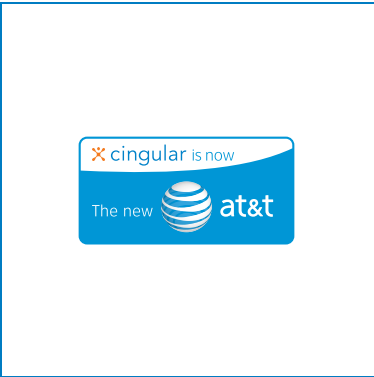
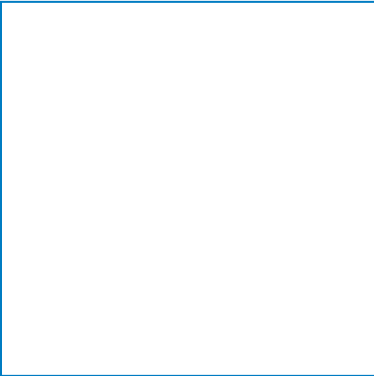
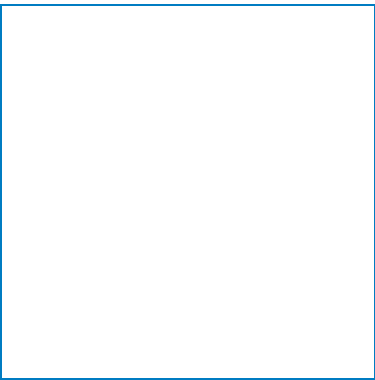
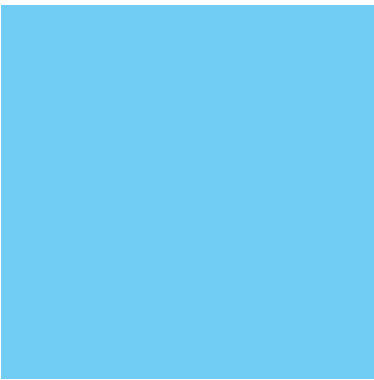
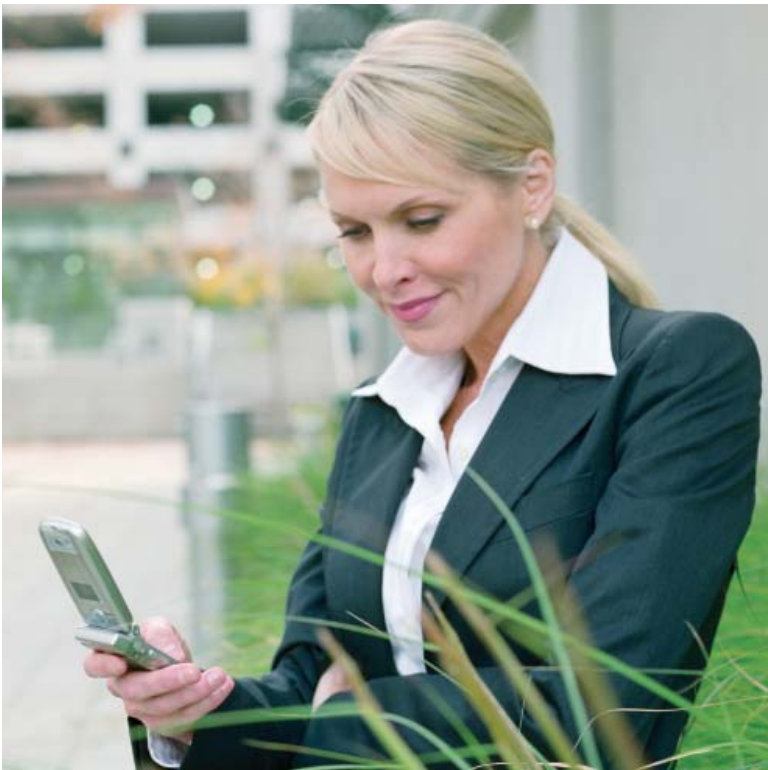


Good Mobile Messaging

Product White Paper





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Introduction

Executives and professional field forces spend an increasing amount of time on the road tending to business. These mobile professionals need to be readily accessible to customers, partners and fellow employees. In the past, this required mobile professionals to carry a laptop and use cumbersome and expensive remote access systems such as Virtual Private Networks (VPNs). Today, advances in handheld and network technology make secure mobile access to e-mail and mission-critical corporate information systems a reality.

