WISE

WEB INFORMATION SERVICES ENVIRONMENT

SYSTEM ARCHITECTURE GUIDE

Version 1.2

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1 Executive Overview

The Web Information Services Environment (WISE) System Architecture Guide (SAG) outlines the minimum hardware specifications, required software applications, and configuration information to support the operation of WISE 1.2. Additionally this guide provides the results of WISE stress testing. The information compiled as a result of the stress testing is provided to help WISE Administrators and Site Administrators to decide on the correct hardware and WISE configuration to best support their site.

The SAG is a living document and will be updated as required to support approved baseline WISE system configuration changes resulting from NATO procurement vehicles or Configuration Control Board (CCB) approved new and/or additional Operating Systems.

1.1 Document Overview

This guide provides a reference to system configurations that will support all WISE software releases.

Acquisition and Site Administrators who are considering initial WISE installations, partial replacement or upgrade of existing WISE hardware components should refer to this guide prior to procurement. Additionally, Allied Command Transformation (ACT) can be notified prior to all procurements in order to lend technical assistance as necessary and to disseminate any lessons learned as a result of previous WISE procurements and installations.

Inclusion in this guide indicates a high degree of confidence for given system suites based on the extent and success of acceptance testing, stress testing, and reports from operational sites. This guide also presents the minimum system configurations in each category to support operation of WISE.

The SAG is subject to modification as hardware baselines evolve at the direction and approval of the WISE System Manager. The guide will be managed by ACT and will be distributed to WISE Administrators, Site Administrators, Acquisition Managers, and Program/Life Cycle Managers in both hard and soft copy.

The guide will stop short of presenting specific vendor recommendations, contract information or cost information. ACT can provide more specific information, recommendations or references to ensure that any selected hardware will be compatible with the specific WISE version in use.

2 WISE Overview

2.1 WISE Server

WISE version 1.2 is a Windows based web portal that has been verified to run on various versions of Windows (e.g. Windows 2000, Windows XP, and Windows 2003). WISE is based on Web Server architecture using modern web technologies. As such, all WISE software is installed on the server and provides a number of services to client side web browsers. Figure 1 depicts the server side architecture of WISE and Figure 2 illustrates the client side.

2.1.1 WISE Configuration Options

For the current release of WISE, there was an urgent requirement to add an option which would optimise the efficiency of file uploading and downloading. Therefore two options of WISE are now presented at installation; Enterprise and Classic. The Classic version works in the same way as previous installations of WISE. The Enterprise version installs an extra web service Apache, which handles requests from users and passes them to the WISE server. In the case of a file upload or download the Apache server provides caching support to lighten the load on the WISE server.

Thus, adding Apache via Enterprise configuration increases WISE responsiveness and performance, although it should be noted that administration of the system becomes more complex. Specific configuration recommendations are provided in Section 3 and 4 of this document.

2.1.2 Zope

Zope is a leading open source application server, specializing in content management, portals and custom applications. ZOPE provides core functions to WISE such as network services, request brokering, security enforcement and application integration.

Zope implements standard network protocols and standards such as the Hypertext Transfer Protocol (HTTP), File Transfer Protocol (FTP), Web Distributed Authoring and Versioning (WEBDAV) and the Simple Object Access Protocol (SOAP). For the proper operation of WISE 1.2, only the use of the HTTP protocol is required.

Zope provides security services for identification and authentication, discretionary access controls and auditing. WISE incorporates these features to implement and enforce global and local security policies. A detailed description of the WISE security architecture can be found in Section 5.

WISE runs on the Windows platforms (2000/XP/2003) as a multi-threaded single-process service and should be administered as such. Zope provides the necessary brokering and synchronization mechanisms. All WISE software runs in the same address space subject to the operating system's policies and security posture.

2.1.3 WISE Framework

The WISE Framework provides a layer of functionality on top of Zope that enables rapid development of WISE capabilities while enforcing quality and consistency. The Framework encapsulates Zope features for developers, administrators, content managers and users.

2.1.4 WISE Objects

WISE Objects are individual components that make up a WISE site and are the most visible parts. Administrators and content managers can instantiate components to build web sites and portals for information and knowledge management purposes. Each object provides a specific capability that can, in most cases, be tailored by the administrator and content manager. All objects and their purpose are documented in the WISE User's Guide.

2.1.5 WISE Application Programming Interface (API)

The WISE API provides access to functions in the WISE Framework. WISE Developers are strongly encouraged to only use these documented APIs to guarantee the quality of the WISE project and to facilitate the migration to future versions of WISE. Direct access to Zope features is strictly prohibited. WISE APIs are described in the on-line developers documentation and can optionally be installed on the WISE server.

