# Computers Are Us

# Windows 7 Deployment

# A Plan for Continuous Improvement

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Contents

[Computers Are Us 1](#_Toc275072061)

[Business Organization 3](#_Toc275072065)

[**Brief History of Computers Are Us** 3](#_Toc275072066)

[Issues of Concern 4](#_Toc275072067)

[Security 4](#_Toc275072068)

[Fault Tolerance 4](#_Toc275072069)

[Recovery 4](#_Toc275072070)

[Management Summary 5](#_Toc275072071)

[Project Summary 7](#_Toc275072072)

[Phase One: Proposed Transition 9](#_Toc275072073)

[Phase Two: Migration 10](#_Toc275072074)

[Phase Three: The Plan for Continuous Improvement 13](#_Toc275072075)

# Business Organization

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### **Brief History of Computers Are Us**

Computers Are Us, incorporated in Michigan September 1993, reported gross sales over $300,000 in 1996. Earnings were equally divided over hardware sales, system consultation, and corporate training. Computers Are Us developed the TINman, Total Information Network Manager. TINman was designed for organization who need a robust client-server network while significantly reducing administrative costs. Administrative time is reduced from four hours to four minutes. The TINman system defines the Windows Primary Domain Controller, the workstations, and the network that connects them.

In April 1996, Computers Are Us opened a computer training and education center. Computers Are Us offers training tailored for company teams. More than 2,650 students have been trained from June 1996 through May of 2004.

## Presenting Issues

Many cities and Townships have grown to include information systems to administer the municipal government, fire department, Police department, DPW, and waste treatment facility. Usually there has been no overall plan for coordination and improvement. The legacy system has a Novell network and an eclectic set of workstations running MS-DOS, Windows 98 and Windows ME.

# Issues of Concern

## **Security**

Most municipal information systems are not secure. At the front desk there may be a Windows XP workstation which allows citizens to look up their tax records. Anyone can assess the FundBalance files and confidential user data from this workstation. The information network is extremely vulnerable to accidental or malicious file corruption and damage.

## **Fault Tolerance**

In general, there is only one server administrating a city or township. This server handles logons, security and user groups, and data warehousing of the FundBalance program. Computers Are Us strongly recommends that municipalities establish this goal: No single point of failure (Spolsky, 2000).

## **Recovery**

An information system is only as good as the data that is backed up on redundant servers or tape. Applications, user groups, and network mappings can all be reinstalled from scratch. Data, however, is a governmental investment in time and talent that is unrecoverable if lost. All cities and townships need to develop and maintain a data recovery program. This program should include contingency plans for server failure, workstation failure, power outages, and sabotage. Computers Are Us recommends server pairs that duplicate each other's services and replicate each other's data stores.



Figure -Hard Drive Failure

# Management Summary

Services Available from Computers Are Us

Computers Are Us designs, implements, and supports Microsoft Windows 7client/server systems. Our business networks provide e-mail, scheduling, and Internet access, file and database management. Our network solutions are engineered for small businesses with fewer than 250 users. By implementing a RAIS (Redundant Array of Inexpensive Servers) configuration, Computers Are Us can reduce costs and improve system performance.

“Controlling your environment makes you happy. “ (Spolsky, 2000)

**On-site Support**

Computers Are Us offers superior on-site support. All members of the Computers Are Us Team are capable of qualifying user issues, hardware failures and stop errors. Recommendations for corrective action are posted to electronic forms for immediate action. Our procedures for analyzing and correcting hardware problems are well documented. (PlaceholderForSupport)

**Hardware Sales, Upgrades and Repairs**

Computers Are Us has a fully equipped lab for repairs and upgrades. We use commercial software tools—such as QA Plus, SpinRite, WDDiag—to examine the extent of the damage and to confirm successful correction. If possible, data can be recovered and transferred to another workstation or server until repairs are complete. (Tom's Hardware, 2010)



Figure -Western Digital Hard Drive

Computers Are Us is a Microsoft certified OEM, Western Digital Eagle Partner, Cyrix VAR, 3COM OEM reseller, and Executive Soft (Diskeeper Lite) VAR. All of our equipment is selected for quality and compatibility.

**Facilities for Training and Testing**

The Computers Are Us Training and Education Center:

The training center has 1,200 square feet. Maximum number of students allowed per class: 10, with two additional seats available for make up and review sessions.

**The Computers Are Us Test Lab:**

The center also provides a technology showcase for system design and installation. Computers Are Us facilities are available for testing upgrades, procedures, and system configurations. Isolating test procedures from the production network has two purposes: 1) Ill-behaved configurations are trapped and corrected before any harm is done to the actual data. 2) Users have a stable, fault-tolerant system with minimal interruptions.



