



Application Guide

e-Billing Manager Consumer Edition Foundation Application

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1

1 Overview

1.1 edocs Customer Self-Service

edocs is the world's leading provider of customer self-service and e-billing software and services. Its solutions help service providers increase customer loyalty while reducing the overall cost to serve their customers. Service providers use the software to move customer service interactions from expensive paper and call center-based channels to lower-cost and more responsive self-service and assisted care channels like the web, e-mail and IVR.

edocs software has been deployed in some of the most challenging business and technical environments in the world and has proven to be the industry's most scalable and reliable solution. The applications have been continuously developed and refined to deliver the most comprehensive functionality available. As a result, edocs customers consistently gain the highest adoption and ROI in the communications industry – typically 5-10 times higher than companies using in-house or competing packaged solutions.

Self-Service for Consumers and Businesses

Many billing and customer care processes today are expensive, inefficient and unsatisfactory for both communication service providers (CSPs) and their customers. With edocs' customer self-service and e-billing solutions, carriers empower their business and consumer customers to serve themselves and address all of their account and service-related activities online, instead of going through a call center, account rep, or retail outlet. For end customers, this makes doing business with a service provider more convenient, more efficient, and more satisfying. For service providers, it means improved competitive differentiation, significantly reduced customer care costs, increased customer loyalty and streamlined billing/payment processing.

Contact centers provide the key to unlocking the potential business benefits of customer self-service. Contact center statistics show that 60-80 percent of customer service issues relate to a customer's account. For this reason, edocs customer self-service solutions provide direct access to detailed account information, and interface with complementary front-and back-office systems to provide access to a variety of account-related services.

1.2 edocs e-Billing Manager

edocs e-Billing Manager enables organizations to deliver interactive access to electronic bills for both consumers and businesses with online payment. With edocs e-billing platform, organizations can cost-efficiently present various bills online and provide users with multiple online payment options.

Designed to integrate with existing online applications and diverse core legacy systems, edocs e-Billing Manager extends the convenience of online self-service to an organization's entire customer base, as well as to its call centers. Online account e-bills with payment enables key features such as drill-down to more detail, "paper turn-off" and access to advanced self-service capabilities, offering an online experience that provides superior service and value to customers, while decreasing the cost of servicing those customers.

- Multi-Bill Quick Navigation
- Account Aggregation
- Online Payment Wallet and Payment History
- Archiving via a "Virtual file cabinet with years worth of statements"
- Customer and Company Profile Management
- Notifications and Alerts
- Paper Turn-Off Support
- Targeted Marketing Promotions
- Print and Download Functionality

edocs platform powers self-service solutions for leading organizations worldwide. The unmatched scalability and performance (1) of edocs platform enables organizations to serve millions of end-customers with real-time access to years of statement data.

e-Billing Benefits

Improve Service Levels

- Allow customers to opt in for secure online e-bill delivery, providing valuable and convenient 24x7 access to e-bills for customers and service representatives.

Accelerate Cash Receipt

- Online payment accelerates cash receipt and reduces float from Days Sales Outstanding (DSO)

Generate Revenue

- Promote targeted offers within e-bills to increase product or service cross-sell.

Reduce Service, Print and Mail Costs

- Handle customer requests for billing reprints and account information online, replacing costly phone calls.
- e-Billing reduces paper bill production and mailing costs by saving \$924,000 annually per 100,000 customers enrolled.
- Online customers make 30% fewer calls to call centers.

edocs solution has demonstrated an over 20% paperless enrollment rate among its deployments.

Key Features of e-Billing Manager

edocs e-Billing Manager is designed to serve the diverse needs of the entire organization's business segments and constituents. Key features of edocs e-Billing Manager include:

Interactive Statement Presentment - e-Bills can be presented in both a dynamic fashion, using HTML, and in a print-friendly format using PDF. When presented in HTML, e-bills provide an interactive Web experience with search, sorting, filtering, drill-down and download capabilities. Furthermore, dynamic HTML presentment allows embedded links so customers can click-through and drill-down to more detailed information and self-service functions.

Combined Accounts Statement - edocs e-Billing Manager creates a single consolidated view of all of a customer's accounts by aggregating account information from multiple disparate legacy systems. Using the application's self-service features, accounts can be linked by customers themselves, or automatically, by the biller in the background.

Online Payments - e-Billing provides personal wallets for managing multiple payment vehicles (for example credit cards or checking accounts). Users or permitted customer service representatives (CSRs) may make one-time payments, establish scheduled recurring payments, view payment history, set thresholds and payment alerts.

Paperless Account Option (Print-Friendly Statements) - Customers have the ability to turn off paper via a managed consent model with both print-friendly PDF or HTML presentment alternatives online. edocs solution complies with regulatory requirements for paperless delivery and has demonstrated an over 20% paperless enrollment rate among its deployments.

Multi-Year Statement History and Online Archive - A disk-efficient, high performance statement archiving system gives organizations the flexibility to store years of historical account statements and account-related communications without degrading performance or increasing storage costs.

Notifications and Alerts - E-mails and messaging alerts notify customers about account changes, payment events and updates. "Statement ready" notifications draw customers to the security of the online site and encourage ongoing use. In addition, customers can configure and manage personalized alerts such as when a checking balance is below certain level, a change was made to the account profile or that a Secure Message response to an inquiry is available for review. Customers can also designate their preferred notification channels including e-mail, PDA and mobile phone.

Contextual Self-Service and Customer Care - While customer self-service is often available via an organization's website, integrating it into e-bills and making it contextual makes it easier for customers to find relevant information and act immediately. It also creates an opportunity for the organization to promote self-service operations that may otherwise be unknown or difficult to find on a site. Examples of self-service include changing an address, turning off paper, or initiating a dispute or an account inquiry.

Downloads - edocs e-Billing Manager supports a variety of download formats that allow customers to conveniently manage their account information off line using personal financial management (e.g. Quicken, MS Money) or Microsoft Office (e.g. Excel, Access) applications. To meet most customers' needs, edocs supports ODF, QIF, CSV, XML, EDI and PDF download options.

Branch, Agency and Kiosk Access - Branch employees are granted access privileges to view and reprint customer's e-bills through a standard web browser, expediting customer service requests. In addition, branch self-service kiosks can facilitate customer in-branch service needs.

CSR Call Center Access - edocs e-Billing Manager provides customer service representatives (CSRs) with customer impersonation rights to access customer e-bills from a standard web browser. CSRs can easily facilitate both online and off line customer service requests since they can view the same statements that customers are inquiring about. edocs customer service dashboard can incorporate additional operational data such as service/payment history and personalized marketing offers into CSRs' views to give them a more comprehensive view of the organization's relationships with customers.

Targeted Promotions and Messaging - Customized product offers or personalized service messages can be presented to customers within e-bills based on individual customer-specific account information. This creates additional revenue generation opportunities and improves marketing efficiency by reducing direct mail and telemarketing costs. Furthermore, since offers are so highly targeted, customers are more likely to respond to them.

e-Billing Manager Features Overview

e-Billing Manager is the leading electronic bill presentment and payment (EBPP) solution for communications service providers. e-Billing Manager provides the mission-critical application platform required for securely managing customer account information such as bills, statements, and other data. With e-Billing Manager, carriers can provide business and consumer customers with highly personalized online account information and self-service capabilities that can be served across multiple channels (Web, PDF, hand-held devices and e-mail). It serves as the foundation for managing recurring customer relationships.

