

Connectware for Oracle Applications: the Middleware Solution



November 5, 1997

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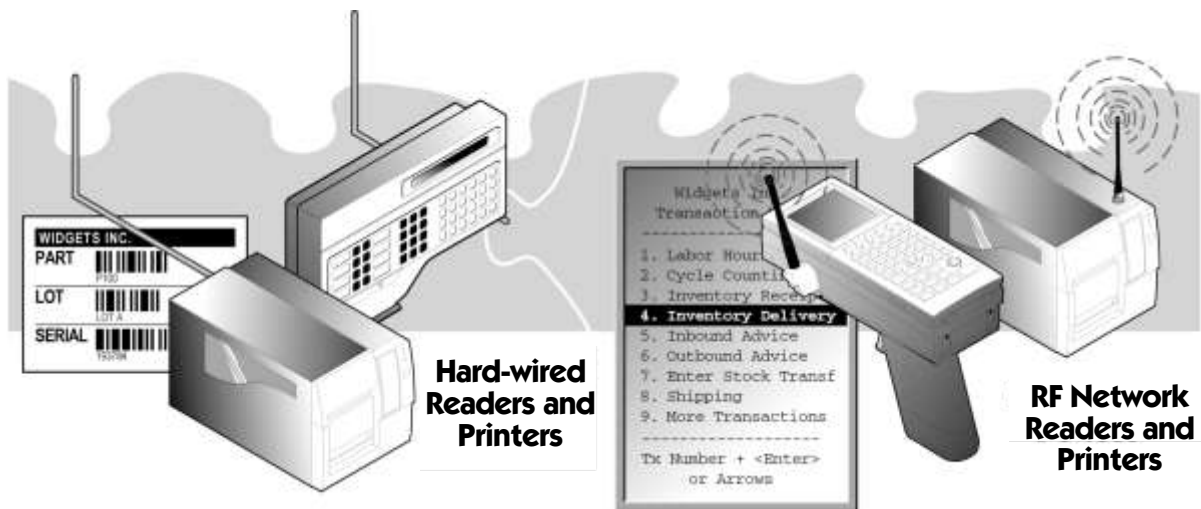
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What This White Paper Covers

This white paper begins by reviewing the practical benefits of bar code data capture and ERP systems such as Oracle Applications. Then we discuss the need for bar code connectivity middleware with Oracle Applications, and the various options available for implementing it. Next we explain the architecture of Connectware for Oracle Applications, the leading solution in this area. The history of this product and its key features are briefly touched on. Finally, we include some tips and success factors for managing a bar code integration project, along with further resources for more information.

This white paper is deliberately written in plain language for your convenience.