2.1.6 Other Web Enabled Systems

Since ZOPE and WISE capitalize on existing commercial protocols and standards, it is quite easy to use WISE in a heterogeneous environment in which some web services are provided by other information systems or web solutions. WISE supports a true portal concept, allowing visibility into third party web enabled information systems.

2.2 WISE Client

The WISE software only exists on the server. There is no requirement to install WISE specific software on each client. Figure 2 depicts a typical WISE client configuration.

2.2.1 Browser

The browser is the only interface to the WISE server. WISE acceptance testing was conducted using Microsoft Internet Explorer 6.0 SP1 and Netscape Version 7.

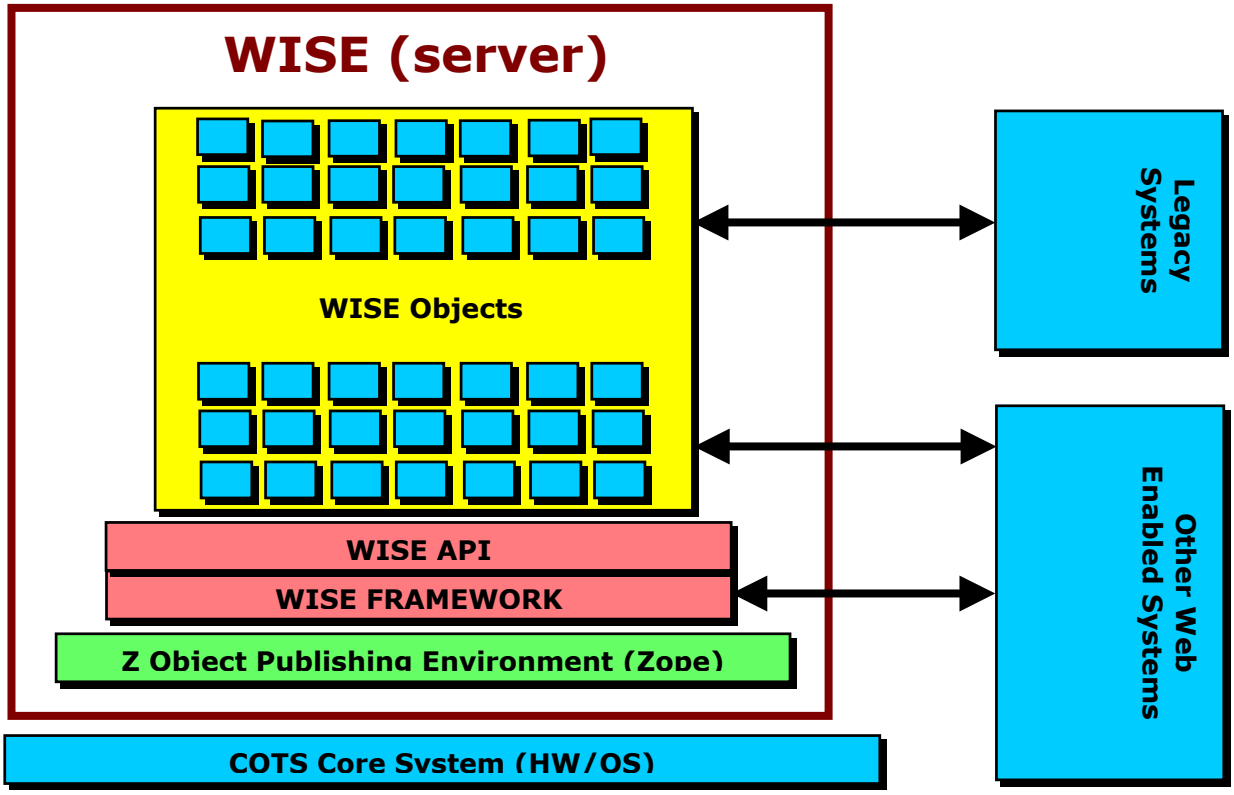

Figure 1—WISE server

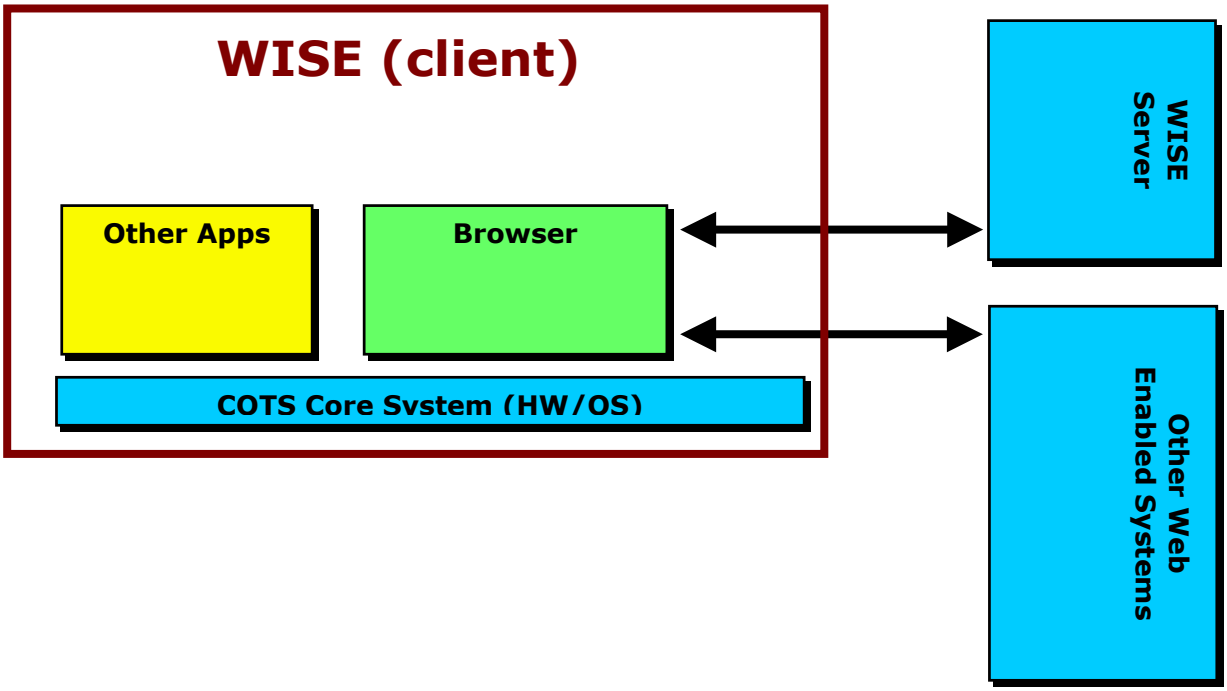

Figure 2—WISE client

3 Hardware Requirements

3.1 WISE Server Hardware Configuration

WISE is a highly scaleable product that can be deployed using a number of server architectures. WISE can be used on a laptop as a single user information management, demonstration or training tool. WISE can also be used on a high-end server providing web services to thousands of users.

The ACT UDB Branch has validated WISE 1.2 on various Windows based server configurations e.g, single processor, dual processor, single disk and raid 5. Obviously the size, user requirements, and expected function of the site will drive the decision for each site's server configuration used to support WISE. The following paragraphs describe hardware recommendations that were the result of stress testing (see Section 5).

3.2 WISE Server Hardware Recommendation