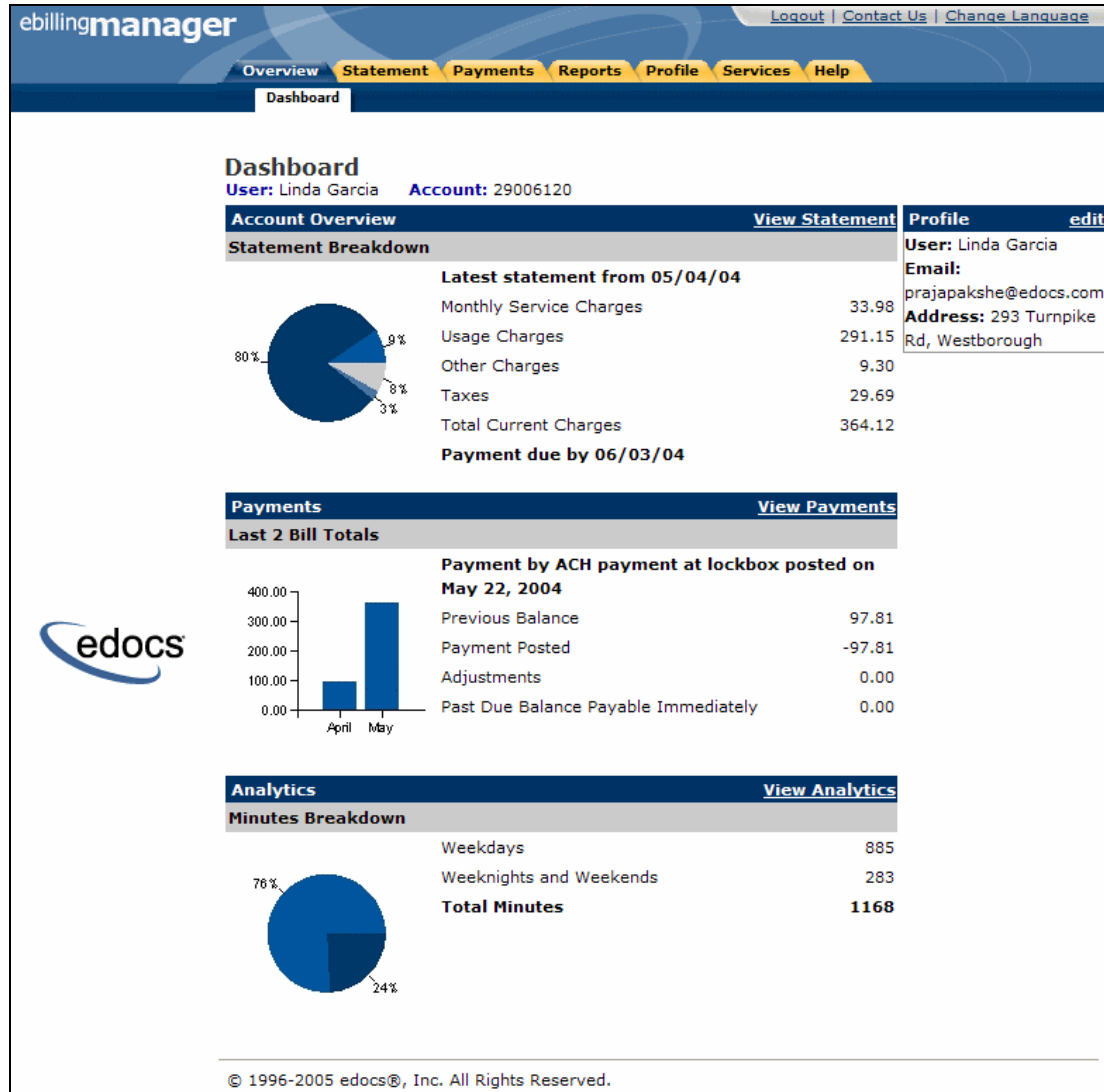
e-Billing Manager is specifically designed for organizations with large numbers of customers, high data volumes and extensive integration with systems and business processes across the enterprise. With its sophisticated data access layer, platform services and data stores, e-Billing Manager is uniquely capable of powering the most complex EBPP and Customer Self-Service solutions.

Realizing that consumer and business customers have very different service needs, e-Billing Manager is available in a consumer edition and business edition with specific features and functionality designed for each user base.

The core capabilities of the e-Billing Manager application editions are detailed below.

e-Billing Manager Consumer Edition

e-Billing Manager Consumer Edition dashboard



e-Billing Manager Consumer Edition is focused on the self-service needs of a large consumer base. The core features of the application are described below.

Customer Account Dashboard

Bills or statement data is dynamically presented within the application dashboard. Once properly authenticated, users can easily and conveniently navigate and view their billing statements, account summaries and bill details.

Electronic Bill Presentment and Consolidation

Consumer customers can access their bills or invoices online, including historical bills stored for as many years as the service provider prefers. Each monthly bill, for a single service or consolidated for multiple services, is presented in dynamic fashion using HTML and can include up-to-date account information such as current balance, bill details, unbilled-usage, last payment received, last payment date, etc. Customers can sort table columns, filter and drill-down into the call detail to further validate charges.

Electronic Bill Payment and Posting

Customers have the complete flexibility to control how and when payments are made. Payment is set up via bank and/or other credit accounts within e-Billing Manager to execute instant payments or to schedule future automatic payments. Customers have the ability to view the status and record of previously made payments. e-Billing Manager also provides an accounts-receivable settlement file for the service provider with the following information: payment amount, payment date, statement number, account number, payment account, payment type (one-time/recurring) and return status (yes or no with corresponding negative amount). Users can change their payment options and user preferences within the application. They can also establish multiple payment methods and payment notification preferences, make one-time payments, automate recurring payments, and set payment thresholds and reminders.

User Profile Management and Notifications

User information and settings are presented and modified within the application. Users may update their profile information, correct personal data, and manage password or notification options, email addresses, and other personal preferences.

Customer profiles may be updated on a real-time basis at anytime while the customer is properly authenticated. Profile information such as the customer's preference for account notifications can be set. e-Billing Manager manages and sends e-mail messages concerning individual accounts or transaction events. A variety of conditions or circumstances can trigger email notifications. Service providers may wish to enable some common notifications:

- Current statement available
- Payment reminders
- Payment confirmations
- Payment rejections
- Payment overdue
- Threshold exceeded on recurring payments

- Credit card expiration pending

Users may establish multiple notification or alert options and modify their settings at any time.

Unbilled Data Presentment

Unbilled account charges can be viewed online prior to bill cycle closing within the application. Users can view their charges as well as analyze to-date spending for the current billing period.

B2C Reporting

Specific reports come with the application whereby users may view summaries, analyze charts, and access their complete statement history using built-in reporting features. Furthermore, users may also drill-down through account information, bill or statement data within the application. Specifically, they can page through bill details, sort across pages, sub-total and filter account information viewing dynamic reports.

Print Friendly Views, PDFs and Downloads

Users may access print friendly views, request a dynamic PDF of their statement, or select to download a dataset. These features are all available for key application views. e-Billing Manager's versioned, disk-efficient and high performance bill archiving feature along with its print-friendly views makes generating hard-copy reprints simple and efficient.

Customer Service Representative (CSR) Views

e-Billing Manager also provides a lightweight solution for customer service management. CSRs can also "impersonate" the user to facilitating the efficient servicing of online accounts. For example, representatives may have roles that provide application access to execute payments, reset passwords or simply search accounts to view the customer statement. The application may also be extended for complete case management with edocs CSR Manager Application, providing additional case creation, routing and tracking, status views of cases, escalation workflows and queuing. Cases can either be completely automated without agent intervention based on predetermined business rules, or routed appropriately to engage an agent for resolution.

e-Billing Manager Business Edition

e-Billing Manager Business Edition Dashboard

The dashboard interface includes the following components:

- Navigation Menu:** Overview, Admin, Statement, Payments, Analytics, Services, Profile, Help.
- Dashboard Header:** User: John Smith, Company: edocs.
- Account Overview:** Search filters for Account Number and Statement Date, with a DISPLAY button.
- Available Business Structures:** A tree view showing departments:
 - Marketing Departments
 - NY Office (2 Users Assigned)
 - 508 452 1001: \$17.91
 - 508 452 1002: \$55.20
 - 508 452 1003: \$104.33
 - 508 452 1004: \$126.26
 - LA Office
 - UK Office
 - Sales Department
 - Support Department
 - Engineering Department

- Analytics:** Call Breakdown pie chart and Top Five Handsets by Cost table.

Handset	Cost
07776 120 120	\$2,340.00
07776 456 456	\$1,090.00
07776 238 238	\$400.00
07776 987 987	\$290.00
07776 838 838	\$200.00

e-Billing Manager Business Edition is focused on the self-service needs of an enterprise customer base. The core features of the application are described below.

Corporate Account Dashboard

Account information, bills or statement data is dynamically presented within the application by the business billing structure. Once properly authenticated, managers, administrators and users may view consolidated account summaries, sub-accounts, individual statements or all bill details based on their access permissions for the billing structure.

Hierarchical Billing and Business Structures

Billing structures are presented within the application as account hierarchies. Managers or administrators may search, view and update their billing structure by assigning other attributes to hierarchy nodes, such as meaningful names. Users are assigned within the billing structure, defining navigation within the account and sub-accounts of billing data. Administrator assignment in the billing structure may provide access to the entire enterprise or limit a single user to viewing their individual statement only. By creating separate business structures within the application, users may maintain multiple hierarchies of their own. Billing structures and user created business structures offer different views of account information for segmentation, payment, analysis and reporting.