Why Companies are Moving to Bar Coding



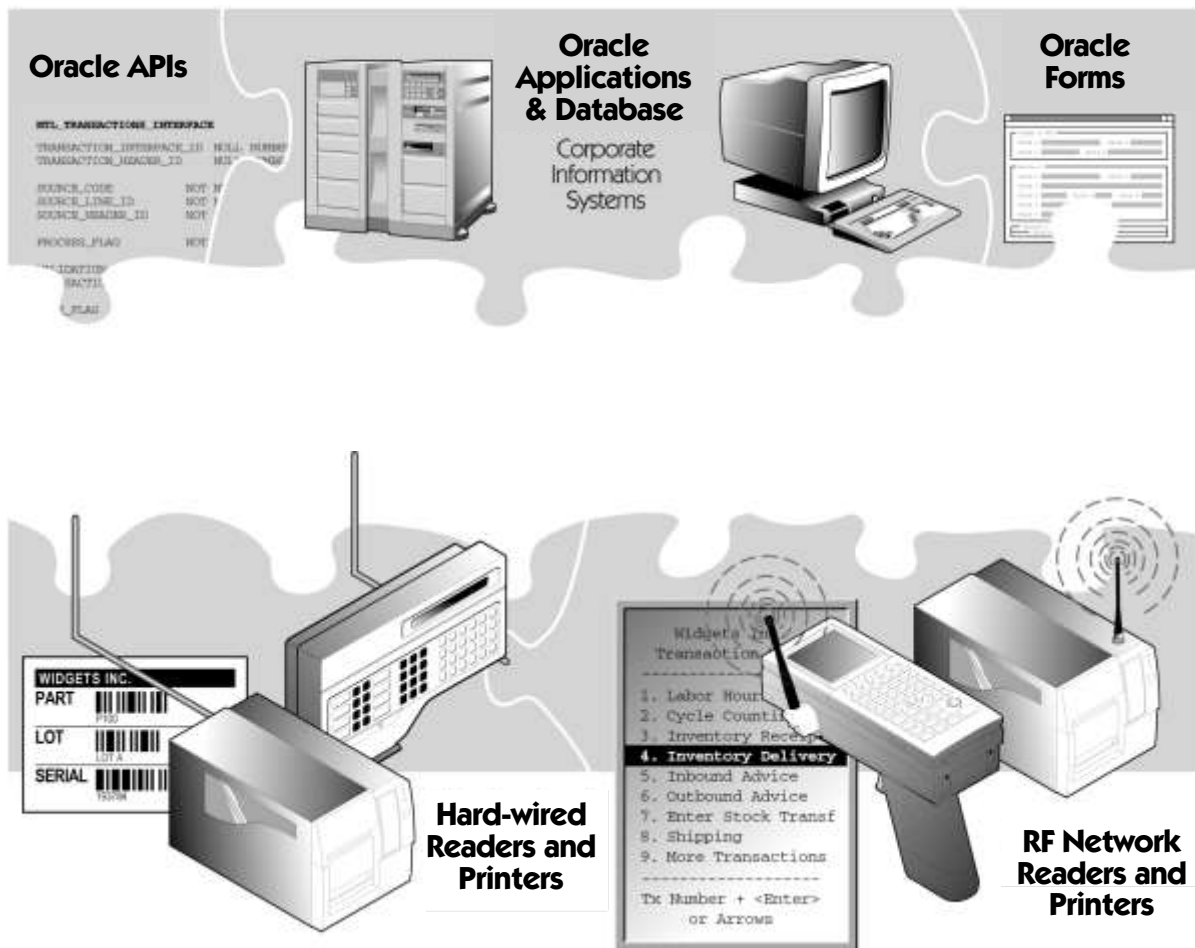
These days, the benefits of bar code data capture (BCDC) seem completely obvious to people who work in manufacturing and distribution. Yet it wasn't so long ago that we had to write piles of memos to our bosses justifying the investment in bar code scanners. Perhaps it's worth going over these benefits one more time.

Bar coding saves money, it saves a lot of money, and it saves it fast. A typical Connectware customer gets a total payback of their investment within 9 to 12 months.

Companies get their payback from faster transactions, reduced labor costs, more accurate inventory, reduced inventory, more accurate shipping, fewer mis-shipments, faster receiving, streamlined operations, better customer support, better data for business decision-making, and so on.

Companies have other motivations for getting into bar coding. Some want to stay on top of technology. Some want to gain a competitive advantage over their rivals. Others are doing it simply to keep up.

