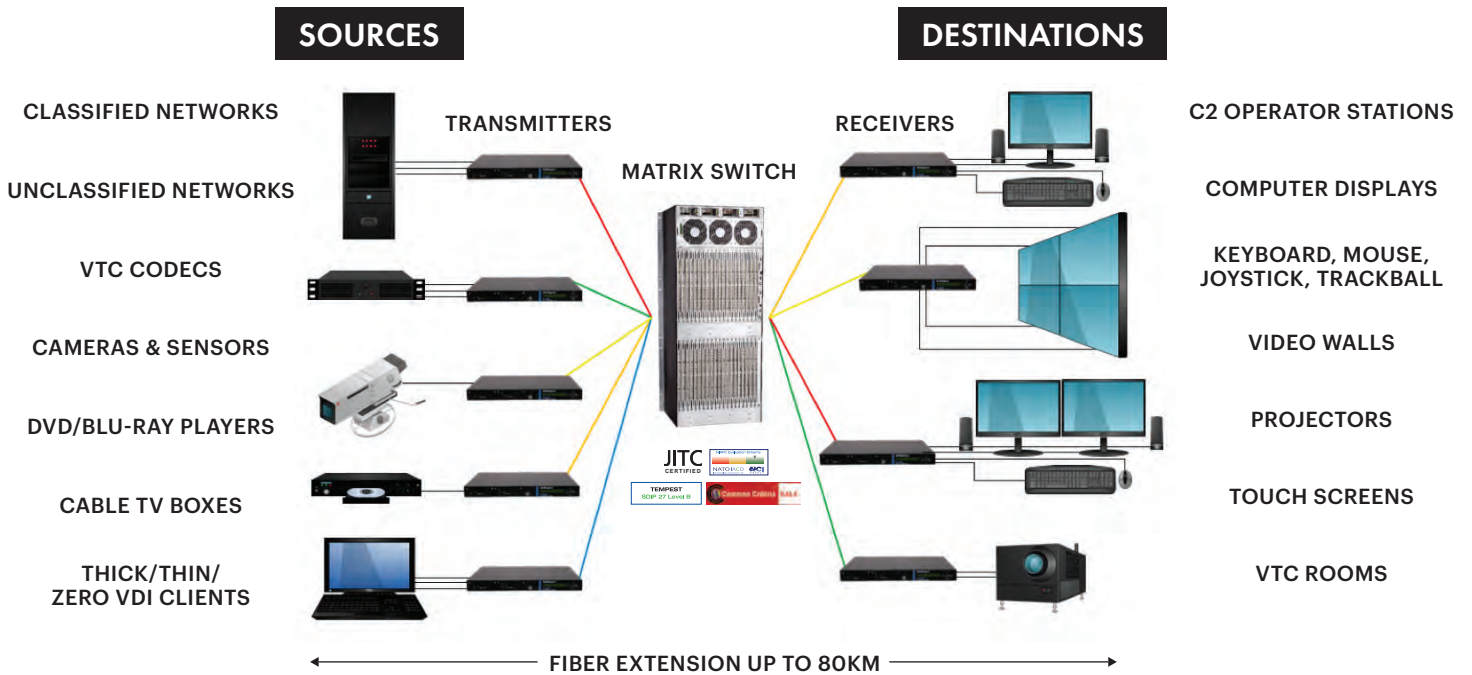
- Access any network at any level of classification
- Enable collaboration between desks, video walls, conference rooms
- Lower the classification level of a room in seconds, not hours
- Minimize IT clutter with less noise and a more productive and efficient work environment
- Higher availability and lower total cost of ownership (TCO)
- Reduce capital expense by pooling and sharing resources
- Adaptable, flexible, modular and future-ready architecture
- 24/7 mission-critical reliability with full redundancy and resiliency
- Make faster and better-informed decisions

MITIGATES THE INSIDER THREAT

- Back-rack computers and data resources for increased security and simplified maintenance
- Computers, USB port, and network ports are not accessible by the user
- Eliminate vulnerable manual desktop KVM switches
- Air gap requirement moved to the rack room
- The only mid to large matrix switch certified to information assurance (IA) accreditations: NATO NIAPC, Common Criteria EAL4, US DOD DISA JITC UCR and TEMPEST

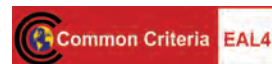
MULTIPLE CLASSIFICATIONS. ONE SYSTEM.

THE ONLY MID-TO-LARGE SCALE FIBER-OPTIC KVM AND VIDEO DISTRIBUTION SYSTEM CERTIFIED TO SUPPORT MULTIPLE CLASSIFICATIONS THROUGH A SINGLE INFRASTRUCTURE



Thinklogical offers an innovative, highly secure, end-to-end video and data extension and switching infrastructure that delivers the information you need, when and where you need it most. Our commercial off-the-shelf (COTS) video and KVM (keyboard, video and mouse) distribution system creates a highly-efficient and flexible command and control architecture, where any source of information may be instantaneously displayed at any end-point, while giving the system administrator the ability to restrict a data source from being displayed as needed to meet operational or security requirements.

WHY THINKLOGICAL? Mainstream audio-visual and VDS systems are not designed for secure command and control applications and are not efficient or approved to manage multiple sources of information at multiple classification levels. Organizations typically need to invest in and maintain separate and parallel air-gapped data infrastructures – one for each classification or network – to accomplish what Thinklogical can do with a single IA-accredited system. Thinklogical allows defense and intelligence organizations to be more nimble, efficient and productive, reducing IT and AV system complexity, and lowering the overall total cost of ownership.



NEXT-GENERATION SECURE MULTI-LEVEL VTC EXTENSION AND SWITCHING SOLUTIONS

KEY FEATURES

- Faster room reconfiguration lowers IT staff and contractor/ consulting costs
- Optimized network utilization leads to fewer network ports needed
- Less aggregate bandwidth required for comparable workflows
- Ongoing operational and maintenance costs reduced
- Reduced room/space/facility requirements for comparable workflows

BENEFITS

- Improved collaboration, workflows and human factors elements
- Mitigation of insider threat due to separation of humans from targets (data sources)
- Reduction of multi-level-security MLS physical assets
- Greater operational control of classification level changes

INCREASE FLEXIBILITY AND SECURITY WHILE LOWERING OPERATIONAL COSTS

Increase the flexibility and productivity of secure video teleconferencing facilities and respond to rapidly-changing mission requirements while reducing costs with Thinklogical.

WHAT IS THE CHALLENGE?

Secure video teleconferencing is a valuable tool to enhance situational awareness and facilitate real-time decision making, but traditional technology infrastructures can limit information sharing and collaboration with resources outside of the VTC room.

THE THINKLOGICAL SOLUTION

Thinklogical offers an innovative enabling technology that allows organizations to enhance and expand the capabilities of their existing video teleconferencing infrastructure and make VTC an integral part of command-wide C2 operations. This next-generation approach from Thinklogical enables the back-racking of codecs in secure IT machine rooms and extending video, audio and control to VTC facilities using an IA-accredited KVM signal extension and matrix switching system. This reduces the IT hardware and cabling footprint in the VTC room and moves codecs (and their vulnerable network jacks and USB ports) away from user access for increased data security.

Thinklogical's scalable, enterprise-class architecture makes VTC part of a facility-wide C2 infrastructure, enabling secure content from any source to be easily distributed and shared with command and control centers and



watch floors, SCIFs, leadership enclaves, and other locations, delivering vital information to where it's needed most. This facilitates staff collaboration, improves situational awareness and leads to faster and better-informed decision-making.

Thinklogical's signal management technology supports distributing multiple-classification VTC applications through a single, IA-accredited matrix switch, dramatically improving the functionality and flexibility of a typical VTC installation. With Thinklogical, classifications within a VTC room can be changed with a simple keystroke, eliminating the need to physically change hardware, connections, or requiring staff to move to a different room.

Switching the Thinklogical system off immediately makes the room "stateless," with no information being actively transmitted to or from screens or cameras.

Because Thinklogical simply transports the video, audio and control system signals between the rack-mounted codecs and the VTC room using fiber-optic cabling, switching the Thinklogical system off immediately makes the room "stateless," with no information being actively transmitted to or from screens or cameras. The room can then be quickly reconfigured for another session or classification level with no additional hardware or software changes.

With an uncompressed, high-bandwidth signal management architecture, Thinklogical's extension and switching system creates no additional latency when VTC codecs are extended from the rack room to the facility, regardless of distance, retaining the codec's original video image and audio quality and delivering smooth and responsive control system performance.