Electronic Bill Presentment and Consolidation

Business customers can access their bills or invoices online including historical bills stored for as many years as the service provider prefers. Each billing period, for a single service or consolidated for multiple services, is presented in dynamic fashion using HTML and can include up-to-date account information such as current balance, bill details, last payment received, last payment date, etc. Furthermore, accounts can be consolidated across disparate system using either full data consolidation via an external data store or summary consolidation by dynamically linking the accounts. Customers can sort table columns, filter and drill-down into the call detail to further validate charges.

Cross Invoice/Sub-Invoice Payment

Payment options and enterprise preferences can be presented and modified within e-Billing Manager. Administrators may establish multiple payment methods and payment notification preferences, make one-time payments, schedule automated recurring payments, and set payment thresholds and reminders. Administrators may also make a single payment across multiple invoices, defining the payment allocation, even allocating payment to sub-invoice charges. Administrators have the complete flexibility to control how and when payments are made. Payment is set-up via bank and/or other credit accounts within e-Billing Manager to execute instant payments or to schedule future automatic payments. Administrators also have the ability to view the status and record of previously made payments. e-Billing Manager integration provides an accounts receivable settlement file to the service provider with the following information: payment amount, payment date, statement number, account number, payment account, payment type (one-time/recurring) and return status (yes or no with corresponding negative amount).

User Roles and Permissions

User roles and permissions can also be presented and modified within the application. Administrators may update user role or access, establishing view only permissions, accounts receivable roles, managerial access, etc. This feature may be configured based on the provider business requirements or back-office integration needs.

Corporate and User Profile Management and Notifications

Corporate profiles are managed by designated administrators, whereas users may update their own profile information, correct personal data, and manage password or notification options, email addresses, and other personal preferences.

Corporate and user profiles may be updated on a real-time basis at anytime while properly authenticated. Profile information such as the corporate contact preferences for account notifications can be set. e-Billing Manager manages and sends e-mail messages concerning accounts or transaction events. Notifications may be aggregated for account and sub-accounts events and limited to administrator or managerial roles. A variety of conditions or circumstances can trigger email notifications, so service providers may wish to enable some common notifications:

- Current corporate statements are available
- Payment reminders
- Payment confirmations
- Payment rejections
- Payment overdue
- Threshold exceeded on recurring payments
- Credit card expiration pending

Corporate administrators and users may establish multiple notification or alert options and modify their settings at any time.

Unbilled Data Presentment

With e-Billing Manager, managers, administrators and users may view unbilled account charges prior to bill cycle closing. All users may view their charges and analyze to-date spending for the current billing period. This feature may be configured based on the provider business requirements or back-office integration needs.

Advanced Reporting

Specific reports come with the application whereby users may view summaries, analyze charts, and access their complete statement history using built-in reporting features. Additional business reports are also provided whereby administrators may view a set library of summarized cost reports and charts. These “roll-up” reports provide for broad analysis of account activity for corporate managers. Furthermore, managers, administrators and users may drill-down through account information, bill or statement data within the application interface. Users can page through bill details, sort across pages, sub-total and filter account information viewing dynamic reports. More complex reporting can be performed with edocs Analytics Manager including extensive call, cost, cost-center, and variance reporting.

Print Friendly, PDFs and Downloads

Users may access print friendly views, request a dynamic PDF of their invoice, or select to download a dataset. Managers and administrators have greater access to account summary PDFs and datasets for the accounts they supervise. e-Billing Manager's versioned, disk-efficient and high performance bill archiving feature along with its print-friendly views makes generating hardcopy reprints quick and easy.

Customer Service

CSRs may create corporate administrators for an organization, thereby enrolling a corporate account and establishing designated internal administrators. Service representatives and corporate administrators may create, manage and search the business organizations and accounts under their supervision. The designated administrators accessing corporate billing statements use e-Billing Manager's on-line self-service application features to manage their own organization and users.

1.3 Key Benefits of e-Billing Manager

Solving Business Problems

Many billing and customer care processes today are expensive, inefficient and unsatisfactory for both communication service providers and their customers. With edocs e-Billing Manager, carriers empower their business and consumer customers to serve themselves, and address all their account and service-related activities online, instead of using expensive paper and call center based channels. For end customers, this makes doing business with a carrier more convenient, more efficient, and more satisfying. For carriers, it means improved competitive differentiation, significantly reduced customer care costs, increased customer loyalty, and streamlined billing/payment processing.

By combining comprehensive online account management functionality with the world's most scalable and reliable e-billing platform, e-Billing Manager enables service providers to gain outstanding adoption and ROI typically 5-10 times higher than companies using in-house, customer or competing packaged solutions. Some of the primary benefits e-Billing Manager enables include:

Business Benefits

Call Center Deflection

By enabling customers to serve themselves online, e-Billing Manager moves expensive call center interactions (globally these costs translate to \$5-\$10 USD per consumer interaction; \$10-\$30 USD per business customer interaction) to the web site where costs run at less than \$1 USD per interaction.

Reduced Paper, Printing and Postage Costs

In countries where paper turn-off is a legal option, providers are saving enormous printing, post-age, reprint and logistical costs. Even when rules do apply, to guarantee postage revenues, paper may be reduced for reprints services and logistical savings realized.

Streamlined Payment Processing

Online payments are proven to reduce payment time as well as errors associated with them. In addition, it is less expensive for the carrier to process an electronic payment when compared to all the manual handling required to process a paper-based payment. Online payment eliminates lockbox fees, minimizes exception processing, and replaces the costly and time-consuming procedure of processing paper checks.

Case Example	
Total customer base	19,700,000
× Online adoption	12%
× Not paying	30%
× Savings per payment	\$0.14
× Payments per year	<u>12</u>
= Annual Savings	\$1,191,456

Some recent metrics:

- Adoption: 5%-60%
- Percentage paying: 30%-85%
- Savings per transaction: \$0.11 -\$1.08 USD

Given these numbers, an attractive ROI can be rapidly achieved.

Improved Days Sales Outstanding (DSO)

By making statements easier to access and read, and speeding approval cycles, e-Billing Manager reduces the time it takes for customers to pay their bills. This improves cash and reduces DSO.

Increased Customer Satisfaction (Reduce Churn)

By providing the option for 24/7/365 online service, carriers make it more convenient and more satisfying for their customers. Although somewhat more difficult to measure, increased customer satisfaction may ultimately be the most critical differentiator. This is particularly true in the B2B world of electronic invoice presentment and payment (EIPP). As evidenced by an independent AMR Research report, “The ROI exercise that generally launches EIPP projects cites process automation and cash flow as key benefits, but the biggest appeal of electronic billing, as it is used today, is its account management and customer support functionality. In reference to calls we conducted, edocs users remarked that the main benefit of implementing EIPP is the dramatic improvement in customer service they can provide. In some cases, where the supplier took the extra step of helping customers incorporate EIPP into A/P workflows, satisfaction went through the roof. Reduction in DSO and paper-based billing costs – the quantifiable benefits of EIPP – paled as suppliers basked in the warm glow of happy customers.” In today’s economy of high customer acquisition costs, providing a robust online account management and electronic payment experience is critical to doing business and keeping your existing customers satisfied.

Application Benefits

e-Billing Manager is a packaged enterprise software application with support, training, and regularly scheduled product enhancements and upgrades. Standard deployments are predictable and deliver “quick wins” for the service provider.

Modularity

e-Billing Manager may be deployed and additional e-Billing Manager Suite applications added to the deployment, all using the complementary edocs platform services.

Open Standards Based

e-Billing Manager is built on a Java 2 Enterprise Edition (J2EE™) architecture making it highly scalable and flexible. Based on leading Java standards like Enterprise Java Beans™ (EJB™), Java Server Pages™ (JSP™), and Java Servlet application programming interfaces (APIs), users of e-Billing Manager can leverage all the sophisticated application management tools, enterprise-class performance, scalability, portability, and easy extensibility this environment provides. The edocs applications presentation layer use struts and tiles standards and may be easily “re-skinned” for branding, internationalization, or customized look and feel.

