

# Managing Printers for Maximum Reliability, Performance and Value



A ZEBRA BLACK & WHITE PAPER



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Consider two thermal printers that work side-by-side to produce shipping labels at a busy distribution center. The printers are very comparable—each is connected to the Ethernet network, has a listed print speed 10 inches per second (ips) and prints 4-by-6-inch bar code labels at 203-dpi resolution. The main difference between the two printers is in how they are managed.

Printer A uses its network connection to periodically send status reports to the system administrator or to a remote management application. Performance and diagnostic information can be sent using SNMP or network connection to a console application the network administrator uses. Ethernet connectivity to Printer B provides one-way communication of print jobs.

An hour before the daily shipping deadline, each printer begins to run low on label media. Printer A senses this and automatically sends an alert through its management application. The IT administrator uses a simple application she developed herself to divert print jobs temporarily to another printer and automatically forward low media alerts to a worker on the floor, who drops in a new roll of labels in less than a minute, resulting in no meaningful disruption to activity.

Minutes later, Printer B's label roll runs empty. The condition isn't noticed until unlabeled cartons pile up at the printing station. An operator then hastily adds a label roll and starts the process of determining which labels belong on which boxes. The delay threatens the same-day shipping status of some orders and will result in rush shipping charges if the cartons can't be sorted, identified and labeled in time for the regularly scheduled pickup. This time, shipping clerks fix the problem in time, but sooner or later media will run out at an inopportune moment and create a missed shipment.

“Supportability” and “uptime” don't show up on thermal printer spec sheets for easy comparison like other key attributes, such as connectivity options, bar code types, print width or price. But the ease with which thermal printers can be managed has one of the biggest impacts on the value they provide. Printer compatibility with enterprise IT support protocols and preferences has a strong, direct impact on reliability, support time requirements and total cost of ownership (TCO).


This white paper shows how thermal printer support features affect printing and support operations, and presents different IT management options and levels for managing thermal printers.

## Specialization Shouldn't Be a Burden

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Thermal printers provide specialized output (bar code and RFID labels, tags, wristbands, receipts, tickets, etc.) that requires special features (e.g., heat settings, print speed) that common document printers don't have. Therefore, mainstream printer utilities and IT management systems can't provide full control over thermal printers. Thermal printers need their own specific management resources for optimal performance and reliability, but that doesn't mean thermal printers can't be compatible with IT and network standards and protocols.

Thermal printers should be managed the way enterprises like to manage—whether through general IT asset management applications like HP® OpenView™ or IBM's Tivoli™, through an SNMP connection to a home-grown management application, or for advanced control with a management system specific to the printer. They should support common networking, interface, and security protocols, and take advantage of them to leverage legacy IT management resources as much as possible. These features and capabilities do exist for




thermal printers, although they are frequently overlooked or misunderstood. Printer management features and options will be presented later. First, here are some questions to ask to help determine what functionality and level of control is necessary for managing thermal printers in the enterprise.

- How long does it take to install and configure a new printer?
- How do we find out if a printer has gone offline or become disabled?
- How long can we afford a printer to be down before we know about it?
- What happens to operations if a printer stops working or the media runs out?
- If our RFID requirements change, can our printer/encoders be modified to support different RFID protocols and standards through a remote firmware upgrade?
- How many people do we want to train and make available to perform common printer maintenance, such as setting heat and darkness settings, performing calibration, testing the printhead, etc.?
- How much time do we spend on these tasks? Could any of these activities be automated?
- How do we make sure settings and firmware are consistent across the printer population?
- How often do we add new fonts, graphics, bar code symbols or label formats?
- Could our legacy management applications provide basic status information about thermal printers, if the printers could connect?
- Can we remotely adjust printhead settings and other features specific to thermal printers?
- Are specialized management tools available for our thermal printers?
- Are our printers network addressable? Do they support our security and connectivity protocols?
- Are printers sometimes moved within the facility, or would it be helpful to do so? How much installation and provisioning time does that take?

Answers to these questions determine the features and level of control enterprises need from their printer management systems. Some needs can be addressed by monitoring printer network status, others with general IT management applications, but many require management resources developed specifically to meet the needs of thermal printers.

An online tool in the Resource Library section of [www.zebra.com](http://www.zebra.com) helps identify the costs and impact of various printer support activities, and calculates the impact a thermal printer management solution can make on operations. You can access the ROI calculator at:  
[www.zebra.com/id/zebra/na/en/index/resource\\_library/roi\\_calculators/zebranet\\_bridge\\_enterprise.html](http://www.zebra.com/id/zebra/na/en/index/resource_library/roi_calculators/zebranet_bridge_enterprise.html).



## Management Options

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Management abilities have a large effect on printer value, even in low-volume operations that aren't commonly under time or performance pressure. For example, printers with remote support capability can provide a tremendous total cost of ownership advantage just from the time savings they provide from initial installation and configuration. The value grows for larger printer populations or when printing is part of mission-critical business operations.