Bar Coding and Oracle Applications Make a Good Fit



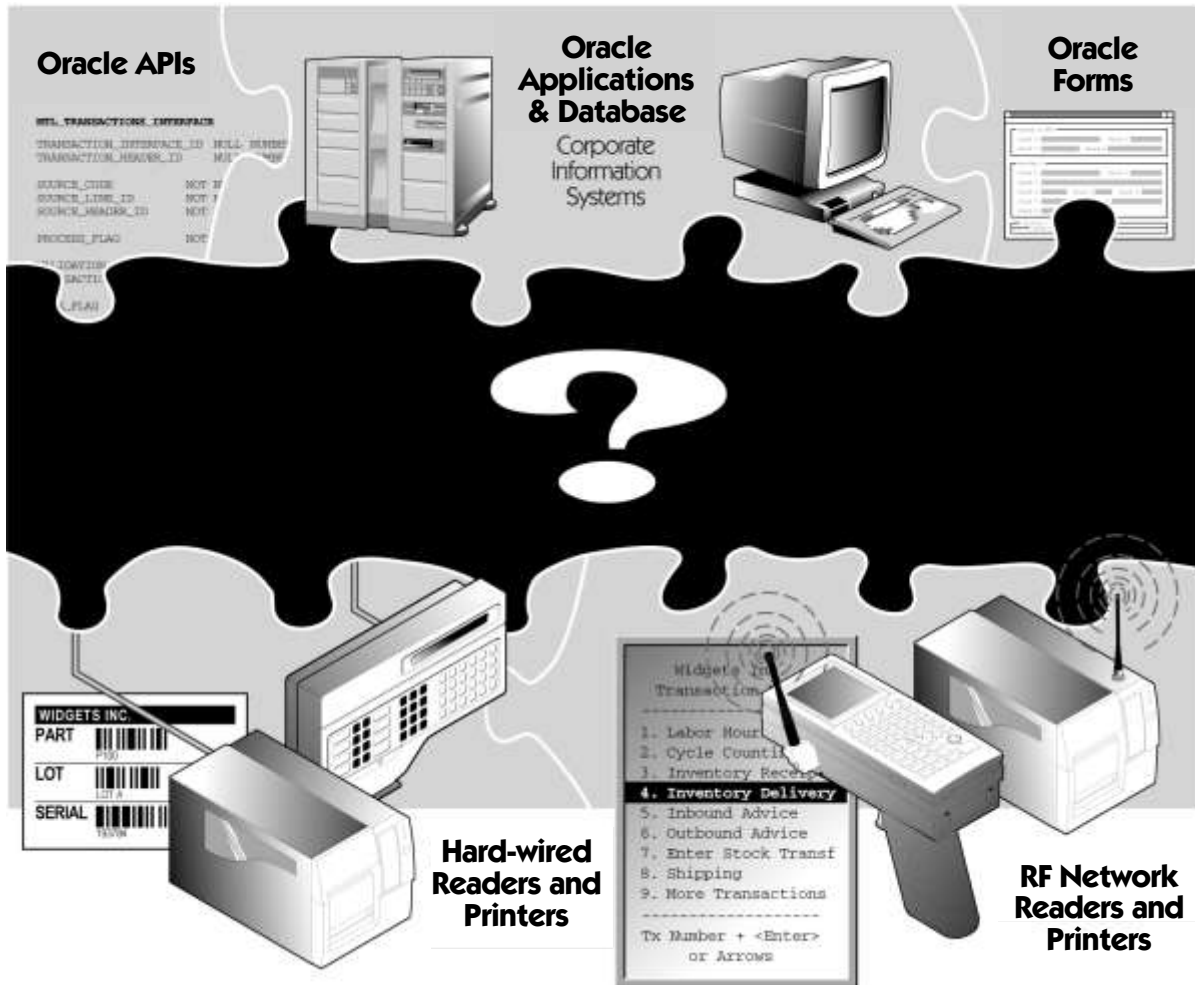
The same kind of companies that go into bar coding are also investing in Enterprise Resource Planning (ERP) systems such as Oracle Applications and SAP.

Oracle Applications provides companies with an integrated, company-wide computer system. You can use it to make, ship, track, and account for all your customer orders. You get much the same benefits from ERP as you do from BCDC: you save money by streamlining your operations, and you have more accurate and up-to-date information with which to make business decisions.

Especially with Year 2000 breathing down our necks, more and more companies are making a major investment in an ERP system such as Oracle Applications.

So bar coding and Oracle Applications are obviously a good fit. You use Oracle Applications to run your company, and you use bar code data capture to automate as much of the front-line data entry work as you can. Our free booklet, *How to Unlock the Power of Your ERP System with Bar Coding*, provides a very readable explanation of how bar coding and ERP work hand in hand.

