

Neverfail for Exchange White Paper

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Executive Summary

Effective business performance depends on effective communication. Email applications have become a lifeline for businesses of all sizes, and users rely on these applications for business critical communication, scheduling, and collaboration. Downtime of these applications is costly to business productivity and revenue. The challenge for continued availability is to ensure Exchange environments are able to recover quickly and to minimize downtime from any situations that might occur — including email surges, viruses, data corruption and more. Organizations must effectively manage all of the interdependencies within a dynamic application environment such as Exchange including: anti-virus and back-up utilities, network components, and general system characteristics like Operating System service packs all while reducing the total cost of system ownership.

Neverfail for Exchange is a high availability software solution for Microsoft® Exchange 2000 that keeps your Exchange services up and running and creates application certainty for your end-users. Neverfail for Exchange proactively monitors and manages all aspects of the application environment and maintains, in real time, a complete system replica as backup in the event of failure. Unlike other software or hardware solutions that focus on recovering only from hardware or data failures, Neverfail for Exchange provides comprehensive failure protection for all elements of your IT system including data, operating system, system hardware, network and Microsoft® Exchange, maximizing application availability.

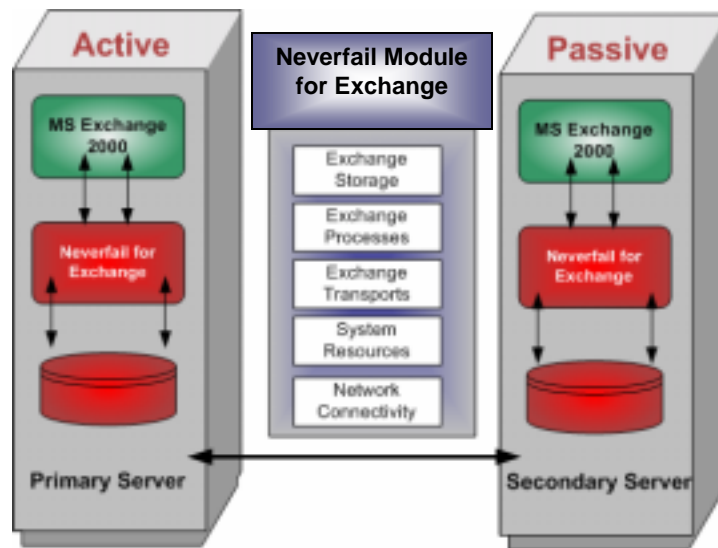
Application Availability

Neverfail for Exchange provides a proactive management facility to monitor many aspects of the Exchange environment. Neverfail for Exchange provides the tools to monitor all resources within an Exchange infrastructure while complementing existing enterprise management tools and data back-up products and procedures. The solution does not require “clustering” and therefore reduces the complexity of installation and maintenance. This approach allows technical managers to increase application performance and service to their customers while providing a high degree of business availability and maintaining a low, total cost of ownership.

There are many causes for application downtime that in practice occur quite frequently.

Such causes include:

- Application crashes
- Administrator errors
- Network errors
- Failure of operating system components and
- Hardware failures



Architectural View

Microsoft Exchange and Neverfail for Exchange are installed on both servers, but only one instance of Exchange is running at one time. Having pre-installed software on both systems eliminates the need for an installation procedure during switchover or failover.

Non-traditional Clustering

Many application availability solutions rely heavily on traditional clustering mechanisms to prevent application downtime. These traditional clusters, also known as shared storage architectures, require sophisticated and costly storage products to ensure the availability of applications and user data. Neverfail for Exchange is built on the premise of a dedicated storage or “shared nothing” architecture which does not require the use of expensive storage facilities or maintain the level of complexity of installation or configuration of traditional clustering technology. In addition to limitations of back-up, many clustering solutions maintain the following characteristics:

- Costly in terms of dedicated and similar hardware required, complexity of maintenance and configuration, and in skilled personnel required for daily management
- To reach the higher levels of availability in a cluster, administrators must employ shared storage solutions which add to the cost and complexity of the overall solution
- Clusters provide no data protection or replication capability. Other back-up technologies must be employed for data protection.
- In general, applications must be cluster-enabled to realize the overall performance and availability benefits of clusters.

Neverfail for Exchange 2000 is a high availability software solution for Exchange 2000 that incorporates an active monitoring facility, a robust replication and back-up capability and a switchover/failover mechanism that's configurable and functional in hours at a much lower total cost of ownership of other point solutions.

Monitoring

Neverfail for Exchange provides the facility to pro-actively monitor application resources and take action to prevent application failure. Exchange uses a variety of transports, processes, and other system resources within the environment to ensure delivery and receipt of messages and other events. Neverfail for Exchange monitors these resources to ensure their availability.