Proven Scalability

e-Billing Manager has a linearly scalable architecture that supports millions of complex accounts and thousands of concurrent users. Its flexible data access layer provides for truly massive scalability in a way no competing architecture can claim. In fact, data volumes do not impact the real-time performance of the core edocs solution at all. This means organizations can retrieve, process, and archive tens of millions of accounts, but only need to scale the application server tier to handle the growing user adoption. These services scale linearly, meaning the platform can easily be extended to accommodate growth in volumes, users, or additional application services. Independent scalability reports from Sun Microsystems and IBM that demonstrate this power can be provided upon request.

Ease of Deployment

The off line authoring components of the e-Billing Manager Suite visual development environment provide menus and wizards that dramatically reduce the time required to configure and deploy e-Billing Manager. Simulation capability is built-in allowing developers to test designs prior to deploying an application. Early testing lowers risks and costly late changes. Through the intuitive, easy-to-use graphical development environment, users can analyze the data sources, define the essential data, map the account data to presentation templates, and define business rules for one-to-one marketing and customer service messaging. Designers can create any aspect of account presentation for the Web, wireless, or other delivery devices.

Unmatched Data Access Flexibility

edocs provides a flexible Business Services Layer (BSL) that can leverage a wide variety of data sources for account information/Tariff analysis. Extensible APIs provide a full suite of integration services for robust comprehensive functionality. Simply stated, e-Billing Manager transforms account data for Internet consumption. But e-Billing Manager is not a simple data translation application: it re-purposes available account data, dynamically retrieving only the information required for the new presentation media.

Simple Integration

e-Billing Manager preserves investment in and extends capabilities of existing infrastructure through enterprise wide integration. The edocs design environment allows designers to develop and integrate custom features with existing system processes into the Customer Self-Service solution. Integration of custom functionality or external legacy systems can be accomplished quickly and easily using standard tools and technologies. edocs eXtensible Modular Architecture (XMA) and Platform Service's APIs are Java-based with XML-interfaces detailed in the e-Billing Manager Software Developer's Kit (SDK). Integration is straightforward for linking existing enrollment and authentication systems, payment processing, order management processes, accounts receivable systems, customer service and CRM systems, middleware infrastructure, and third-party operational tools.

Operational Oversight

The Command Center console provides a single production management browser application for the e-Billing Manager Suite including scheduling of services, statement and account application configuration, customer statement notification configuration, auditing and event logging with general system administration and reporting.

Proven Performance

e-Billing Manager delivers superior performance without regard to data volumes or user loads.

Multiple Communication Channels

e-Billing Manager supports a multi-channel deployment paradigm for data delivery via, HTML, XML, IVR, PDF, Email, and devices.

Personalization

Any e-Billing Manager application view (or the entire template itself) can be replaced or modified based on business logic. By leveraging the account information contained in the data stream, e-Billing Manager can present highly personalized and dynamic views of a customer's account. Designers define logical expressions based on actual account data that will modify the presentation to the customer. This means that all account data can be used as variables in the dynamic of the rendered account view. The mapping of data elements to logical expressions is encapsulated in an XML file used at run-time.

Architecture Benefits

Reduced Storage Requirements

Competing approaches generally only offer transforming and storing statement data as XML or as normalized rows and columns in a database. The XML tags, which need to be stored as part of the data file, can increase file sizes by 30-40% in most cases. edocs solution may store data in native file formats, and convert it to delivery formats (including XML) only on-demand. This dramatically reduces storage requirements. Data compression may also be optionally provided to further reduce storage by a ratio of greater than 3:1.

A Tunable Application

Billing information is the corner stone of any Customer Self Service solution, it is the data held within the bill that affects the bottom line of a customer's business or a consumer's likelihood to delay payment or switch providers. e-Billing Manager manages arriving bill data, processes it for storage, and archives the statement files into an extensible statement repository. A data store of account tables are also maintained in a relational database along with user management information and logging and tracking information. This data store may be "dialed down" using a lightweight metadata index to dynamically access statements, or "dialed up" creating a content repository of billing data. e-Billing Manager offers this option of loading bill detail or account summary information into a content repository for sophisticated customer reporting and analysis. The e-Billing Manager application and platform is therefore "tunable," providing a flexible approach to managing account-based communications for multi-channel delivery.

Reduced Database Licensing Requirements

edocs data store generally comprises only 3% of the size of the raw statement data. Competing architectures, on the other hand, require a massive database deployment as the full content of each statement is stored as database rows. Database licensing implications can therefore add a significant cost load to competing solutions.

Enhanced Performance and Memory Management

edocs utilizes dynamic data extraction and transformation for presentation of statement data. In addition, individual statements are decomposed into "views" such as summary, detail, sub-accounts, etc. Only the view being requested by the user is extracted and transformed. By carefully tuning view size, the developer retains complete control over the application's real time performance profile.

Improved Reliability and Data Quality

Competing architectures require batch data transformation to convert data formats. Any time data transformation occurs, there is a risk of user or system error where data will be "left on the cutting room floor," improperly truncated, or generally mis-mapped. Since transformation occurs in large-scale batch jobs, error recovery is very expensive. In the case of error, all of the errant data needs to be identified and purged from the database, the source data needs to be recreated, transformation rules corrected, and the batch jobs rerun. If the batch cycle is long, the correction may be impossible if several days have passed before the error was detected. edocs utilizes "dynamic data transformation" whereby data is transformed on the fly by dynamically applying extraction and presentation rules. As such, if an error should occur, the rules can be fixed and re-published on the fly without having to rerun the batch process or drop data.

Reduced Batch Cycle

edocs batch cycle consists of scanning and indexing arriving batch files. Depending on the file format, the batch process typically runs at 7.5 GB of source data per hour. The process may even be configured to run parallel across server clusters for greater throughput. Competing architectures are simply not able to achieve this load time, leading to consumption of additional system resources and higher stakes for error recovery.

Robust Version Management

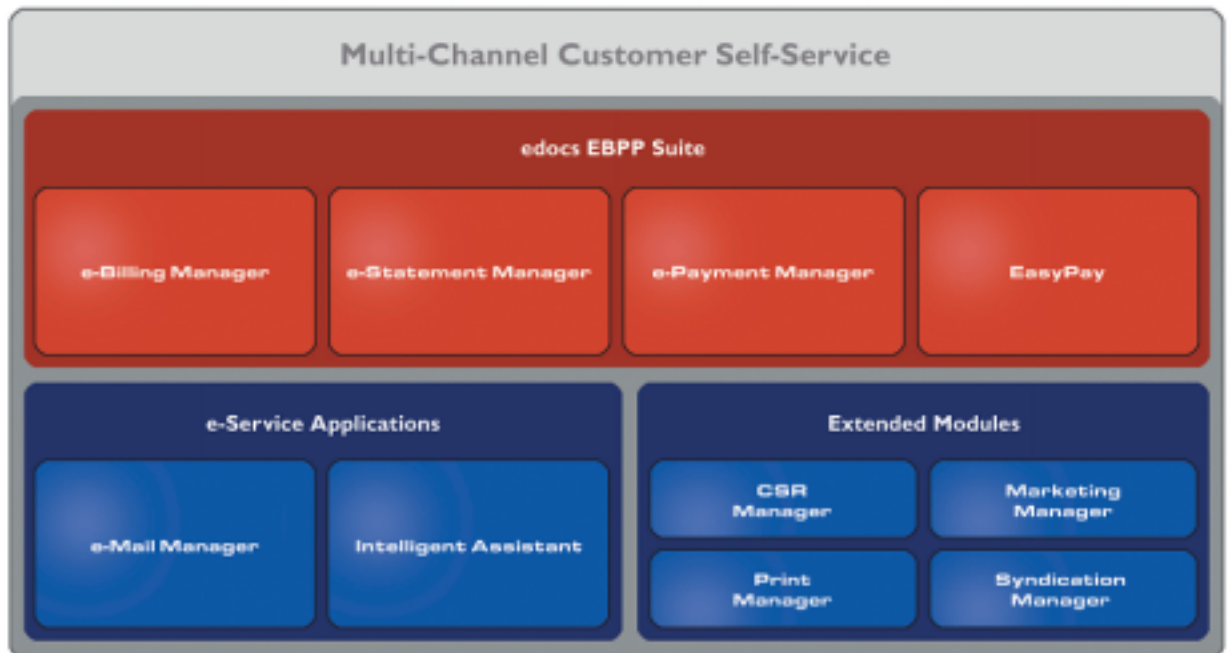
edocs realizes the frequency with which businesses change: new products are introduced, statements are redesigned, and old products are discontinued. As such, edocs makes extensive use of a template-based architecture and provides robust capabilities for versioning templates. Essentially, rules for transforming and presenting data are versioned by date and stored with the source files they correspond to. As such, if a new service offering or bill format is introduced, a developer need only publish new templates which accommodate the changes and need not worry about affecting historical statements. Competing approaches to changing fixed relational database schemas are far more complicated to manage. These advantages translate in to a lower total cost of ownership, which offers returns every day that the system is in production.