Why You Need Middleware with Oracle Applications



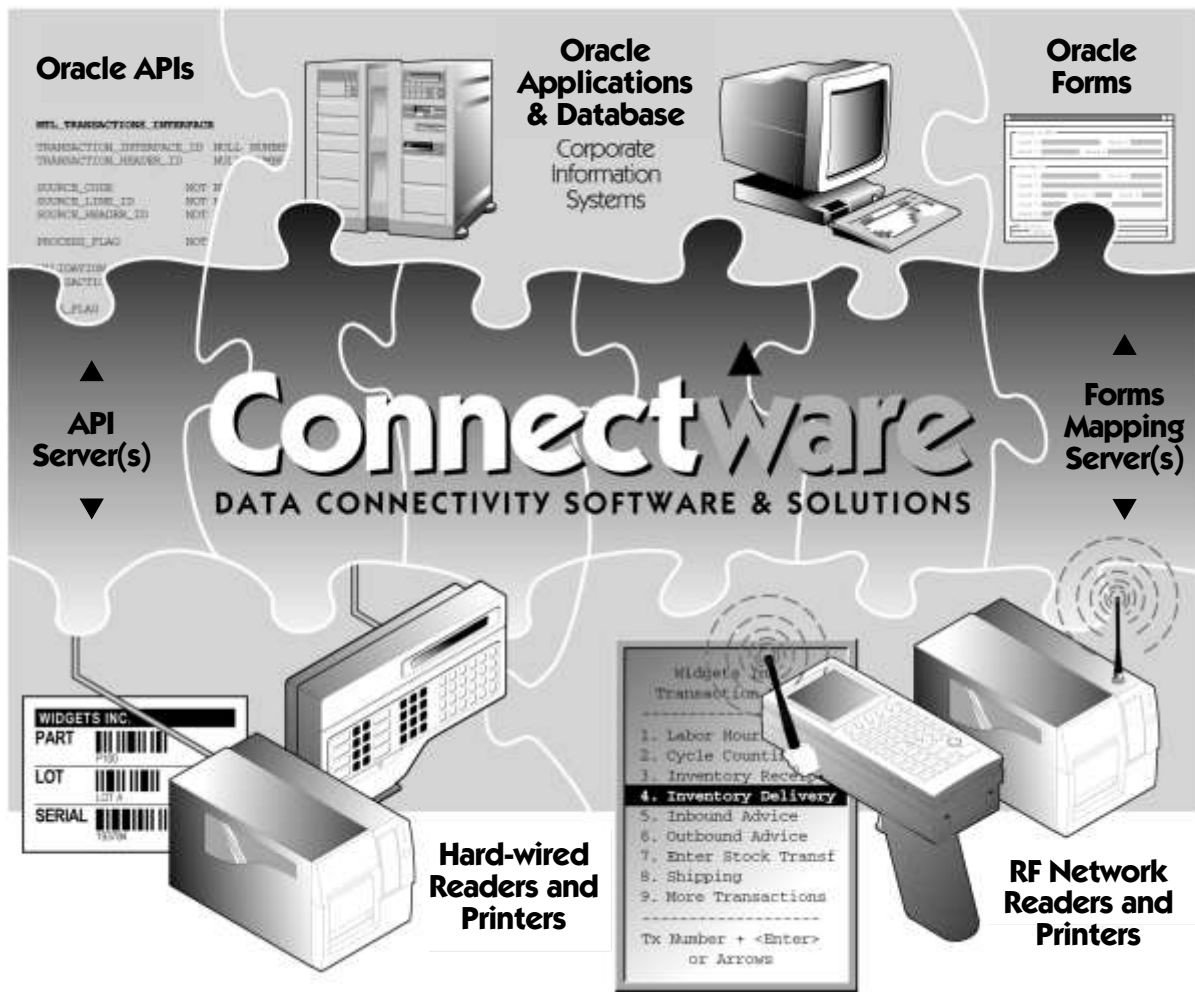
But using BCDC with Oracle Applications is something of a puzzle: you can't just plug bar code readers into Oracle Apps or any other ERP. There are too many pieces missing.

To make the connection between the bar code scanners at the front end and Oracle Applications at the back end, you'll need some special-purpose code in the middle to provide the connectivity; in other words: middleware.

That's where Connectware comes in: middleware for bar coding is our business. We fill in the missing pieces of the puzzle between Oracle Applications and your data capture devices.

You may have heard that all it takes to integrate bar coding with your ERP is "a little coding at your end." First of all, "a little coding" is not enough. It can easily take several programmers several months' effort to integrate a BCDC project with an ERP system. And second, why gamble your company's resources in an unfamiliar area? Connectware's entire focus for the past five years has been developing middleware for our customers. And with 400 installations under our belts, we consider ourselves the experts in this area.

Connectware: What We Do



Connectware can provide all the middleware you need to quickly connect any data capture device to any application running on any platform.

At the front end, Connectware currently supports the complete family of Intermec, UBI and Norand readers and printers. And our modular architecture allows us to quickly add support for new data capture devices.

At the back end, our tools provide connectivity to a multitude of platforms. We currently support applications running on IBM mainframes, IBM AS/400, Windows NT, HP 3000, DEC VMS, and any UNIX platform. These applications include:

- Custom MIS systems developed in-house.
- The major Enterprise Resource Planning systems, including Oracle Applications. We provide configurable, off-the-shelf solutions to integrate your data capture devices with the Oracle Applications transactions you most likely want to use.

Connectware Connectivity Tools

There are only so many ways to integrate BCDC with an ERP or any other kind of application. Connectware has a complete family of connectivity products from which we can choose the perfect tool for each job.

