

Wrapmation White Paper -- Roll Tracking on Personal Computers

Roll tracking systems (RTS) provide computerized management and tracking of paper production and movement in a paper mill. This white paper examines Wrapmation's application of recent technological innovations in personal computers (PC), how these developments influence RTS selection, and how Wrapmation's PC-based roll tracking systems enable customers to benefit from this technology.

This document also explains Wrapmation's choice of the IBM PC, Microsoft Windows and our TRAQ Manager roll tracking system development environment. Our technical, financial and ergonomic assessment includes both the benefits and the challenges of Microsoft desktop technology in paper mill production management.

TRAQ Manager, Wrapmation's RTS solution, runs on all Windows platforms and on industry-standard networks such as Microsoft NT and Novell NetWare. Wrapmation's preferred platform is Windows NT because of its strength in the marketplace and versatility.

TRAQ Manager and PCs: the best combination for Wrapmation customers

Look at any desk in any paper mill. Chances are, there is a PC on almost every one. Then look at what is running on those PCs. They are probably running Microsoft Windows in one form or another, and many of these PCs are part of the mill's Novell or Microsoft networks.

In the office desktop environment, Microsoft and Windows are unquestionably the leaders in the desktop operating system marketplace. Out on the factory floor, however, it is a different story – there are no standards here. While Wrapmation could have chosen one of many platforms, our choice of Windows for TRAQ Manager provides the opportunity for a common unified computing environment throughout a mill.

Why Windows? Because of Microsoft's dominant position in office applications, we wanted to bring factory floor automation in to this platform. This allows clerks and customer service representatives to view what is happening on the mill floor and make business decisions and analysis directly on a single platform.

TRAQ Manager office modules will run on all current versions of Windows -- and therefore can probably run on most of the existing desktop workstations. Floor modules run best on Windows NT.

Clamp Truck Terminals – simplicity in motion

Our clamp truck industrial PC, similar to a PC notebook, is equipped with a touch screen. The touch screen feature minimizes typing or mousing around, and allows the operator to mind his driving and his work.

The clamp truck PC also contains a wireless Ethernet card, bridging the PC to the mill network. This provides the clamp truck operator with access to information in the TRAQ Manager database.



The TRAQ Manager clamp truck runs Windows applications that provide the operator with information such as: order status, production plans, inventory, and vehicle availability. The clamp truck workstation is a mobile decision-making tool, empowering the driver to make informed decisions about roll storage, loading and other inventory-management issues.

Windows NT for fun – and profit

Windows NT offers many advantages as a computer platform. It is easy to use, robust, reliable and secure.

Regarding the bottom line, NT's entry-level costs are lower than those of mainframe or minicomputer-based systems. Overall, Windows-based systems cost less than Unix or proprietary technologies.

*Everyone knows that
Windows applications are
more fun to use.*

Windows NT is ideal for the desktop environment, in large part because of the popularity it has already earned throughout the marketplace. Another advantage is its use of the familiar Windows 95/98 interfaces.

Since Windows NT can run on multiple hardware platforms, users are not limited to a single technology or hardware vendor. At the same time, that flexibility also includes the capability to support most programs written for any Windows generations. Looking ahead, it is quite reasonable to expect that future versions of Windows will support existing applications.

Windows NT is easy to learn and easy to operate. As an added bonus, it is also FUN to use, especially compared to the character-based systems common with mini and mainframe systems. These advantages reduce the stress in the day-to-day working environment. This is especially true on the plant floor where repetitive roll-production steps are being automated.

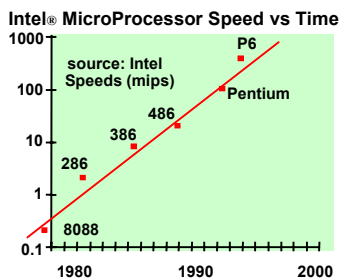
Scalability: room to grow

Scalability is our measure of how much and how easily a system can be expanded. While PCs are scaleable, we do consider Unix to be superior in this area.

However, roll tracking systems tend to be very static. Changes to the system are usually to accommodate new customer and business requirements. It is unlikely that a roll tracking system will experience a tenfold expansion. On the other hand, PC scalability is sufficient to handle mammoth operations such as large airline reservation systems.

While an organization may expand, the roll tracking system – like the paper mill itself – will often be a static component in the enterprise. The mill must consider the degree of importance for system scalability and the additional costs of maintaining a highly scaleable system.