1.4 The EPP Suite

edocs Electronic Presentment and Payment (EPP) Suite is a set of modular applications that include every capability organizations need to enable a complete online account management experience. The suite is comprised of four packaged applications:

- e-Billing Manager
- e-Payment Manager
- e-Statement Manager
- EasyPay

The suite combines the industry's most comprehensive e-billing, e-invoicing and e-payment functionality with edocs extensive industry experience. These out-of-the-box applications have been deployed in some of the most challenging business and technical environments worldwide and are proven to be the industry's most scalable and reliable. As a result, edocs customers consistently gain the highest customer adoption and ROI in their industries -- often five, ten, even twenty times higher than companies using in-house, custom or competing packaged solutions.



e-Billing Manager

edocs e-Billing Manager gives consumer and business customers' valuable and convenient online access to their bills or invoices, along with the ability to easily make online payments. Bills and invoices encapsulate all of the activity and charges associated with the exchange of goods or services between a customer and an organization and as such, are at the foundation of the relationship.

- HTML Presentment
- Drill-down
- Consolidated View
- Bill/Invoice Archiving
- Paper Turn-off Support
- Printer-friendly Views
- Reporting
- Targeted Messaging
- Proactive Advanced e-Care
- Notifications
- Profile Management
- Electronic Payments
- Payment Scheduling
- Payment Status and History

- Accounts Receivable Reconciliation

e-Statement Manager

edocs e-Statement Manager enables organizations to deliver interactive and personalized electronic account statements to both business and consumer customers. The application provides a more cost-efficient way to present current and archived statements online. Organizations, especially financial institutions and healthcare insurance carriers, are deploying e-statements as part of a comprehensive online customer care strategy.

Realizing that not all customers require paper statements and that many prefer to access their account information online in a more convenient and valuable way, organizations are switching to the online model and are reaping the benefits.

- HTML and PDF Presentment
- Statement Consolidation
- Drill-down
- Statement Archiving
- Printer-friendly Views
- Paper Turn-off Support
- Reporting
- Targeted Messaging
- Proactive Advanced e-Care
- Notifications
- Profile Management

e-Payment Manager

edocs e-Payment Manager is a complete solution for electronic payments executed by customers enrolled in e-billing and e-invoicing. It plugs into existing applications and systems, preserving investments in, and extending the capabilities of existing infrastructure. With edocs e-Payment Manager, organizations decrease payment-processing costs, accelerate receivables, and improve operational efficiency in the areas of billing and collections, customer service and treasury management.

EasyPay

edocs EasyPay is a convenience payment solution that enables organizations to integrate web, response (IVR) and contact center payment channels to accept one-time, often last minute, using a wide range of payment instruments, eliminating the existence of multiple technology “silos” that are often used to collect payments from customers.

- Web, CSR, and IVR-based Payment
- Payment Scheduling

- Summary View
- Drill-down
- Error and Fraud-Prevention
- Multi-lingual Interfaces
- Reporting and Auditing
- Organizational Branding
- Hosted and In-house Deployment Models

e-Service Applications

Whether customers are visiting an organization's web site, communicating by email, or seeking to chat real-time with a CSR, edocs e-Service Applications ensure the ability to deliver knowledgeable and exceptional customer service. Driven by sophisticated intelligence engines and automation technologies, these solutions replicate the knowledge of an organization's most experienced personnel, providing timely, accurate responses to customer inquiries.

e-Mail Manager is an automated e-mail response management system that determines the intent of the incoming e-mail messages and composes personalized answers that can be automatically dispatched to customers or routed to service agents for a single-click review.

Intelligent Assistant is an advanced natural language-based self-service application that empowers customers, prospects and customer service representatives (CSRs) to leverage all of an organization's knowledge assets-web pages, account data, documents, databases, existing legacy data sources, and knowledge bases to quickly and accurately find answers to their specific billing, account, product and service questions.

Extended Customer Service Modules

edocs' Extended Customer Service Modules augment edocs core e-billing and online self-service capabilities and extend them to additional users, channels and endpoints. This enables organizations to provide more effective and efficient service regardless of what service channel customers choose.

Print Manager is a complete solution for data consolidation, visual statement formatting and design, and print output generation that significantly reduces the cost and complexity of producing paper bills, invoices and statements. edocs combined electronic and print output solution handily solves the challenge of account consolidation avoiding the need to alter complex back-end legacy systems to present a consolidated account view online or on paper.

Syndication Manager is an account content distribution system that handles all the complexities of securely distributing summary account information to any endpoint, while also enabling customers to go back to the billing organization's website to take advantage of more comprehensive self-service capabilities.

CSR Manager enables customer service representatives (CSR) to access critical account data and service-related information and capabilities to effectively service both online and off line customers. CSR Manager is a browser-based application that couples traditional customer-facing online self-service capabilities with CSR-specific features including case management, facilitating better service at the point of customer contact.

Marketing Manager is a personalization, campaign and content management solution that weaves personalized marketing and customer service messages based on specific account information throughout the customer self-service and e-billing experience. The browser-based application facilitates collaboration between internal marketing and customer service departments as they create, deploy and track the performance of campaigns.

The edocs Advantage

edocs EPP Suite has the lowest total cost of ownership (TCO) of any self-service approach. It provides an optimal TCO because of the following key attributes:

User Scalability - edocs platform demonstrated unparalleled scalability and performance in testing by IBM and Sun. The platform routinely supports millions of accounts and online users without performance degradation for edocs individual global 2000 customers around the world. This translates into less hardware and lower IT costs for edocs customers.

Standards-Based - edocs J2EE standards-based platform and modular component architecture meets the demanding requirements of leading organizations.

Integration - edocs ' EPP Suite integrates with existing infrastructure including web portal, call center, IVR and other enterprise applications to maximize the solution 's ROI. The application uniquely accesses a variety of diverse data sources (e.g. legacy, print source, data warehouse) that most applications cannot, providing a consolidated view of customer accounts.

Time to Market - edocs EPP Suite allows for rapid deployment because it comes as a complete packaged, out-of-the-box application that is tailored to solve distinct business problems and meet industry specific process requirements.

1.5 Conclusion

edocs e-Billing Manager is the proven software platform for scalable, high-performance self-service and e-billing applications that enable organizations to manage account relationships with business and consumer customers online. e-Billing Manager application solutions:

- Reduce support and processing costs
- Improve operational effectiveness
- Increase customer satisfaction
- Enhance marketing effectiveness

e-Billing Manager's out of the box consumer and business applications for data access, online account composition, analytics, one-to-one messaging, and business hierarchy dramatically decrease time to market for deploying self-service solutions. Developed on J2EE technology, the e-Billing Manager platform is flexible, extensible, and easy to manage, and is the proven platform for online consumer and business applications.

e-Billing Manager leverages available data from transactional systems to dramatically reduce the costs associated with producing, delivering, and paying account communications, while simultaneously transforming accounts into dynamic, interactive self-service and marketing tools.

e-Billing Manager goes far beyond bill presentment solutions providing packaged applications with many e-billing features, including online account and statement composition, payment, business logic, one-to-one marketing, hierarchy, customer service access, and service messaging with application management.

e-Billing Manager's EJB platform architecture has been proven scalable in production and through independent testing. This is a key differentiator in comparing packaged solutions.

Finally, because of e-Billing Manager's flexibility and methodology, time to market with an e-Billing Manager Suite solution is extremely rapid, stable, and scalable resulting in a total cost of ownership lower than competing or home grown solutions.

2

2 Business Processes and Application Logic

2.1 Business Processes and Application Logic

The objective of the B2C application is to provide online account management and customer self service for telecommunications provider's consumer customers.