TCO SAVINGS

- Reduced codec hardware and licensing fees due to pooling
- More efficient asset utilization
- Less hardware, cabling, and reduced network infrastructure
- Lower IT admin costs due to consolidation of assets
- Future proof: supports next-gen VTC technology
- High MBTF and redundant, resilient components maximizes uptime

THINKLOGICAL VTC SOLUTIONS ARE:

- IA-Accredited: EAL4, JITC, NATO NIAPC, TEMPEST
- Certified for Secure Environments (SCIF)
- TAA Compliant: Made in the USA
- Proven, Commercial Off-the-Shelf (COTS) Technology
- Codec and Protocol Agnostic
- Interoperable with All VTC Products and Brands
- Compatible with All Common IT and AV Signal Formats and Interfaces

RECOMMENDED THINKLOGICAL PRODUCTS



TLX12 Matrix Switch



TLX48 Matrix Switch



TLX24 Matrix Switch



TLX Video, Audio and KVM Extenders

INTUITIVE DISPATCH SOLUTIONS FOR PSAP 911 EMERGENCY OPERATIONS

KEY FEATURES

- Immediate, real-time access from a single keyboard and mouse
- Realtime collaboration for instructors and supervision of new dispatchers
- Seamless and instant screen and application selection by just moving the mouse from screen to screen
- Jump to two pre-programed screens by clicking the top and side buttons of the mouse simultaneously
- Video and data can be moved to or from any desk position at any time
- Back-rack computers in a secure IT environment for security and cost savings
- Hot-swappable equipment modules for easy servicing and replacement

BENEFITS

- Faster access to video, audio and computer data
- Flexibility to share critical information and media where and when it's needed
- Improved collaboration, workflows and human factors elements
- Instant situational awareness leads to better-informed decisions and faster response times
- Reduced operator fatigue, stress and errors
- Ease of maintenance and less foot traffic in operations center
- Clutter-free workspaces and improved cyber security
- Maximum uptime in mission-critical, 24/7 applications

STREAMLINING OPERATIONS AND IMPROVING WORKFLOWS

Intuitive Dispatch solutions from Thinklogical provides 911 call centers, emergency operations centers (EOC), and public safety answering points (PSAP) with next-generation features and capabilities, enabling real-time information sharing, enhanced situational awareness, and faster, better-informed responses.

WHAT IS THE CHALLENGE?

- Dispatch facilities need the flexibility to manage multiple, simultaneous events and to quickly and easily share information among various agencies.
- Operators requiring access to multiple applications on several computers must stop activities to manually turn desktop KVM switch or move among several keyboards and mice.
- Dispatch for emergency services must operate 24x7 in a zero fault-tolerant environment with no or minimal downtime.
- IT staff needs access to computer consoles to maintain systems, potentially disrupting operations.

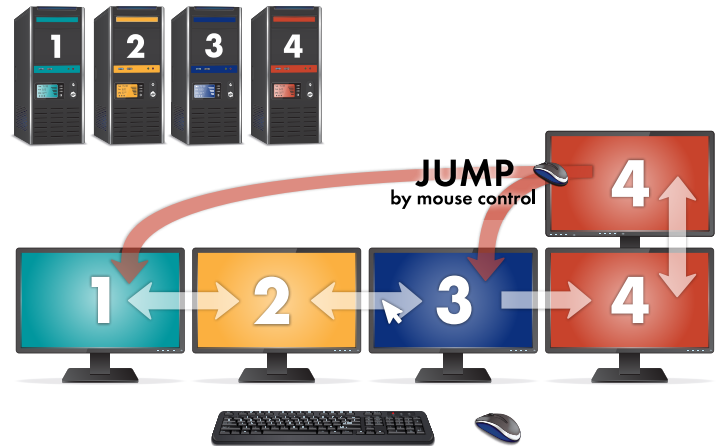


THE THINKLOGICAL SOLUTION

Thinklogical's Intuitive Dispatch system provides Immediate, real-time access to multiple applications, computers and video sources from a single keyboard and mouse, allowing users to obtain the information they need to make mission-critical decisions in seconds. The system delivers seamless and instant computer and application selection by just moving the mouse from screen to screen, eliminating the complexity of using a manual desktop KVM switch or having to use multiple keyboards and mice. Provides intuitive access to multiple independent computer sources without manual switching or interrupting workflow – and no additional software needs to be installed on computers or servers.

Our patented signal management technology supports distributing video, audio and computer data through a single high-performance matrix switch, dramatically improving the functionality and flexibility of a PSAP center. With Thinklogical, video and applications can be moved to any location in facility with just a simple keystroke, eliminating the need to physically change hardware, connections, or requiring staff to leave their positions. With an uncompressed, high-bandwidth signal management architecture, Thinklogical's Intuitive Dispatch system retains the original video image and audio quality with no latency and delivers smooth and responsive control system performance for reduced operator fatigue.

Thinklogical brings its expertise in secure defense command centers to the public safety community with rugged, unique, and innovative solutions that are designed to provide the redundancy and fault protection needed for emergency preparedness and dispatch communication to help secure life, property, and public infrastructure.



INTUITIVE MOUSE CONTROL

- Reduces the number of keyboards at the operator level by providing access to multiple computers and applications from a single keyboard and mouse.
- Introduce high-capacity, high-availability matrix switching that allows distribution of source materials from one to many users and “any-to-any” connectivity.
- Relocate operators’ computers and system controls from the dispatch floor to a secure IT room.
- Establish redundant systems to ensure nonstop 24/7 operations.



THINKLOGICAL INTUITIVE DISPATCH SOLUTIONS ARE:

- Interoperable with All PSAP and Emergency Dispatch Applications
- Certified for Use in Secure Environments
- IA-Accredited: EAL4, JITC, NATO NIAPC, TEMPEST
- TAA Compliant: Made in the USA
- Proven, Commercial Off-the-Shelf (COTS) Technology
- Compatible with All Common IT and AV Signal Formats and Interfaces

SECURE VIDEO DISTRIBUTION AND SIGNAL MANAGEMENT SYSTEMS TOTAL COST OF OWNERSHIP GUIDE

The need for faster and more accurate analysis of ISR (intelligence, surveillance, and reconnaissance) data is driving new investments in command and control technology, with the goal of enabling instant situational awareness and rapid decision making. Modularity and interoperability enabling a smooth transition to the next mission is also an important objective.

Next-generation signal management systems from Thinklogical deliver a host of benefits for C4ISR applications, including immediate access to video-rich information, mitigation of the insider threat, and a more productive and collaborative workspace that is nimble, flexible and responsive to changing operational requirements. Thinklogical's innovative KVM and VDS extension and switching technology offers government, defense and intelligence organizations a *measurable and sustainable* savings in total cost of ownership (TCO) when compared to alternative distribution solutions, both in capital outlay, and recurring sustainment expenses.

In these complex IT and AV environments, concerns about initial equipment procurement costs can be quickly offset by the added efficiency, reliability, and security provided by a Thinklogical solution. The ability to manage multiple classifications of information through a single IA-accredited Thinklogical system dramatically streamlines the IT and AV topology. Less computer hardware and cabling, fewer software licenses, reduced power and cooling requirements, and extended equipment refresh cycles all contribute to ongoing infrastructure and maintenance cost savings while increasing productivity and efficiency.

The chart below highlights the potential TCO benefits derived from implementing a Thinklogical system in a variety of typical use cases in defense and intelligence applications, including classroom training, secure ops and watch floors, video teleconferencing, simulation, and UAV/UAS/RPA operations.