Figure -Motherboard with Processor

# Project Summary

**Upgrade to Microsoft Windows 7**

Computers Are Us strongly recommends that cities and townships consider implementing Windows 7 workstations. Windows 98 and ME are the home operating systems. Windows 7 is the business operating system.

**Security**

Windows XP offers good security and logon passwords. However, it is relatively easy to circumvent Windows XP’s precautions. It is an old system released before the invention of many of the today’s security threats. Windows 7 can be configured to government C-2 Orange Book standards.

**Virus Protection**

The old Windows 98 computers use the File Allocation Table (FAT) file system. The FAT system is built on MS-DOS and is vulnerable to all DOS viruses. Windows 7 uses the NT file system (NTFS). Most Viruses simply cannot "live" on NTFS: they abort on load before any damage can be done to files or hardware.

**Administration**

Computers Are Us provides a blueprint for improving the network operating functions, and transferring the database programs. Computers Are Us also proposes to administer hardware upgrades and develop a standard workstation configuration. All work will be thoroughly documented for future reference and troubleshooting.

In addition to on site support, Computers Are Us can configure the Information Network to allow Remote Access Administration. Remote Access will allow Computers Are Us to handle many administrative and maintenance tasks on-line.

**Training**

Careful planning, the best equipment, and the latest software will not do any good if the staff cannot figure out how to use it all.

Computers Are Us recommends training an administrative crew to manage, maintain, and improve the system. System administrators should successfully complete basic Windows server training and be able to perform a given set of tasks on the system. These classes will cover Windows server, networking, data back-ups, and using the Microsoft applications that will be part of the system. Once they have this training, they should be able to answer normal operating questions, and make the most productive use of contracted support.

# Phase One: Proposed Transition

A new Windows server will be installed as a Domain Controller. This server will coexist on the Novell network sharing the same network cabling but independent of the Novell system. When the network is tested and operational, Computers Are Us will begin the migration from Novell to Windows.

**Windows Server Implementation**

Benchmark

With Windows Server Computers Are Us can collect a set of statistics and create a performance benchmark. Some goals can be quantified: How long does it take to print a Word document? Which printers will be unavailable when required for extensive reports? Does the network slow down when the tax assessments are printed? This information will provide the priority of the tasks that should be accomplished.

**Control**

The benchmark statistics are also useful in the control process. The time it takes to produce a day’s worth of work normally varies over a certain range. Whenever these times fall outside of the statistical norm, something has changed, and the system may need some attention. This control process becomes a way to help manage the system, pointing out problems before they would otherwise become apparent and focusing efforts where they are needed.

Microsoft Windows Server offers several tools for controlling the system: Network Monitor, Performance Monitor, Remote Access Administrator and Windows 7 Diagnostics.

**Maintain**

New diagnostic tools enable the system administrator to look for and correct potential sources of trouble before they cause any problems. Computers Are Us can also perform some administration and troubleshooting through public telephone lines using remote access capability. We can send or install new versions of software and operating systems, as they become available.

# Phase Two: Migration

Migrate Novell network to Windows Domain

Data migration has to be handled thoughtfully. During the migration, Windows 7will coexist with the Novell network for a brief period of time to insure as little disruption of normal operations as possible.

The steps involved with migration are as follows:

Migrate Novell file and print services to Domain

Confirm network file and print sharing

Train system administrators on Windows Server

Train office staff on Microsoft Office, Windows 7, and collaborative document management

**Migration Considerations**

Building a Reliable System

Windows 7 gives companies the option to develop distributed document management. Data can be separated on different servers by function and access permissions. For example, simple logon security and file and print sharing can be established on the Domain Controller. The financials records and databases can be warehoused on a separate server. This plan for data distribution allows companies to purchase many cost-effective business computers with standard hardware components for the price of one monster machine.

 **Distributing the Workload**

There are three primary functions of the Information System: Login, File and Print Sharing, and Corporate Communications. These processes can be separated by function to increase the efficiency of the network.

The Primary Domain Controller will administer:

Login

User group permissions

File and print sharing

In addition, the PDC will host the workstation installation and recovery files.

The Backup Domain Controller will administer:

Login SAM and Script replication

User group permissions replication

File and print sharing if PDC is unavailable

In addition, the BDC will host the redundant workstation installation and recovery files.

The Server Pairs (DATAman and MAILman) will provide:

Email

Scheduling

Public Folders

Project management

These servers will also host and replicate the FundBalance, Equalizer, GIS and other databases.

The Proxy Server will offer:

A protective firewall between the municipality and the outside world

Remote Access Connection to State, County, and Township sites

Internet access to all City workstations

The Proxy Server will also replicate the Communication Server data.

