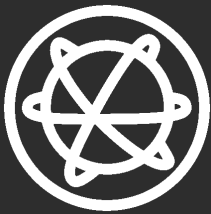
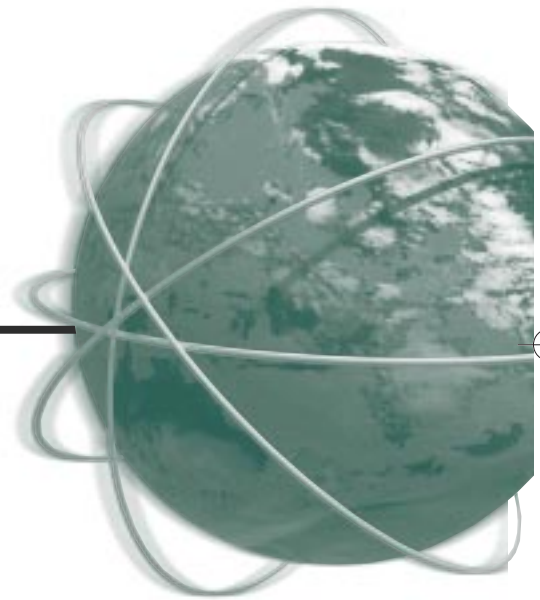


ARBOR[®]/BP



CONVERGENCE

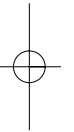
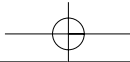


Technical Overview

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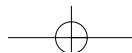
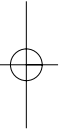
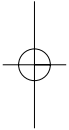
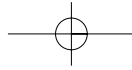
Lucent Technologies
Bell Labs Innovations





ABOUT KENAN SYSTEMS

Kenan Systems Corporation is a leading provider of billing, customer care, order management, usage mediation, and customer analysis software products and services to the telecommunications, CATV, energy and utilities, and on-line services industries. Kenan Systems products and services allow single- or multi-service providers to grow and enhance relationships with their customers, promoting customer satisfaction and retention. With offices throughout the Americas, Europe, and Asia-Pacific, Kenan Systems software solutions have been licensed by many of the world's leading communications companies, including @Home Network, AT&T, BellSouth International, British Telecom, Cegetel, Embratel, France Telecom, GTE, MCI WorldCom, Optus Communications, RCN, and Vidéotron. Additional information on Kenan Systems products and services may be obtained by visiting our World Wide Web site at www.kenan.com or via e-mail to info@kenan.com.



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ARBOR/BP ADVANTAGE**Comprehensive Functionality**

Account establishment
Customer self-care
Real-time account information
Usage collection, guiding, and
rating in real time or batch
Discounting
Taxation
Invoice calculation
Invoice formatting
Invoice dispatch
Payments processing
Adjustments
Refunds
Journalizing
Accounts receivable
Collections/treatments
Reporting
Data analysis

Support for multiple...

...accounts
...currencies
...user types
...products
...countries
...networks
...service centers
...languages
...objects
...invoice formats
...payment methods
...tax methods

Minimal investment risk**Rapid time to market for new
products, services, and
marketing initiatives****Fully integrated with
Arbor®/OM software for
order entry and workflow
management****AN INTRODUCTION TO ARBOR/BP**

Kenan Systems' Arbor/BP software is one of the most comprehensive billing and customer care solutions in production today. Sophisticated billing, customer care, and customer analysis are of paramount importance for increasing customer satisfaction, retention, and loyalty. Customers may never enjoy receiving a bill, but they do prefer invoices that are timely, accurate, and easy to understand.

When a customer needs attention, a customer support organization must be armed with the real time information it needs to resolve questions efficiently and effectively. Communications service providers worldwide must understand their customers and be able to deliver the products and services customers want at a price they are willing to pay.

Arbor/BP software provides flexible billing processes that enable service providers to rapidly introduce new products, services, and marketing initiatives. Tight integration between the billing module and the customer care module of Arbor/BP enables rapid, effective responses to customer inquiries. The Arbor/BP automated analysis tools highlight a service provider's most effective packaging, pricing, and promotion strategies.

The Arbor/BP solution offers a full range of functionality for the communications and energy marketplaces. Arbor/BP software can support services from multiple industries simultaneously, allowing service providers to provide a single, unified invoice for all their products and services. At the same time, Arbor/BP can handle the diverse requirements of an international customer base, supporting multiple languages, currencies, invoice formats, and tax methods within a single installation.

The Arbor/BP solution offers comprehensive, multi-service functionality while minimizing service providers' investment risk.

- The Arbor/BP product incorporates features and functionality from nine years of development. Specific billing requirements are often already available in Arbor/BP, eliminating the need for custom coding and saving service providers time and money.
- The Arbor/BP object-oriented data model and table-driven billing processes are easy to use and extremely flexible. This means service providers can independently configure and extend the Arbor/BP solution to support their changing business rules, minimizing cost and time to results for new initiatives.

- Arbor/BP software fully leverages multiple symmetric multi-processor servers to provide a highly scalable solution. Arbor/BP can support introductory services on base hardware configurations, and can then grow with the service provider's needs to support tens of millions of subscribers. By distributing storage requirements and processor load over several servers, Arbor/BP provides mainframe performance without mainframe costs.
- The Arbor/BP solution makes full use of open systems standards to ensure maximum portability and integration potential, thus preserving existing investments in hardware, software, and network infrastructure. A fully documented set of application programmer interfaces (APIs) allows standardized access to all system objects, so that integration is fast and simple. Typical customizations require three to six consultants for three to ten months, rather than the dozens of programmers and years of development that are the industry norm.

The simple concepts of flexibility, scalability, rapid time to market, and minimal investment risk have been the driving principles behind Arbor/BP development since it was made commercially available in 1991. They have made Arbor/BP the billing and customer care solution of choice for leading communications and energy and utilities providers in all industries worldwide: local and long distance telephony, mobile (cellular, GSM, PCS, and paging), CATV, Internet access, energy, electronic commerce, and other enhanced services.

Arbor/BP is a robust billing and customer care solution that allows leading communications and energy and utilities providers to turn billing processes into strategic advantages by offering rapid deployment, complete billing flexibility, and industrial-strength scalability, all with minimal implementation risk.

Scalable

Transparent multi-server architecture (MSA) can support very large customer bases

Functional processes can use separate network hosts

Database and user interface server can be placed on any network host

Modern, open architecture

UNIX® System V release 4

Support for HP®, Sun®, and Compaq® platforms

Supports connectivity to other networks

Client/Server Architecture

ANSI C/C++

ANSI SQL

Support for Oracle® and Sybase® relational database systems

Unified billing and customer care for multiple industries

Telephony (US and international)

Local telephony

Long distance telephony

IP telephony

Leased lines

ISDN

Packet-based network services

Usage-based data services

Bandwidth-based data services

Voice messaging

Transactional services

PCS

GSM

Cellular

Paging

Online services

Internet access

Electricity

Natural gas

Water and wastewater

Home security monitoring

Appliance service

Electronic commerce

Web hosting

Online content

CATV

Cable telephony

Enhanced services

Fax services

Video conferencing

Collaborative computing

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FEATURE LIST

Graphical User Interfaces for key tasks

Customer inquiries
 Individually negotiated rates
 Free form notes
 Reminders
 Issuing refunds
 Customer self care
 Reporting
 Customer analysis
 Revenue analysis
 Product and rate definition
 Invoice review
 Process monitoring
 Process scheduling
 Operating system monitoring
 Database monitoring
 Database configuration

Multiple platform GUI support

Windows NT®
 HTML

Online help and online documentation

Multiple language support
 Interface language selectable by user
 Preferred language selectable by customer
 Reports available in multiple languages

Access control

Restrict access to sensitive data and functionality
 Maximum adjustment and refund amounts for CSRs
 Adjustments and refunds that exceed threshold are routed to supervisors for approval

Real time availability**Data security****Database integrity****Auditability**

OVERVIEW

Arbor/BP supports six general types of users:

- Customer service representatives (CSRs) and their supervisors are responsible for front-line customer care. They create new accounts, update account information and account status, associate products and services with customers, review customer invoices, and monitor collections activity. They also issue credits and make adjustments as needed. In addition to resolving the service requests and inquiries of customers, they can sell new products and services or cross-sell a promotion.
- Subscribers with a Web browser can register themselves, select new services, modify their services, query their account, access their billing information, and select or modify their payment mechanisms.

Arbor/BP Graphical User Interfaces

ACE (Arbor Configuration Environment) — Product and Billing Managers, System Administrators: Create objects in the Configuration database that embed your business rules for provisioning and billing operations.

iCARE® is a full suite of browser-accessible customer care applications, and includes customer self-care.

Interface	User	Task
Arbor Customer Interfaces		
Payments	CSRs, Supervisors, Billing Managers	Review and modify balances and payments
Deposits and Refunds	CSRs, Supervisors, Billing Managers	Review and modify deposits and refunds
Bill Invoice Browser (BIB)	CSRs, Supervisors, Billing Managers	Review and back out bills
Supervisor Approvals	Supervisors, Managers	Authorize actions performed by other users
Credit Card Investigation Unit (CCIU)	Billing Operators, Managers	Review and correct failed CPM transactions
Electronic Funds - EFT Investigation Unit (EIU)	Billing Operators, Managers	Review failed EFT transactions
Lockbox Investigation Unit (LIU)	Billing Operators, Managers	Review and correct failed LBX transactions
Message Processing Investigation Unit (MPIU)	Billing Operators, Managers	Review and correct failed usage transactions
Collections	Collections, Supervisor	Review and schedule collections events
Reports	Billing Managers	Display and print reports which summarize key billing data
Tickler	All users	Create/review notes to/from other users

Invoice Designer

Arbor Invoice Designer	Product and Billing Managers	Create bill layouts for use by iDesign, the invoice generator
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Command Center

The Command Center interfaces are for configuring and scheduling batch billing processes.