TOTAL COST OF OWNERSHIP COMPONENTS/BENEFITS

(TYPICAL EXPERIENCE KNOWING THERE ARE EXCEPTIONS IN EVERY CASE)

Marginal Positive Impact on TCO	Some Positive Impact on TCO	Substantial Positive Impact on TCO
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TCO MEASUREMENT COMPONENT	CLASS ROOM	OPS FLOOR	VDS	VTC	SIM	UAS GROUND	UAS PILOT
CAPITAL SAVINGS							
A MORE EFFICIENT ASSET UTILIZATION							
B REDUCED NETWORK INFRASTRUCTURE							
C FEWER COMPUTERS AND LICENSES			N/A	N/A			
D FEWER CODECS	N/A	N/A	N/A		N/A	N/A	N/A
E CUSTOMER PROGRAMMABILITY (FOR CONTROL SYSTEM CHANGES)							
SUSTAINMENT & SOFT COST SAVINGS							
1 IT ADMINISTRATION COSTS LOWER DUE TO CONSOLIDATION OF ASSETS							
2 LOWER COST OF POWER & COOLING DUE TO LESS EQUIPMENT							
3 FUTURE-PROOFING FOR NEXT GENERATION TECHNOLOGY							
4 HIGH MTBF AND SIMPLIFIED IT INFRASTRUCTURE							
5 ROOM CHANGES LESS INTRUSIVE DUE TO PROGRAMMABILITY, MODULARITY AND INTEROPERABILITY. IN-HOUSE SYSTEM MANAGEMENT REDUCES CONSULTING COSTS.							
6 NETWORK UTILIZATION OPTIMIZED WITH FEWER NETWORK PORTS							
7 LESS AGGREGATE NETWORK BANDWIDTH REQUIRED FOR SAME WORK FLOW						N/A	N/A
8 REDUCED SOFTWARE LICENSING FEES ANNUALLY (FEWER COMPUTERS)						N/A	N/A
9 OPERATION AND MAINTENANCE COSTS REDUCED							
10 ROOM CHANGEOVER TIME DRAMATICALLY SHORTENED						N/A	N/A
11 REDUCED OVERALL FACILITY REQUIREMENTS FOR SAME WORK FLOW / USE CASE							
12 OPTIMIZED WORKFLOW AND HUMAN FACTORS							
SECURITY COST BENEFITS							
A MITIGATION OF INSIDER THREAT DUE TO SEPARATION OF THREATS FROM TARGETS							
B REDUCTION OF MLS PHYSICAL ASSETS							
C OPTIMIZE OPERATIONAL AREA CONTROL OF CLASSIFICATION LEVEL CHANGES					N/A	N/A	N/A
D MITIGATION OF MALWARE INTRODUCTION (USB HID)			N/A	N/A		N/A	N/A

CUSTOMER CASE STUDIES

OPTIMIZING OVER-DEPLOYED NETWORKS FOR OPERATIONS FLOOR

Legacy Approach Key Variables:

- **Ops Floor Desks:** 200
- **Networks at Each Desk (avg):** 5
- **TS Networks per Desk:** >1
- **TS Network Utilization per Operator:** 12 minutes / month
- **Operator Switching Method:** Desktop KVM Switch
- **Objective:** Remove Networks from Operators, Optimize Resource Usage and Workflow

By removing the IT hardware from the operator areas and back-racking them via Thinklogical, each desk can now easily and quickly change its purpose, configuration and use case to meet mission requirements. Additionally, the typical operator logged onto a specific TS network for about 12 minutes per month to maintain account privileges. Once computers were back-racked, the customer quickly realized that they could reduce the number of TS computer resources from 200 in the legacy method to approximately 75 and maintain the same workflow. Each operator can gain access to a TS computer, log on, log off and the computer will then be back in the “pool” and available for another operator. Power users have all the access they require without impacting ad hoc resource availability.



TRAINING AND NEXT GENERATION CLASSROOMS

Legacy Approach Key Variables:

- **Buildings:** 13
- **Classrooms:** 222
- **Seats per Classroom:** 25 plus an instructor
- **Network Resources (computers):** 5,400
- **Network Resource Utilization (max):** <20%



By pooling network and computer resources in “back-racked” IT rooms with Thinklogical, instructors can easily allocate the exact amount of resources needed for each class and then release them to other instructors at the end of the session. KVM and audio are allocated from a system of secure matrix switches and extended to the room via fiber optic cabling. Since no actual networks exist in any classrooms, they become “stateless” and not inflexible “curriculum silos” when no resources are allocated. Additionally, instructors have full monitoring access to each student’s screens and can collaborate by switching keyboard control anywhere within the classroom they want. This also eliminates a very expensive third party sub-system in each classroom for additional savings.

MULTI-LEVEL SECURE VIDEO TELECONFERENCING

Legacy Approach Key Variables:

- **VTC Rooms:** 14
- **Total Codecs for Site:** 56
- **Physical Location of Codecs:** Local to VTC Rooms
- **Associated IT Infrastructure:** VTC Room Closets

Security requirements dictate that there be sufficient preparation to each room prior to a secure VTC session. Once completed, the room must be secured once again to enable the next VTC session to occur. This required a significant burden on the IT and security personnel as well as downtime between sessions. Additionally, the number of Codecs required was maximized at several per room. The associated network infrastructure and local control software engaged network owners and programmers working under contract. Thinklogical facilitates back-racking enough Codecs to enable VTC sessions to take place in as many rooms as needed, at whatever security level required.





Air Traffic Control

According to the FAA, air traffic is projected to grow in the United States from 740 million passengers last year to one billion in 2015. This exponential growth has spurred the industry to invest in airport and air traffic control infrastructures and has accelerated the implementation of comprehensive next generation systems. The United States is not alone. Europe is experiencing explosive air traffic growth as well, with a critical need for air traffic infrastructure modernization. European air traffic is increasing on average of 2.7% per year and there will be an estimated 20.4 million flights by 2030. This has also prompted European nations to seek better ATC technology for more efficient operations.

By providing critical high-performance KVM extension and routing solutions, Thinklogical plays a key role in the effort of modernizing not only the nation's air traffic control systems, but systems worldwide. Thinklogical specializes in ATC infrastructure optimization and has a keen understanding of the heightened security requirements and regulations these organizations face. Thinklogical's systems and solutions help to limit ATC operational risks, improve workflows, abide by regulatory compliances, and provide state-of-the-art visualization solutions.

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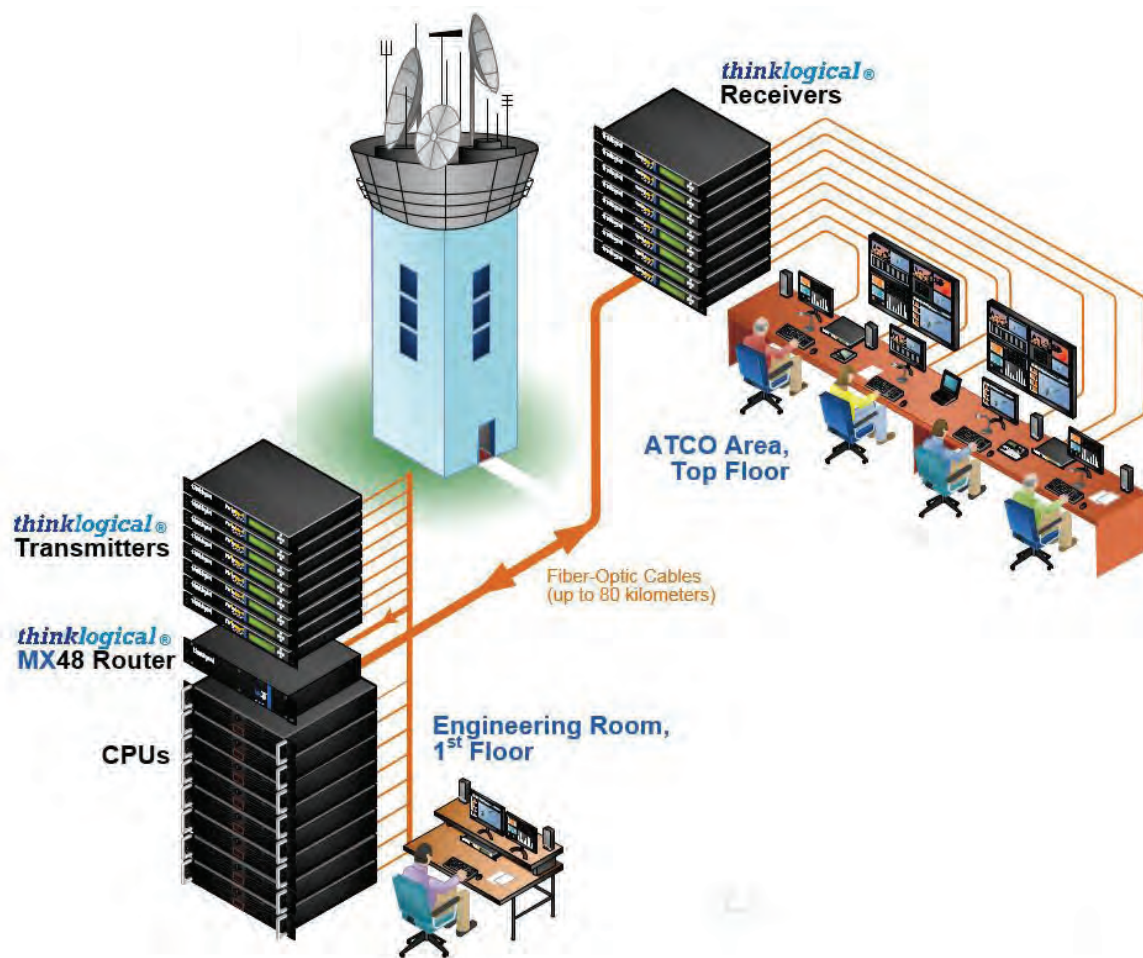
AIR TRAFFIC CONTROL

Thinklogical's KVM Extension system provides a secure, efficient and reliable solution to meet demands of the Air Traffic Control industry.