Monitoring – Exchange Processes

Neverfail for Exchange manages and monitors all Exchange processes that are required for application availability. These processes include the Routing Engine, Information Store, Message Transfer Agent, and the System Attendant. The Neverfail Routing Engine monitor ensures the link-state routing capabilities are functioning. The Neverfail Information Store monitor is responsible for ensuring the organization can store and manage documents, collaborate with other users, and access other Exchange applications. The Neverfail engine also monitors the Microsoft System Attendant to ensure the availability of essential services necessary for effective routing and messaging between systems are functional. The Neverfail engine ensures the Microsoft Message Transfer Agent (MTA) is available for addressing and routing messages from

one server to another. All of these Exchange processes are crucial to the inter-communication between system components and application characteristics. Neverfail for Exchange is designed to maximize the availability of individual service components to improve application availability.

Monitoring – Exchange Transports

Neverfail for Exchange proactively monitors and manages specific Exchange transport services. Each of these services is critical to Exchange availability and can drastically reduce application performance and incur application downtime. Neverfail for Exchange takes proactive measures to ensure each service is functional, accessible and available.

- Simple Mail Transfer Protocol (SMTP) - The SMTP service is a key component in Exchange 2000 because it is the primary protocol for communicating with other computers running Exchange 2000. It is also a key protocol for transferring e-mail over the Internet and providing interoperability with other e-mail systems.
- Network News Transfer Protocol (NNTP) - NNTP is the predominant protocol used by computer clients and servers for managing the notes posted on newsgroups. NNTP is used within Exchange to ensure the news group service.
- Hyper-Text Transport Protocol (HTTP) - HTTP enables Outlook Web Access (OWA) to Exchange 2000. In addition, Exchange's Instant Messaging (IM) service uses this protocol to provide its service to end-users.
- Post Office Protocol 3 (POP3) & Internet Message Access Protocol (IMAP) - POP3 is an Internet protocol that allows a client to download mail from an inbox on a server to the client computer where messages are managed. In addition to POP3, users may elect IMAP as a way to access their mail.
- Internet Relay Chat (IRC) - Microsoft Exchange 2000 Chat Service furnishes organizations an informal and immediate means of communication. The Chat Service is based on IRC, a client-server protocol that supports real-time conversation between two or more users over a TCP/IP network. A chat community is a set of users and channels (chat rooms) that are configured for an instance of Chat Service.

Monitoring – System Resources

System monitoring is critical for ensuring non-application specific resources are available. These non-application specific or system resources include CPU, Virtual

Memory, and Storage. All of these system resources can contribute to application failure. Neverfail for Exchange is capable of managing both application and system level resources within the Exchange environment. For system level monitoring, Neverfail for Exchange provides a facility to manage the critical services within the system to ensure they are properly functioning.

The CPU monitor tracks the usage of a server's CPUs. When CPU utilization is too high for the Exchange Server to effectively process messages or manage other critical functions, Neverfail for Exchange can be configured to manage maximum CPU utilization usage. If CPU utilization is at a maximum level for a given period this could indicate an application related performance problem. Neverfail for Exchange can be configured to switchover to a secondary server in the event that CPU utilization maintains maximum utilization after a set period of time. Neverfail for Exchange can be configured to execute a series of instructions based on the parameters set by the administrator under specific conditions particular to the Exchange environment.

In addition to CPU monitoring, Virtual Memory monitoring is critically important to normal system operation. When a server runs low on virtual memory, system performance can suffer and message processing can reduce to a barely functional state. To avoid this, Neverfail can be configured to take corrective action, perhaps check the status of a specific resource and engage a start/stop action to resuscitate a non-reactive or perhaps a failed resource before virtual memory issues cause problems with Exchange services. Thirdly, disk storage characteristics can contribute to server performance and application availability. Exchange uses available disk space for data storage, logging, tracking, and virtual memory. When hard disks run out of space, Exchange can function improperly and possibly lose data. To avoid exceeding limitation of free disk space and creating application failure, an administrator can configure Neverfail for Exchange to monitor the disk space and invoke a pre-emptive action that might automatically free up more space or switchover to the secondary system if more space is available. Neverfail for Exchange is designed to assist Exchange administrators to avoid system and application level failures by taking pro-active measures to ensure resources remain active and services perform as required.

Operating system services can be actively monitored and managed within the Neverfail for Exchange solution. In addition to the application-level and system-level resources associated with the particular application, Neverfail for Exchange can actively monitor and take corrective action for failed system resources. If necessary Neverfail for Exchange can be configured to restart operating system (OS) services as an actively monitored resource. In such an instance, the solution can be configured to maintain Exchange on the active server while specific, either application or system-level, resources can be reached and re-started if necessary. Additionally, the solution can be configured to simply switchover to the secondary server while the operating system of the primary server is restarted. Neverfail for Exchange provides the administrator with a powerful set of utilities to pro-actively monitor all services associated with application availability at any level within the environment. Unlike other solutions that provide functionality for a piece of the solution, Neverfail for Exchange provides the most comprehensive, Exchange high availability solution on the market that meets the demands of cost-performance.