As stated earlier for very simple uses WISE may be installed on a PC and can provide web services for individuals or small groups. However, for supporting an entire site where multi-level web pages, a large number of users, and multiple transactions are part of the daily operation the site should consider the following server configuration recommendations.

At a minimum 512 MB of RAM is required in a multi user environment. A standalone version of WISE (e.g. a laptop) can use as little as 128 MB of memory, however it is not recommended to use a laptop for sites, which have a high volume of users. Recommended minimum data storage requirments are listed below:

- A minimum of one 18 GB Hard Disk Drive (RAID level 5 is strongly recommended)
- A minimum of one CD ROM drive
- One 3.5-inch floppy disk drive (optional)

3.3 WISE Client Hardware

WISE does not put any requirements of the client hardware since all WISE software is located on the server.

4 Software Requirements

4.1 WISE Server Software Configuration

WISE can be configured using one of the following options: WISE Classic or WISE Enterprise. The choice of configuration options is presented during installation. The WISE Classic version may be upgraded to WISE Enterprise, however the Enterprise version cannot be downgraded.

The WISE Classic version works well for very small sites that support limited web site access and a few users. The Enterprise version is designed to support larger sites with many users and large amounts of site access. The improvement with the Enterprise version comes from the use of Apache. Apache is a front-end web server that assists in file uploads and downloads to free up WISE to support other web service requests. The use of Enterprise does increase the amount of log files produced. The WISE Administrator's Guide provides a description on how to manage these files. The stress testing results shown in Section 5 highlight the difference between the two different WISE configuration.