Logfile Browser	Billing Operator	Review status reports
Process Monitor	Billing Manager	Monitor and stop processes
Process Calendar	Billing Manager	Review process schedules
Process Setup	Billing Manager	Configure processes

- Product managers are responsible for strategic planning. They analyze customer, product, and financial data and define products, rates, customer contracts, product packages, bill formats, promotions, discounts, and collection scenarios.
- Billing operators manage the billing process. They configure and run the billing processes, investigate transactions, and apply corrections. Additionally, they have access to process and account activities for point-in-time transaction recovery.
- Financial users manage financial reporting, accounting, and high-level customer care tasks involving financial investigations.
- System Administrators install and maintain software and hardware, configure the database, maintain the networks, set up user accounts, back up system data, and restore data as needed.

Separate graphical user interfaces (GUIs) provide each user with easy access to Arbor/BP functions and data. Arbor/BP GUIs operate under Windows NT and HTML. They are mouse-driven and make extensive use of operating system standard elements, such as pick lists, pull down menus, and toolbar shortcuts. The Arbor/BP GUIs also provide security and access control, allowing each user group to perform only the tasks appropriate for that group.

Service providers can develop additional GUIs for specific tasks. They can integrate these GUIs into the Arbor/BP data model using object-oriented APIs. A service provider can define objects to represent products, discounts, promotions, rate plans, and other aspects of its business. The service provider can then apply instances of these objects to individual customers or customer groups.

The Arbor/BP API set includes objects representing accounts, products, charges, discounts, adjustments, credit cards, payments, and much more. The API set surrounds the data model and makes it available to external applications in real time. Service providers can access account information, perform provisioning activities, configure products, rates, and discounts, and retrieve data through API objects.

All Arbor/BP data objects are stored in a relational database. The API set simplifies access to these objects by combining information from several database tables. Because the same database is used both by API objects and the Arbor/BP GUIs, it is easy for a service provider to augment its customer care and analysis functionality with its own specialized business rules and custom interfaces.

Develop custom interfaces using object-oriented Application Programmer Interface

Application Programmer Interface (API)

Makes billing data available to other applications

Over 100 API objects

Fully documented

Provides access to 90% of data model

Supports calls from C and C++

Server-to-server connectivity

Facilitates integration of custom GUIs

Easily extend and integrate billing processes

Simplifies access to Arbor/BP database

Relational Database Management System (RDBMS) for transaction storage

Oracle8® or Sybase Adaptive Enterprise Server 11.5

Flexible, table-based product and rate definitions

Dynamic, table-based customer account hierarchy

Rate packages combine usage, recurring, non-recurring, credit, and discount rate plans

Customers are associated with table-based rate packages

Dynamic support for rate changes and special promotions

Multiple invoice payment methods, format appearances, and dispatch methods

Full point-in-time recovery

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Billing modules can be configured and monitored in real time

Database-resident task schedules and definitions for modules

18 separately schedulable modules for key billing tasks

Integration with external systems

Usage recording

Trouble ticket

Corporate financial systems

Inventory management

Data analysis

Specialized tax systems

Remote invoice dispatching

Fraud management

Network management

Settlements

Sales/lead management overview

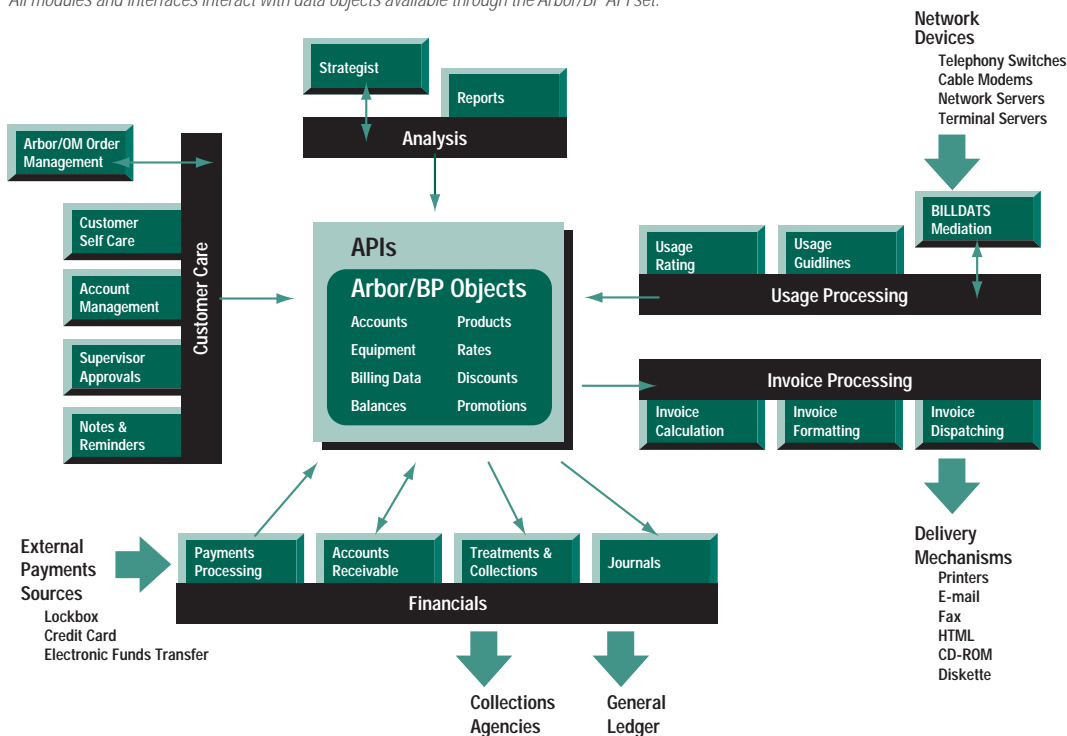
The Arbor/BP database also underlies several functional modules that perform billing tasks:

- Usage processing modules read usage from a variety of external systems, guide usage to customer accounts, and calculate usage charges based on customer specific rates and discounts.
- Invoice processing modules generate and dispatch customer invoices, including all usage, recurring, and non-recurring charges (monthly service charges, taxes, fees).
- Financials modules accept, authorize, and track customer payments, feed financial transactions into a general ledger system, and handle collections activities for overdue accounts.

Standard interfaces allow these billing modules to communicate with a variety of external systems, including general ledger, inventory management, usage recording, adjunct billing, invoice dispatching, credit validation, and much more. The Arbor/BP API set provides object-oriented access to billing modules, enabling service providers and third-party integrators to quickly integrate the Arbor/BP solution into existing computing environments. For example, the API set can be used to integrate Arbor/BP with a network management system to automatically issue credits to customers for service outages based on the customer's service level contract.

Arbor/BP System Overview

Arbor/BP's billing modules perform usage processing, invoice processing, and financials tasks. Arbor/BP interfaces facilitate customer care and analysis. All modules and interfaces interact with data objects available through the Arbor/BP API set.



Data Model

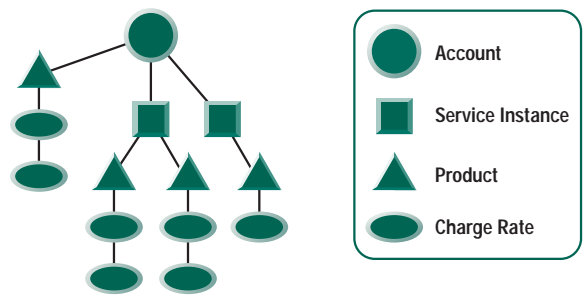
The Arbor/BP API makes data objects available to external applications. API objects represent basic business entities, such as accounts, products, charge rates, and discounts. This object-oriented data model facilitates the design of external applications such as GUIs and automated processes.

The core of the Arbor/BP data model is the customer account, a billable entity that contains a customer’s name, address, preferred payment method, tax status, and other information. Each account can have one or more service instances representing service delivery points (for example, a phone number, meter number, or email address).

Individual product types represent a product or service and specify when it is billed (advance or arrears billing, monthly or weekly billing, and which day of the month), when it is available for provisioning, and other product specific information. Products are provisioned to individual accounts or service instances.

Arbor/BP Data Model

Products are provisioned to accounts or service instances. One or more charge rates can be defined for each product.



Charges to be accrued by the account can be associated with each product. A product may specify a recurring charge rate, such as a monthly flat rate, and usage rates, such as daytime, evening, and weekend per-minute rates. Non-recurring charges, such as installation fees, can be associated directly with an account or service instance.

Accrued charges can be modified by discount plans (for example, 25% off product usage charges), which can be combined into contracts to support complex discounts or time-sensitive promotions (10% off service charges plus free weekend usage between July and October).

Products, charges, and contracts can be organized into product packages to facilitate provisioning. The components of a product package can be easily associated with an account and its associated service instances.

Object-oriented data model

Accounts
Adjustments
Bill dispatch methods
Bill formats
Bills and bill images
Bill periods and frequencies
Billed and unbilled usage
Collections events
Contracts
Credit cards
Currencies and languages
Deposits
Discounts
Non-recurring charges
Payments
Refunds
Products and services
Product packages
Recurring charges
Service centers
Service instances
Tax exemptions
Timezones
Usage charges
Usage credits

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FEATURE LIST**Separate view screens**

Account type, hierarchy, and status
Billing address
Bill cycle and format
Contact information
Marketing and service center information
Payment method and credit card/bank information
Tax exemption status
Account verification
Account summary

Notes and tickler memos

Free-form annotations for each account
Timed reminders to CSRs
Automatic notes triggered by CSR actions

CUSTOMER CARE

The Arbor/BP solution allows CSRs to easily view real-time customer account information and perform a variety of customer care functions.

