

ITES-3H

ITES-3H Zero Client Configuration

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General System Design and Bill of Material White Paper

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Preface

Dear Valued U.S. Federal Government Customer:

Affigent, LLC is pleased to present a Zero client VDI solution to the US ARMY ITES-3H contract.

Affigent is an Alaska Native Owned Small Disadvantaged Business and Certified Minority Business Entity (MBE). Affigent is recognized as a Small Business VAR under the ITES-3H Contract.

Affigent, an Alaska Native Corporation part of the AKIMA Corporation has been delivering solutions for complex information technology problems for over 10 years and we have assembled a dynamic team to respond to the challenges of providing the US ARMY a solution that encompasses the monitoring and management of network, compute and storage resources servicing the zero client virtual desktop infrastructure. The team also has extensive experience delivering enterprise-wide solutions to the US ARMY.

As our customers' needs have evolved over the last five years, we have worked diligently to grow our corporate capabilities to continue to meet our customers' mission requirements.

Why Affigent?

Affigent combines the sound and meaning of two words: Affinity, a relationship based on shared interests, and Cogent, intelligent and compelling. Affigent represents our ability to deliver the most intelligent and compelling solutions to our customers as well as our commitment to their success and yours.

Affigent offers these turnkey solutions in four integrated service offerings:

- Enterprise Software and Cyber Security
- Networks and Communications
- Infrastructure and Physical Security
- Data Center Transformation

Section 1: VDI Architecture Based on ITES-3H Zero Client Requirement

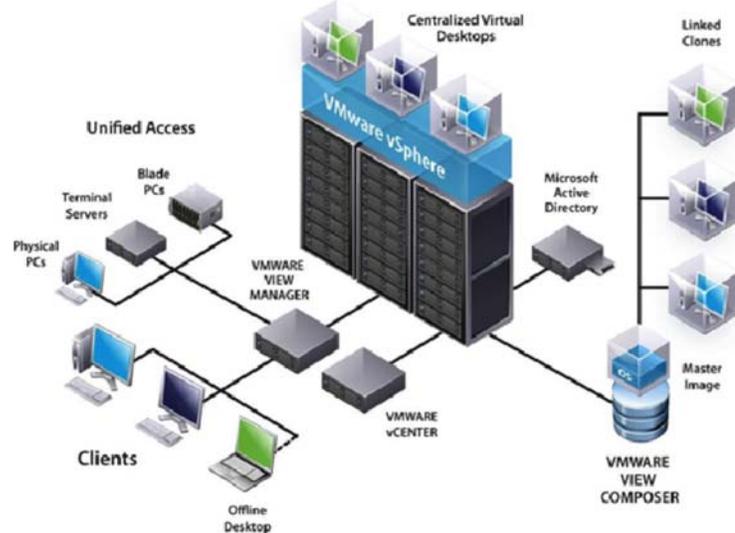
There are several considerations to entertain when architecting a VDI solution among them, I/O end user requirements, end user experience expectations, Disaster Recovery (DR) and Continuity of Operations (COOP) planning. For the purpose of this requirement the focus will be on zero clients and supporting components.

1.1 Definitions

1.1.1 Virtualization

Virtualization is the simulation of the software and/or hardware upon which other software runs. This simulated environment is called a *virtual machine (VM)*. There are many forms of virtualization, distinguished primarily by computing architecture layer. This publication focuses on the form of virtualization known as full virtualization. In *full virtualization*, one or more OSs and the applications they contain are run on top of virtual hardware. Each instance of an OS and its applications runs in a separate VM called a *guest operating system*. The guest OSs on a host are managed by the *hypervisor*, which controls the flow of instructions between the guest OSs and the physical hardware, such as CPU, disk storage, memory, and network interface cards. The hypervisor can partition the system's resources and isolate the guest OSs so that each has access to only its own resources, as well as possible access to shared resources such as files on the host OS. Also, each guest OS can be completely encapsulated, making it portable. Some hypervisors run on top of another OS, which is known as the *host operating system*.

The recent increase in the use of full virtualization products and services has been driven by many benefits. One of the most common reasons for adopting full virtualization is operational efficiency: organizations can use their existing hardware (and new hardware purchases) more efficiently by putting more load on each computer. In general, servers using full virtualization can use more of the computer's processing and memory resources than servers running a single OS instance and a single set of services. A second common use of full virtualization is for desktop virtualization, where a single PC is running more than one OS instance. Desktop virtualization can provide support for applications that only run on a particular OS. It allows changes to be made to an OS and subsequently revert to the original if needed, such as to eliminate changes that negatively affect security. Desktop virtualization also supports better control of OSs to ensure that they meet the organization's security requirements.



1.1.2 Zero Clients

A typical zero client product is a small box that serves to connect a keyboard, mouse, monitor and Ethernet connection to a remote server. These are client devices that require no configuration and have nothing stored on them. The server, which hosts the client's operating system (OS) and software applications, can be accessed wirelessly or with cable. Zero clients are often used in a virtual desktop infrastructure (VDI) environment.