4.2 WISE Server Software Recommendation

4.2.1 Operating System

The WISE server has been validated on the following platforms:

Type	Version
WIN 2000	PROFESSIONAL and SERVER PROFESSIONAL ACE CORE BUILD Version 2.2 Rev 1, dated 8 Jun 2001
WIN XP	PROFESSIONAL
WIN2003	SERVER

4.2.2 Office Automation Package

To use the site search in WISE, the Microsoft Office Suite must be installed on the server. This software is required to index the content of Microsoft Office documents so they can be searched.

The following versions have been validated:

Version
Microsoft Office 2003
Microsoft Office 2000
Microsoft Office XP

4.2.3 Internet Browser

A standard Internet browser is required to access the WISE services. WISE 1.2 has been validated against the following browsers:

Type	Version
Internet Explorer	6.0
Netscape Navigator	7.0

4.3 WISE Client Software Recommendation

4.3.1 Internet Browser

A standard Internet browser is required to access the WISE server. WISE 1.2 has been validated on the following browsers:

Type	Version
Internet Explorer	6.0
Netscape Navigator	7.0

4.3.2 Browser Plug-ins

Required plug-ins for the browser are provided by the WISE server the first time that an object requires the service. The user must have a security permission that will allow the downloading of plug-ins; otherwise, the local system administrator should download the plug-ins separately.

The following Browser Plug-ins are required for WISE:

Plug-in	Version	Usage
Adobe Acrobat	5.0, 6.0	WISE Documentation
Author ware WEB Player	6.5	WISE Computer Based Training (CBT)

5 WISE 1.2 Stress Test Results

The stress test simulated multiple simultaneous "gets" to simulate a large amount of users accessing a site, multiple simultaneous downloads, and multiple simultaneous uploads of WISE objects. The purpose of this testing was to check WISE performance in situations where many users hit a WISE site at the same time, i.e., during initial daily logins to command web sites, large exercise support and command center support where many users are required to access the same files simultaneously.

The stress test results are based on the following hardware configurations:

- Single 533MHZ Processor w/500MB RAM
- Single 750MHZ Processor w/1GB RAM
- DUAL 700MHZ Processor w/ 1GB RAM Raid 5 (5 disks)
- Single 3.8GHZ Processor w/ 1GB RAM Raid 5 (5 disks)

For the most part, the result of web site access and downloads the faster processor and raid configurations provided faster response times. There are stress loads that would eventually force WISE to slow down beyond acceptable response times, however those stress loads were extreme with at least 256 simultaneous web page retrievals before response times exceeded 20 seconds. Simultaneous downloads of very large files (20MB used for testing) also would eventually slow WISE down at given saturation levels but would not cause a failure. The table on page 5.1 illustrates the results and shows the response times that were achieved with the Enterprise version, Classic version, and the various server types. The bottom line is high levels of use for WISE requires a high-end server or servers.

Stress testing was also conducted on servers containing the ACE ACCIS Security Settings provided by INFOSEC. These settings did not cause a difference in performance with similar severs not running these security settings.

The baseline results were documented against the Single 750MHZ Processor with 500MB RAM. This server was used as the baseline because it is a lower end server similar to the server types initially used at many sites.

Server Type and WISE Configuration	Muliple Simultaneous Web Site Access 256 requests per second	Muliple Simultaneous Downloads (5MB files) 12 Users WISE Response Times in Seconds	Muliple Simultaneous Downloads (20MB files) 12 Users WISE Response Times Seconds
Single 533MHZ Processor w/500MB RAM (WISE CLASSIC)	Processed 20 requests per second	Avg: 30 Min: 11 Max: 75	Avg: 160 Min: 45 Max: 180
Single 533MHZ Processor w/500MB RAM (WISE ENTERPRISE)	Processed 38 requests per second	Avg: 20 Min: 7 Max: 60	Avg: 120 Min: 35 Max: 130
Single 750MHZ Processor w/1GB RAM (WISE CLASSIC)	Processed 39 requests per second	Avg: 27 Min: 2 Max: 52	Avg: 130 Min: 45 Max: 160
Single 750MHZ Processor w/1GB RAM (WISE ENTERPRISE)	Processed 60 requests per second	Avg: 13 Min: 2 Max: 31	Avg: 100 Min: 35 Max: 120
DUAL 700MHZ Processor w/ 1GB RAM Raid 5 (5 disks) (WISE CLASSIC)	Processed 45 requests per second	Avg: 21 Min: 2 Max: 40	Avg: 110 Min: 45 Max: 120
DUAL 700MHZ Processor w/ 1GB RAM Raid 5 (5 disks) (WISE ENTERPRISE)	Processed 100 requests per second	Avg: 16 Min: 2 Max: 33	Avg: 100 Min: 35 Max: 120
Single 3.8GHZ Processor w/ 1GB RAM Raid 5 (5 disks) (WISE CLASSIC)	Processed 30 requests per second	Avg: 15 Min: 2 Max: 25	Avg: 85 Min: 25 Max: 110
Single 3.8GHZ Processor w/ 1GB RAM Raid 5 (5 disks) (WISE ENTERPRISE)	Processed 65 requests per second	Avg: 11 Min: 2 Max: 22	Avg: 55 Min: 20 Max: 90