Heartbeat

Neverfail for Exchange provides a dedicated mechanism for communication between the primary and secondary server. The passive server utilizes this mechanism to monitor the active server's availability and vice-a-versa. Unique to the Neverfail environment, the Neverfail Heartbeat guarantees communication between a primary and secondary server via dedicated single channel configurations such as network interface cards (NICs) - direct NIC-to-NIC using physical connections or NIC-to-NIC over local areas networks (LANs) or wide areas networks (WANs) leveraging intelligent network technologies. Maintaining dedicated, physical channels, Neverfail for Exchange is able to failover to a secondary server in close proximity or to a secondary server in a different physical location; even across different networks and sub-networks.

Dual Channel

In addition to guaranteed communication between the primary and secondary server using a single NIC channel configuration, Neverfail for Exchange can employ a dual NIC channel configuration. A dual communication channel provides guaranteed communication between two servers using dual NICs directly, or via LAN/WAN. Neverfail is unique in its ability to employ dual communication configurations to provide

increased flexibility and dedicated communication between the primary and secondary servers – all to improve application availability.

Application Recovery

Upon failure of an application or an application resource, Neverfail for Exchange is able to employ several means to ensure Exchange availability. These methods include Dynamic Recovery, Switchover, or Failover.

Dynamic Recovery is a feature of Neverfail for Exchange that provides a facility for automatically recovering failed resources with the Exchange environment. Recovering individual services is one way to avoid any application downtime. It is possible to start and stop specific resources within Exchange and take preemptive action to keep individual services running. By identifying and recovering specific Exchange resources, application downtime can be avoided. Neverfail for Exchange manages this process by using a system of checks and actions. The product includes many standard checks that monitor the specific services within Exchange as described above. Actions are rules defined and configured by the administrator that perform a specific task based on a failed Neverfail check. Actions can include restarting a failed resource, executing custom code or script, or executing a Neverfail Switchover. The administrator has a highly flexible tool that can be used to define the action of a Neverfail check.

In a *Switchover* operation, the roles of the primary and secondary servers are reversed. The switchover process is a controlled shut down and can be completely automated as the result of a failed Neverfail Check or can be manually triggered by an operator. Once the planned switchover operation is initialized on the active server, the application is shut down on the primary server and all associated user and application activity is moved to the secondary server. Neverfail ensures all data remains synchronized and services remain available on the network with minimal interruption and loss of service to the end-user. The secondary server automatically begins the “activation” process and assumes the active role and thus the responsibilities of the primary server. This process ensures there is no data loss and that the Exchange system was in a stable state at the switchover point.

Planned maintenance is a common use of the switchback operation. Switchover and Switchback between the primary and the secondary Server can be used in a maintenance procedure to apply operating system service packs or to simply decommission the primary server from the network to perform hardware, memory or operating system updates. The administrator maintains full control of the Exchange environment to ensure application availability and to prevent any loss of data.

In a *Failover* situation, the primary server becomes unresponsive and must be decommissioned from its active responsibilities. If the active server fails, the passive server can assume the active role automatically. The Neverfail for Exchange channel service on the passive server quickly detects that the active server has failed by way of the heartbeat mechanism. The Neverfail for Exchange channel service will automatically initiate a series of steps similar to the steps taken on the passive server during a switchover operation:

- A “network-connect” operation commissions the passive server into the network and decommissions the active server from the network.
- Updates to the disk-files on the formerly passive, now active server are now permitted and are queued to be processed. Note that the failed server will not be able to receive these updates as long as that server is not operational.

Data queues serve as a mechanism to manage Neverfail channel traffic and prevent data loss and corruption between primary and secondary servers. Neverfail defines two queue types: safe and unsafe update queues. Safe update queues manage data and prevent bottlenecks at the file system on the secondary server. Unsafe update queues manage traffic and minimize data loss and corruption at the network level to ensure that data between the two servers is synchronized. Administrators can configure traffic levels on both servers to ensure an efficient use of bandwidth and minimal data loss in the event of a failure.

Replication

Neverfail for Exchange includes an advanced replication feature. Exchange provides several significant storage elements that must be protected to ensure that user data is available after switchover, or failover. These storage elements include public folders, private mailboxes, contact lists, news feeds, calendar events, task lists, and journals.

Each of these storage facilities contain specific user data that must be protected and replicated to ensure application availability and data integrity. Neverfail for Exchange replicates all of these storage elements within the Exchange environment.