The continued growth in air traffic combined with heightened security concerns and new regulations focused on improving the quality of air traffic management requires an environment that is secure, provides immediate access to resources and delivers a work environment that ensures the highest level of concentration can be maintained during operations.

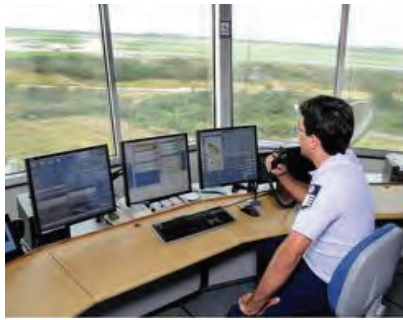
Leveraging its patented fiber optic technology, MRTS (Multi Rate Transmission System), at the foundation of its solutions, Thinklogical provides ATC infrastructures with end-to-end systems that securely transmit uncompressed video and data signals over distances up to 80 kilometers. ATC organizations using Thinklogical solutions are able to securely locate critical computing assets, away from user desktops. This frees up space in the limited confines of the control room while keeping the environment undisturbed by computer emissions such as heat and noise.

Thinklogical systems have been deployed in ATC organizations worldwide, with recent major deployments in Norway, Vietnam, China, UK and Saudi Arabia, in both civil and military applications.



Thinklogical's KVM and Video Extension and Switching Systems Support:

- Supported SMPTE standards 424M, 292M, 259M, 372M, 425 level A and B
- High Bandwidth - up to 10Gbps
- No compression - Zero latency - No dropped frames
- DVI/Dual-Link DVI/RGB/VGA
- HDMI/3G-6G SDI/DisplayPort/2K/4K
- PS/2 USB Keyboard & Mouse
- Analog Stereo (balanced & unbalanced)
- Digital Audio (AES3 & S/PDIF)
- RS-232/422
- USB HID/2.0/3.0 FireWire 800 (2.0 at 480Mbps)



Thinklogical Air Traffic Management Solutions

Thinklogical's Air Traffic Management solution combines a family of KVM transmitters and receivers, optical matrix router technology and a centralized system that provides maximum flexibility for establishing an environment that meets the specific requirements of air traffic controller facilities or airport control tower operations.

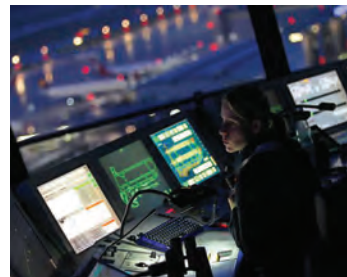
Keyboard, Video, Mouse (KVM) Extension

A broad range of KVM transmitters and receivers are available that provide the physical connections needed for air traffic controllers to access remote resources and to customize their workstation environment.

Air Traffic Controller workstations can be configured with dual interface DVI terminals and support up to four high resolution monitors at a single workstation. The keyboard, mouse and microphones are connected through standard interfaces allowing both voice and data communications. Additional peripheral devices can be connected via USB interfaces.

Thinklogical understands that technology innovation is seen as central to a range of key developments in this sector. Leveraging its deep understanding of industry knowledge and engineering competencies, Thinklogical solutions provide:

- **High availability and secure systems** that ensure immediate real-time access to mission critical computing resources located anywhere across facilities and operations
- **The only system that can deliver uncompressed video images (pixel for pixel, no dropped frames)** which are seamlessly transported to the end user, providing them with detailed and immediate visibility to critical images and data
- **Improved workflow dynamics by leveraging content and equipment access**, multiple computers can be accessed from one console
- **Hot-swappable product components**- in the unlikely event of a component failure and hot-swappable components (power supplies, fans, I/O cards) which provide for maximum uptime (24/7) and high availability
- **Extension of computing resources up to 80 kilometers**, which allows control rooms to be located away from the engineering or computer room
- **SFP+ modules are MSA compliant** - SFP+ are hot swappable and have a higher MTBF of 5.9 million hours
- **Integration with external CWDM and DWDM platforms** - provides further aggregation of fiber network
- **Industry leading MTBF across all systems and components**
- **Dry contact alarms and remote control and monitoring system** - provides a centralized awareness of the equipment performance and availability



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Defense & Intelligence

The Thinklogical Advantage in Mission Critical Environments and Secure Facilities

Having a complete picture of the current situation offers a clear advantage. Therefore, governments and their military have chosen Thinklogical's products and solutions over other manufacturers for their electronic transmission of video and data. And, here's why: Thinklogical's fiber-based, single thread, resolution agnostic systems deliver every pixel and refresh frame from end to end up to 10Gbps. Thinklogical understands that in order to support an uncompressed full resolution and full frame rate digital video interface (DVI) image roughly 5 Gbps of bandwidth is required. In addition, increased bandwidth is required to support associated computer peripherals, such as keyboard, mouse, audio, etc. Therefore, a system solution that does not provide sufficient bandwidth provides not only a soft image with dropped random frames and pixels, but peripheral latencies as well.

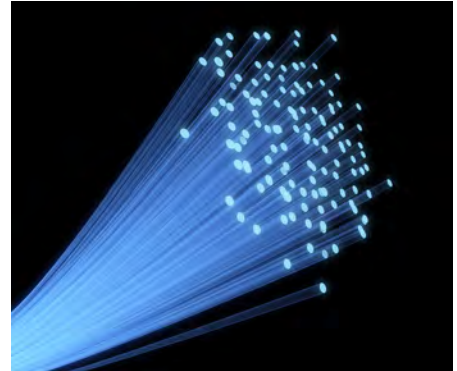
Within the demanding realm of military and defense installations, Thinklogical delivers products that meet the performance, reliability and security standards necessary to fulfill mission-critical visualization applications. Thinklogical systems have Accreditation for Common Criteria EAL4, NATO (NIAPC) Green Status, JITC UCR and TEMPEST approval. Common Criteria is an internationally recognized set of guidelines (ISO 15408), which define a common framework for evaluating security features and capabilities of Information Technology security products. The standard consists of several predetermined evaluation assurance levels, each one more stringent than the last. Common Criteria allows vendors to have their products tested against a chosen level by an independent third-party testing laboratory. Once completed, Common Criteria certifications are mutually accepted by 25 countries through the CCRA (Common Criteria Recognition Agreement), including the United States government. Common Criteria certification of security products is a requirement for purchases made by many governments within the CCRA regime.

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DEFENSE & INTELLIGENCE

Utilizing Fiber Optics in Secure Computing Environments

Thinklogical's products have been engineered and designed with defense and intelligence applications in mind. Therefore, Thinklogical's fiber-based systems use light pulses, not electricity for data transmission. This means that the data cannot be eavesdropped upon, intercepted, or disrupted by electromagnetic noise. Also, fiber is ideal in many different types of environments, it cannot corrode, it can be buried in all kinds of soil forms, and can be exposed to all kinds of atmospheres as well. Since the only carrier in fiber optic cables is light, there is no possibility of spark from a broken cable wire. Thus, fiber optic cables leave no room for fire hazards.