No longer just a luxury for top executives, mobile technology has become a necessity for field forces. Mobile access to corporate IT systems drives productivity and efficiency. Handheld and mobile application technologies are changing the way that companies, employees and customers conduct business. These technologies can improve business processes in such areas as sales, service, marketing and logistics. Improvements in these areas yield real ROI.

With an increasing number of wireless systems available in the marketplace, CIOs, IT managers and many mobile professionals are seeking an extensible system that combines extreme reliability and state-of-the-art security with low-cost deployment and support.

INTUITIVE, CONSISTENT USER EXPERIENCE

Good Mobile Messaging is a standards-based, wireless messaging application and management system that provides mobile field forces with a two-way, wirelessly synchronized connection to the enterprise messaging server (enterprise e-mail, contacts, calendar, notes/personal journals and tasks/to do lists) and rich attachments such as Word, Excel,® PowerPoint,® Acrobat® and dozens of other rich formats. The robust Good Mobile Messaging architecture incorporates end-to-end encryption of all data and ensures delivery of all data. Good Mobile Messaging is also offered with a variety of support packages for flexible support and service.

GREAT HANDHELD AND CARRIER SUPPORT

Companies can avoid vendor lock-in with the Good Mobile Messaging open-platform approach. The complete Good Mobile Messaging application is offered on multiple handhelds and carriers that support industry-standard operating systems, so customers have maximum flexibility and choice.

Good Technology supports a variety of enterprise-class industry standard handhelds across the Palm® (Treo™ family), Windows Mobile®, and Symbian™ operating systems. As Good frequently adds support for new handhelds, please see www.good.com for the latest supported handhelds.





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END-TO-END SECURITY

Good Mobile Messaging provides end-to-end system security, from the Good server, over wireless networks, and across your handheld fleet. See the Good Security White Paper for an in-depth overview of Good's security.

RELIABLE MESSAGE DELIVERY

Enterprises must be assured that messages are delivered even if there is an interruption in service or a handheld has been out of coverage. Good Mobile Messaging uses a multi-level Positive Acknowledgement Architecture to confirm that all messages are delivered, in order, with no duplicates. The Good Mobile Messaging centralized management console and portal provide administrators with feedback, 24/7, to ensure maximum uptime.

NO DESKTOP SOFTWARE REQUIREMENTS

Easy, low-cost deployment and maintenance of software drive the success of an IT organization. Good Mobile Messaging offers a zero-desktop installation option to simplify deployment and reduce total cost of ownership. Software installation and handheld setup can be done at the server, removing the time-consuming and costly requirement that IT touches every desktop.

SECURE OTA MANAGEMENT

With Good Secure OTA (Over-the-Air) management, IT never needs to physically touch handhelds in order to provision or maintain them. Secure OTA management allows IT managers to wirelessly install Good Mobile Messaging with minimal end-user action, and then to automatically provide wireless OTA upgrades.

IT MANAGEMENT CONSOLES AND MOBILE PORTALS

IT managers can rely on powerful Good Mobile Messaging management tools that make it easy to manage both servers and handhelds. The Good Management Console (GMC) is designed to mirror the Microsoft Management Console in Exchange, providing a central place to provision, track and administer users and servers. Good Mobile Messaging also allows for mobile Web-based handheld access to the Good Monitoring Portal, a troubleshooting and remote management tool that allows IT managers to view and fix problems remotely.