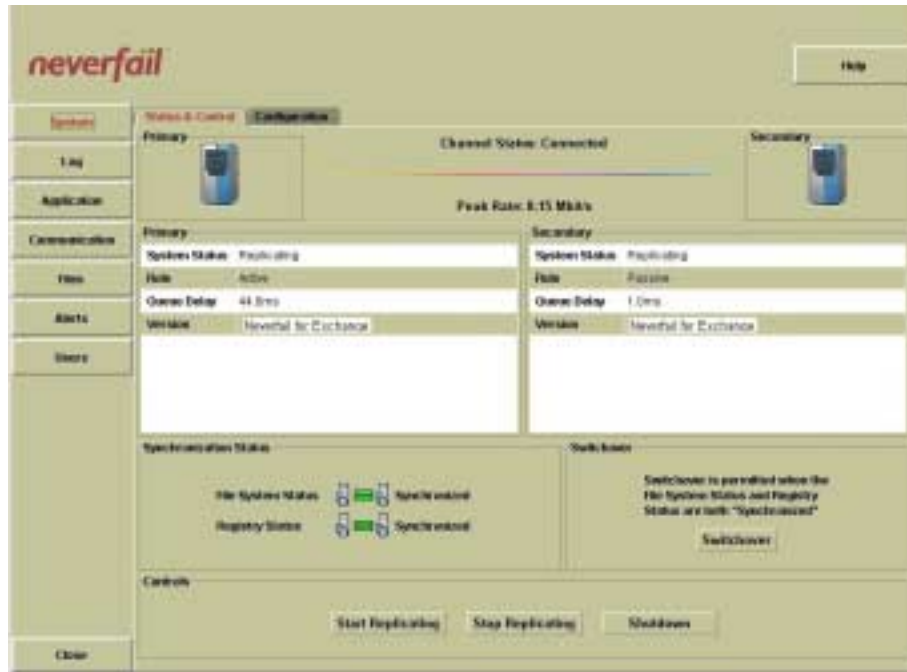
To reduce data loss, Neverfail for Exchange includes a robust verification and synchronization process to ensure that data on the primary server and secondary servers are completely identical. This process determines exactly which files of the primary may already exist or are in sync on the secondary and only copies the necessary files to the secondary. Thereafter, only changes are replicated, which reduces the latency associated with transferring complete files during the replication process.

A key feature of Neverfail for Exchange is the verification and synchronization process can be run while Exchange is active. This significantly minimizes the Exchange downtime often experienced during Exchange installation and activation.

After a thorough verification and synchronization process, Neverfail for Exchange initiates replication. The replication procedure updates all changes of the protected Exchange data to the secondary server. Each update is written to the passive system to guarantee immediately that all data that is written to disk on the active system is available on the passive site in the event of a failure of the active system.

User Interface

Neverfail for Exchange offers an administration user interface (UI) providing the ultimate flexibility and control to manage all aspects of the Neverfail for Exchange environment. The administration UI allows technical managers to dynamically define specific Exchange services to monitor, define how the services are monitored, and assemble the logic required to take corrective action. The user creates a check for each resource to be monitored. Neverfail for Exchange includes many pre-defined checks that allow users to monitor the most common Exchange services. Each Neverfail check can be modified to or used in conjunction with other user-defined checks.



Graphical User Interface

The user interface of Neverfail for Exchange gives administrators complete control of the entire Exchange environment. Administrators can choose which resources are monitored and define the parameters of Neverfail checks and actions.

Installation

Neverfail has taken every effort to ensure that Neverfail for Exchange is a seamless, non-disruptive installation process that will ensure that your Exchange server keeps running and that there is no disruption of the Exchange environment. Neverfail for Exchange meets the demands of ease of use, installation and configuration to keep your business running.

- Installs and configures in hours to reduce downtime of your application environment.
- No “clustering” expertise required – the installation procedure is less complex than other solutions that require clustering components
- Installs with minimal downtime on an active Exchange server

The solution is designed to minimize costly downtime during and after the installation process. Unlike traditional clustering solutions that incur complex and costly installations and configurations, Neverfail for Exchange simplifies the installation and configuration process without the need for others point solution that often impact the total cost of ownership.

Summary

Neverfail for Exchange provides real-time, proactive management of Microsoft® Exchange to ensure anytime access to its messaging and collaboration services and to prevent failure and costly downtime of business critical communications. Neverfail for Exchange proactively monitors all services within the Exchange environment to automatically restart failed resources and take preemptive action before resorting to switchover or failover. As part of a comprehensive solution, Neverfail for Exchange, a high availability product for the Windows platform, provides the most robust communication and application certainty solution available on the market.