**Creating a Consistent Workstation**

Building and documenting standardized computer workstations is another major improvement in system administration. Computers Are Us recommends a thorough evaluation of the municipal workstations. A minimal upgrade would include confirming that all workstations have:

Standard configuration for operating system, applications, and user data

Identical operating systems on the same version and service upgrades

Identical network cards (where required)

**Server Pairs and Network Deployment**

Server pairs distribute the workload and duplicate the data on redundant, identical machines. This method provides online backups and reduces the probability of system failure.

Each server uses a fault tolerant drive system - the most vulnerable server component will not cause server failure

Each member of the server pair provides unique services to maximize performance - no standby server waiting for a failure that may occur

Each member of the server pair can quickly take on the services of the other in the event of a failure - no single point of server failure

Modular design allows quick replacement or additions as needed to meet capacity requirements and to maximize uptime.

During the migration, two identical Servers will be deployed. They will be configured as Windows Backup Domain Controllers. The information from the database programs will be copied to DATAman and replicated on MAILman.

In addition MAILman will be configured as Microsoft Exchange servers for e-mail, scheduling and corporate communications. The Proxy Server will replicate the Exchange site and backup important data files automatically.

# Phase Three: The Plan for Continuous Improvement

The Plan for Continuous Improvement is based on the following projections:

The municipality will need to support additional users

Will need to provide remote access connection with State and Local agencies

Will need to provide Internet Access and perhaps support a Web page

May require more than 400-800 GB of storage when the databases and GSI MAP programs are fully deployed.

**Phase III Projects**

**Backup Domain Controller**

As the municipality installs additional workstations, the City will need to configure another Backup Domain Controller (BDC) for redundant login, replicated user data, and network administration.

**Public Access Security**

Permissions can be implemented for user groups on a Windows 7 system. The TINman system will establish the Friends, Associates, and Explorer levels. Additional work should be performed to secure the workstations available for public review of tax records.

**Network Performance**

The municipality may benefit from a new network switch--a 100 Mbit backbone--to provide a high speed data transfers. The connections from the servers to the workstations will be upgraded from the 10 Mbit the legacy hardware.

One important method for improving performance is to route work by department or volume. The municipality will receive a Microsoft server with the BackOffice software package. When the server is implemented, the municipality will be able to monitor network traffic, benchmark and document the results.

**FundBalance Database Management**

Using the resources available with Windows server, the FundBalance program can be replicated on-line to facilitate frequent backups without data corruption.

**Roaming Profiles**

Roaming Profiles enable people to log into any workstation and use the items on their desktop (such as the Equalizer short cuts specific for their network permissions.) Another benefit of roaming profiles is retaining individual settings for the monitor, keyboard and mouse. E-mail is also routed automatically to the new desktop.

**Creating a Consistent Workstation**

In most cities, hardware was purchased over time as the need and budget warranted. It would be advantageous to upgrade or replace computer hardware to create standardized workstations. As a minimum, all users should have the same version of software for word processing, spreadsheets, and e-mail.

**Proxy Server/ Exchange Replication**

The Proxy Server acts a firewall to protect the public documents held at the City offices. The Proxy Server also replicates the MAILman Exchange Server. Proxy Server will be installed when the municipality is ready to use Remote (or Dial UP) Access. Proxy Server can be configured on a new machine or recycled from qualified legacy hardware.

**Fax Server**

Many municipalities have a heavy fax burden. On the average, the City receives 200-400 faxes per day. The Faxination software program routes faxes to the Microsoft Exchange in-box. It is fully integrated with Windows 7. This solution offers a paperless option. Another option that may be considered is Web-page public access.

**Data Backup and Archival**

The municipality may benefit from installing a backup and archival program with Read/Write CD-ROMs.

**Additional Training**

The plan for Continuous Improvement includes intermediate training for Microsoft Word, Excel, Access, and Outlook.

**Long-Term Support**

Computers Are Us can provide telephone support, remote monitoring and on-site consultation relating to the installed hardware and software. Software and technical support is initiated by a request for action by phone or e-mail. Additional support is available and will be billable monthly.

# Sample Index

Administration, *7*

Benchmark, *9*

Control, *9*

Maintain, *9*

Security, *7*

Training, *7*

Virus Protection, *7*

Windows Server Implementation, 9

# Works Cited

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# Table of Figures

[Figure 1-Hard Drive Failure 4](#_Toc275107879)

[Figure 2-Western Digital Hard Drive 5](#_Toc275107880)

[Figure 3-Motherboard with Processor 6](#_Toc275107881)