Scalability is not a major roll tracking system selection criterion. However, the knowledge that there *is* room for expansion – if necessary – provides peace of mind. IS managers should be more concerned about the roll tracking system's connectivity into the corporate platform.



Training – getting the best return on your investment

Training is a major cost of any system implementation. It can be expensive, especially when instructor costs, staff overtime pay, the learning curve and losses in production-level efficiencies are factored in.

However, with PC-based systems, training is no longer an expense. It is an investment – and one with a good return. We believe that having a computer-literate staff will encourage better employee productivity. The skills acquired can encourage home-computer use, which will in turn help to improve workplace skills and experience.

Windows-based applications do require less training. This is because many operators are already well acquainted with Windows through their use of other applications at work as well as at home.

This popularity of Windows reduces training costs and efforts during the start-up phase. The same goes for any upgrade activities, since enhancements will use common graphic user interfaces. Windows means minimal operator training for system updates.

Another advantage is that replacement employees can usually learn Windows applications easily. Plus, your electronic technicians probably already know how to install, maintain and troubleshoot PC- and Windows-based systems. To further simplify training efforts, Wrapmaton does not modify any equipment. The original equipment manufacturers normally will support their products.

Networks

Many paper mills today already have a computer network infrastructure that usually consists of standard Ethernet or Token Ring and one or more of the following servers: NT, NetWare, Unix and others. TRAQ Manager runs TCP/IP over Ethernet and can run with NT and NetWare servers. TRAQ Manager also runs IPX/SPX on NetWare.

Unlike mini- and mainframe-based systems, TRAQ Manager was *not* specifically designed or adjusted to run on any particular network. It was built on industry networks, using industry-standard components and software. No custom work was done to make TRAQ Manager run on industry networks.

For the mill that already has a network, it will most likely be already compatible with TRAQ Manager. For the mills that do not have a network, industry standard TCP/IP networks -- especially PC-based networks -- are the de facto standard to be installed now-a-days. Users should be able to use one unified network, computers and operating systems for their office automation as well as roll tracking functions.

Reliability and Stability: Perfection? No. Excellence? YES.

While the Windows NT platform is more stable than other Windows releases, it is not perfect, nor is it the most reliable or stable. However, as computer science advances, Wrapmaton believes that software crashes will become history -- even in Windows. With each successive Windows release, bugs and memory leaks are rectified and reliability increases.

As an analogy, consider the evolution of television technology. Sets used to be heavy, and equipped with vacuum tubes. TVs took time to warm up, and picture quality was inconsistent. TV repairmen made house calls.

Today however, TVs turn on instantly and seldom fail. If they did, you would probably have trouble finding a TV repairman. Wrapmation believes that PCs will be just as reliable one day.

Security: meeting government specs

Windows NT satisfies many security requirements – key variables in any computer-selection criteria. Typically, Windows networks are password-protected, and enable system administrators to determine which users can log in, from which locations, and at which times.

Windows NT is built around a security kernel that ultimately protects the system itself. This kernel also enforces access controls that protect all sensitive files and data *outside* the kernel, affording complete protection. Windows NT offers system integrity, the foundation for all other security features. This is one of the strongest arguments in favor of the Windows NT Workstation for desktops at sensitive facilities.

Windows NT is one of the few commercial operating systems that has successfully completed the United States government's C2 evaluation, as well as its European counterpart, the FC2/E3 evaluation under ITSEC. ITSEC is a major international security group.

With the Microsoft Zero Administrative Kit (ZAK), system administrators can limit end-user access to system files and unauthorized applications on the workstation. This means fewer failures resulting from operators' accidental or malicious access to operating-system components that is outside their day-to-day requirements.

The use of ZAK throughout a mill can reduce costs by:

- Allowing IS to lock down desktops and prevent end-user operations that result in help-desk calls.
- Providing centralized desktop configurations.
- Eliminating end-user access to system files and features.
- Prohibiting unapproved application installations.

For more information, please see <http://www.microsoft.com/ntserver>

Clustering – with an eye on the future

A cluster is a set of loosely coupled, independent computer systems that behave as a single system. With a cluster of servers, if one server fails, others will instantly take over the workload. Until the failed server is replaced, existing servers will automatically “pinch hit,” taking over the workload.

In 1997, Microsoft released phase-one of its clustering solution; code-named “Wolfpack.” At this early stage, Wrapmation feels that this technology is unproven on NT. However, the Microsoft Windows NT architecture does contain many of the basic components for clustered system construction. Wrapmation expects that the phase-two technology will be more viable, and assures customers that TRAQ Manager will run on this platform. Phase-two is projected for early 1999.