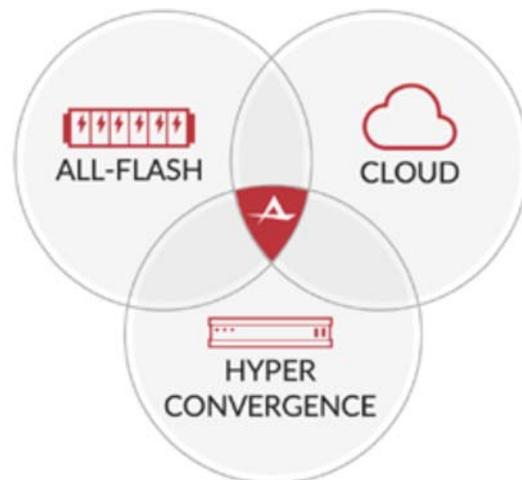
Benefits of zero client computing:



- Power usage can be as low as 1/50th of fat client requirements.
- Devices are much less expensive than PCs or thin clients.
- Efficient and secure means of delivering applications to end users.
- No software at the client means that there is no vulnerability to malware.
- Easy administration.
- In a VDI environment, administrators can reduce the number of physical PCs or blades and run multiple virtual PCs on server class hardware.

1.1.3 Hyperconverged Architecture

Hyperconvergence is a ground-up rethinking of all the services that comprise the data center. A software-centric architecture that tightly integrates compute, storage, networking and virtualization resources and other technologies from scratch in a commodity hardware box supported by a single vendor. With a focus on the virtual machine or workload, all the elements of the hyperconverged infrastructure support the virtual machine as the basic construct of the data center.



The results are significant and include lower CAPEX as a result of lower upfront prices for infrastructure, lower OPEX through reductions in operational expenses and personnel, and faster time-to-value for new

mission needs. On the technical side, newly emerging infrastructure engineers — people with broad knowledge of infrastructure and business needs — can easily support hyperconverged infrastructure. No longer do organizations need to maintain separate islands of resource engineers to manage each aspect of the data center.

1.2 Architecture solution

Affigent’s solution decreases the TCO and increases the ROI by leveraging the best of breed technologies in a Hyperconverged architecture that vertically and horizontally scales. Presented in this solution are two configurations one to support 500 end clients, the other for 1000 end clients. Please review the attached Bill of Materials (BOM) for each OEM listed in table 2.3

1.3 High Level Product list

OEM	Product	Function
VMware	Horizon view 7	Virtualization Desktop Infrastructure OS
NCS	Zero Clients	Client device – single monitor
Atlantis computing	Hyperscale	Converged architecture (compute, storage, virtualization)
Juniper	QFX5100	Networking infrastructure
Samsung	S22E200B/21.5inch/LED/1920x1080/250cd/m2/VGA, DVI	Monitor
Gration	GYM5600LKNA	Keyboard and Mouse

Table 1: Affigent zero client VDI recommendation

1.3.1 ITES-3H Zero 500 Client Configuration

***NOTE: SYNnex			
SKU SYNNEX P/N	Mfg. P/N	Description	Qty
4211461	S22E200B	SAMSUNG : S22E200B/21.5inch/LED/1920x1080/250cd/m2/ VGA, DVI	500
2736543	GYM5600LKNA	SMK-LINK : Gyration Air Mouse Elite In-Air Cur- sor Control using Patented MotionSense™ Technology and Optical Sensor with Low Profile Keyboard. Includes MotionTools software, allow- ing the user to draw on the screen with the push of a button. TAA compliant.	500
***NOTE: Vmware			
Horizon 7 Enterprise (CCU)	HZ7-ENC-100-C	Enterprise includes all components necessary for VDI.	5
***NOTE: Juniper			
QFX5100	QFX5100	Juniper Switch	2
***NOTE: Atlantis Com- puting			
Hyperscale	SSG-C12B1P1M11D1N1V3	Atlantis computing Hyperscale to support 500 VDI sessions.	2
software	2 SW HS-SW-OEM12-v	Atlantis computing Hyperscale Software to sup- port 500 VDI sessions	2
SW Support	HS-SMS-OEM12-v-3Y	SW support	2

Table 2: ITES-3H Zero 500 Client Configuration

1.3.2 ITES-3H Zero 1000 Client Configuration

***NOTE: SYNnex			
SKU SYNNEX P/N	Mfg. P/N	Description	Qty
4211461	S22E200B	SAMSUNG : S22E200B/21.5inch/LED/1920x1080/250cd/m2/ VGA, DVI	1000
2736543	GYM5600LKNA	SMK-LINK : Gyration Air Mouse Elite In-Air Cur- sor Control using Patented MotionSense™ Technology and Optical Sensor with Low Profile Keyboard. Includes MotionTools software, allow- ing the user to draw on the screen with the push of a button. TAA compliant.	1000
***NOTE: Vmware			
Horizon 7 Enterprise (CCU)	HZ7-ENC-100-C	Enterprise includes all components necessary for VDI.	10
***NOTE: Juniper			
QFX5100	QFX5100	Juniper Switch	2
***NOTE: Atlantis Com- puting			
Hyperscale	SSG-C12B1P1M11D1N1V3	Atlantis computing Hyperscale to support 1000 VDI sessions.	3
software	2 SW HS-SW-OEM12-v	Atlantis computing Hyperscale Software to sup- port 1000 VDI sessions	3
SW Support	HS-SMS-OEM12-v-3Y	SW support	3

Table 3: ITES-3H Zero 1000 Client Configuration