All information associated with a customer account is viewed through a series of customer care interfaces, with separate, easily-accessed screens displaying different types of information. The customer care interfaces provide multiple views into various attributes of each customer such as credit/payment histories, service levels experienced or promised, special agreements or discounts in effect, and problem history and status. This allows a CSR immediate access to just the subset of information needed to satisfy a customer inquiry, while still maintaining the maximum information online. As a result, CSRs are empowered to act directly and immediately as the single point of contact with the customer. They can provide much better quality of service and more rapid overall response than if the customer were required to contact multiple offices to order new services.

CustomerCare

The screenshot displays the 'Arbor Customer Information' application window. The 'Arbor Summary Information -- new account' sub-window is active, showing various fields for account and customer data.

Arbor Customer Information

File Edit View Account Inter-Account Help

Information to View

☐ Account ☐ Address ☐ Billing ☐ General ☐ Payment ☒ Summary ☐ Contact ☐ Verification

View Hide All Reset Set All

Current Account

Account No. [NEW ACCOUNT]

Company Name []

Name []

Arbor Summary Information -- new account

Contact Information

Contact Name [A. Theisel]

Contact Phone [517-595-9951]

Account Information

Active Date []

Termination Date []

Parent Id []

Child Count [0]

Billing Address

Company Name [King Tech]

Address [Accounts Payable]

[1001 King's Plaza, 44th Floor]

City [Roxbury]

State/Province [MA]

Postal/Zip Code [02001]

Franchise/Prov. [Comm. Comm. - USA1]

Country [United States]

Billing Information

Notes Indicator [0]

Credit Rating [0]

Billing Format [Standard]

Payment Record [0]

Avg. Days to Pay [0]

Last Invoice Amount []

Outstanding Balance []

Classification Code [Business]

Currency [US Dollars]

Language [English]

Customer Address

Address [1001 King's Plaza]

[]

[]

City [Roxbury]

State/Province [MA]

Postal/Zip Code [02001]

Franchise/Prov. [Comm. Comm. - USA1]

Country [United States]

Hide

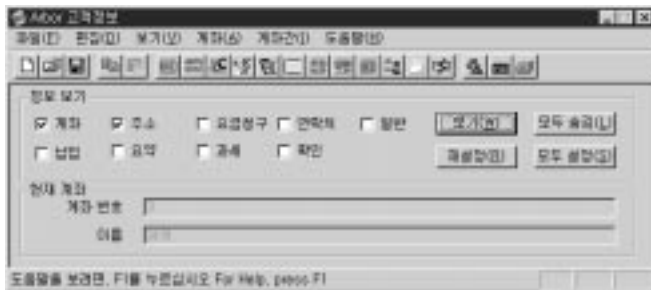
The Arbor/BP solution also enables CSRs to capture knowledge of customer behavior and concerns. The notes and tickler memo function supports full annotation of ongoing discussions with customers so that any CSR can pick up where the previous one left off. This is important for providing high levels of consistent service around the clock.

Arbor/BP customer care is designed to resolve a majority of customer issues efficiently, regardless of the size of the account or complexity of services purchased. Customer care functions supported through the interface include adding new customer accounts, reviewing customer bills and current unbilled charges, entering payments and adjustments, and viewing credit ratings and adjustment histories.

Arbor/BP software also includes configurable, table-driven access controls for different customer care functions and levels of approval authority. Each group of CSRs has a maximum adjustment amount, so transactions that exceed that amount are automatically routed to supervisors for approval. Customer care functions can be enabled or disabled separately for each CSR group. For example, the ability to issue free usage credits or refunds might be restricted to a single CSR group.

A single Arbor/BP installation can provide support for a diverse, international customer base. Since the Arbor/BP solution uses the same data model to define products and services for all convergence industries, CSRs can support telephony, CATV, and Internet customers from a single, integrated interface. International customers can be billed in different languages and currencies, including the Euro, while their account information is stored in a single database system. Arbor/BP can support small, medium, and large customer bases with equal facility.

Arbor/BP provides comprehensive support for international deployments, including CSR GUIs configured to meet local language requirements.



Account information

Full name

Multiple addresses (billing, shipping, and email)

Phone and fax numbers

Social Security Number or Tax ID

Market and SIC codes

Customer type (user defined)

VIP status

Rate class

Discount plan

Tax exemption status

Security codeword or PIN

Payment method

Credit card type and number

Credit rating and limit

Billing status (held or unbilled)

Billing media and format

Billing period and frequency

Next scheduled bill date (regular or interim)

Preferred language and currency

Message to appear on invoice

Reason for service termination

Collections status

Equipment status inquiry

Service start/stop dates

Equipment numbers

Features associated with equipment

Adjustments

Applied to invoices

Applied directly against individual transactions

Calculated based on charge amount, number of units, or number of days

Taxes automatically calculated

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Account Maintenance

Track pending service orders
Establish customer rating plans
Issue usage credits and refunds
Review account history
Enter manual payments

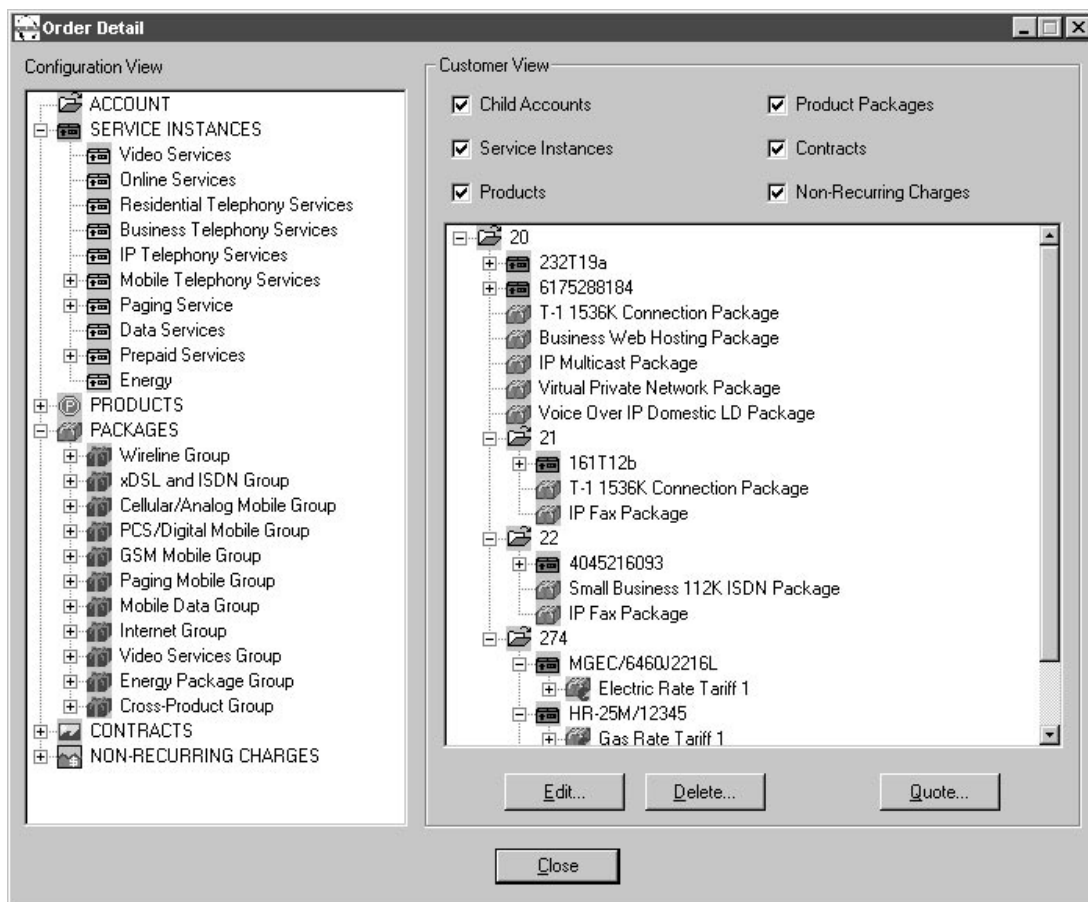
Account Hierarchies

Dynamically expandable
Models customer organization
Assign products, services,
and charges to any level
Issue invoices at any level
Headquarters discounting

Arbor/BP software supports n-level account hierarchies. Account structures can be defined to reflect a customer's organizational structure. For example, a business customer may be organized with a headquarters having three regions reporting to it, and each region having a set of departments. The customer can determine which accounts receive invoices, and to which accounts the charges for unbillable accounts are routed. One customer may choose to have its headquarters receive a single, consolidated invoice for all charges, while another may prefer to have invoices sent to particular regions or departments. Arbor/BP software provides a graphical hierarchy browser which facilitates the creation and management of complex customer hierarchies.

Account Hierarchies

Arbor/BP supports n-level account hierarchies. CSRs can view account hierarchy structures, and use the point-and-click feature of the browser to review account, product and billing information for a specific member of a hierarchy.



The Arbor/BP solution also includes iCARE, a Web-based application that enables customer self-care over the Internet. iCARE interfaces with the Arbor/BP database to provide authorized customers with account information and access to customer care functions. iCARE allows any authorized customer to register, select new services, modify their services, query their account, access their billing information, and select or modify their payment mechanisms. Using any forms-capable Web browser, a customer accesses the iCARE Web Server, which checks the customer's access privileges against the Arbor/BP customer databases. If the customer is registered, they can then access the Arbor/BP billing database for information pertaining to their account. By giving customers secure, real time access to their own account information, service providers can lower customer care and provisioning costs, and increase responsiveness and customer satisfaction.