Mill IS departments selecting any computer technology today should take a serious look at the compatibility of that choice with Microsoft’s clustering solution. For that very reason, Wrapmation’s TRAQ Manager runs on cluster-aware foundations such as MS-SQL.

Third Party Packages – Buy “off the rack” if the fit is good

Many Windows-based packages are available today. TRAQ Manager makes extensive use of commercial software offerings such as fax packages, electronic data interchange, Programmable Logic Controllers (PLC) communications, spreadsheets, report writers and others.

Wrapmation incorporates off-the-shelf software packages into TRAQ Manager to give our customers feature-rich functionality for a fraction of what would otherwise cost us millions of dollars to develop.

Packages such as Symantec’s WinFax provide amazingly powerful and rich faxing functions. And they sell for just a couple of hundred dollars.

Almost every system vendor today has a PC solution. For example, recent PLC and gauging system vendors should already have PC-friendly solutions. Wrapmation investigates your existing equipment vendors’ PC solutions. Then we try to integrate our technology with theirs. If we are both PC-based, the construction of the *glue software* between the two systems usually requires less customization effort. This should provide tighter integration and lower costs.

TRAQ Manager can support several protocols including TCP/IP, ODBC, API calls and OLE.

TRAQ Manager Support – on call and (virtually) on site

In most cases, mills are responsible for much of their system hardware and operating systems. Usually, mill technicians can efficiently handle failed monitor or disk-drive replacements. However, Wrapmation is always available as the second line of defense.

For software support, TRAQ Manager uses a Symantec PC Anywhere program that automatically answers the telephone when a Wrapmation technician calls. With PC Anywhere, Wrapmation personnel can perform almost any on-site service function from remote locations.

To enable this feature, a mill must provide a data-grade phone line that can be dialed directly from outside the mill. This offers full security since mill management can always disconnect the computer system from the phone line. Other technologies such as Point to Point Tunneling Protocol (PPTP) to enable Internet access to the system.

For after-hours support, a designated mill representative need only call a single Wrapmation telephone number. The Wrapmation operator will collect any relevant information and contact the appropriate Wrapmation experts. The employee will evaluate the situation and decide to contact other colleagues for additional support, or contact the customer directly. Wrapmation technical personnel are always within reach, either by pager or cellular phone.

TRAQ Manager features a self-monitoring function for system health. For non-critical problems, TRAQ Manager sends electronic mail to those responsible for system maintenance. Additionally, the system sends nightly status reports to the appropriate support personnel. The electronic mailing list for reports can include both mill and Wrapmation personnel. This proactive feature enables Wrapmation to detect and resolve potential problems – often before they noticed by the mill.

TRAQ Manager and Internet capabilities – we are wired

There are two kinds of businesses: those that *have* Internet services, and those that *will have* Internet services. For businesses of the future, Internet access will be as commonplace as telephone and fax access is today.

Wrapmation has been a “business of the future” for many years. For instance, in 1994, we became the very first roll-tracking supplier to have a web site.

Our TRAQ Manager, with many points of Internet presence, is helping to bring our clients into the future as well. First, TRAQ Manager users can send and receive electronic mail to and from the system. TRAQ Manager uses your SMTP (Simple Mail Transport Protocol) or UUCP (Unix to Unix Copy) gateway to send status reports and diagnostic information. Order acknowledgements, shipping confirmation and shipping details can also be sent to customers via the same e-mail gateway.

TRAQ Manager can use HTML, the language of the World Wide Web, to create reports that can be read from any Internet browser. This enables reporting of inventory, production statistics and other useful information on the Internet or Intranet.

TRAQ Internet is Wrapmation's web-based module providing interactive access to TRAQ Manager from the World Wide Web. With TRAQ Internet, sales representatives and clients can access TRAQ Manager through a web browser. From anywhere on the Internet, they can log into TRAQ Manager and investigate inventory status, order status, shipment dates, quality certificates and much more.

The system can incorporate high-security protocols like those used by web-based banks and brokerage houses. TRAQ Manager security can include 128-bit strong encryption and Secure Socket Layer (SSL).

The remote client can include PC, Macintosh, Sun Workstations and other platforms with a Java-Enabled browser. This makes TRAQ Manager platform-independent.

The Internet offers many exciting developments – and opportunities – for progressive paper mill managers who take the lead in customer service.