Secure Transmission of Data Between Black and Red Networks

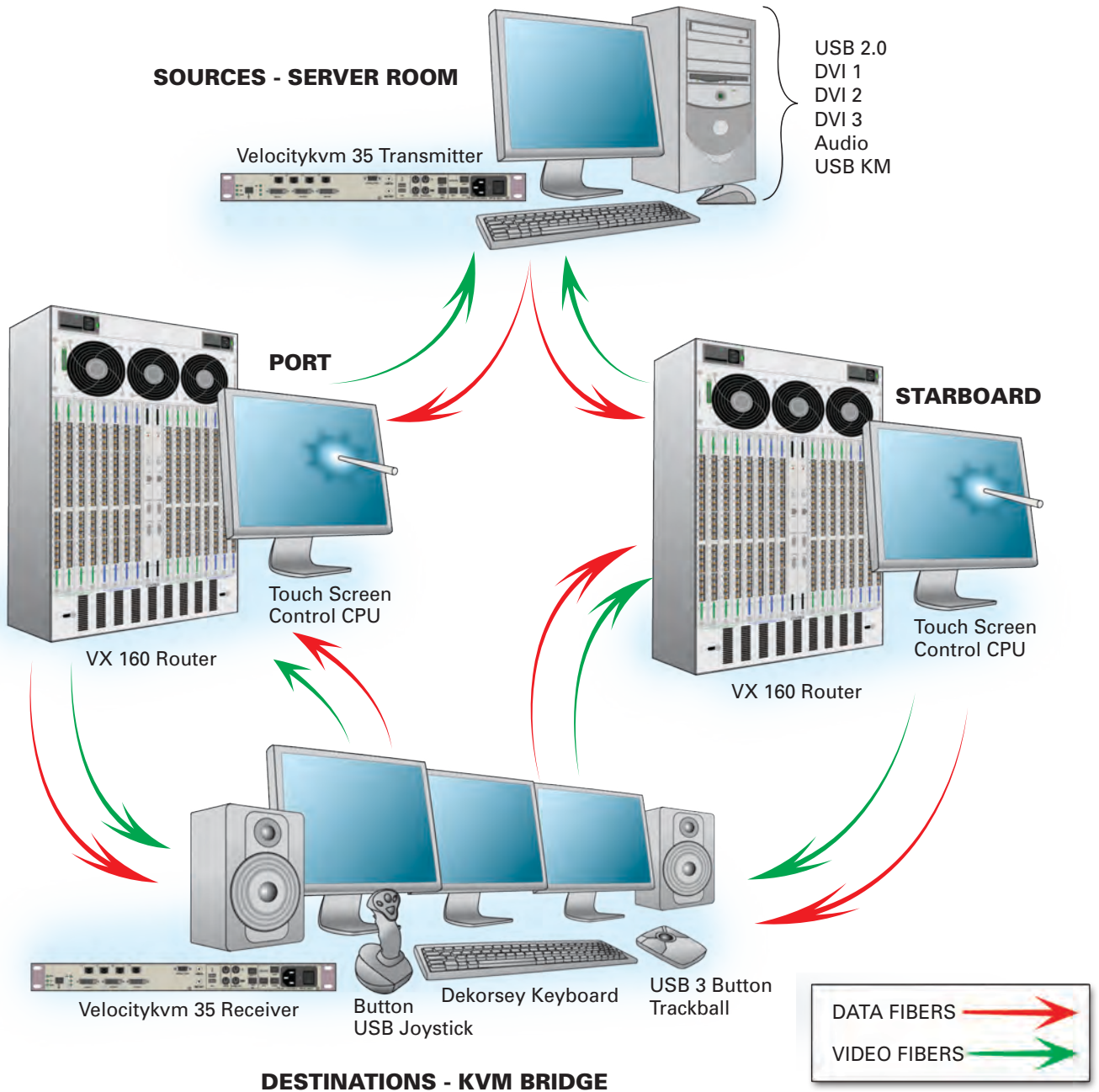
Accessing data can become of paramount importance in secure applications. In many instances, end users need to switch between two or more computers, at different classification levels, thus introducing data vulnerability as well as inefficiencies in productivity. In addition, strict security rules for the protection of classified information apply: That is, where networks with different security classifications are connected, it must be absolutely certain that classified information processed solely in trustworthy red networks is never transferred to black networks, where unauthorized personnel would have access to it. For this reason, Thinklogical's family of fiber optic extension, switching and routing products do not store or buffer any data transmission in its circuitry or components. Thinklogical's products follow strict User Data Separation policies in which there is no data flow between Transmitter Port Groups or Receiver Port Groups and any other physical port on Thinklogical routers unless an authorized, deliberate and logical connection has been established. Therefore, unauthorized personnel have no chance of retrieving data that has been transmitted, switched and routed on our products.



Thinklogical's extension systems are also capable of ensuring that only USB human interface devices (HIDs) function on target computers, by allowing only HID devices to be attached to ports. Therefore, non-HID devices such as flash drives, hard disk drives, cameras and printers will not be capable of introducing security vulnerabilities. These features have enabled our products and solutions to play a critical role in helping defense and intelligence departments and agencies overcome the critical infrastructure, collaboration and information sharing issues they face on a daily basis.

A Naval Shipboard Infrastructure Application

Extending, switching, and routing desktop peripherals and dvi video using Thinklogical's Velocitykvm 35 (with support for 3 dvi displays) and the VX 160 Router (routing and switching up to 160 sources to 160 destinations).



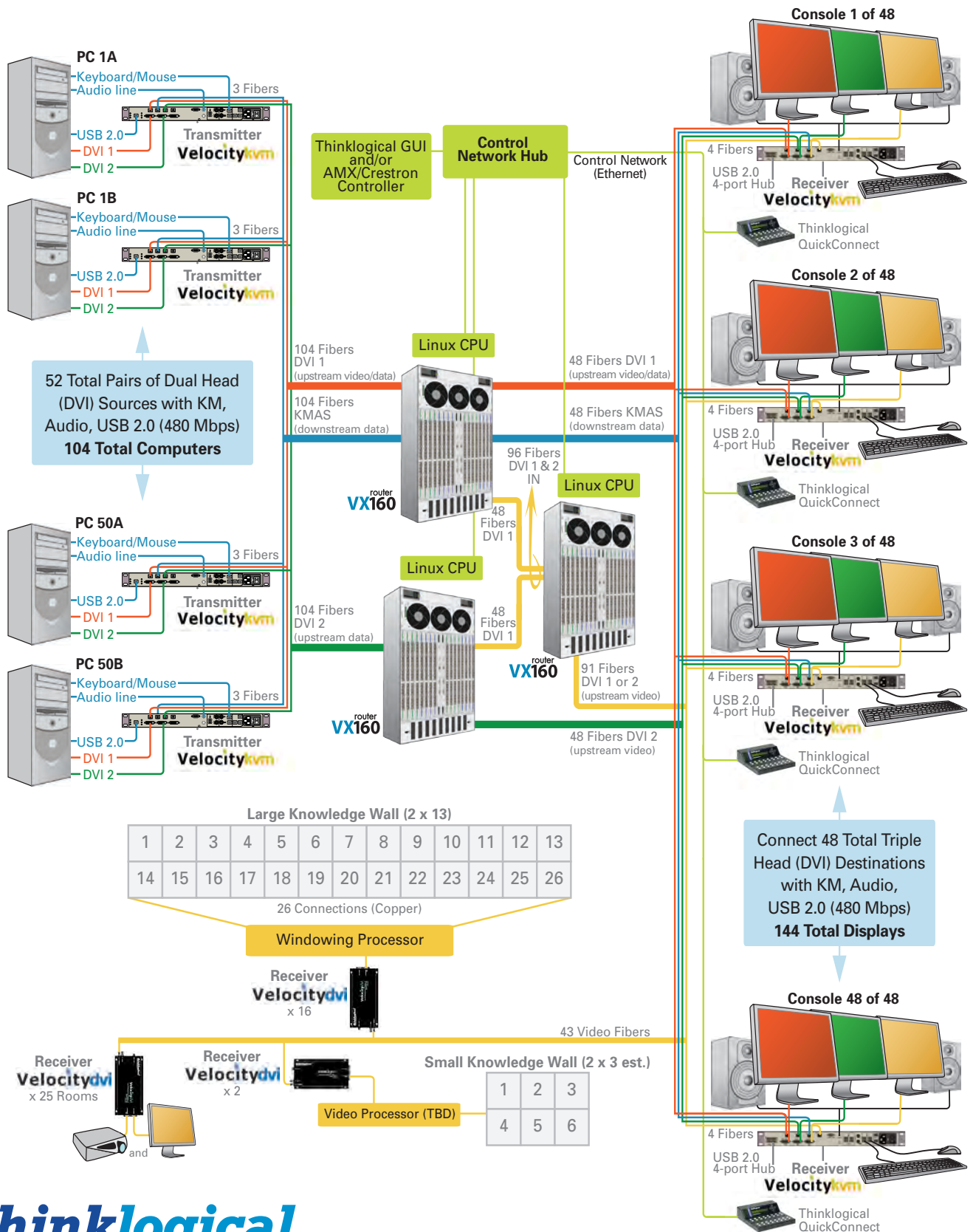
Secure, Powerful, Long Range KVM Extension and Routing Solutions

Our specialized solutions for advanced visualization applications, namely our Velocity line of video and KVM extenders and our VX Routers, create a deep synergy between military applications and Thinklogical solutions. Therefore, our switching and extension technologies are widely deployed and used within the infrastructure of training, simulation and immersive environments and applications. Applying the most advanced technology, Thinklogical's fiber optic systems assist in safeguarding infrastructure and information assets, all while playing a vital technological role in high performance visualization.