In addition to the customer care interfaces, Arbor/BP software provides full support for customer provisioning through its API set. Custom applications can make use of the Arbor/BP API set to perform batch account creation and maintenance. The iCARE Developer's Kit is a ready-made example of an application which uses the API set to access account, invoice, and billing information through a Web browser. This flexible module can be modified and tailored by the developer to meet the unique needs of each business, automating many of the most commonly used customer care features provided by the Arbor/BP solution.

Customer Self-Care

All screens can be customized to reflect a service provider's corporate image. iCARE enables self-service account queries via the world wide web.



iCARE

Customer self-care toolkit

Real time access to account, billing, and subscription information

Encrypted queuing

Registration servers in ANSI C for UNIX, Windows NT

HTML- and JavaScript™-based

Extensible and customizable

Supports any Web browser

Firewall independent

Provisioning APIs

Bypass user interfaces

Provision large numbers of customer accounts at once

Sample application provided

Real time rate quoting and taxation

Sub-second rating and taxation of valid usage events

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FEATURE LIST**Multiple usage input methods**

Batch or real time collection
 TCP/IP file transfer protocol (FTP)
 UNIX file transfer
 Real-time socket communication
 Modem transfer
 Single installation can accept multiple input types

Data transfer initiated by Arbor/BP or external device**User-configurable collection frequencies****All usage files and records logged and archived****Multiple external devices**

Telephony and data switches
 Wireless clearinghouses
 Email servers
 Cable modems
 Web servers
 Network usage monitors
 MDMA/MDM

Multiple usage record formats

AMA
 EMI/EMR
 CIBER
 TAP
 EDI
 Additional user-configurable formats

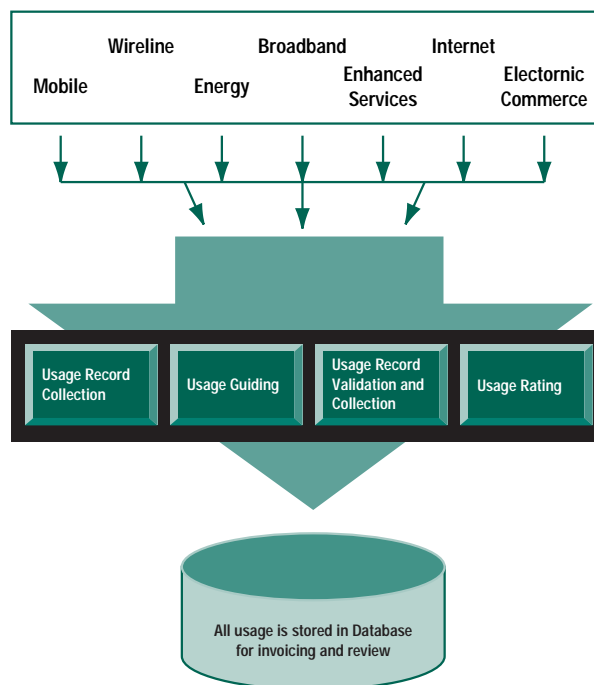
Usage guiding

Guide usage to origin, target, or a third party (A, B, or C number)
 Multiple privacy levels for B-number masking
 International usage guiding
 Roaming
 Incollects/outcollects

USAGE PROCESSING

Arbor/BP software collects raw usage data from a variety of network recording elements, and generates charges for that usage based on configurable, customer-specific usage rates. Arbor/BP can collect and rate usage as frequently as necessary. Usage charges are stored along with the customer account until the customer's next bill cycle, and are available online to support customer inquiry and adjustments.

Billing operators can configure the Arbor/BP solution to communicate with multiple external devices, and can define one or more sets of file-transfer parameters — polling frequency (including real time), origin and destination directories, communications protocols, and filenames — for each device. Once transferred, usage files are translated into standard Arbor/BP formats and stored in the database. The usage retrieval and translation process is table-driven and fully configurable, making

Multi-Service Usage Processing

it easy to support new external devices and file formats, and to modify how files are transferred and stored.

Arbor/BP software guides each usage event to the proper customer account and calculates the charge for that event. Arbor/BP selects the appropriate usage rate based on account attributes and usage event attributes. For example, separate usage rates can be defined for residential and business accounts, and for daytime, evening, and weekend usage events. These rates can be flat, usage-based, incremental, or pre-rated. All usage rates reside in the Arbor/BP database and can be modified at will and customized for a particular account.

The Arbor/BP usage processing system is fast and highly scalable. A centralized catalog system can route up to 11,000 usage events every second to autonomous servers, each of which can guide and rate over 3,300 usage events per second. Service providers can incorporate real time rate quotation into their custom interfaces and applications through the Arbor/BP API set. The API set provides open access to usage guiding and rating libraries.

The Arbor/BP solution also includes comprehensive error correction, validation, and auditing features. Each usage event is validated to detect file-level and field-level errors, inconsistencies, and duplication. Events that fail validation are listed in process control reports and can also be reviewed, corrected, and rated, or marked as uncorrectable through a graphical user interface.

Each step in this process is designed for a convergence environment. Arbor/BP software can accept simultaneous input from recording devices on multiple different networks. In addition, Arbor/BP can differentiate between equipment identifiers for different usage types such as phone numbers, email addresses, online service access codes, and cable account numbers all provisioned to the same account.

Usage rating based on:

Distance (for leased lines)
Duration
Bytes (for document downloads)
Amount (for pre-rated usage)
Vertical and horizontal position (LERG and TPM)
Longitude/latitude
Rate class
Usage type
Grade of service
Territorial range of usage
Origin and/or target point ("usage corridor")
Account (individual case basis rates)
Service provider class
Rate period (for "weekend" or "holiday" rates)
Product
Meter reads
Service type
Cell Site
Rating zone
Class of service
Any combination of the above

Aggregate usage rating for each bill cycle

Automatic control reports for each data load

Error checking

File level validation
Field level validation (alphanumeric, range, cross-field checks)
Automatic logging and roll-back of errored files
Batch correction capability
Automatic online investigation queue for all errors
Corrected records recycled into system

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FEATURE LIST**Configurable billing cycles**

Multiple billing frequencies

Configurable bill dates

Different cycles for different services and accounts

Account billing cycle easily changed via GUI

Automatic invoice calculation

Determines invoices to be calculated based on customer bill cycles

Collects all charges, adjustments, payments, and balances associated with an account

Calculates all applicable recurring charges, discounts, taxes, and credits

Advance and arrears billing

Late fees

Disconnect credits

Prorate recurring charges and discounts

Updates account and generates journal entries

Configurable rounding methods

Full backout of invoice calculation

Taxation

Country-level taxes (VAT)

Sales and communication taxes for all US tax jurisdictions

Taxable locations in different countries

Taxes on charges with different tax types

Sales/rental/service and franchise taxes for cable services

Distinguish franchise fees that must be treated as revenue

Compute taxes on applicable franchise fees

Tax exemptions at the customer or product level for each jurisdiction

INVOICE PROCESSING

Flexible, fast invoice processing is the heart of any billing system. Customers must be billed accurately for services received so that businesses continue to generate revenue.

The Arbor/BP solution allows high volume processing for customer bases of up to 20 million residential subscribers. Recent benchmark tests have shown that Arbor/BP can calculate up to 350,000 invoices per hour on a single server.

Arbor/BP software generates invoices based on user-defined billing cycles and supports the production of interim bills. Invoices automatically include appropriate usage charges, non-recurring charges (such as installation fees), received payments, adjustments, and refunds. Arbor/BP also calculates recurring charges for products and services, applicable discounts, and additional charges such as taxes and late fees.

The Arbor/BP solution supports three basic tax packages: Vertex™ Quantum™, Vertex® CommTax™, and Arbor/BP Universal. The Universal package supports VAT taxation and provides flexible franchise fee calculation and handling. Tax compliance, tax exemption, and tax overrides are also supported.

Arbor/BP software allows service providers to specify which billable items appear on each customer's bill, and in what order they appear. Billing operators can define the language, position, and format of text elements, the displayed currency of rates and charges, and additional invoice elements such as bill messages, inserts, and graphic elements (custom logos, icons, and fonts). Using Arbor/BP, service providers can define bill templates for elements that appear on multiple bills (summary and detail sections).

For example, a service provider introducing a new service could announce a 25% discount for that service on the invoices of a select group of customers. For new customers, a special welcome message can appear on their next invoice.

Within a single deployment, Arbor/BP software supports multiple languages, currencies, and international taxation within a single installation. This allows providers to calculate and format bills in the customer's own language and currency, and apply taxes based on the country of residence.

Clear identification of customer with special marketing program or affinity group

Account 617-225-2200 HTC4
Type "Full-Use Program" - Residential
Billing Period Feb 21-Mar 20, 1999

CCC

INVOICE

COMMUNICATION	Calls	Rate/Minute	Minutes	Charges
Metro Calling Plan	30	\$0.080	327	\$26.16
Phone Home Long Distance	15	\$0.10	63	\$ 6.30
Calls Outside the Plan	2	\$0.19	14	\$ 2.66
On the Road Mobile Plan	20	\$0.38	60	\$22.82
Mobile Voice Mail	3			\$ 0.60
Communication Charges				\$58.52

ENTERTAINMENT

Basic Cable				\$ 7.56
Metro Plus Package				\$ 6.22
Video on Demand				
Apocalypse Now				\$ 1.95
Thelma & Louise				\$ 1.95
Terminator				\$ 1.95
Pay-Per-View				
Superbowl XXXI				\$24.95
The Beatles — Together Again Tour				\$19.95
Entertainment Charges				\$64.53

ONLINE SERVICES

	Transaction Number	
Net Online		\$24.95
The Electronic News	#277485-1595-7	\$ 0.30
Catalog Orders		
Lands End	#365940-3775-2	\$ 32.99
L.L. Bean	#472566-4221-4	\$144.99
Online Music Samples - 18 CDs	#248894-1195-3	\$ 5.25
Online Charges		\$208.48

▼ Detach Bill Here

ACCOUNT SUMMARY

Communications	\$58.25
Entertainment	\$64.53
Online Services	\$208.48
Taxes	
Federal	\$ 2.54
State and Local	\$ 4.22
Total	\$338.02
Bundle Discount (15%)*	-\$ 20.75
Amount Due	\$287.27

NEW SERVICE!