6 Security

6.1 Operating System

The ACT UDB Branch has validated WISE 1.2 on various PC platforms. Any NATO site choosing workstations other than those on the list is responsible for their own validation or they can optionally provide a test platform to the UDB branch. UDB will then validate the selected computer platform to ensure that it will execute all WISE functionality as intended.

WISE 1.2 must be installed and managed in accordance with:

- The WISE System Architecture Guide
- The WISE Administrator Guide
- The WISE Installation Guide
- The WISE User's Guide

Access to objects can be controlled via User IDs and passwords; additionally, there is a guest user (no password required) which can be used for objects that contain information that has no Need to Know (NTK) requirement. With the use of WISE, **site administrators** have the ability to enforce NTK and individual accountability for objects containing classified information.

6.2 Implementation

WISE security is implemented in the WISE framework, capitalizing on the security function provided by Zope. All indentification and authentication, discretionary access controls and auditing features are encapsulated in WISE modules for better control.

The security components of the WISE Framework are maintained by the ACT under strict configuration management to guarantee the highest integrity and to avoid third party abuse.

WISE runs as a service on the Windows (2000/XP/2003) platforms and as such, it is subject to the security posture and policies enforced by the operating system. Although the WISE process is subject to the security features in the kernel, WISE does **not** use the operating system for its security.

6.3 User Account

Any user who views WISE content does so as either a **guest** or a **registered user**. A session that does not include user identification through the login procedure is considered a **guest session**.

It is possible for a user to launch the WISE application and review content without any indication of identification/security issues. Limitations during such a session would become evident only when the person attempts to access information that is not available to guests. At that time, **user authentication** (identification and password) will be required.

A WISE user is not a specific Windows user on the client. NTK enforcement is allowed across operating system trust boundaries where users may not necessarily have a Windows user account on remote systems (clients).

6.4 User Authentication

A **guest user** can complete an on-screen registration form and receive a WISE account, thereafter possessing the ability to identify himself as a **registered user** to WISE through **user authentication**. During the registration process, the information a user must provide includes name, billet code, contact information (phone and e-mail) and a password. A **registered user** may change his password at any time, provided the user is logged into WISE. Once established as a **registered user**, the user may then send an e-mail requesting access to the individual responsible for the WISE web or sub-web, which contains information of interest to the user.

6.5 Discretionary Access

Users assigned **site administrator** privileges can assign site administrative privileges and grant user access to objects to other **registered users** and **guest users** within their remit**.**

The **registered user** whose identity has been confirmed by **user authentication** may have access to content beyond what is available to the **guest user**. Additionally, a user may have responsibility for the content of one or more objects and may control access by other users to those objects.

It is strongly recommended that each WISE object **site administrator** review the NTK requirements for all classified objects, especially those classified NATO SECRET, and ensure that **guest users** are provided access **ONLY** when the NTK requirement has been justifiably eliminated.

6.6 Audit Logs

Using the WISE Classic or WISE Enterprise configuration there are log files that need to be maintained by an administrator. The list below identifies these log files, the location on the server, and the associated WISE configuration version.

Log File Name	Configuration Version	Log File Location
Z2.log	Classic and Enterprise	Program Files\WISE\VAR\
Error.log	Enterprise	Program Files\Apache\Apache2\logs
Acess.log	Enterprise	Program Files\Apache\Apache2\logs

The purpose of these logs and the recommendation for management of the logs is contained in the WISE System Administrator's Guide. It is important to note that these files grow over time and need to be managed by system administrators.

6.7 Z Object Publishing Environment (Zope).

WISE is implemented in a modern, open-source web application server called Z Object Publishing Environment (Zope). Zope runs in UNIX and Windows and can be used with most popular web servers or its own internal server. This enables the WISE framework to provide support for a variety of users, including application developers, web site administrators, content managers and individual page developers. Zope runs in the background and is transparent to most users who use the WISE interface to build and maintain their web pages.