Thinklogical's video processing solutions are built on extraordinary technology, differentiated by Thinklogical's patented MRTS technology (Multi Rate Transmission System), which supplies a core platform for exceptional and enhanced image processing and quality. This technology successfully maintains digital video and peripheral signals over distance (up to 80 kilometers), with the ability to transport every frame of a video stream with no compression, along with all desktop peripherals (keyboard, mouse, USB 2.0, 3.0 and FireWire 800) with no latency. Thinklogical's MRTS technology plays a critical role in many applications, especially in the military arena, where real-time collaboration applications are in place and eliminating dropped frames and latency is of paramount importance.

Certified EAL4 Routing Solution - Common Criteria has become the worldwide standard for certifying software and appliances, and provides a comprehensive range of evaluation criteria for government-use installations and corporate security products.





Key Points

- All valuable and expensive computer equipment is housed in a secure and climate controlled machine room
- End users have an environment that is free from the heat and noise of computers
- Provides secure data separation in restricted switching environments where secure access between source and destination end points is critical - this provides the ability to establish "Red/Black" levels of access within a single system, which is critical in complex, multi-layered secure military and government environments
- Collaboration is now possible between government personnel and/or military teams without any major redeployment of equipment or infrastructure redesign
- Users have full access to all equipment that has been allocated to them using standard KVM peripherals
- Thinklogical's Control Management System provides customizable graphical user interface designed for easy and intuitive system setup and control
- All desktop peripherals (included all Wacom digital tablets) function with no latency
- Full frame rate video is successfully maintained over any distance up to 80 kilometers
- Dual screen and dual-link capability is available to all desktop users
- Pristine video quality no matter what the format, DVI, dual-link DVI, 3G-6G SDI, HDMI and 4K @ 60Hz (4096 x2160 resolution with 4-4-4 color depth)
- Routing technology is protocol agnostic - route any signal regardless of the format - data and video

KVM and Video Extension, Switching and Routing Systems for:

- Command and Control Centers
- Intelligence Agencies
- Black and Red Military Networks
- Secure Operations and Communications Centers
- Shipboard Infrastructure
- Aerospace Operations Centers
- Secure Meeting Centers

Every aspect of our engineering, design, manufacturing and customer service happens under our roof overseen by some of the most skilled and experienced people in the business. Our products and solutions are deployed in government, military and defense operations worldwide.

Partial Client List

AWE - ATOMIC WEAPONS ESTABLISHMENT

BOEING

DEPARTMENT OF DEFENSE

DEPARTMENT OF ENERGY

DEPARTMENT OF JUSTICE

DEPARTMENT OF STATE

FEDERAL BUREAU OF INVESTIGATIONS

GENERAL DYNAMICS

LIBRARY OF CONGRESS

LOCKHEED MARTIN

LOS ALAMOS NATIONAL LABORATORY

MOD NORWAY

NATIONAL AIR TRAFFIC SERVICES LTD.

NASA - AMES RESEARCH CENTER

NASA - GLENN RESEARCH CENTER

NASA - GODDARD SPACE FLIGHT CENTER

NASA - LANGLEY RESEARCH CENTER

NATO

NORTHROP GRUMMAN

NATIONAL SECURITY AGENCY

NUCLEAR REGULATORY COMMISSION

OAK RIDGE NATIONAL LABORATORY

RAYTHEON

SAIC

SCOTT AIR FORCE BASE

SANDIA NATIONAL LABORATORIES

UNITED STATES AIR FORCE

UNITED STATES ARMY CENTCOM

UNITED STATES NAVY

Profit from a simplified, secure, and highly efficient system designed to include video, keyboard, mouse and all desktop peripherals. For more information contact a Thinklogical representative at info@thinklogical.com or call +1 (203) 647-8700 - toll free (800) 291-3211.



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Energy and Utilities

The constant flow of mission-critical data is a core requirement for safe and efficient operations within the Energy, Utility and Nuclear Power industries. The infrastructure and equipment requirements for the control room must provide the highest level of performance, availability and identity management to ensure maximum up-time, workflow and security while enabling compliance including NERC-CIP.

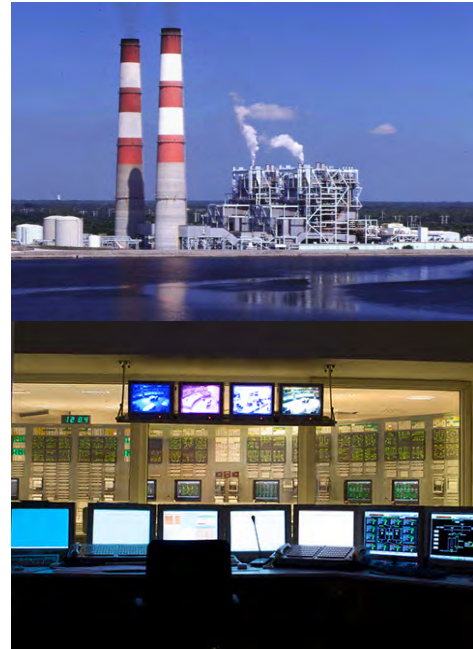
Global leaders in Energy and Utilities rely on Thinklogical to deploy high-performance switching and extension systems that limit operational risk, improve workflow, abide by regulatory compliance, as well as provide visualization solutions for ongoing exploration initiatives. Leveraging its patented technology, Thinklogical provides end-to-end systems that securely transmit uncompressed video and data signals over distances up to 80 kilometers with no added latency. Thinklogical solutions also improve the working environment within the control center, by securely locating critical computing assets away from users.

Infrastructure and equipment requirements for the Energy and Utility industries require cyber security features that provide the highest level of identity management and restricted routing to ensure security classifications, and guard against cyber threats. By leveraging our deep experience in restricted routing environments, and our familiarity with federal and state regulations, Thinklogical has the ability to mitigate infrastructure risks.

Simply put, Thinklogical provides state-of-the-art switching and extension solutions that help protect operations as well as digital assets.

Thinklogical's extension systems combined with matrix switches/routers provide a total solution that furnishes Energy and Utility organizations for a variety of applications:

- Control Rooms (Primary & Remote/Backup)
- Process Monitor Computer Systems/Operator Aid Computer
- Simulation and Training Facilities
- Remote Monitoring Station
- Visualization and Exploration
- Security and Surveillance
- Video Conferencing Centers