Starting this month, CCC Offers online payment! When you use a home computer to pay your bill electronically, CCC will give you 15% off your total bill. Your online services account can be initialized in the CyberBank area of the CCC online forum. Call 1-800-555-2435 for customer support.

*Applied pursuant to "Full Use" Package.

Spans a full range of service

Easy to understand summary of costs and benefits

Customized Discounting

Example of direct marketing: special offer

Arbor/BP software generates formatted invoices and can render them on anything from the smallest desktop printer to the largest mainframe printer. Invoices can be dispatched via PCL and AFP printers, fax, email, online file transfer, diskette, CD-ROM, HTML and other output media. Arbor/BP also supports OCR marks for inserter machines.

Since all billing information is stored in Arbor/BP database tables, it is easy for service providers to access and modify customer billing schedules, invoice contents and appearance, and invoice dispatch methods. Even generated invoices are stored in the database for later review.

Invoice formatting

Customer-specified detail on invoice

Specialized customer-based invoice formats

Can issue reports of call detail information in conjunction with the invoice

Different formats can be defined for each billable item

Bill templates for elements on multiple bills

Bill sections can be suppressed

Prebilled items from adjunct billers can be incorporated into invoice

Integration to WYSWYG format design systems

Invoice sorting

Specialized bill sorts and page breaks for an invoice

Sort by service/product

Sort by department

Sort by rate band

Sort by billing number

Sort by network event type

Sort by origin, destination, date/time, duration, billable units, etc.

Invoice messages

Table driven

Insert into any page of a customer invoice

Supports standard, consumer interest messages

Supports conditionally triggered messages

Supports messages to select customer segments

Supports registration marks on invoices for specialized mail processing equipment

Invoice rendering

Customer specifies invoice dispatch method

Local and remote printing

Multiple dispatch methods (paper, tape, diskette, facsimile, CD-ROM, HTML, or email)

Re-dispatching invoice batches

Re-dispatching individual invoices

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FEATURE LIST**Product representation**

Multi-level product hierarchy

Discounts associated with any level in the hierarchy

Multiple charges associated with a single product

Multiple discounts associated with a single product

Models provider's existing product and rate structure**Provider scripts synchronize product and rate structure on other databases****Rate plans**

All rates are table based

Rates can be usage based, incremental, or flat

Customer-specific rate classes

PRODUCTS, RATES, AND DISCOUNTS

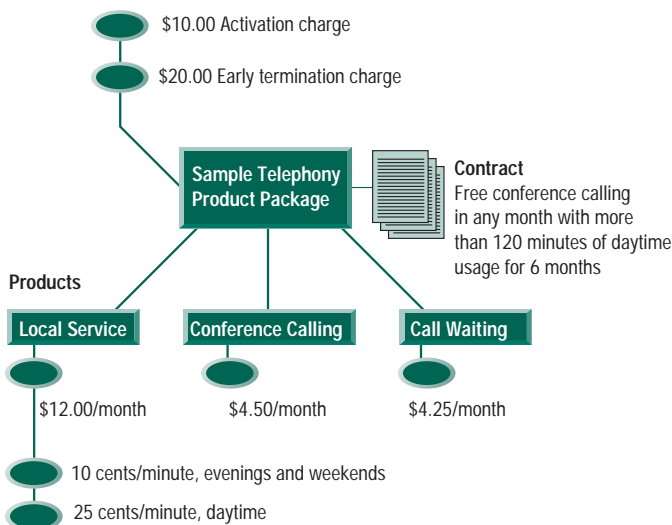
The ability to package and sell services based on competitive offerings and customer needs is often a key differentiator for service providers. The Arbor/BP solution provides a flexible product hierarchy that meets the needs of providers and customers alike. In conjunction with Arbor®/OM (Kenan Systems' order entry and workflow management solution), providers can provision customers for a wide variety and number of products and services. Providers can assign distinct rates, discounts, credits, and tax packages to each account, product, or service.

Within the Arbor/BP system, products and services such as unlimited local dialing, call waiting, leased line rental, Frame Relay data transport, port charges, cable service, pay channels, video conferencing, and Internet access are defined generically in database tables. Product packages can combine multiple products and services along with recurring, non-recurring, and usage charges. For example, a telephony product package could include unlimited local telephone service, call waiting, conference calling, a monthly service charge, a non-recurring installation charge, and a set of usage rates for long-distance service.

Discounts are also generically defined and grouped together into contracts, allowing time sensitive promotions to be configured. A contract may contain discount plans, recurring charges, and non-recurring charges for a specific time period.

Product Packages and Contracts

Contracts combine discounts into complex or time-sensitive promotions. Product packages combine multiple products, services, and contracts into a single, easily-provisioned entity.

Non-recurring charges

Product packages and contracts can be applied to specific accounts based on a service provider's business rules. By combining multiple products, rates and discounts into a single entity, product packages allow CSRs to provision complicated promotions and product bundles to a customer quickly and easily with a single action.

As the business environment changes, service providers can quickly configure new packages and rate plans to adapt to a dynamic market. They can apply rate plans and promotions to an entire customer base, to select groups of customers, or to a single customer. This capability enables a service provider to remain agile and market-driven, and to segment and differentiate its customer base for maximum revenue generation.

Multiple recurring and usage charge rates can be defined for each product and service. Arbor/BP software selects the proper rates by matching rate keys to usage, account, and product and service attributes. For example, account attributes can include the customer's rate plan, preferred currency, and billing frequency. Product and service attributes can include the service type (wireline telephone, electricity, cellular, PCS, GSM, Internet access account), service speed, or the length of a point-to-point service such as a leased line or frame relay connection. Usage charge attributes could include the usage duration, time of day, day of the week, and event priority. Recurring charge attributes could include the product or service itself, its rate class, and which product package it is included in. Arbor/BP software can use any or all of these attributes as keys to determine the proper rate.

Arbor/BP software provides facilities to override standard rates for individual customers. This override (or individual case basis) rating capability provides a strategic advantage in negotiating with, acquiring, and retaining the most valuable customers in the competitive communications markets.

Complementing its robust rating capability, the Arbor/BP solution offers equally strong and flexible discounting functionality. Arbor/BP enables service providers to implement innovative discounting plans easily. Discounts can be tapered (in bulk) or tiered (incremental), with any number of levels. For example, a tiered discount might offer 10% off charges under \$30, 15% off charges between \$30 and \$60, and 20% off charges above \$60 in a single month. Discounts can be defined as percentage-off charges, fixed monetary rebates, or usage credits (for example, 20 free hours). Discounts can be based on the total amount of charges, the total number of charges, or the total units of usage-based charges (such as minutes or bytes).

Usage rates selected based on:

Customer incurring the charge
Currency the charge will be billed in

The product itself
Billing frequency

Distance associated with the transaction

Date the product was activated

Equipment location

Equipment class

Service provider class

Any combination of the above

Volume discounts

Apply to all charges or to selected products' charges

Apply to all charges or to selected service providers' charges

Apply to recurring, non-recurring, usage charges, or all charges

Usage charge discounts based on changes or units

Bulk (tapered) or incremental (tiered) algorithms

Select discount based on:

Product being charged

Product line

Service provider

Discount active date

Usage credit discounts

Apply to some or all service instances belonging to an account

Apply to all usage or to selected products' usage

Apply to all usage or to usage through selected service providers

Apply to all usage types, or only to particular usage types

Can be restricted to certain time periods

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Customer-specific discount plans

Special rates, volume discounts, and usage credits can be combined

Different kinds of volume discounts and usage credits can be combined

Cross product discounting

Contracts (Promotions)

Combine discount plans, usage credit plans, and charges into a single offering

Supports time based discounts (promotions) and unlimited discounts

Can apply to multiple accounts and service instances simultaneously

Can extend beyond a single bill cycle

Commitment contracts supported

Headquarters discount contracts supported

Can apply to particular charges

Contracts (promotions) can be valid for:

A particular month

A particular day of the year, month, or week

A particular area called, or particular object purchased

A particular service provider

A particular geographic region (local, intrastate, interstate)

A particular class of service

A particular length of time

The Arbor/BP solution supports the following complex discounting options:

- Cross product discounts are discounts for which one set of charges is used to determine a discount threshold, and the discount is then applied against a different set of charges.
- Headquarters (HQ) discounts allow service providers to calculate and distribute discounts to multiple, separately billed accounts. For example, a service provider could offer a customer's headquarters \$1000 off total long-distance charges, distributed over a number of subsidiary accounts, if the usage charges incurred by all those subsidiaries total more than \$10,000. HQ discounting introduces discounting flexibility that helps carriers attract and support large, complex business accounts.
- Usage credits are either recurring (30 minutes of free long-distance per month), non- recurring, or off-cycle credits (a customer is given a fixed number of credits and a set period in which to use them).

The Arbor/BP product, rate, and discount model has been effectively used to implement product offerings in a wide variety of industries, such as wireline and mobile telephony, CATV, and Internet services. Because Arbor/BP provides flexible mechanisms for configuring new product offerings in multiple industries, service providers can use a single billing and customer care product to support all their strategic initiatives in the convergence marketplace.