Wrapmation and Microsoft are committed to providing a tightly integrated platform for the Internet.

Questions. Questions. Who? What? When? Where? Y2K? Is TRAQ Manager Year 2000 compliant?

Yes. TRAQ Manager software has been Year 2000 (or Y2K) compliant since the product was first introduced in 1993.

The TRAQ Manager system uses built-in intelligence for date manipulation. It does not store dates as two-digit years as many other systems do. Rather, TRAQ Manager stores dates as the number of days that have passed since a fixed date. Using this paradigm, January 1, 2000 is merely one day greater than December 31, 1999.

Hardware suppliers must be Y2K compliant also. This issue is dependent on the hardware supplier since Wrapmation allows mills to choose their own hardware.

A word about clones – and why TRAQ Manager does not run on them

Actually, TRAQ Manager does run on clones (generic-brand computers). Wrapmation uses them extensively in our offices.

For production systems, however, Wrapmation recommends brand-name systems.

We do not recommend the use of clones as file servers, since servers are the central repositories of information that is critical to the mill. This includes information about orders, production, inventory and shipping activities.

An hour of lost production can cost in excess of \$5,000. The loss of the server or network or data can raise havoc. This cost estimate does not account for the impact to the corporation of permanent data loss on the server.

All network operating systems suppliers, including Microsoft and Novell, have their own hardware-compatibility (HCL) list of vendors and models that have been tested under various operating conditions and are actively supported. With brand-name computers, customers are alerted about the latest software drivers, engineering change orders and, most importantly, information about hardware combinations that have experience problems.

Most clone manufacturers do not go this far in terms of customer support and product testing.

Last but not least, having brand name server provides confidence to management.

What's in a name? Plenty. How do brand-name computers prevent system failures?

It is very expensive to have 100 per cent perfectly secure system availability. An objective like 99.9 per cent uptime is more realistic. Data integrity must be 100 per cent.

Redundant mirrored disk drives for continuous data back-up reduce the risk of data loss. The use of redundant servers and network components allows instant or very fast service restoration after experiencing a failed component.

For any system that incorporates redundancy, the appropriate individuals must be informed about partial component failures. That way, the failure can be repaired before there is any chance of back-up component failure as well. Brand name

server manufactures provides many methods for alerting technicians of component failures.

Brand-name computer manufacturers such as Compaq and Hewlett Packard invest heavily in research and production of superior products. Wrapmation believes that brand-name products are better engineered and these manufacturers offer superior support. Since brand-name manufacturers have higher volumes, they can afford better quality control programs that will ensure greater reliability. Also, brand-name vendors provide on-site warranties and more formal comprehensive product support – usually available seven days a week, 24 hours a day.

Some may argue that spare parts for clones are available just around the corner at local computer stores. We feel that paper mills must maintain complete spare parts on site for critical computer systems, as they do for any production machinery. Roll tracking systems are very much part of the mill's production machinery.

Brand-name vendors are able to ship replacement parts within 24 hours, and technicians are often available to come on-site to install these new components, often at no charge. However, since most mills are outside urban centers, mileage fees may apply, but these costs are small in relative terms.

Some of the technology that brand-name servers and workstations incorporate to provide ultimate uptime includes:

- Error Checking and Correcting (ECC) Memory

A single memory bit error can crash a computer system. By using error checking and correcting (ECC) memory, the computer will survive memory failures. Most clones do not use the more expensive ECC memory.

- Pre-failure warranty

The Compaq pre-failure warranty covers server products using Compaq's Insight Manager. The Insight Manager software tool monitors system hardware. When a computer is about to fail, the temperature may start to rise, the power supply voltage may dip, memory error rates rise, and disk drives will do more retries to get the data off the disk. When these events start to occur, Insight Manager software automatically prints problem reports. Customers need only fax this report to the manufacturer. The manufacturer then ships a new component and the customer returns the soon-to-fail component before it fails. This is all free of charge during the warranty period, and it maximizes server uptime and prevents data loss.

The Pre-failure warranty applies to Compaq servers, desktop and portable products using Intellisafe hard drives and Compaq Insight Manager.

Wrapmation is an authorized reseller for various brand-name computers.

TRAQ Manager is written in Clarion – for speed, accuracy and economy

TRAQ Manager's database engine is MS-SQL and the front end is developed in Clarion.

Clarion is a Rapid Application Development (RAD) package, which produce computer programs. RAD tools enhance productivity since they enable far faster coding than conventional environments such as PowerBuilder, Delphi and Visual Basic.