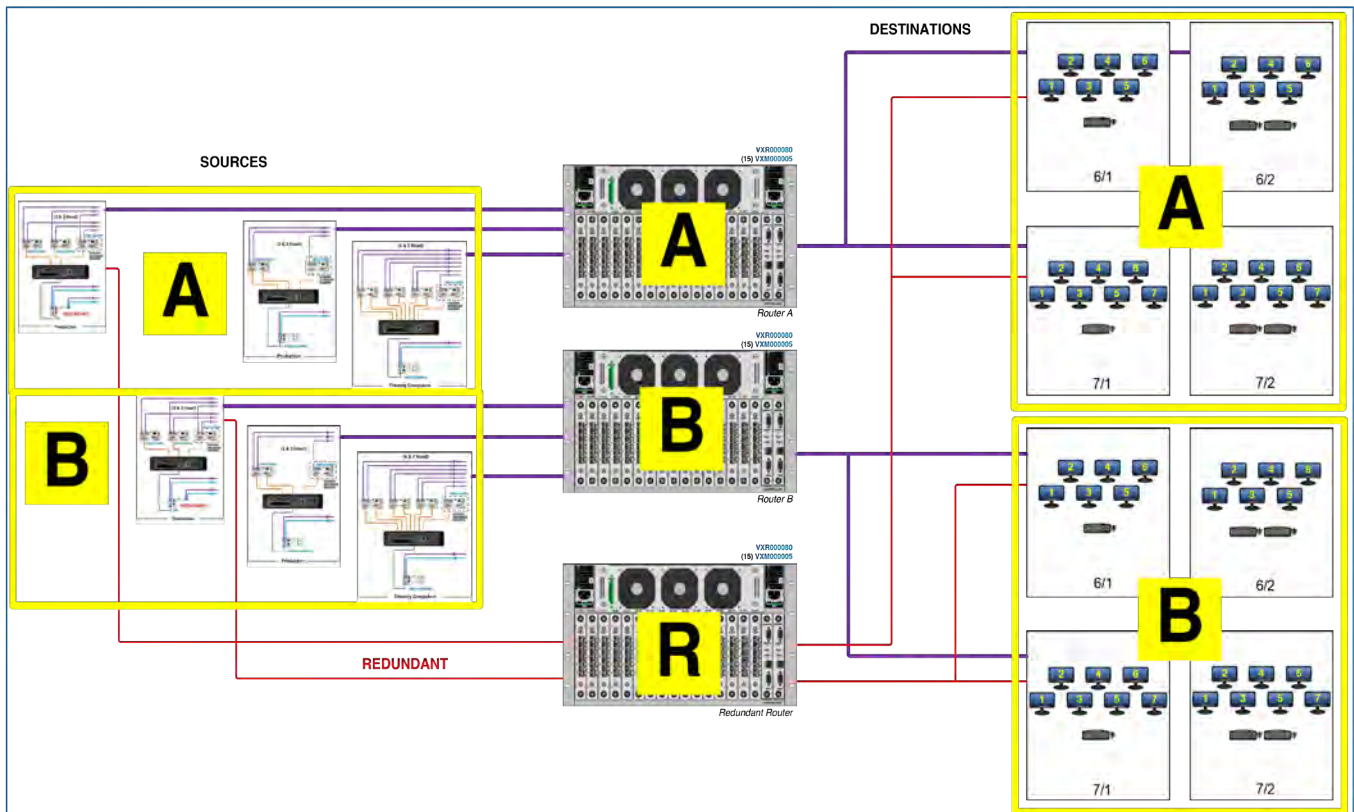


Thinklogical understands that technology innovation is seen as central to a range of key developments in this sector. Leveraging its deep understanding of industry knowledge and engineering competencies, Thinklogical solutions provide

- **Security: Maintain compliance with NERC-CIP.** A secure system that does not store or buffer any data transmission in its products circuitry or components - unauthorized personnel have no chance of retrieving data that has been transmitted, switched and routed through our systems.
- **High availability and efficient workflow:** Hot-swappable product components- in the unlikely event of a component failure and hot-swappable components (power supplies, fans, I/O cards) ensure immediate real-time access to mission critical computing resources located anywhere across facilities and operations. Computing resources can be extended up to 80 kilometers, which allows control rooms to be located away from the process plants they serve, which also decreases heat and noise.
- **High-Performance:** The only system that can deliver uncompressed video images (pixel for pixel, no dropped frames), including 4K/UHD, which are seamlessly transported to the end user and provides them with detailed and immediate visibility to critical images and data.
- **Maximum up-time:** Alarms, remote monitoring and optional redundant infrastructure by extending a single source through two dedicated paths. The signals are received in two separate destinations, allowing one destination to be designated as a system fallback, key to maintain a 24/7 seamless operation.

Regional Power Transmission Back-Up Control Center Application Example

A dual-purpose facility, acting as a Backup Control Center and a training and simulation site for the organization's Master Control Center. In this architecture, the sources (computers, network data, Blu-ray players, etc.) are separated from the displays, keyboards and other peripherals by some distance, and located in a separate, IT-controlled environment outside of the user work area.



Each source is connected to a Thinklogical matrix switch, as well as each destination (display, keyboard, mouse, etc.). With this configuration, any source can be switched to any destination at any time. This is how the customer achieves their requirement for fast switchover of the facility from training to backup control. With a simple “flip of a switch” using control management software, the console’s displays will be filled with the desired backup control information from a new set of sources – all in the time it takes for the displays to reset, typically in one or two seconds.

KVM and Video Extension and Switching Products

Thinklogical's simplified, secure and highly efficient systems are designed to include video, keyboard, mouse and all desktop peripherals.

Video & KVM Extension

Extend uncompressed video, audio and peripheral data up to 10Gbps over fiber-optic or CATx cabling, including 4K@60Hz video. Simple plug and play designs utilizing either multi-mode or single mode fiber. Compatible with Thinklogical Matrix Switches.

Matrix Switches

High-performance, protocol agnostic, modular, non-blocking matrix switches for complete, end-to-end routing of video and peripheral signals with efficient hybrid fiber/copper architecture up to 10Gbps. Scalable from 12 to 640 ports. Accredited for use in secure, multi-classification environments.

System Management Portfolio

Four specialized software packages to help users easily configure, manage and maintain Thinklogical system deployments of any size.

Additional Products

Multiplexers, Image processors and converters, Power distribution units and Secure console servers.



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Oil and Gas

High Performance KVM and Video Extension and Switching Systems for the Oil and Gas Industry.

- Real-Time Operating Centers
- Control Rooms
- Simulation and Training
- 3-D Modeling and Visualization
- Security and Surveillance
- Tele-presence and Video Conferencing Centers

The Challenge

Change is constant in all aspects of today's oil and gas industry. The Industry-wide concept of Asset Integrity Management (AIM) was designed to address these challenges, thus evolving the "control room" to a more multi-faceted facility known as a Real Time Operating Center. Implementing a secure, high-performance video and data distribution system for Real-Time Operating Centers will ensure that organizations are able to manage this change effectively and capitalize on the benefits and efficiencies of AIM.

The Thinklogical Solution

The Real Time Operating Center requires flexible, real-time access and delivery of key information in the Oil and Gas industry. Secure, high performance video and data distribution systems from Thinklogical are designed for today's digital oil and gas field – supporting a central, cross functional collaboration center equipped to handle number of situations.

Thinklogical's fiber-based KVM and video extension and switching solution provides:

- Performance: Extend high-resolution video and audio up to 80 km with no latency or loss of quality
- Physical Separation: Mitigate chance of security breach by separating users from data sources
- Robust Access Control: Regulate user access to content on a port-by-port basis
- Resiliency and Redundancy: Ensure high levels of continuation for mission-critical applications
- Flexibility and Scalability: Easily adapt to growth, new users and/or additional data sources

Thinklogical is the worldwide leader in the design, manufacture and sales of high performance, secure extension and switching systems to control, distribute and manage video-rich, big data. Our systems switch real-time video, audio and peripheral signals between many sources and many destinations for applications where high and reliable bandwidth is required, co-location of computers with users is not desired, permitted or possible, and where maintaining data integrity and security is necessary or highly important.