Examples of Products, Rates, and Contracts

- 25% discount on call waiting and conference calling charges for new wireline service customers for 3 months. After three months, the discount drops to 10%.
- Online stock quotes service charges at \$5 per use, with maximum of \$25 per week.
- Customers buying basic cable service at regular price get premium channels at 30% off.
- Online discussion forums accessible for \$5 per month, special bundle of 12 available for \$40 per month.
- Unlimited free usage for one month.
- Customers who use more than 60 minutes of long-distance in a month get a free pay-per-view movie.

- \$7.95 a month for 10 free hours of Internet usage or 60 free minutes of long-distance telephony.
- Free wireless activation plus free evening and weekend usage for three months.
- One-time \$25 rebate after 6 months of service.
- \$120 per month access fee, with an activation charge of \$65.
- Up to \$110 of usage per month is free, usage exceeding \$110 is discounted 20%.
- \$30 fee for cancellation after less than 12 months of service.
- \$1,200 corporate subscription fee for up to 200 subsidiary user accounts, plus free software upgrades for one year.
- Guaranteed highest grade of voice data for \$25 service charge, otherwise \$10.
- Customers with more than 60 minutes of network access time save \$10 on phone bill.
- Business customers get 10% off service usage between 10 PM and 6AM, while residential and government customers do not.
- State residents receiving certain kinds of financial assistance receive a \$9.50 reduction in basic monthly rate for telephone service.
- Per-minute usage charge of 25 cents for the first 3 minutes, 10 cents for the next 10 minutes, and 8 cents per minute for usage after 13 minutes.
- 10% discount on all charges incurred by a group of accounts, if the total over all accounts exceeds \$12,000, allocated among the participating accounts.
- 30 free minutes of network access, usable at any time.
- Usage charge of 25 cents per minute during business hours, and 10 cents per minute 7PM - 7AM.
- \$5 off first month for new basic retail electricity customers.
- 10% off total bill for combined electricity and natural gas customers.
- First month free home security monitoring when customers add this service to their basic service plan.

Product packages

One product package can cross multiple service instances

Full audit trail of product package history

Combine multiple components (products and contracts) into a single package

Active date range for each component

Offset start date for each component

Account-level and service instance-level components

Components can be mandatory or optional

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FEATURE LIST

Accounts Receivable

Prepayments for products and services

Configurable payment grace periods

All financial transactions stored in database tables

Tracking of disputed charges, adjustments, refunds, and deposits

Reversals for prepayments, corrections, refunds, and deposits

Flexible issuance of adjustments

Outside collection agency (OCA) payments

Payments processing

Electronic funds transfer, cash, check

Credit card (American Express®, Visa®, Master Card®, Discover®, and Diners Club®)

Automated and manual entry of payments

Payment reversals (for bounced checks or insufficient funds)

Payment method associated with each account

Payment method easily changed by CSRs

Collections and treatment

Table driven collections

Collections events triggered by customer balance

Events scheduled through configurable scenarios

Automatic aging of overdue accounts

Account- and invoice-level collections

Configurable collections events

Overdue messages on customer invoices

Letters to customers with overdue balances

Call lists of overdue accounts for collections personnel

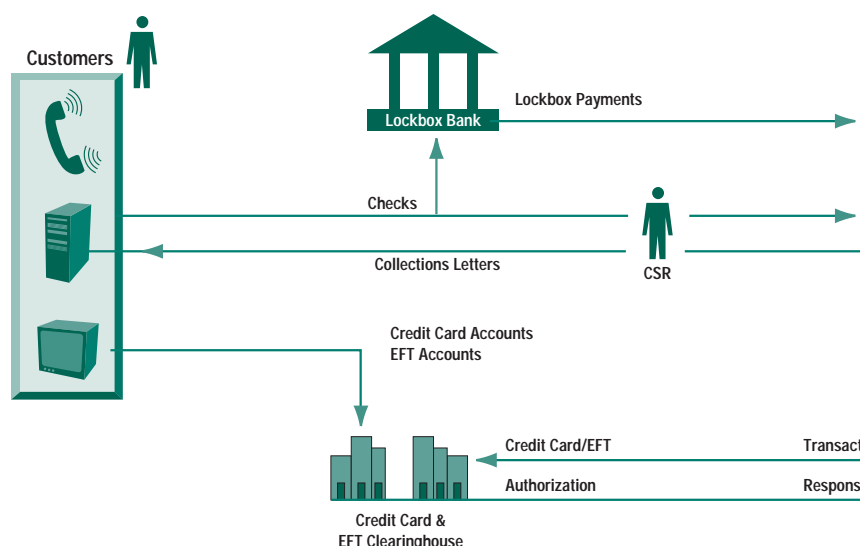
FINANCIALS

Organization, maintenance, and management of financial data is crucial to any billing program. In order to provide complete revenue assurance, the Arbor/BP product provides an extensive financials system to handle payments processing, accounts receivable processing, collections, intelligent feeds to journals (general ledgers), and tax compliance.

The accounts receivable process can exchange transaction files with credit card and EFT clearinghouses as well as lockbox banks. Additionally, check or cash payments can be entered manually. Each customer can choose a different payment method, and customer balances are automatically updated to reflect all payments. Deposits, prepayments, and refunds can be credited to an account and reversed.

The Arbor/BP accounts receivable process works in conjunction with collections and journals to ensure that full payment is received and accurately booked within the system.

The Arbor/BP collections process is highly configurable. Service providers can define collections events, such as the generation of reports, issuance of collections letters, the scheduling of phone calls, and the writing off of accounts. Collections events can be grouped into collections scenarios. These scenarios define which collections events should occur and how quickly they should follow one another. Arbor/BP software allows service providers to define any number of collections scenarios.

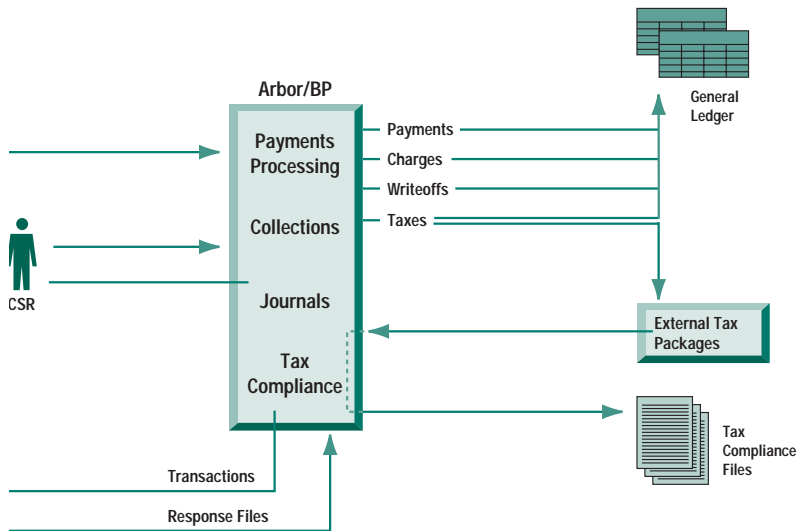
Arbor/BP Financials Processes

Each overdue customer is assigned to a scenario based on amount outstanding, customer credit rating, and customer VIP status. Arbor/BP software initiates collections events for each customer based on their assigned scenario. Accounts in collections are assigned to specific work queues, making it easy to manage collections activity for large customer bases.

Arbor/BP software tracks each customer's collections status and automatically moves accounts out of collections when their balance is paid.

Arbor/BP's journals process matches financial transactions from the Arbor/BP database with accounting codes used by the service provider. The Arbor/BP solution then generates transaction files for a given journal period, which are fed to the service provider's corporate general ledger system. Arbor/BP journals all transactions, including usage charges, adjustments, taxes, and payments. The transaction files contain detail and summary information. Journal periods, accounting codes, and correspondences between codes and Arbor/BP transactions are configurable by the service provider. Arbor/BP also supports full journal backouts.

Arbor/BP software generates tax compliance files based on calculated tax charges. Separate tax compliance files can be generated for each service provider, taxable location, and/or account category. Arbor/BP recognizes the global nature of the communications industry by supporting international taxation and currencies.



Collections scenario selected based on:

Customer credit rating
Customer status (VIP code)
Overdue amount
Time past due

General ledger feeds

Standard journal feed capability to Oracle Financials®
Configurable journal feed capability to any general ledger system, such as PeopleSoft®, SAP®, Platinum®, or Lawson®

Journal by owning and/or revenue receivable cost center

Journalized transactions include:
Usage, recurring, and non-recurring charges
Tax charges
Adjustments
Discounts and usage credits
Payments, deposits, refunds
Account balance write-offs
External billing system feeds

Aggregate journalized transactions
Service provider
Account category
Usage type
Rate class
Jurisdiction
Currency
Units
Market code
Charge amount
Fraud (adjustments only)
Any combination of the above

Currency support
Multiple currencies within a single installation
Currency conversion for all charges
Currency selectable by customer and represented on invoice
High-precision currency support

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FEATURE LIST**Call detail reports**

Discounts/Credits
Expiring credit cards
Missing tax codes
Adjustments
Non recurring charges
Account hierarchy
Collections
Tax exempt accounts

**Reports available on
Windows NT****Monitoring reports**

Manual transactions
Volumes
Bill production
Bill pull audit
Invoice tracking
Server status

Financial reports

Deposits
Unbillable messages
Accounts receivable
Payments
Adjustments
Collections
Refunds
Revenue
Sales
Accruals
Taxes
Third party charges
Customer reports

Control reports (UNIX)

Automatically generated for all
system activities
Available for browsing online
Can be printed to a local or remote
device

**Custom interface for
generating ad hoc reports****All system data available for
reporting****Create new reports using
PowerBuilder® and/or
InfoMaker****REPORTS AND ANALYSIS**

Accurate and accessible reports are critical to an effective customer care and billing environment. The Arbor/BP solution includes a form-driven, point-and-click reporting facility based on Windows NT that allows the generation of both standard and ad-hoc reports. The Arbor/BP product includes over 40 standard reports in the following categories:

- Customer activity reports, providing business information to analysts and managers.
- Financial reports on accounts receivable, deposits, cash receipts, and payments, providing data to financial personnel.
- Automatically-generated control reports that monitor system activity, providing system administrators and billing operators with critical audit information on system operation.