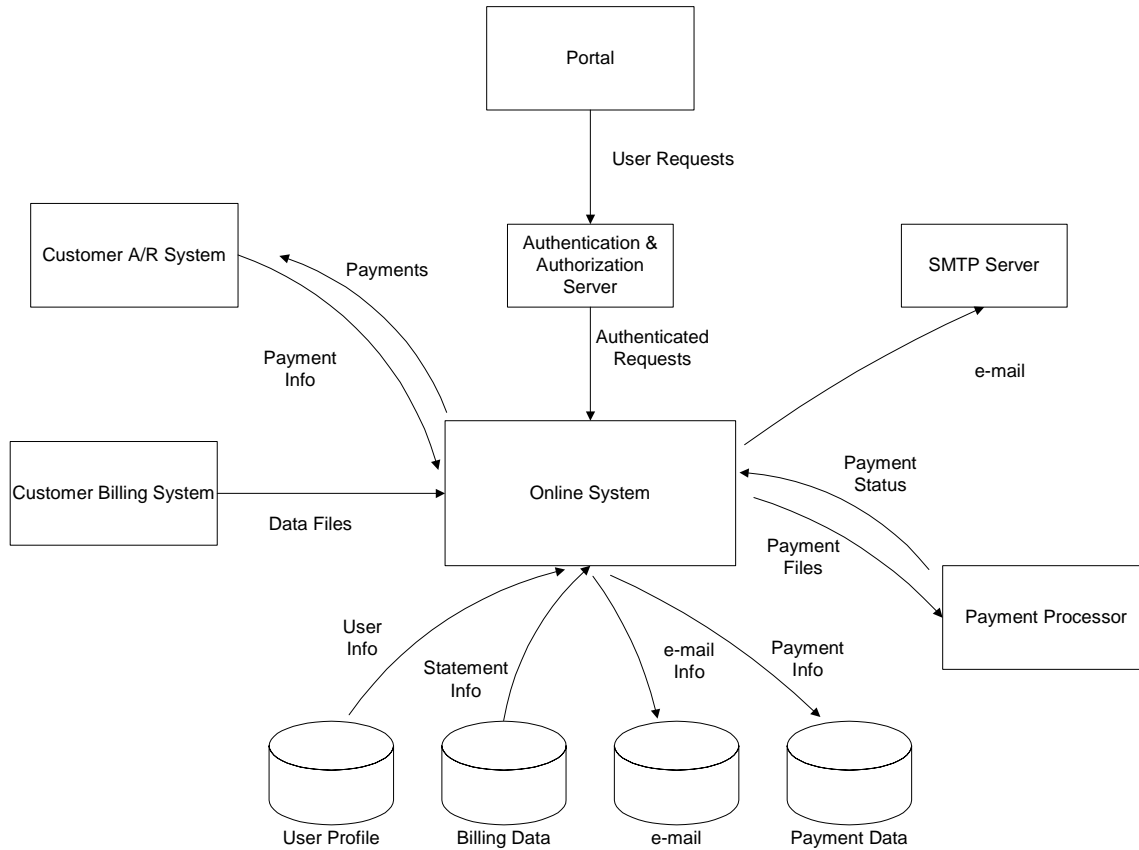
The main features of e-Billing Manager – Consumer are:

- **Statements** – Consumers can view summary and detailed statements on accounts, charges, and usage.
- **Payments** – Consumers can set up payment accounts for recurring and one-time payments, which historical payment activity for a configurable period of time.
- **User Profile Management** – Users can manage personal profiles and address books, user names and passwords, and notifications.
- **CSR Management** – edocs' standalone application for CSR management lets customer representatives search accounts and impersonate company users.
- **Analytics** – You create reports with standard account, charges and usage reporting functionality. Advanced reporting and report creation is available in a separate application.

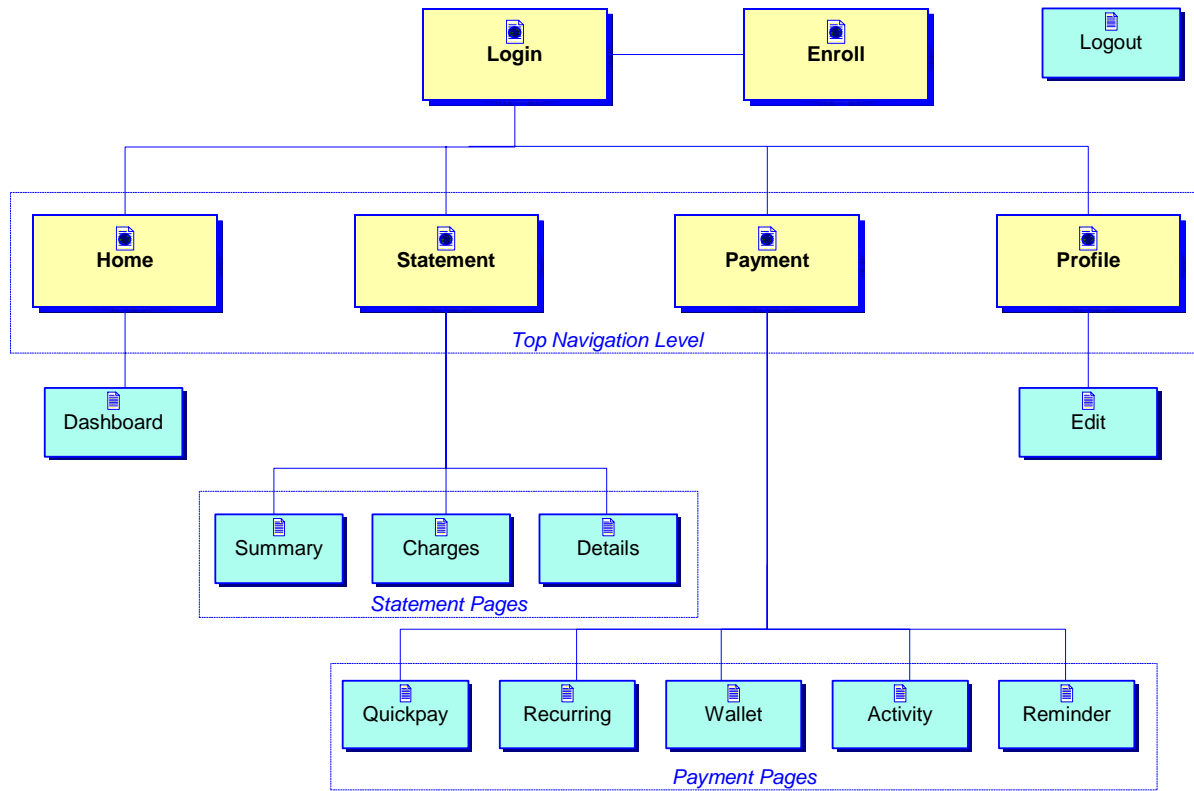
Details about individual use cases for the various tasks that users perform as part of these functional areas appear in the next chapter.

2.2 System Context Diagram

The following diagram shows the main e-Billing Manager application functions in the context of the entire system:



2.3 Navigation Flow Diagram



The e-Billing Manager uses a simple hierarchical navigation. The Navigation Flow diagram, above, shows the top levels of navigation, which are implemented using a horizontal navigation bar with tabs for the top navigation level and sub-tabs for the next level of navigation.

2.4 Menu Navigation Diagram



2.5 Users

Generally, a few different people use the e-Billing Manager functionality:

USER	NOTES
Consumer User	A consumer customer that uses the B2C application to manage, view reports, print, edit, add, delete account(s).
CSR Administrator	Internal Customer Service Representative Administrator that has all associated privileges, including managing internal users.
CSR	This user is the internal Customer Service Representative that assists the consumer customers with overall account and payment management.

3

3 Site Webflows

3.1 About Site Webflows

The site webflows in this chapter describe the essential interaction between the user and the system. The system is based on e-Billing Manager and a customizable set of screens. The User Interface (UI) consists of a set of screens and navigation elements with interfaces (APIs) to e-Billing Manager platform functions, which provide access to statement and payment information. The user presentation is driven by a set of HTML templates (Tiles). The navigation and control is driven through a standard Java framework (Struts).

Each use case specifies a set of activities performed by a user, or other type of actor, to complete a task. Use cases describe the flow of contingent actions the user takes.