Clarion programming is three times faster and ten times more accurate than conventional development environments.

RAD tools generate much of the computer code and the code that is generated is pre-tested. The result is a significant reduction in the painstaking process of debugging one statement at a time.

No two paper mill operations are identical, even if they are owned by the same corporation and make the same product. Mills all have specialty niche products, and different shipping methods that depend on geography, ownership and culture.

Mills also have different conversion and wrapping machinery. One mill may wrap rolls using an automated wrapline and another mill may stretch wrap the rolls. One mill may operate just-in-time (JIT) from the wrapline and another mill may inventory rolls to serve markets where customers call in and purchase from stock.

Since mills produce lots of paper, the benefits and savings of automation can be better leveraged if systems are customized to their needs. A finely tuned system will result in improved performance, increased savings and reduced headaches.

For this reason, roll tracking systems must always be customized for the particular mill operation.

With RAD, we can rapidly and economically customize our software modules to each mill's requirements. And almost as easily, we can create the custom modules required to meet special needs.

Clarion produces the actual software source code. This generated source code can be further fine tuned for very specific application. There is no need to be stuck with "plain vanilla" code.

In fact, parts of TRAQ Manager are also written in SQL stored procedures, C, Java, Fortran, Assembler and some NT scripts. We use the best tools for each job.

Still on the subject of tools, Wrapmation does not believe that customers should be too concerned about a package's underlying software. Mill management,

however, should be more concerned about the final results: system reliability, data access, costs, and ease of system modification.

The great Oracle question. Why was TRAQ Manager not developed in Oracle?

At Wrapmation, we believe in using the right tools for the task at hand.

Oracle is an excellent product, but it is designed for large enterprises and enterprise-oriented applications, rather than roll-tracking applications. Roll tracking systems are more group or departmental systems, usually employed in the finishing and customer service departments. Mill production environments place uniquely heavy demands on the database and this requires tight integration into a responsive database for peak performance periods.

Oracle requires large and powerful servers and client machines. It requires extensive computer resources that may not be available at remote locations such as customers' and partners' sites, or in employees' homes. Oracle requires a Database Administrator to keep the database tuned and maintain its integrity.

Oracle is not optimized for Windows NT or NetWare. As an enterprise solution, it is configured for enterprise operating systems such as UNIX.

On the other hand, Wrapmation's TRAQ Manager PC client-server technology is built on Microsoft MS-SQL. The design methodology is relational using Entity Relationship diagramming and other relational methodologies. Our databases provide continuous operations during system backups, ODBC connectivity and many other rich database features.

Oracle does not accommodate customization of the look and feel of applications, so that you cannot do exactly what you want. Oracle applications fit into an Oracle framework for portability across multiple platforms. These applications have an Oracle "look and feel" that is not transparent to Windows users.

MS-SQL's self-tuning wizardry reduces can even eliminate the need for an on-site Database Administrator (DBA). TRAQ Manager actually runs well if nobody changes anything.

TRAQ Manager data accessibility

All data in the TRAQ Manager system is accessible through Seagate's Crystal Report Writer, DDE, SQL, ODBC or cut and paste. TRAQ Manager can export and replicate most of its data through industry-standard comma separated variable (CSV) files for access by other applications.

Clarion allows us to read and write to various database formats including X-base (Dbase), IBM DB II, Oracle, MS-SQL and many others.

TRAQ Manager source code – no cost

Once customers sign a standard non-disclosure agreement, Wrapmation provides application source code at no charge. Development environment, development tools and software development training are available for an extra fee.

Summary – the Wrapmation Wrap-up

PC-based systems offer many advantages. They are the leading platforms today, and face no challengers in the foreseeable future.

While no-one can guarantee that the PC is here to stay, system managers must consider the momentum of PC technology in the market place. For instance, in the last two years, every Request For Proposal received by Wrapmation has specified a PC platform.

Wrapmation is a roll tracking system pioneer, bringing this product to the standard PC environment in 1993 – long before other vendors. Wrapmation experts' experience is the product of more than 50 roll tracking installations worldwide.

For more information about TRAQ Manager and Wrapmation, contact WRAPMATION at (514) 846 9727 or email to: sales@wrapmation.com. Information can also be found at our website <http://www.wrapmation.com>.

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Wrapmation Inc. ♦ 4207 St. Catherine Street West ♦ Westmount, Quebec Canada H3Z 1P6