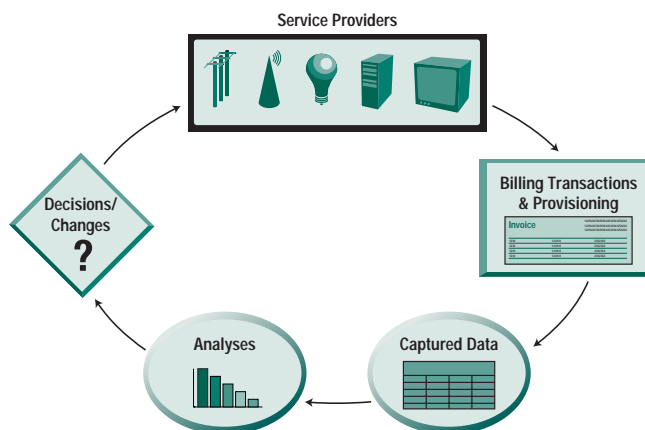
The Arbor/BP reports interface allows users to specify parameters appropriate to each report, such as date ranges or customer account characteristics. For example, a user investigating customer fraud might request a frequently called numbers report for a particular customer during a 3-month period, while an accountant might request a monthly billed revenue report with a particular end date.

All data within the system is available for reporting and other analysis, and is protected from unauthorized access.

As data is stored in the Arbor/BP relational database, users can create their own reports utilizing popular SQL products such as Infomaker® and others.

The Arbor/BP Agility Loop

Billing is the point at which the value delivered by service providers is communicated and evaluated by customers. The ability to analyze and assess the impact of this evaluation creates an "agility loop" through which the value of the provider/customer interaction is enhanced and suppliers are better able to differentiate themselves from the competition.



Strategist

To leverage the data accumulated in Arbor/BP, Kenan Systems offers the Strategist® analysis-based decision-support application. This application suite empowers end users across the enterprise to develop insight about their customers and their business, enabling companies to take the appropriate actions that deliver measurable results. Fully integrated with Arbor/BP the application suite incorporates data from multiple sources to form a centralized and unified view of your customers. From this centralized data source, end users can quickly and easily run a multitude of sophisticated analyses including customer segmentation, scoring, modeling and profiling.

Strategist supports a marketer throughout the entire marketing cycle, from gathering of data through testing of programs through validating of program results. From a desktop PC, marketers can easily analyze customer and business data, uncovering patterns in customer behaviors and similarities in demographics. Strategist software helps marketers optimize their marketing dollars by enabling the end user to design programs and campaigns according to a customer's lifetime value.

However, Strategist is more than an application designed for marketers. Within any department, data access and analysis are essential for making informed decisions and defining successful strategies. The Strategist application gives end users direct access to decision shaping information. Some examples of the department-specific business issues that Strategist will help to address include:

Finance:

- Profit Analysis
- Revenue Reporting
- Collections Analysis

Customer Care:

- Customer Value Analysis
- VIP Treatment
- Cross Selling Opportunities

Network Planners

- Point to Point Analysis
- Capacity Analysis

The application has a multi-dimensional database at its core, enabling the end user to dynamically 'stack' and 'rotate' data to investigate hypotheses or to research correlations and related impact of variables. The application operates within a standard client-server architecture, and is available on Solaris, HP-UX and AIX servers and on Windows 95™, Windows® 98 and Windows NT® clients.

STRATEGIST

Support for a broad range of functionality including:

Reporting
Analysis
Customer scoring
Customer segmentation
Campaign management

Support for solutions to business challenges including:

Churn reduction
Acquisition initiatives
Customer lifetime value optimization
Revenue stimulation

Enable end users to develop insight about their customers and their business . . .

Empower them to take the appropriate actions that deliver measurable results

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FEATURE LIST

User groups control access to:

Executables
Files and directories
Databases
Graphical user interfaces
Selected customer care functions

Create user groups as needed**Environment variables**

Define global operating parameters
Define names and paths for databases, servers, printers, etc.
Defaults defined in login scripts
Shared directory structure across multiple servers

SYSTEM ADMINISTRATION

Arbor/BP system administrators are responsible for installing and upgrading the Arbor/BP solution, and for configuring the UNIX and database environments to work with Arbor/BP. They also monitor system activity, perform day-to-day maintenance, and make adjustments as needed to the hardware and system software to ensure smooth operation. Arbor/BP provides a variety of user interfaces, scripts, and batch processes to simplify and automate these tasks.

Each Arbor/BP release includes installation and initialization scripts which set appropriate values for environment variables, UNIX directory structure and permissions, relational database contents, and system parameters. Arbor/BP upgrades include conversion scripts to facilitate database transition.

Command Center, a Java-based system administration GUI, facilitates many of the day-to-day monitoring and maintenance tasks involved in running the Arbor/BP solution. Command Center is used to:

- Configure and schedule billing processes
- Monitor all billing processes
- Review activity logs, which contain alerts and warnings generated by billing processes
- Monitor system load levels, database size, and transaction log size

Command Center

Command Center, the Java-based system administration GUI, provides single-point, integrated access to real time configuration and status information for all billing processes.

PID	Status	Name	Process	Task	Start Time	End Time	Database	Command
21944	Idle				17-Jan-00 16:50:10 AM			Accepting commands on port 9800
21945	Idle				17-Jan-00 16:50:21 AM			Sending TRMT at 17-Jan-00 16:50:21 AM
2240	Run	BP	BP	BP	17-Jan-00 11:03:34 AM	17-Jan-00 11:03:34 AM	BP	Executed at UNIX time 17-Jan-00 11:03:34 2000 with exit value 0
2242	Run	BP	BP	BP	17-Jan-00 11:04:11 AM	17-Jan-00 11:04:12 AM	BP	Executed at UNIX time 17-Jan-00 11:04:12 2000 with exit value 0
2246	Run	BP	BP	BP	17-Jan-00 11:06:10 AM			Suspended at UNIX time 17-Jan-00 11:06:10 2000 by signal 23
2248	Run	BP	BP	BP	17-Jan-00 11:06:11 AM	17-Jan-00 11:07:46 AM		Killed at UNIX time 17-Jan-00 11:07:46 2000 by signal 9

Arbor Process Monitor

process monitor

Release: 3.0.0 Process: BP PID: 2246 Start Time: 17-Jan-00 11:06:10 AM

Process: BP Task: BP Database: BP

Command: BP

UnSigned Java Applet Window

System administrators are responsible for backing up Arbor/BP data on a regular basis. The Arbor/BP solution provides an archiving module which automatically backs up critical system data and moves non-critical database records and files out of highly-used production tables and directories to tape or archive areas for later removal. The archiving module operates on a fully configurable task schedule. Arbor/BP also includes an interactive archive restorer to read Arbor/BP data from archive tapes.

Arbor/BP software includes utilities to perform a variety of billing tasks. A general-purpose utility scheduling module controls these utilities. For example, a system administrator might configure this module to generate tax compliance files at 5:30 PM every Wednesday and copy those files to a special directory.

Through the table maintenance GUI, user groups' access to Arbor/BP functions and data can be controlled. Each user group is assigned permissions so that users in that group can perform only the tasks appropriate for that group. Each CSR user group is also assigned threshold amounts. Adjustments and refund requests that exceed that amount are automatically routed to a supervisor for approval.

The table maintenance GUI can also be used to control Arbor/BP system parameters, which are maintained in a single, centralized table. System parameters control error thresholds, maximum file sizes, memory usage, supported payment methods, and many other aspects of Arbor/BP operations.

Populating database tables

Initialization scripts for default table configurations

Table maintenance interface provided

Any SQL interface tool supported

Scripts for triggers, rules, indexes, permissions, and stored procedures

Scripts for database cleanup and conversion

Scripts for database consistency checks

Automatic database replication across servers

Archiving

By table name or pathname

By age of data

Wildcard matching

SQL "where" clause matching

Multiple archive tasks can be scheduled

Interactive archive recovery module

Multiple archive media

Point-in-time recovery

Device mirroring

Distributed networking

Continuous availability

System parameters

Control module specific operations

Defined in a single table

Performance monitoring

GUI displays load, database size, and transaction log space

Control reports for each process

Activity logs for errors and warnings

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Multiple customer servers can hold over 20 million residential subscribers

Leverages symmetric multiprocessing hardware architectures

Benchmarks as of November 1997

Routes up to 11,000 usage events per second

Guides and rates over 3,300 usage events per second per customer server

Calculates up to 350,000 invoices per hour per server

Hardware from workstations to massive SMP servers

Open systems standards

UNIX System V release 4

Coded in ANSI C/C++

ANSI SQL

SYBASE 11.5 or Oracle8

Windows NT

TCP/IP layered network protocol

PowerBuilder or InfoMaker for report generation

Required software

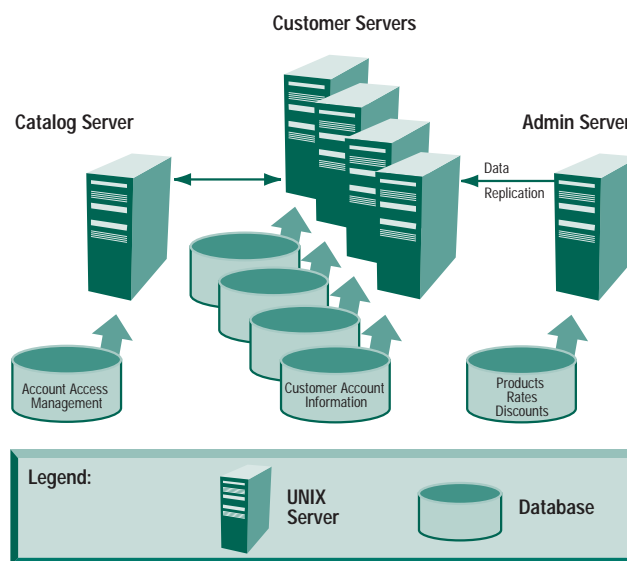
SQL - relational database server and client software

Windows NT

TECHNICAL ARCHITECTURE

Customer centricity is the foundation of the Arbor/BP system. Whether a service provider has ten customers or ten million, every Arbor/BP function operates against a customer database, and is constantly updating that database to ensure service providers can obtain information on customer status in real time.