Good Mobile Messaging and the Good System

Good Mobile Messaging is part of the Good System, which consists of the following components (see Figure 1):

- Good Messaging Server
- Good Network Operations Center (NOC)
- Good Messaging Client
- Good Management Console
- Good Monitoring Portal

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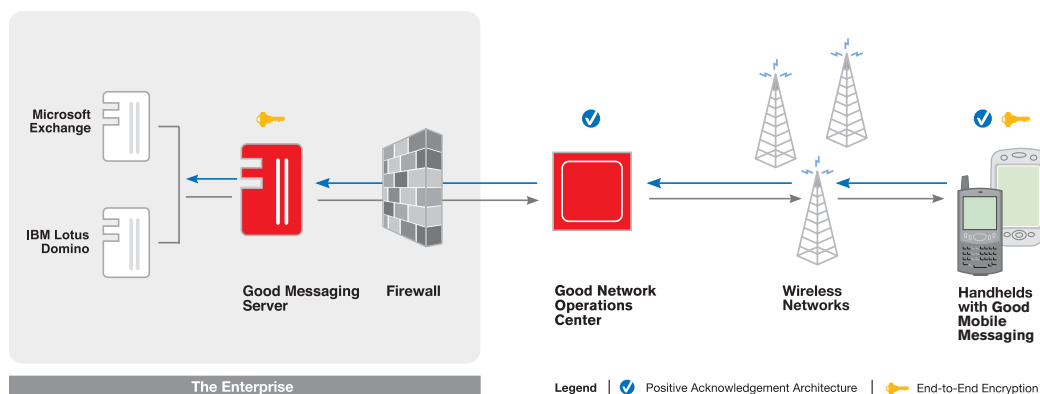


Figure 1: The Good System

Good Messaging Server—The Good Messaging Server is optimized to work with industry leading messaging servers to offer enterprise-class security, exceptional reliability and centralized fleet management. Specifically designed to meet the needs of IT managers, it reduces costs of deployment and support via its zero-desktop software architecture. Good Messaging Server software monitors the user's enterprise mailbox and synchronizes any mailbox activity with the Good NOC, which then passes the e-mail and data through the wireless network to the user's handheld using a true-push architecture. Changes made on the handheld are sent to the Good NOC via the handheld's radio transmitter and the wireless network and return from the Good NOC to the enterprise messaging server via the Good Messaging Server. As a result, e-mail and data are available on both the user's desktop and handheld, ready to be read and filed from either location.

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Good NOC—The Good NOC ensures the highest level of data encryption and fastest possible synchronization between the Good Messaging Server and the handheld. The Good NOC is a network operations center (NOC) that provides a number of benefits.

- **Push-based e-mail**—With the Good NOC, customers get more timely delivery of messages and more efficient battery use on the handheld. Even when users have been out of coverage, they have e-mail delivered to them in the correct order as soon as they come back into coverage.
- **Positive Acknowledgement Architecture**—With the Good NOC, IT managers have data-path visibility with a built-in receipt of delivery so that they can ensure that messages were delivered to the right recipients.
- **Multiple networks**—The Good NOC makes it possible to manage connections to multiple carriers and networks, including Code Division Multiple Access (CDMA) 1XRTT, General Packet Radio Service (GPRS) and 3G networks. A single Good Messaging Server can support handhelds on all of these networks and will be able to support new networks in the future.
- **Standard firewall settings**—The Good NOC allows a Good Mobile Messaging customer to work without requiring any changes to the external firewall. The server makes a secure outbound connection using the standard port 443, and all handhelds can communicate with it. No inbound connections are required.
- **Optimized battery life**—The Good NOC communicates with handhelds to keep a connection established. Because the Good NOC does most of the work to keep handhelds online, it improves the battery life of the handheld.
- **Fleet monitoring**—The Good Monitoring Portal, which is discussed below, connects to the Good NOC to provide server and handheld visibility. This means that IT has visibility to the server status, individual handhelds, including handheld type and ROM, radio status and more—all from a Web-based interface.

Good Messaging Client—Provides up-to-date wireless access to all enterprise e-mail and personal information management (PIM) applications (e.g., e-mail, calendar, contacts and more) and support for rich attachments. This client has an intuitive, consistent look and feel even across different handhelds and platforms.