Our approach to middleware development is multi-layered and modular, with a very high degree of granularity. Because our modules are so small and specific, when we start to develop a new solution for a new environment, we can pick and choose the best possible approach for that environment.

Approach	Notes	Product
Label printing	Tools to print bar code labels. Required for almost every integration project.	ConnectLP
Standard file input/output	Tools to integrate files with BCDC. Used for applications that support file input/output. Especially useful for legacy applications that are batch-oriented rather than interactive. Usually not required for an ERP.	ConnectIO
Terminal emulation	Tools to convert a BCDC device into a terminal emulator. A low-cost, easy-to-implement approach, but it lacks flexibility. Not used for ERP systems.	ConnectTE
Screen mapping	Tools to “scrape” the full-size screens that the application normally displays, and then map the fields onto smaller screens that fit onto a BCDC device. We use this approach for ERP systems, but only for transactions where transaction processing is not available.	ConnectTM
Transaction processing	Tools that provide a client/server environment for integrating bar code data capture with an ERP system.	ConnectTP

Connectware for Oracle Applications: Overview

Oracle Applications is one of the most widely-used ERP packages. The product that links BCDC devices to this ERP system is called, not surprisingly, Connectware for Oracle Applications.

This product was created in response to customer demand. The software was first installed in the field in April, 1995. And this was the first solution certified under the Oracle Cooperative Applications Initiative (CAI).

Off the shelf, Connectware for Oracle Applications provides data capture connectivity to the transactions most commonly used in the manufacturing and distribution sectors.

Here is a list of the business functions where the software currently supports one or more transactions off-the-shelf:

- Cycle Counting
- Inventory (including Issues, Receipts, and Inquiries)
- Label Printing
- Order Entry (including Shipping Picking and Shipping Confirm)
- Purchasing
- Work in Process (including Issue to WIP, Return to/from WIP, and Move)

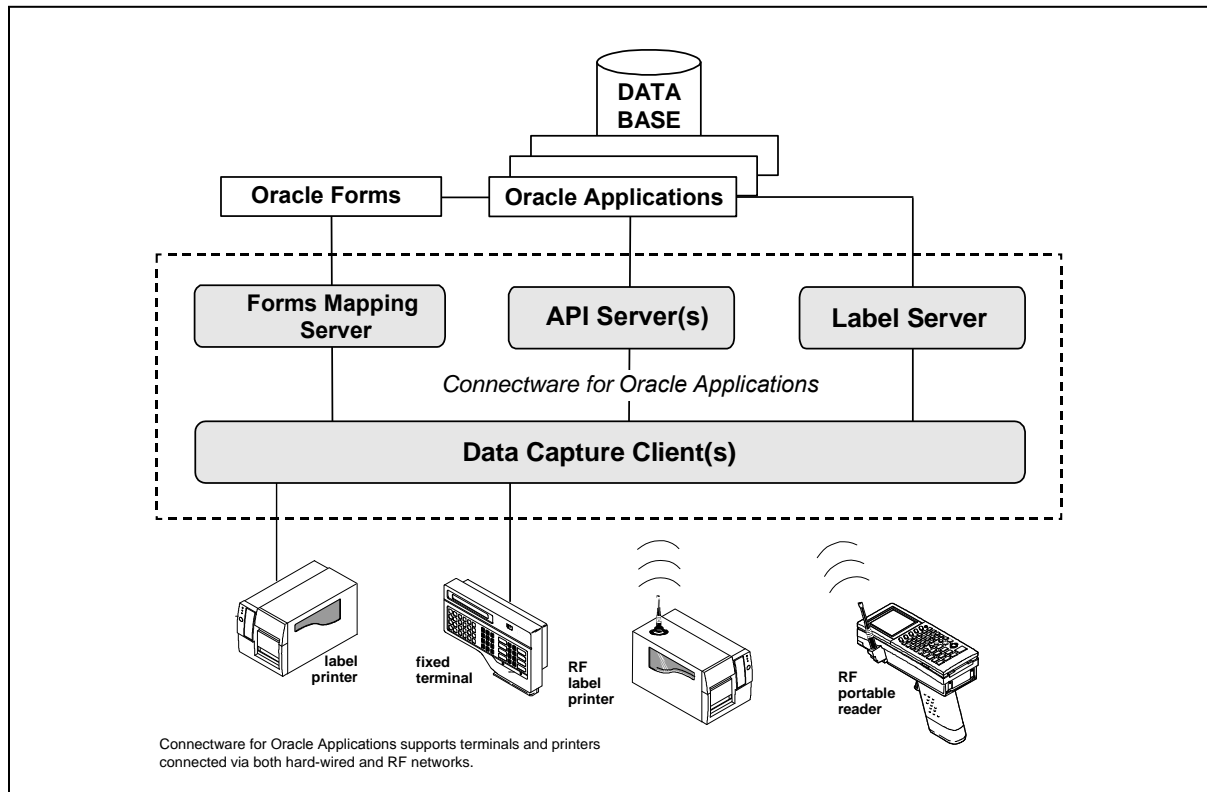
In total, Connectware for Oracle Applications now supports 18 standard transactions within Oracle Applications. We continue to develop support for further transactions.

