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Fault Tolerance

Ensuring Highly Reliable Business Communications



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| | |
|--|---|
| About Artisoft | 2 |
| Introduction | 2 |
| Fault-Tolerant Architecture Based on Best-of-Breed Components | 2 |
| Windows NT and Windows 2000 | 3 |
| Switching Hardware | 3 |
| Standard PC Servers or Industrial-Grade Telecommunications Servers | 4 |
| LAN Integration | 4 |
| TeleVantage Server Software | 4 |
| TeleVantage System Reliability | 5 |



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About Artisoft

Artisoft is a leading developer of software-based phone systems for small-to medium-sized businesses and corporate branch offices. Artisoft's TeleVantage product has received more than 25 industry awards, including "Product of the Year," "Best of Show," and "Editors' Choice" from Network magazine, Computer Telephony magazine, Communication Solutions magazine and CTI magazine, among others. The company distributes its products worldwide.

For more information about Artisoft products, visit Artisoft's World Wide Web site at www.artisoft.com or contact the company at 1-800-914-9985.

Reliability is the single most important criterion to consider when evaluating a phone system. To handle the company's mission-critical communications, it is imperative that the phone system stay up and running with virtually no downtime. With more than 10 years' experience designing phone systems, Artisoft puts best-of-breed reliability into every aspect of TeleVantage, its software-based phone system. From the start, TeleVantage has been designed to stay up and running even under adverse conditions, and requires zero maintenance to achieve that level of reliability. All TeleVantage components provide redundancy and fault tolerance to create end-to-end high availability for a company's mission-critical communications.

Fault-Tolerant Architecture Based on Best-of-Breed Components

Artisoft's TeleVantage system is optimized to provide complete reliability for the communications infrastructure of a business, integrating industry-standard software and hardware. The integrated system's fault tolerance is based on its components:

- TeleVantage runs on Microsoft Windows NT and Windows 2000 Server software, designed for 99.999 percent uptime.
- Intel telephony hardware ensures the reliability of the switching connections and the network interface.
- Because of its open architecture, the TeleVantage system runs on a choice of industry-standard servers, built with components that maximize reliability.
- The TeleVantage system can operate independently from the data networking LAN.
- The server software optimizes the reliability of the integrated solution through its self-monitoring software capabilities.