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¹Requires Microsoft Active Directory

²This feature is currently available with Good Mobile Messaging for Exchange and will be available in a future release of Good Mobile Messaging for Domino.

Good Management Console—Simplifies user and server management by providing an integrated, centralized management console from which an administrator can manage and monitor handhelds and servers. Tight integration with Microsoft Management Console (MMC) facilitates streamlined administration of users and servers.

- **User and server management**—IT managers can add, delete and monitor users and servers. In addition, they can also access detailed information about the handheld and servers, and assess performance such as coverage history.
- **Secure OTA management**—IT managers can enable Good Mobile Messaging users without ever touching their handhelds. Secure OTA also allows IT managers to push out third-party applications, and enforce password and other handheld policies. In addition to being able to upgrade an entire company with one command, IT managers can also schedule regular OTA upgrades of Good Mobile Messaging or third-party applications as needed.
- **Role-based administration**¹—IT managers can distribute management tasks across a hierarchy of administrators by using role-based administration that offers a set of roles, with varying permissions, for administering the Good Messaging Server and users. By assigning appropriate roles to administrators, IT can better manage assets and increase security. Routine tasks, such as loading software, can be delegated to a wider group of administrators across multiple locations. More sensitive tasks, such as setting global policies or remotely erasing a handheld when lost or stolen, can be restricted to a smaller group.
- **User-group management**²—Administrators can create groups to organize and manage Good Mobile Messaging users. All policies and software distribution can be managed at the global, group or individual user level. This provides IT with more granular control and reduces the time it takes to manage users, especially in larger deployments.

Good Monitoring Portal—The Good Monitoring Portal (GMP) is a Web-based monitoring system that allows administrators to manage Good Messaging Servers and handhelds remotely. Administrators can easily use any Web browser to access server and handheld status. Potential problems can be tracked and resolved before they become serious. IT managers can provide higher levels of service, and users can get increased uptime. Administrators have access to server information, including current server status, connection history and a list of connected handhelds, and they receive alerts about available server software upgrades. They can also track current handheld status by device ID or by user e-mail address, and they can view server status and coverage history.

Reliable Message Delivery

Reliable message delivery is a primary requirement of a wireless messaging system. Good Mobile Messaging incorporates a unique multi-level Positive Acknowledgement Architecture to ensure every message arrives at the handheld, in order, with no duplicates. Positive Acknowledgement Architecture ensures reliable message delivery.

Good Mobile Messaging Positive Acknowledgement Architecture confirms point-to-point, as well as end-to-end, delivery of every message (see Figure 2). The system also ensures delivery in order, with no duplicates, and with timestamps that match those in the enterprise messaging server. Events such as enterprise messaging server downtime, network problems and handheld failures do not cause messages to be lost or delivered out of order.

End-to-end message delivery confirmation is assured via several point-to-point message delivery confirmations:

- **Enterprise Messaging Server to Good Messaging Server**—Uses standard protocols (i.e. MAPI or NRPC), including a parallel confirmation channel, to ensure that messages have been delivered successfully, even if there is temporary enterprise messaging server downtime.
- **Good Messaging Server to Good NOC**—Confirms that messages have been delivered using Transmission Control Protocol (TCP) over Secure Sockets Layer (SSL).
- **Good NOC to handheld**—Ensures that messages have been delivered successfully to the handheld using secure, highly efficient wireless network protocols.
- **Good Messaging Server to handheld**—The Positive Acknowledgment Architecture session layer saves messages at the source until delivery is confirmed.

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³This feature is currently available with Good mobile for Exchange and will be available in a future release of Good Mobile Messaging for Domino.