All data about customers, transactions, products and services, rates, and promotions is stored in a relational database management system (RDBMS). The RDBMS supports full auditing with point-in-time recovery for all functional processes, including full invoice backout capability.

Multi-Server Architecture

Arbor/BP uses distributed networking (TCP/IP) to connect client machines in a multi-server architecture consisting of clusters of ANSI SQL-compliant database servers installed on symmetric multiprocessor UNIX machines. The servers are autonomous, and each includes a local database. There are three kinds of servers listed below.

- Customer servers maintain customer accounts. Customer data can be allocated across one or more Customer servers. Usage and invoices for those customers are processed locally on each server.
- The Catalog server acts as the central entry-point for new data and information requests. It keeps track of which customers have their information on which Customer server. The Catalog server ensures that the multi-server nature of Arbor/BP is transparent to end users or functions requesting information from it.

- The Admin server acts as a central location for system-wide configuration information including products, rates, discounts, external devices, and invoice formats. All configuration is performed on a single Admin database, portions of which are automatically replicated to all customer servers.

Separate GUI servers can also be incorporated into an Arbor/BP installation, supporting distributed customer service and maximizing the number of concurrent Arbor/BP users.

The ability to use clusters of servers allows the Arbor/BP solution to exceed the physical performance limitations of a single server. By fully leveraging the hardware available in a multi-server environment, Arbor/BP software can support truly massive customer bases. However, service providers with smaller customer bases (less than 2 million) can choose to consolidate in a single-server environment.

Arbor/BP billing processes can be run concurrently on each server, supporting further scalability. Billing operators can run multiple instances of each process to maximize throughput. For example, a billing operator might run two, or five, or ten Bill Preparers simultaneously on a single machine. Because Arbor/BP supports full application concurrency, running multiple processes radically increases the number of invoices processed per second.

Each process can be configured to perform multiple tasks on independent schedules, allowing service providers to coordinate related tasks and distribute processor-intensive tasks over time.

Cross-platform

Sun Solaris

HP-UX

Compaq® UNIX

Windows NT

Easy integration with external systems

Credit card clearinghouses

Tax libraries

Lockbox banks

Network usage recorders

General ledger systems

Billing mediation platforms

Additional third-party packages via APIs

Arbor/BP Billing Modules

Module	Task	Area
Communications Usage Processor Usage Router Usage Guider and Rater	Handles file transfers between Arbor/BP and external systems Translates Usage files into standard formats Identifies appropriate customer server for each usage record Identifies owning account and usage charge for each usage event	Usage Processing
Bill Preparer Bill Formatter Invoice Dispatcher	Calculates billable items and creates unformatted bill records Formats Bill Records Dispatches formatted invoices to output media	Invoice Processing
Journals Collections Lockbox Payments EFT Payments Credit Card Payments	Aggregates revenue for output to general ledger systems Manages the collections status of customer accounts Interacts with bank lockboxes for remittance processing Interacts with clearinghouses to manage electronic funds transfer Interacts with clearinghouses to manage credit card payments	Financials
Archiver Archive Restorer Utilities	Copies data from database tables and UNIX files to tape or archive areas for removal Restores archived data back into the Arbor/BP database General-purpose module for executing user-written programs	Administration

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Full configuration management

Biannual product releases

Support for migration and conversion

Designs integrate Arbor/BP and related technologies

RDBMS

Data replication tools

Hardware configuration (RAM disks, server machines, etc.)

Testing

Unit testing after every development stage

System testing by independent test team

Post-installation integration testing

Live test version of each deployment maintained

Production support

Consultants assigned to clients

24 x 7 Capability

International scope

Training

Comprehensive, hands-on training

On-site or in Kenan Systems training centers

On-site consultant visits**SUPPORT SERVICES**

Kenan Systems clients benefit from a proven implementation methodology that is the result of many years of experience deploying complex information systems. The Kenan Systems project management approach is designed to:

- Foster client involvement in all critical project phases.
- Provide a mechanism for response to client input.
- Allow each deployment to leverage all available features of the Arbor/BP solution.
- Effectively manage software releases within each client's deployment.

A small project team is formed for each Arbor/BP product deployment. This team works closely with the client organization and includes developers as well as experts in documentation, training, testing, and support. Typically the team stays with the project throughout its entire life cycle, including the following stages.

- **Requirements:** The project team works with the client to identify the business requirements that will determine the underlying structure for the deployment.
- **Design:** The project team develops a system design to meet the client's business requirements.
- **Development:** New capabilities and features are added to Arbor/BP, if necessary. Full unit tests are conducted at the conclusion of this stage.
- **Release:** A state-of-the-art release management system is used to produce custom deployments and maintenance releases. Full system integration and acceptance testing ensure that Arbor/BP conforms to requirements.
- **Maintenance:** The maintenance phase is designed to assist the client in the ongoing operations of the application via production support and product upgrades.

Because the Arbor/BP solution incorporates attributes of both an off-the-shelf product and a tightly managed custom development effort, Kenan Systems' deployment strategy accommodates the installation of the core Arbor/BP product and the customizations needed to conform the billing system to customer requirements. Since the core product incorporates seven years of development, there is a high likelihood that a service provider's business requirements can be met without costly custom development. Because new functions from ongoing development become part of the core product, all customers can benefit from product enhancements. Typical deployment times range from 3 to 10 months.

Production Support

Using a worldwide consultant model approach, Kenan Systems provides high quality hotline support services to Arbor/BP clients. Dedicated production support personnel are assigned to each deployment to work with clients and project consultants to resolve system related issues. Kenan Systems also offers optional 24 x 7 hotline support. On-site support engineers are available to address specific client needs.

System Documentation

The standard Arbor/BP software documentation set supplied to the client includes over 3,000 pages of technical, end-user, programmer, and database documentation. In addition, software documentation updates are provided as needed for project releases. Arbor/BP documentation is available in electronic format for online reference.

Training

Educating Partner Program members to be more self-sufficient is the best way to ensure mutual success. Kenan Systems' Educational Services Group (ESG) offers an expanding series of open enrollment courses on Kenan Systems' products at Kenan Systems' training facilities and offices around the world. ESG provides training to address a variety of business needs. Our training program for Partner Program members combines product and business courses to help members of our Partner Program effectively engage with Kenan Systems and mutual clients.

- **Arbor/BP Fundamentals (5 days)**
Hands-on instruction on Arbor/BP system components, process flows, and data model.
- **Arbor/BP Overview (2 days)**
Introduction and overview of Arbor/BP.
- **Arbor/BP Customer Care Trainer's Workshop (3 days)**
Trains customer service representatives (CSRs) and supervisors on the Arbor/BP Customer Care interface, which is used to perform customer service tasks.
- **Arbor/BP Usage Processing (3 days)**
Teaches the student to configure, run, and troubleshoot the movement of usage from raw format through the system.
- **Arbor/BP Background Processing (2 days)**
Covers table configuration, system parameters, and troubleshooting involved with the background processes of Arbor/BP.
- **Arbor/BP Products and Promotions (4 days)**
Teaches the student to configure the software to support a variety of typical communications industry billing plans.

ARBOR/BP SOFTWARE DOCUMENTATION

Product release bulletin

Overview of core release changes

User guide

CSR procedures

CSR supervisor functions

Financial reporting

iCARE developer's kit

Installation, setup, and modification of iCARE

API guide

API functions and objects

Graphical user interface reference

GUI screens and fields printed and online

Billing operations guide

Operation and maintenance of all billing processes

Guide to products, rates & discounts

Configuration of products, product packages, rate plans, and contracts

Reports

Describes all reports

Creating custom reports

System administrator guide

Installation and configuration

System and database maintenance

Technical reference

Detail process flow for each module

External interfaces

Software documentation updates as needed

Third-party software documents

Configuration Guide

Database Reference

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- **Arbor/BP Administration (3 days)**
Teaches the student to perform Arbor/BP administration tasks.
- **Arbor/BP APIs (2 days)**
Introduces students in a hands-on format to the Application Programming Interfaces — a set of C language routines for programmed interaction with Arbor/BP.
- **Arbor/BP Release Updates (1 day)**
These high level presentations address the enhancements made in the latest incremental release of the software.
- **Arbor/OM (2 days)**
Introduction to Arbor/OM (Order Management) functionality, building on the participant's Arbor/BP knowledge and relating it to workflow and order management.
- **Sales and Marketing Training (1 day)**
Provides a general understanding of Kenan Systems, our Partner Program and strategy, sales and marketing model, product suite, vertical strategy and project philosophy, as well as how to engage successfully in sales and implementation.
- **How to Give an Arbor Demo (1 day)**
Helps prepare Partner Program members to deliver an effective Arbor/BP and Arbor/OM demonstration.
- **How to Build a Demo Database (2 days)**
Discusses the strategy for designing a good demo database, keys to maintaining the database, pitfalls learned along the way, and other hints to ensure that the efforts to create demo databases are successful.

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