### Management Starts with the Printer

Most thermal printers are connected to networks, which are the foundation for monitoring and management. But printers can provide more than basic connectivity to help maintain uptime and support efficient maintenance. For example, there are tools available for printers that support SNMP that monitor status and provide automated alerts to prevent downtime. SNMP also provides a gateway for including printers in a variety of packaged and home-grown IT asset management and control applications.

Printers should be good network citizens, supporting enterprise standards and preferences for security and connectivity. Wireless printers are no exception. Leading wireless security protocols can be implemented on 802.11-standard printers, so organizations should choose wireless printers that support their preferred security.

Ideally, printer manufacturers support backwards compatibility in their firmware, so customizations and support applications developed for legacy printers can be applied to new models without requiring redevelopment. Printer firmware itself should be easy to install so users can take advantage of upgrades.

Printers that are deficient in these areas take longer to maintain and support, and may make administrators reluctant to change settings, customize applications or install upgrades because of the inconvenience, time and expense. These factors contribute hidden costs to total cost of ownership and can undermine performance and reliability.

The following sections profile the various options for managing thermal printers in an enterprise.

### General IT Tools

Mainstream enterprise IT management systems have set a high standard for functionality, user interfaces, and convenience. System administrators rely on these tools to manage most of their IT resources. Folding label printers into this management environment gives administrators the advantage of using a single, familiar environment to manage label and document printers, along with computers and other equipment. The drawbacks are enterprise IT asset management systems provide only limited support for specialty label printers and can't be used to optimize performance.

Many features that are specific to bar code, RFID, mobile and card printers are not supported in general-purpose management applications. These applications are further limited because thermal printers also have specialized printer control languages (e.g. ZPL® for Zebra printers) that provide more control and flexibility for bar code printing than the common document printer languages such as PostScript® and PCL®. The proprietary control languages for thermal printers are optimized to provide high-quality bar code printing and smart label encoding. They support specific features like temperature and darkness settings, print speed, bar code symbology support, and special graphics and font handling performance that mission-critical label printing requires.



## Printer Utilities

Thermal printer utilities provide a distinct alternative to enterprise IT applications for printer management: Utilities are optimized to support specific thermal printers, but lack many of the scalability and centralized management advantages of mainstream solutions. The ZebraNet™ Utilities suite for Zebra printers is an excellent example. ZebraNet Utilities provide monitoring and alerts for specific label printing conditions, but the applications work best in local rather than large, distributed enterprise environments. ZebraNet Utilities take advantage of SNMP support native to Zebra printers to provide monitoring and management capabilities, which are extremely valuable for improving uptime, and reliability. See Zebra's white paper "ZebraLink Solutions for Extending and Enhancing Zebra Printer Capabilities" for more details.

ZebraNet Utilities are a convenient way to configure Zebra printers and often are sufficient for companies that operate a few label printers at a single location. However, with the consolidation of operations and headcount that is prevalent in most manufacturing and IT organizations, there is a trend toward centralized management and administration of peripheral equipment, including printers. In a distributed environment, IT professionals tend to value the functions found in general-purpose IT management applications.


## ZebraNet™ Bridge Enterprise

ZebraNet Bridge Enterprise was created to bridge the gap between label printer-specific support provided by printer utilities and the centralized management, configuration, and control available in general-purpose management applications. ZebraNet Bridge Enterprise is exclusively for Zebra printers and ZebraNet® print servers. With ZebraNet Bridge Enterprise, users can manage all their networked Zebra printers around the world from a single desktop application. Features include grouping, for managing multiple printers, remote configuration changes, real-time status monitoring, remote label format, font and firmware installation and more.

ZebraNet Bridge Enterprise can be used with printers with the ZPL command language and firmware version X.10 and higher, which makes it backward-compatible with many legacy installed Zebra printers. Wireless printers are also supported. Unlike other printer management applications, ZebraNet Bridge Enterprise can also be used to manage Zebra's mobile printers and provides limited support for printers with EPL™ that have a ZebraNet print server. It also provides limited management control for Zebra card printers. For more information see Zebra's white paper "Centralized, Enterprise-wide Printer Management: Creating a Bridge to Greater Operational Efficiencies"

## Custom and Hybrid Solutions

Printers can be managed with a combination of the aforementioned resources and through legacy, homegrown management applications. Printers that support enterprise standards and protocols let organizations leverage their legacy management environment and IT skills. Printer support for standard protocols and connectivity options is key for compatibility with many custom management applications.



## How Printer Management Improves Reliability and Reduces Costs

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The example at the beginning of this white paper illustrated how effective printer management can prevent a common occurrence like running out of media from escalating into a problem that spills into other operations and requires managerial and labor time to fix. Here are some more anecdotes and calculations that illustrate how printer management features contribute to reliability, uptime and TCO.

The ability to designate and manage printers in multiple, non-exclusive groups helps ensure consistency that prevents many one-off problems that occur when configurations aren't the same across printer populations. Grouping, which is a key feature of ZebraNet Bridge Enterprise, also makes it easier and less time-consuming to support printing.