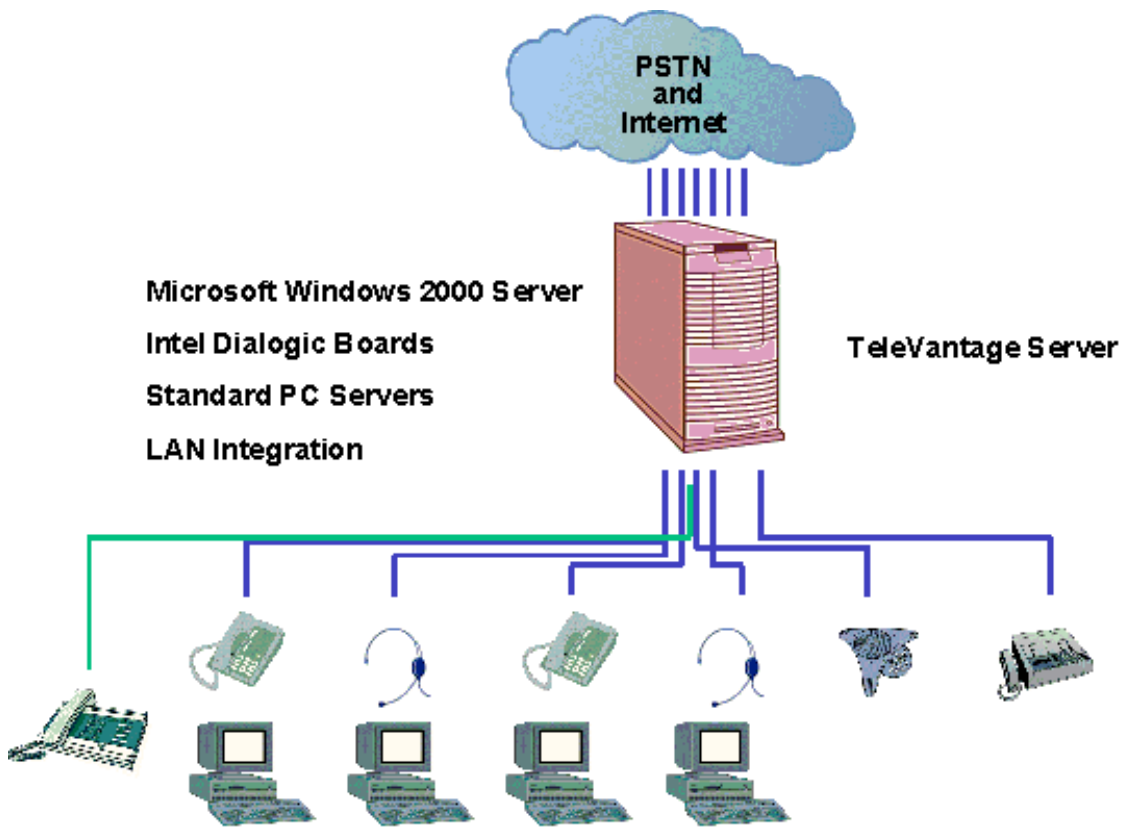



Figure I. Fault Tolerant Architecture Based on Best-of-Breed Components

By eliminating single points of failure in both hardware and software, the TeleVantage system architecture delivers industry-leading reliability for businesses that rely on critical connections with customers.

Windows NT and Windows 2000

Artisoft's TeleVantage system runs on Microsoft's Windows 2000 server software in a locked-down, totally controlled environment. The Windows 2000 Server Family is the most reliable set of server operating systems Microsoft has ever produced. The software is designed for 99.999 percent uptime (sometimes referred to as "five nines"), which translates to downtime of less than five minutes per year.

The developers who built the Windows 2000 server family targeted 24x7x365 uptime. Field experience, as well as independent testing, proves that the servers are achieving that level of reliability. Market researchers at the Aberdeen Group found that Windows 2000 Servers delivered 99.95 percent uptime right out of the box, before the servers were fully optimized or the IT staff had become accustomed to the new operating system.



In its report on Windows 2000 servers, consulting firm DH Brown Associates says, “Windows 2000 clearly takes a major step up in the enterprise food chain and now resides legitimately on the same field as UNIX competitors. This will give broad classes of users the confidence to deploy higher-end applications on [the Microsoft] platform.”

Windows 2000 has been engineered to prevent both planned and unplanned outages. The developers conducted tests with many software applications, including anti-virus software and multiple software and hardware drivers. To keep systems up and running, Windows 2000 greatly reduces the number of maintenance tasks such as installing hardware and software, which require rebooting the computer. Other reliability tools include a resource-partitioning feature that prevents application failures from forcing reboots, and an improved Task Manager that lets administrators kill entire process trees to completely shut down a “misbehaving” application. Lastly, to reduce the amount of time systems are offline, when a system fails or is taken down for maintenance, new boot options let administrators quickly restart the system.

For Microsoft, much of the work to improve Windows reliability and availability went into improving the operating system software, both to reduce causes of failures and eliminate the need to take the system down for maintenance tasks. For further information on the reliability of the Windows 2000 Server Family, visit www.microsoft.com/windows2000/guide/server.

Switching Hardware

To ensure high reliability, Artisoft TeleVantage systems are deployed using industry-standard Intel telephony hardware to handle trunk, phone station, and IP connectivity. Each Intel component is engineered to achieve mission-critical standards of availability and is designed to optimize reliability for phone system configurations. Intel rates the mean time between failure (MTBF) of its Dialogic trunk cards from 143,000 to 243,000 hours and its Dialogic station cards from 132,000 to 200,000 hours. With a TeleVantage system built on Intel switching systems, customers can feel confident, knowing that their industrial-strength hardware components will last more than 15 years, even with heavy usage.

To protect against virtually any disabling condition, Artisoft and Intel have teamed up to develop special failsafe telephony hardware that ensures that a company’s important phone lines always remain open. Even in the case of an extensive power failure that exceeds the capabilities of UPS, TeleVantage will connect trunk lines directly to critical extensions.