The software supports a broad range of data capture technologies, including Intermec, UBI, and Norand. And due to our client/server architecture, we can easily add new features and new transactions as requested by customers. With each new installation, the product evolves into a more comprehensive solution for future customers. We can also tailor the product to meet the needs of a new site with a minimum of coding.

And we use only approved methods for accessing your database to ensure complete data integrity.

Now let's look at the architecture of Connectware for Oracle Applications.

Connectware for Oracle Applications: Architecture



Naturally, we use a client/server architecture. Let's look at our architecture diagram from top to bottom, going from the back end (the server side) to the front end (the client side).

Server-Side Architecture

Database

At the very back end of our client/server architecture is your database with Oracle Applications to maintain it. You can use any database supported by Oracle Applications, although naturally many of our clients choose an Oracle database. Connectware ensures the integrity of your corporate data. We never write directly to the database; we always go through Oracle Applications in the approved manner.

Oracle software supported

Connectware supports Oracle Applications Release 10 or later, and Oracle Forms 9.X or later.

Your choice of interfaces: Oracle Forms or APIs

Connectware uses two approaches to supply complete connectivity: The software can either communicate directly with the Oracle APIs or it can interface with Oracle Forms using our transaction mapping software, ConnectTM. Both interfaces enable Connectware to insert data into your Oracle Applications using Oracle-provided routines.

Connectware Servers

Notice that Connectware has three servers: the Forms Mapping Server, the API Server, and the Label Printing Server. If and when Oracle releases a new interface to the Oracle Applications software, we can simply add a new server to support it. This provides a smooth upgrade path for Connectware users, who can benefit from new software releases while still using the older functionality. To improve performance, you can run several instances (copies) of each server at the same time.

Forms Mapping Server

The Forms Mapping Server processes the transaction data generated by the Data Capture Client(s) by interacting with Oracle Forms, following the guidelines laid out by Oracle.

We use the Forms mapping interface to shield the user from unwanted fields, make others smaller, and provide some default values. In effect, the useful contents of a full-size terminal screen are displayed on the much smaller screen of a data capture device.

And because we are using Oracle Applications to update the database, this approach ensures complete data integrity.

API Server(s)

Each API Server processes the transaction data generated by a Data Capture Client and provides a direct and reliable interface to the Oracle APIs. An additional API Server is added to the system for every added Data Capture Client. The APIs are provided and documented by Oracle to allow non-Oracle software to update the database in an approved manner, so that this approach also ensures complete data integrity.

Label Printing Server

The Label Printing Server looks after printing any labels on any printer, at the request of a user either sitting at a terminal or using a data capture device. This software is very flexible.

We provide the tools to get data either from the database or directly from the end user and then print it on a bar code label printer. We can also trigger an Oracle Applications report, either from your bar code reader or from any other computer terminal.

We can do report mapping: to print out certain fields on a bar code label printer, we can redirect printer output, reformat the output, and use filters that retain only the fields you want.

TYPICAL TRANSACTION SCREEN from ORACLE APPLICATIONS (132 X 24)

tdpur4120m000		zoom	multi/group (3)	Form 1-2 >
Maintain Receipts				Company: 999
Receipt Number	:	17	Packing Slip	: 555
Supplier	:	2002	Miller Thermal Inc.	
<u>Order Pos.</u>		<u>Item</u>	<u>Cont.</u>	<u>Pack.Slip Qty</u> <u>Rec.Date</u> <u>Delivered Qty</u> <u>Back Order Un.</u>
20001	10	02101	Arm-chair red	9.0000 09-10-97 9.0000 41.0000 pcs P
20001	20	02103	Arm-chair blue	10.0000 10-02-97 10.0000 40.0000 pcs P
20001	30	02106	Arm-chair black (engin	0.0000 10-02-97 0.0000 0.0000 pcs P
To be Del. :				10.0000
				Choice: █.