There are many ways to group printers to save administrative time. All wireless printers could be placed in a group to simplify security upgrades. RFID smart label printer/encoders could be grouped because of the specialty output they provide. There are benefits to grouping for more common applications. For example, printers used to create work-in-process tracking labels for components perform differently from the printers used to create large shipping labels for the finished product. Imagine if users noticed a change in the bar-code-reading performance of their work-in-process labels. A simple analysis could find the problem would be corrected by printing bar codes slightly darker, which requires an adjustment to the print temperature. The system administrator could make the adjustment on the ZebraNet Bridge Enterprise console and load it to all printers used to produce WIP labels within a facility, or to factories around the world. Meanwhile, printers for shipping labels and other uses would retain the settings optimized for their applications. The grouping feature could also be used to download new customer label formats to shipping label printers at only the facilities that supply the specific customer, which saves memory on unaffected printers.

Grouping eliminates redundancy from configuration, which provides valuable time savings. It takes practically the same amount of time to optimize a group of printers as it does to change settings on a single device. Users can frequently update and modify their printers to take advantage of new developments, without paying a penalty in excessive administrative time requirements.

A team responsible for maintaining a large population of Zebra printers at a busy distribution center estimates it takes approximately 20 seconds to find a specific printer on the network and view its settings using ZebraNet Bridge Enterprise, compared to about 45 seconds using previous methods. Changing settings and saving them to the printer takes about 40 seconds. If ZebraNet Bridge Enterprise were used to manage the entire population, configuration changes could be handled in about a minute. Without centralized management, the time required would be a minute per printer.

Let's use these baseline figures to calculate the difference in support time central management and grouping creates for a population of 50 printers.

<b>Activity</b>	<b>Time Required if Printers Serviced Individually</b>	<b>Time Required if Printers Serviced by Grouping</b>	<b>Time Savings by Grouping (for 50-printer population)</b>
Find printer on network	20 seconds	37.5 minutes	37.3 minutes
Change configuration	40 seconds	33.3 minutes	32.7 minutes
Total	1 minute	1 hour, 11 minutes	1 hour, 10 minutes (1.17 hours)

Multiply the time savings by the labor cost for IT support to calculate the financial savings grouping provides for each activity. These calculations help show how printers that can be managed separately and support innovative features like grouping can provide a significant total cost of ownership advantage over the life of the printer. For example, if settings are adjusted only every six months, and just one new font or label format is added annually, the centrally managed printer may cost several hundred dollars less to support each year.

Centralized management also allows organizations to consolidate support operations, further reducing administrative expenses. Consider a company that uses Zebra printers at three locations and wants to take advantage of a free firmware upgrade to enhance its printer capabilities (for example, to add international language support or a new bar code symbology). Previously, administrators at all three locations would go from printer to printer to install the firmware, or a specialist would travel to each location to perform the task. With remote configuration, the firmware could be pushed from a single location for simultaneous installation to all printers on the network. It would require about the same amount of time to upgrade all printers as it would a single device—without the travel or the involvement of additional administrators. It is now much more cost-effective to upgrade, modify, and optimize printer settings, because the time and labor expenses associated with doing so are significantly reduced.

Simplifying management also promotes improved printer reliability by making it practical and cost-effective to keep printers up to date. Inconsistencies in label files, firmware and settings can lead to less-than-optimal printer performance, and cause unusual error conditions that can be difficult to diagnose and correct. Many mission-critical printing operations can't afford these kinds of problems, so it is important to take proactive steps to keep printers running reliably.

Reliability has different value for different companies. For example, a printer that develops an error condition and goes offline at one company may only lead to an inconvenience and some additional IT support. At another, it may cause express freight expenses to meet same-day shipping commitments. At a third, the inability to print bar codes may cause a production line shutdown, costing thousands of dollars in lost productivity and idle equipment costs each hour. The questions raised earlier will help determine the impact of printing problems so organizations can put a value on reliability.



## Conclusion

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It's easier for enterprises to figure out their printer output and performance needs than it is to determine the best way to manage printers. However, it's important to take time to consider printer management scenarios and options, because management has a tremendous impact on printer reliability, output quality and total cost of ownership. In many operations, printers are only as valuable as they are reliable. Using a convenient and comprehensive management system increases uptime and reliability without requiring a corresponding increase in support time and expense.

One of the reasons Zebra printers are considered extremely reliable is because Zebra offers a full assortment of printer management options, including SNMP connectivity built into printers, a variety of printer utilities and the comprehensive ZebraNet Bridge Enterprise printer management solution. For more information visit the Printer Management products section of Zebra's Web site, [www.zebra.com](http://www.zebra.com).

Zebra Technologies Corporation (NASDAQ: ZBRA) delivers innovative and reliable on-demand printing solutions for business improvement and security applications in 100 countries around the world. More than 90 percent of Fortune 500 companies use Zebra-brand printers. A broad range of applications benefit from Zebra-brand thermal bar code, "smart" label, receipt, and card printers, resulting in enhanced security, increased productivity, improved quality, lower costs, and better customer service. The company has sold more than 5 million printers, including RFID printer/encoders and wireless mobile solutions, as well as ZebraDesigner label formatting software, ZebraLink connectivity solutions, Genuine Zebra supplies and ZebraCare services and support. Information about Zebra bar code, card and RFID products can be found at [www.zebra.com](http://www.zebra.com).



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## Notes

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