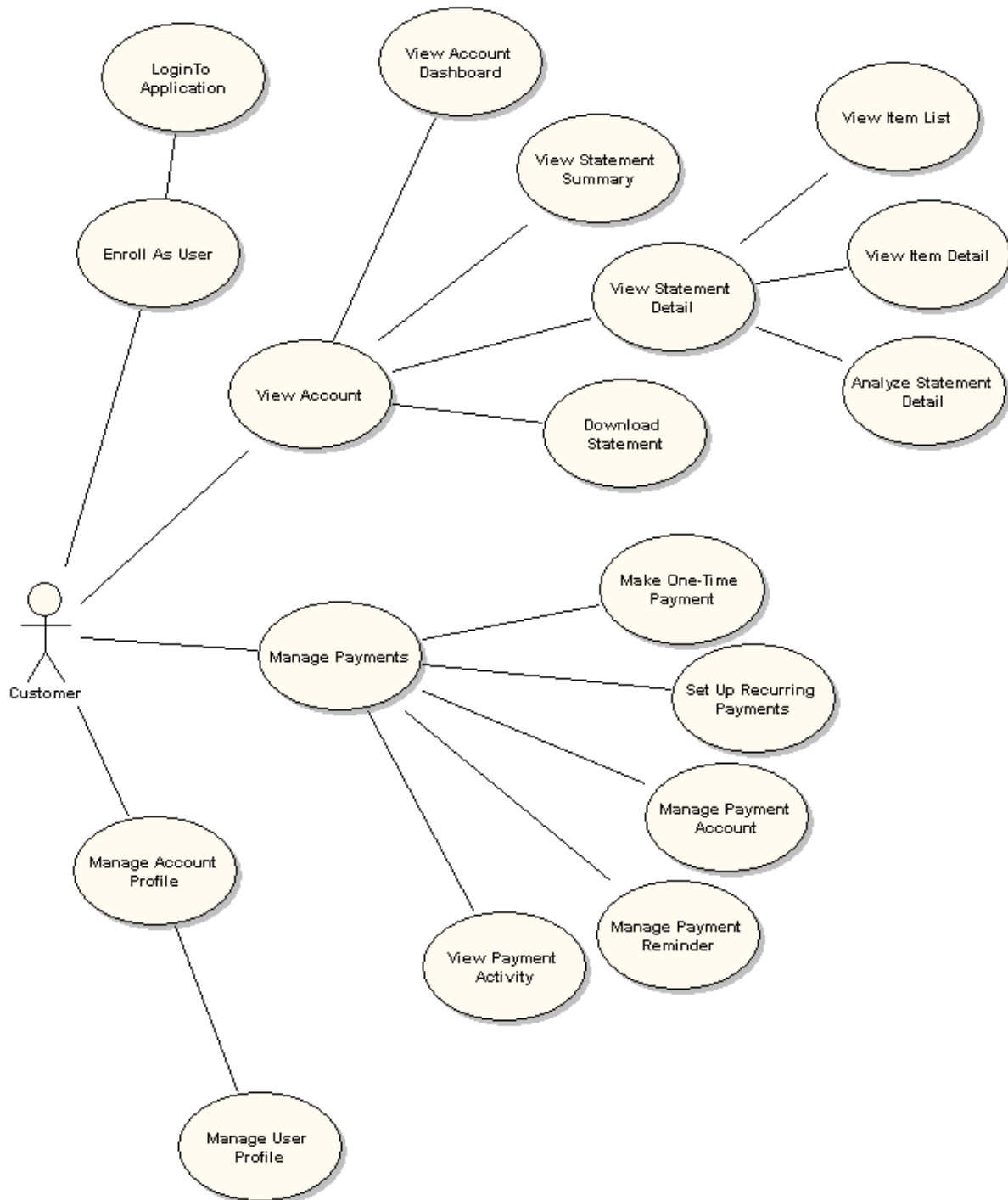
There may be many possible paths through a site webflow:

- **The Main Path** – This describes the successful completion of the use case without encountering any exceptional conditions.
- **Alternate Paths** – These describe one or more related paths through the use case (for example, add, edit and delete) that are considered not part of the common flow of the use-case.
- **Exception Paths** – These describe exception conditions and how they are handled.

A use case may also interact with external systems, which are systems that are outside the boundary of the e-Billing Manager implementation.

3.2 Catalog of Application Logic

This diagram shows how the use cases relate and tie back to the overall application logic and navigation.



3.3 Functionality Overview

The following table provides a complete list of the web flows that specify the functionality and site navigation of the application:

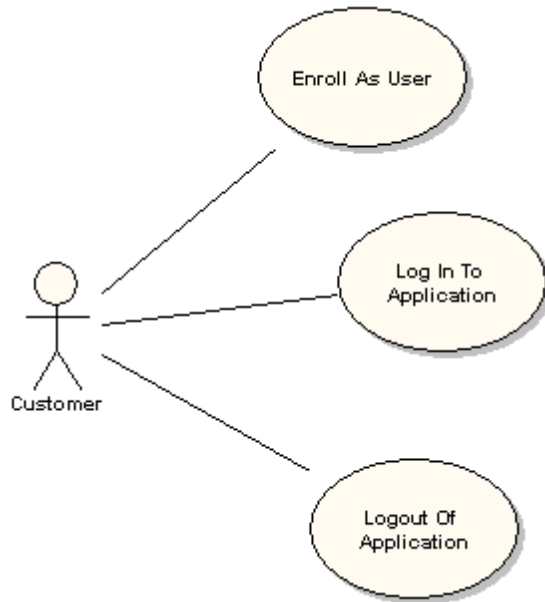
REQUIREMENT CATEGORY	DESCRIPTION	USE CASES
Enrollment & Authentication	Enroll users and manage the login user session. The <i>Log In To Application</i> use case is a pre-condition for all customer use cases.	Enroll As User Log In To Application Log Out Of Application Forget Password
Statement Presentment	Functions related to presenting and accessing the customer's statements.	View Dashboard View Statement Summary View Charges View Usage Detail View Unbilled Activity Print Current View Download Account Data
Payment	Handle user payments.	Make One-Time Payment Set Up Recurring Payments Manage Payment Accounts View Payment History
Analytics	Summarize data in a variety of reports.	View Report Download Report
Profile Management	Manage user account and profile information. Send e-mail notifications as appropriate to customer.	Manage Personal Profile Manage Password Manage Notifications
Customer Service	Customer Service Application that enables critical account management access and capabilities to customer service representatives.	Manage Internal Users Search for an Account Impersonate User
System	Tasks required to administer the application.	Self-Enrollment SAF Secure Access Framework Use Cases Process Recurring Payment Email Notifications

3.4 Enrollment and Authentication Use Cases

The enrollment and authentication use cases cover the business requirements for allowing customers to access the system.

This section describes the following use cases that allow consumers to to:

- **Login to Application** – Access the system as an authenticated user.
- **Logout of Application** – End user session.
- **Enroll as User** – Provide user profile information and user credentials.
- **Forgot Password** – Lets user reset their password.



Login to Application

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Login
Please use the login area to login to your account.

Login to your Account

User Name:

Password:

[Forgot your password? Click Here.](#)

if you are a new user, [Enroll Now](#)

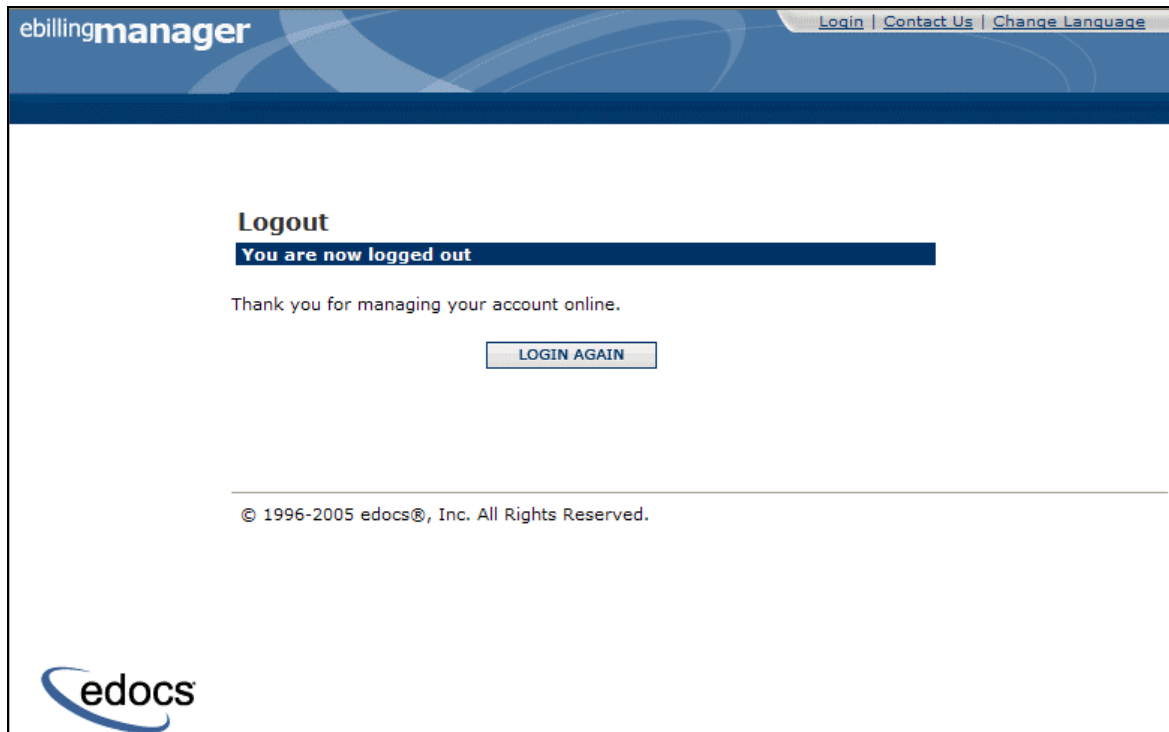
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edocs