Standard PC Servers or Industrial-Grade Telecommunications Servers

Because of its open architecture, TeleVantage can be installed on any industry-standard server, ranging from a cost-effective PC to an industrial-strength or telecommunication-grade server. For enhanced reliability, servers can be equipped to include multiple RAID drives and redundant hot-swappable uninterruptible power supplies (UPS) with multiple hours of backup. Servers are often deployed with redundant fans, telephony hardware, and even CPUs. With those components, servers are configured to stay running in the event of power interruptions or surges, environmental temperature changes, drive failures, or other hardware or software problems. The inherent reliability of the server, combined with the operating system and applications software,

means that the system stays running even when other information technology at the company experiences an unexpected problem.

LAN Integration

The TeleVantage system ensures that the business's important connections stay open, even if the network goes down. Phones on the Local Area Network stay connected because the TeleVantage system can operate independently from the company's data network. Even if the company experiences data communications failures with the e-mail system, network congestion due to large file downloads or desktop PC problems, the phone system stays up and running to allow employees to communicate among themselves and with their customers.

TeleVantage Server Software

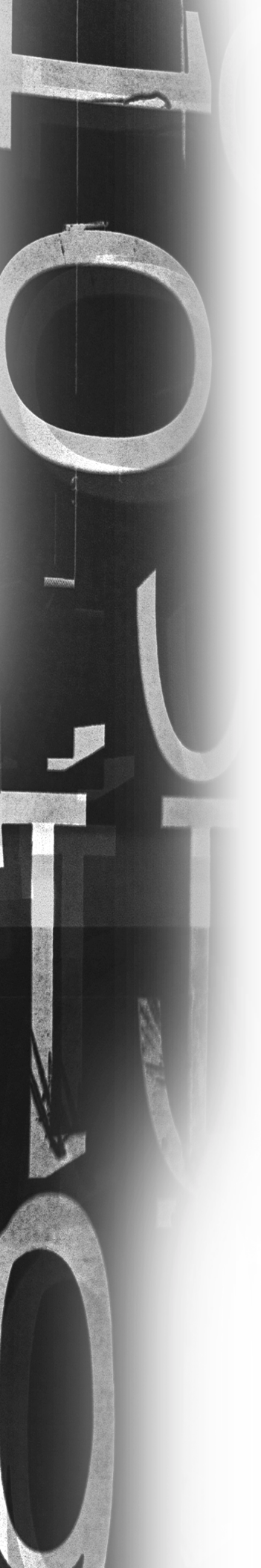
Artisoft's TeleVantage system software provides redundancy in all critical system operations. The system is built on Microsoft's MSDE Server, an extremely robust database utilized by mission-critical applications worldwide. The system monitors the server process, and in case of failure, automatically restarts the server without intervention.

In the rare event that a particular trunk or station fails, the TeleVantage system is designed so that the problem does not affect the rest of the system and is quickly rectified. The TeleVantage server monitors its own status and e-mails administrators for any key system events. In the unlikely event that a specific trunk or station has a problem, TeleVantage restarts the software "thread" that is managing that trunk or station without affecting any other trunk, station, or user. Therefore a disconnect at a particular station need not cause problems with the rest of the system, and the problem can be corrected for a particular user without affecting the rest of the company's users.

The TeleVantage system is designed for zero maintenance, and personnel are not required to monitor the system or perform routine maintenance. The server and client software work within the allocated disk space and memory specifications of the PC. You can be confident that the server will require little, if any, ongoing maintenance, after it is up and running. TeleVantage never consumes any more disk space or memory than is originally allocated by the system administrator.

TeleVantage System Reliability

Your phone system creates and maintains your most vital business connections, and it is instrumental to employees' productivity, customer satisfaction, and business expansion. With a reliable phone system, you can be confident that you will not experience business interruptions that are costly to your business. Artisoft's TeleVantage has been designed to provide mission-critical reliability, using standard hardware and software components from industry leaders such as Microsoft and Intel, as well as server and client software engineered for redundancy and fault tolerance. With its dependable operating software, reliable server platform, and carefully engineered soft switch, the integrated system performs with the reliability required to safeguard your company's critical voice and data transactions.



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