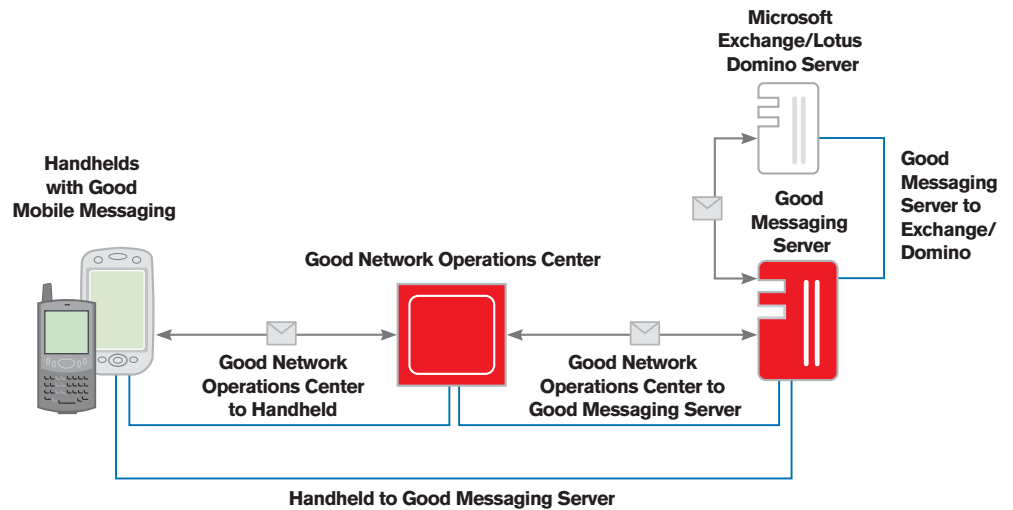


Figure 2: Positive Acknowledgement Architecture

At certain times, connectivity between the Good Messaging Server and the handheld may not be possible—mobile workers travel in and out of coverage, IP connectivity to the enterprise can go up and down and messaging-system components occasionally have scheduled downtime. To ensure that messages are always delivered in these situations, Good Mobile Messaging is designed to temporarily store an encrypted copy of each message that cannot be immediately delivered at the Good NOC, so it can be delivered successfully and in order once system connectivity is restored. Good Mobile Messaging also recovers from any component failure in a way that ensures that the end user receives all messages, including any sent during downtime. Good Mobile Messaging is designed to recover from situations such as:

- Enterprise messaging server (i.e. Exchange or Domino) failures or maintenance downtime.
- Firewall failures or downtime.
- Network failures affecting wireless network or base stations, the network backbone, the Internet or handheld coverage or transmission.

Good Messaging Server redundancy configuration ensures maximum uptime. Redundancy for the Good Messaging Server is available through Microsoft clustering, which allows administrators to set up a second Good Messaging Server that can automatically fail over in the event of a software or hardware lapse on the primary Good Messaging Server³.

Efficient System Management

OTA DEPLOYMENT SECURITY CONSIDERATIONS

Focusing on the costs of deployment and system management to drive down total cost of ownership, IT managers look for applications that are easy to deploy and manage in order to minimize the number of IT hours required for support. Good Mobile Messaging minimizes support requirements via zero-desktop installation, easy administration and monitoring controls, a simple user interface, extensive support resources to reduce troubleshooting time and Secure OTA management.

ZERO-DESKTOP INSTALLATION OPTION

Administrators can take advantage of the zero-desktop installation option to set up handhelds centrally at the server. This means no desktop visits to install software, no version management and no end-user desktop help-desk tickets. Companies can deploy to more users while assigning fewer employees to manage the wireless messaging system. IT managers can further decide which types of deployments to do in different parts of the company: server, kiosk or desktop.

EASY ADMINISTRATION AND MONITORING

The Good Messaging Server integrates tightly into an enterprise messaging environment to simplify administration, including setup, removal, management and viewing of users. IT administrators can easily deploy and manage a fleet of Good Mobile Messaging users by setting global policies for all users while making exceptions for individuals. The Good Messaging Server includes the Good Management Console, a powerful administration console with tools to manage both servers and handhelds. The console supports monitoring server performance through the Microsoft Windows® NT performance monitor, monitoring troubleshooting information from error logs via such products as NetIQ and adding large groups of users to the Good Messaging Server via the Global Address List or Domino Directory. In addition, the Good Monitoring Portal helps the IT manager monitor server and handheld performance and uptime. Problems can be identified early, before end users encounter them.