<Ctrl>[G]: delivered = to be delivered. <Ctrl>[O]: fast approval



RF PORTABLE
BAR CODE
READER

```

ACME MANUFACTURING
RECEIVING
-----
FK SLIP:555
PO NUMBER:20001
Item:
02101
REV LEVEL:
FKSLIP QTY:9
QUANTITY:9
ARM-CHAIR RED

REC.:9          INSPECT
-----
Enter Item NUMBER
ESC-ABORT  F3-DONE
    
```

TYPICAL CONNECTWARE
CLIENT SCREEN (16 X 20)

Client-Side Architecture

Data Capture Clients

Each data capture device needs a client program, which we call the Data Capture Client. This client provides the user interface the end user actually sees on the bar code reader's little screen.

Most of the streamlining, customizing, setting of default values, and remapping of the user interface occurs here. You will be amazed at what a clear, user-friendly user interface we can create on a 16 X 20 screen (*as shown on the previous page*).

After any bar code is scanned, that field is validated by the client. If the value is valid, the client displays the next prompt. If the value is invalid, the client produces an error message and an audible beep. This validation of all scanned data is another step towards complete data integrity.

There is really no limit to how much customizing we can do to this client.

For example, if you have a factory where some workers use English and others prefer to use Spanish, no problem. You can use a client with English prompts on some devices, and a client with Spanish prompts on other devices at the same site at the same time.

Or, when a certain user logs onto any device, the interface can automatically switch to their preferred language.

Data Capture Devices

The end user sees a streamlined series of prompts on the device's screen.

The user does not know or care whether we are using the Forms Mapping Server, the API Server, or the Label Printing Server on the server side. All the database interactions are completely seamless and transparent to the user. There is no loss of performance—and a major gain compared to scribbling notes and waiting for your turn at a traditional computer terminal.

When to Implement Bar Code Data Capture

When the time comes to implement bar code data capture with Oracle Applications, you have a choice between two strategies:

- You can launch bar coding at the same time as—and in parallel to—your roll-out of Oracle Applications. This is sometimes called the “Big Bang” approach.
- You can roll out bar coding after implementing Oracle Applications, as a separate project.

Your choice very much depends on your company’s situation.

For example, if resources are limited, you may not be able to use the Big Bang approach.

But if you seek to minimize retraining, you may prefer the Big Bang, since this avoids training staff first on the Oracle Applications interface and then again on the bar code reader interface.

Success Factors for Your Project

Here are a few words of advice on how to organize a successful project to integrate bar coding with Oracle Applications:

- Assemble the right team.
- Name a project leader accountable for success.
- Set a realistic budget.
- Use the so-called “USA approach” for all business processes: Understand, Simplify, and then Automate.

Too many projects fail by rushing to the automation stage before the team has spent enough time considering how their key processes now work, and how they could be streamlined and simplified as part of the BCDC project.

Remember, you can do more than just automate all your existing manual procedures.

With more timely and accurate information derived from bar coding, along with software validation of all entries, you may be able to safely do away with certain checkpoints and reviews that were imposed to guard against manual data entry errors. It will likely pay to take the extra time to consider these possibilities.

Further Resources

- If you are looking for an entertaining introduction to bar coding and how it works with ERP systems, we have the book for you. *How to Unlock the Power of Your ERP System with Bar Coding* is a light and lively story about the ACME Tricycle Works, and the men and women who struggle every day to manufacture, sell, and ship tricycles, and how bar coding has improved their lives.

We created this fictitious company to illustrate something very real: the bottom-line benefits of bar coding.

- By the time you see this white paper, it may already be out of date, and we may have an updated version available.
- You can find us on the World Wide Web at www.connectware.ca

About Connectware

Founded in 1992, Connectware provides quick and easy, off-the-shelf bar code data capture for ERP systems. Connectware has done hundreds of successful installations in mission-critical areas such as receiving, inventory management, production control, and shipping. Our satisfied clients include AT&T, Black & Decker, Coca Cola, and hundreds more.

With headquarters in Montreal, a growing number of Solution Centers, and a worldwide network of resellers and business partners, Connectware is the leading player in data capture software for Oracle Applications.