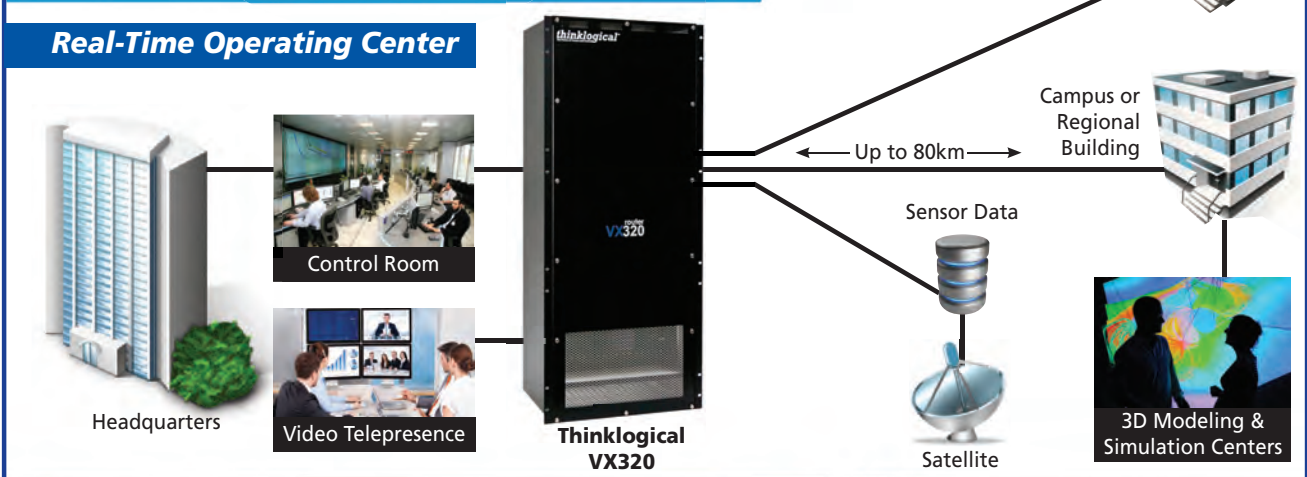
Offshore Drilling



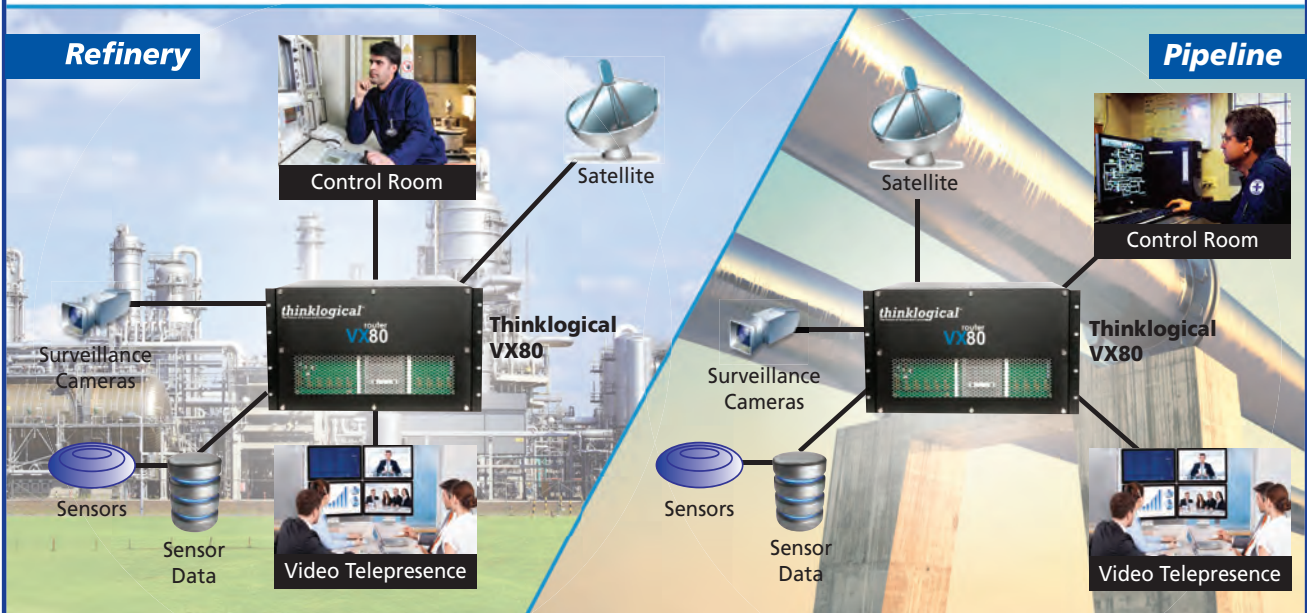
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Real-Time Operating Center

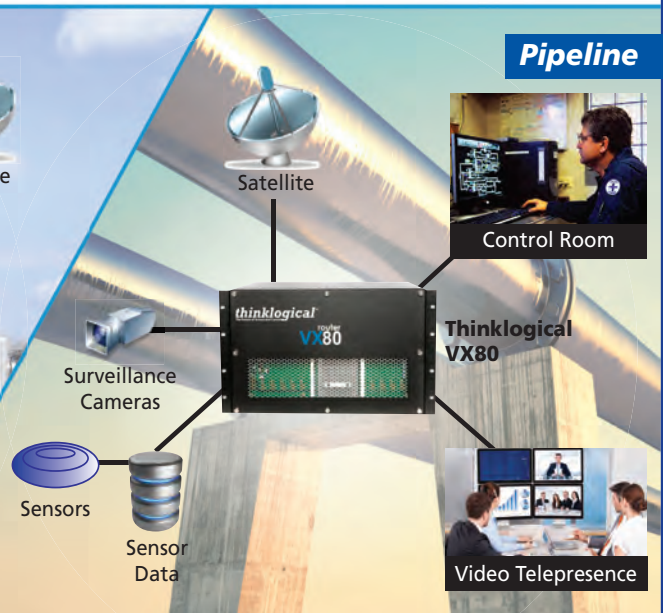
Real-Time Operating Center



Refinery



Pipeline



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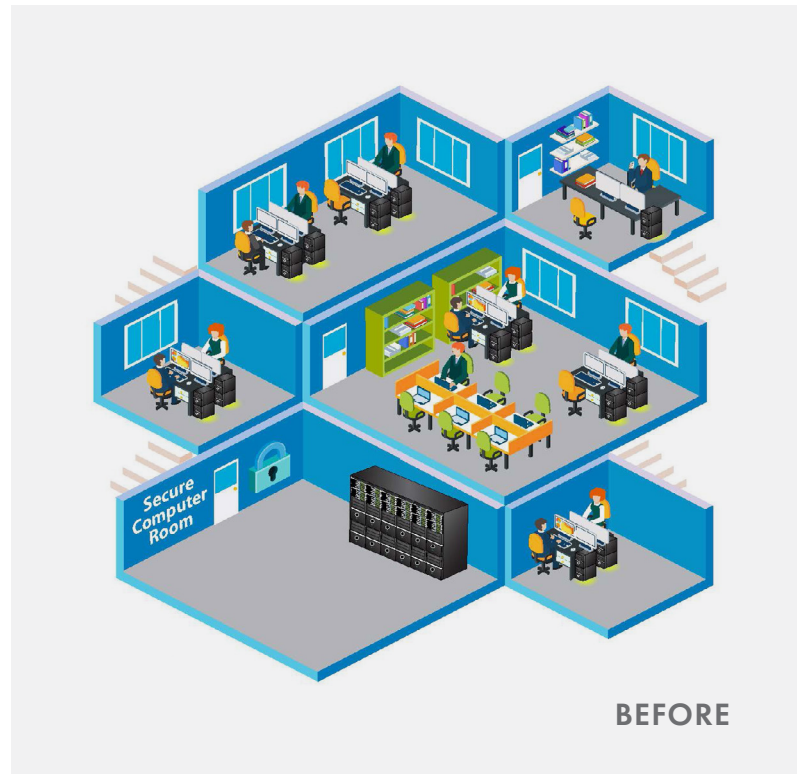
SECURE COMPUTING IN A HIGH RISK ENVIRONMENT

PROBLEM STATEMENT

- Traditional configurations of computer networks involve distribution of computing resources with both local and centralized data storage.
- When an event occurs that threatens the physical security of the site, these resources are vulnerable as there may not be adequate time to secure or destroy the computing/storage resources.
- Difficult and complex to distribute and manage multiple classifications (Top Secret, Secret, Classified, Unclassified) of video, audio and computer data to meet increasing security requirements.

A SOLUTION

- Deploy Keyboard Video Mouse (KVM) extension technology to facilitate co-location of all computing and storage resources in a central physically secure location.
- Full user functionality is preserved while securing all critical resources.
- In the event of a security breach, all computing resources are in a central location with higher physical security. Storage devices are accessible for “grab and go” or destruction if required.



THINKLOGICAL BENEFITS

THE THINKLOGICAL APPROACH

- Thinklogical’s patented uncompressed transmission technology does not touch or alter the signal, for maximum security and integrity of the content, highest video resolution, and computer peripheral performance.
- Thinklogical supports this high security approach using a high-bandwidth, highly reliable and IA (information assurance) security accredited KVM extension and switching/routing technology.
- Computers (and local storage) previously located throughout the facility can be centrally located with server and network storage in a physically secure location.
- Thinklogical equipment provides an interface to the computer resources and “extends” that connection to the users over a fiber-optic connection. A receiver unit is located at the user location to connect to the Keyboard, Video (monitors) and Mouse.
- All processing, storage and electrical interconnection is contained at the source computer within the secure room. No intelligible data leaves the room to the user workstations.

SECURITY

- All computing resources can be co-located and isolated for higher physical security.
- There is NO electronic data transfer to the user workstations. Signal transmitted is essentially pixels and keystrokes over fiber-optic cable, creating no electrical emanations (TEMPEST certified), unintelligible if intercepted, and immune to external RF and electrical interference.
- Input/output connectivity can be limited or denied to the user stations (transparent to USB Key authentication).
- The system can be configured to allow flexible or limited user access to various data sources.
- Users cannot change rights and permissions.
- The Switch/Router is Information Assurance (IA) certified to allow multiple classifications of data to flow through the one system (EAL-4).

ERGONOMICS

- Computers are removed from the workstation and office environment which lowers workplace clutter, heat and noise.
- Maintenance activities no longer happen near users, therefore there is no disruption of work.
- Configurations can be easily changed by administrator as conditions dictate.

COST

- Cost savings are possible through a resource pooling approach where users share a pool of computers rather than one-to-one.
- Multiple classifications through a single switch reduces the need for parallel air-gapped systems to meet security requirements, resulting in less overall hardware and infrastructure to buy or maintain.

PERFORMANCE

- Instant situational awareness - immediate access to information for improved decision-making.
- Enhanced team collaboration and productivity.
- Faster system reconfiguration to meet changing mission requirements.