INTUITIVE USER INTERFACE

Good Mobile Messaging is easy to use for anyone familiar with enterprise e-mail and personal information management (PIM) applications, such as Outlook or Lotus Notes®. Frequent tasks, such as composing an e-mail or looking up a contact, are simplified and can be done intuitively with only a couple of clicks. Good Mobile Messaging also includes encrypted, integrated attachment viewing, so users can view the content of e-mail attachments in text or rich format. To control the type of data sent to the handheld, IT managers can select which users have access to rich attachments. The intuitive Good Mobile Messaging interface is the same on all supported handhelds; this means minimal training for end users and fewer calls to the help desk.



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MULTIPLE SUPPORT PLANS

IT administrators can get questions answered and issues addressed by phone or e-mail. Good Technology's highly trained support staff, equipped with network and service management tools, is on standby to assist with any problems or questions. The online knowledge base is updated continually, so the latest information and the best solutions are available at all times to customers. Good also offers 24/7 support along with other premium services like proactive server monitoring, which notifies Good customers when their server goes down or there are issues with carrier networks.

STANDARDS-BASED ARCHITECTURE

Using industry standards including HyperText Transfer Protocol (HTTP), SSL and Advanced Encryption Standard (AES), Good Mobile Messaging is built for flexibility and future extensibility. In addition, the Good Messaging Server runs on standard hardware that can be deployed at low cost.

MULTI-NETWORK SUPPORT

The Good Messaging Server supports multiple networks, allowing enterprises to select multiple carriers or to flexibly and cost-effectively switch carriers. Once the Good Messaging Server is installed, it will instantly be able to communicate and synchronize with all devices on all networks, including GPRS, CDMA 1XRTT, and 3G networks. No additional software or hardware is required.

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System Redundancy and Monitoring

Access to e-mail and other corporate data is mission-critical, and service uptime is a crucial component of system reliability. Good Mobile Messaging is designed to recover gracefully from hardware, software or network failures, and it incorporates end-to-end redundancy that enables automatic recovery. Service uptime is also assured during system expansion since the architecture is designed to allow smooth and rapid scalability. Finally, advanced tools for network and system monitoring ensure that potential problems are quickly detected and prevented.

GOOD NOC AND NETWORK REDUNDANCY SYSTEMS

Throughout the Good System architecture, redundant and clustered systems provide backup support, eliminating any single point of failure. Both the wireless network and the Good NOC are equipped with alternative infrastructures that enable recovery from failures.

GOOD NOC REDUNDANCY AND BACKUP

Messages are routed from the Good Messaging Server (behind the firewall) through the Good NOC to the handheld and vice versa. The Good NOC is engineered with complete redundancy to eliminate single points of failure (see Figure 3). The high-availability network and computing infrastructure within the primary data center is fully self-healing. In the event of any component failure, message flow is automatically rerouted by custom clustering applications to the redundant systems or network path.

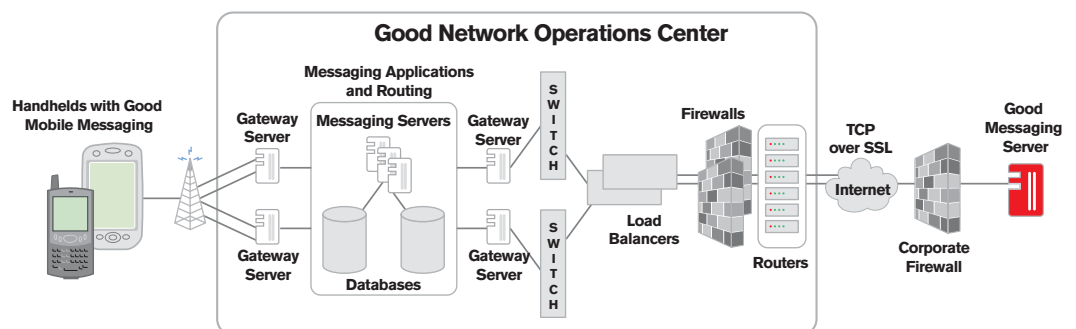


Figure 3: Good NOC Redundancy and Clustering



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Network Redundancy:

- Access routers have two different paths, both physically and logically, to the Internet. Traffic failover is seamless in the event of a router or network failure.
- A firewall cluster within the Good NOC will fail over to a redundant firewall in the event of any switch, router or firewall failure. Communications between protected subnets will resume transparently.
- SSL accelerators will fail over to redundant hardware.
- In the event of load-balancer failure, sessions will be maintained and failed over to redundant hardware.
- For hardware failures in the backbone switch, network traffic will fail over and communications between subnets will continue to flow smoothly.
- The wireless network gateway is designed to multiplex traffic. If any gateway server is down, messages are automatically rerouted to a redundant gateway server.
- Multiple lines connecting the Good NOC to the wireless network provide physical line failover.

System Fault Tolerance:

- All system hardware has built-in redundancy to guard against CPU, disk, power supply and memory errors.
- Systems are clustered and/or load-balanced to provide immediate recovery in the event of a total system failure.
- Backup copies of system-critical information are stored off-site.

Application Layer Redundancy:

- Database and message-queuing software is protected by VERITAS® clustering software.
- In the event of process or system failure, redundant processes and systems will be brought up automatically.
- Applications use purpose-built clustering. Redundant processes are always running. If failures occur, message flow is not interrupted.



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Hardware and Physical-Layer Backup:

- Each component (systems, storage area network (SAN) and network gear, etc.) has redundant counterparts or is load-balanced across multiple systems.
- Redundant physical infrastructure components such as uninterruptible power supply (UPS) air conditioner and backup generator are available.

HIGHLY SCALABLE ARCHITECTURE

The Good NOC is set up to add capacity transparently, so end users will not be affected by system expansion. Good Technology monitors capacity utilization at each component level, including the network, system, application and physical layers.

PROACTIVE MONITORING

The Good NOC provides 24/7 system monitoring and fault detection to ensure that service uptime is maintained. It is equipped with backup power, access to redundant monitoring systems, redundant private network lines and access to news and information that may impact the data center in an emergency. If a failure is detected by the monitoring system, it is immediately escalated, and appropriate failover systems are activated. If message flow is discontinued for some time, the customer will be notified. In this way, the customer can be alerted to a potential problem before end users encounter it.

End-to-End Security Protects Valuable Corporate Data

Protecting the integrity of corporate data is very important to an enterprise. By design, wireless solutions send data outside the corporate firewall, so it is essential to ensure that all information is secure and protected throughout the transmission. Good Mobile Messaging is designed to meet strict corporate guidelines for confidential information.

ENCRYPTION AND AUTHENTICATION PROCEDURES

Good Mobile Messaging features end-to-end security to protect against unauthorized access to the system, hostile capture of information as it travels through the wireless network and unauthorized information retrieval off the handheld.

SECURITY

Good Mobile Messaging protects against unauthorized network and server access by requiring a three-step authentication process involving the Good Messaging Server, the Good NOC and the handheld. Both the Good Messaging Server and the handheld must be authenticated at the Good NOC before data can be transmitted successfully.

- **Transmission security**—Good Mobile Messaging uses AES-192 advanced security technology to secure data during transmission. Good Mobile Messaging also uses a shared encryption key to ensure that only the sending and receiving parties can read the data. The key is stored in the handheld and in the user's account at the enterprise messaging server. Every message is encrypted behind the corporate firewall and decrypted only when it reaches the correct handheld. As an added security measure, keys on a handheld are automatically rotated every 30 days. At no point are the data or the encryption key accessible within the Good NOC or over the wireless network. Finally, communication between the Good Messaging Server and the Good NOC is encrypted using SSL to protect messages traveling over the Internet.
- **Handheld security**—Data residing on the handheld are protected from unauthorized access via an advanced password-protection system. Passwords are protected by SHA-1, a one-way secure hashing algorithm. To avoid any possible brute-force attacks, the handheld will automatically erase all data after a specified number of incorrect password attempts. IT managers can define password characteristics and can enforce password policy on users' handhelds. In addition, if a handheld is lost or stolen, the IT manager can wirelessly erase all data from the handheld, so sensitive corporate data are not accessible to a rogue user. Good Mobile Messaging also supports the ability to view signed e-mail messages on the handheld, allowing organizations to provide additional protection for sensitive information.



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- **Third-party software management**—With the Secure OTA capability of Good Mobile Messaging, IT administrators can distribute and upgrade third-party software like anti-virus scanners, thus enhancing security throughout the system.
- **Good Messaging Server security**—IT managers can distribute management tasks across a hierarchy of administrators by using role-based administration, which includes a set of roles with varying permissions, for administering the Good Messaging Server and users. By assigning appropriate roles to administrators, IT can better manage assets and increase security. Routine tasks, such as loading software, can be delegated to a wider group of administrators across multiple locations. More sensitive tasks, such as setting global policies or remotely erasing a handheld when lost or stolen, can be restricted to a smaller group.

STANDARD FIREWALL SETTINGS

Good Mobile Messaging is designed to be installed behind the corporate firewall. A connection between the Good Messaging Server and the Good NOC, established via HTTPS, uses advanced AES encryption for enhanced security. For outbound communication, this connection is established through the firewall using standard port 443, so most customers do not need to modify their firewall configuration. Good Mobile Messaging also supports ports 3101 and 4663. Outbound traffic from the Good Messaging Server has no destination other than the handheld; inbound traffic from anything other than the handheld will be discarded.

For more information on security, please refer to the Good Mobile Messaging Security White Paper.



Conclusion and Checklist

Wireless messaging systems are complex by nature. Message traffic travels across multiple networks; users travel in and out of coverage; IP connectivity is variable; components such as the enterprise messaging server have routine maintenance, as well as unscheduled downtime; and the wireless messaging system must deliver messages reliably and securely. When selecting a wireless messaging vendor, it is important to find one that understands what makes a messaging system truly enterprise-class. Using the checklist below, IT managers can evaluate which systems meet the key requirements.

From software design to network infrastructure, the Good System is designed to meet the high expectations of the IT manager for a reliable, secure and flexible system.

ENTERPRISE CHECKLIST

Reliable Architecture:

- Is off-server messaging capability available in emergencies?
- Does the design of the system ensure reliable message delivery?
- Are positive acknowledgements in place at each level and end-to-end?
- Are messages temporarily stored until delivery confirmation is received?

Service Availability:

- Is redundancy provided for all hardware, software and network elements?
- Are transparent clustering and load balancing used?
- Are all single points of failure eliminated?
- Is the infrastructure physically secure?
- If systems become unavailable, is failover automatic?
- Is the system designed with a disaster recovery plan?
- Is monitoring in place to discover potential problems?
- Are customer systems monitored as well as network systems?

Security:

- Is the server behind the firewall?
- Does the server use standard firewall ports that require no reconfiguration?
- Is data encrypted end-to-end rather than transmitted in the clear at any point?
- Is information encrypted using strong encryption such as AES?
- Are there multiple levels of authentication?
- Can IT enforce password policy on handhelds and define password requirements?
- If a handheld is lost or stolen, can the handheld data be wirelessly erased?
- Can IT prevent the messaging software from being installed or started if required applications, like virus protection software, are not on the handheld?

Ease of Management:

- Is a zero-desktop software installation option available?
- Can the wireless messaging software and third-party applications be deployed and upgraded completely OTA?
- Is the user interface designed to minimize training?
- Are global policy controls available and easy to deploy?
- Is customer support available 24/7?
- Is the solution based on standards, and will it be extensible?
- Does the server support multiple networks?
- Are multiple networks and handhelds supported?