Name:	Login To Application
Brief Description:	Consumer user logs in to the application.
Primary Actor:	Consumer user
Main Path:	<ol style="list-style-type: none"> 1. This use case begins when a user navigates to the login page. 2. System displays Login page displaying a form for entering user name and password. 3. User enters login information. 4. User submits data. 5. System validates data. 6. System displays the Account Dashboard page.
Alternate Paths:	<ol style="list-style-type: none"> 3a) User has forgotten their password and selects the Forgot Password operation: <ol style="list-style-type: none"> 1. System invokes Forgot Password use case. 3b) User has not enrolled and selects the Enroll Now operation: <ol style="list-style-type: none"> 2. System invokes Enroll User use case.

	<p>5a) System determines that customer credentials are invalid:</p> <ol style="list-style-type: none"> 1. System displays a message “Login incorrect: Please try again”
Standard Features:	<ol style="list-style-type: none"> 1. Authentication of User Name and Password 2. Forgot Password link 3. Enroll Now link
Configuration Points:	<ol style="list-style-type: none"> 1. Messaging instructions around the login form. 2. e-Billing Manager ships with a default enrollment and authentication model for user management. This framework for user management may be configured via a plug-in to use available systems for authentication and other user information.
Notes:	<ol style="list-style-type: none"> 1. Default implementation stores the enrollment information within the e-Billing Manager application.

Log Out of Application



Name:	Log Out of Application
Brief Description:	Consumer user logs out.
Primary Actor:	Consumer user
Main Path:	<ol style="list-style-type: none"> 1. This use case begins when the user invokes the logout operation from the navigation menu. 2. System ends the user's session

	<ol style="list-style-type: none">3. System displays a logout message and prompts the user to login again to the application.
Alternative Paths:	<ol style="list-style-type: none">1a) User is inactive on the site for 15 minutes:<ol style="list-style-type: none">1. System ends session
Standard Features:	<ol style="list-style-type: none">1. Session timeout.2. Customer logs out3. Login Again link
Configuration Points:	<ol style="list-style-type: none">1. Timeout period is configurable.

Enroll as User

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Enroll

If you are a new user, please enroll

Complete the following form and click Enroll Now.

*** required fields**

* User ID

* First Name

Middle Initial

* Last Name

* Account

Validation Code

Date of Birth / / (mm/dd/yyyy)

* Email ID

* Street Address

* City

State

* Zip Code

* Country

Home Telephone

Business Telephone


Security Question

Security Answer

* Password

* Re-type Password

ENROLL NOW

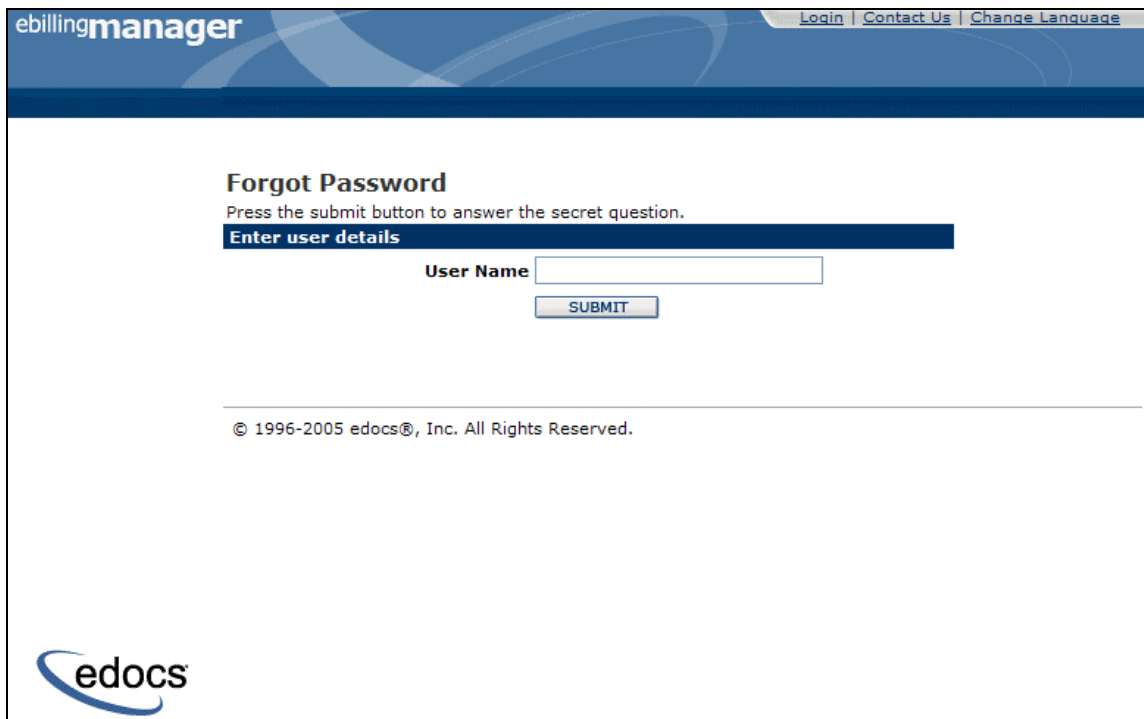


Name:	Enroll As User
Brief Description:	Consumer user enrolls for online account access.
Primary Actor:	Consumer user
Main Path:	<ol style="list-style-type: none"> 1. This use case begins when a user invokes the Enroll Now operation. 2. System displays enrollment screen requesting user to provide the required fields for the following information: <ol style="list-style-type: none"> a. User ID

	<ul style="list-style-type: none"> b. First Name c. Last Name d. Middle Initials e. Account Number f. Validation Code (optional) g. Date of Birth h. Email address i. Street address j. City k. State/province (optional if country NOT US or Canada) l. Zip or postal code m. Country n. Home Telephone o. Business Telephone p. Selection for Secret Question (optional) q. Secret Question response r. Password s. Confirm Password <ul style="list-style-type: none"> 3. User provides enrollment information. 4. User submits form data. 5. System validates the enrollment information via a Validation Code field from the billing data. 6. System displays an enrollment confirmation.
Alternate Paths:	<ul style="list-style-type: none"> 4a) Username already exists. System displays a message informing the User that the selected Username already exists. 5a) User enters invalid information: <ul style="list-style-type: none"> 1. System displays a user-friendly error message. 5b) System cannot complete enrollment: <ul style="list-style-type: none"> 1. System displays a user-friendly error message. 5c) User does not provide required information: <ul style="list-style-type: none"> 1. System displays a user-friendly error message.
Standard Features:	<ul style="list-style-type: none"> 1. Password confirmation 2. Required fields 3. Form validation of enrollment fields
Configuration Points:	<ul style="list-style-type: none"> 1. The system can be configured to force a user to change their password at first login. 2. Additional fields can be added to the profile management page based on client requirements. <ul style="list-style-type: none"> ▪ Password confirmation ▪ Required fields ▪ Form validation of enrollment fields

	<ul style="list-style-type: none"> ▪ Additional enrollment fields ▪ Field validation ▪ Secret question options <p>e-Billing Manager ships with a default enrollment and authentication model for user management. This framework for user management may be configured via a plug-in to use available systems for authentication and other user information</p>
<p>Notes:</p>	<ol style="list-style-type: none"> 1. Default implementation stores the enrollment information within the e-Billing Manager application. 2. Sample validation and error messages provided.

Forgot Password



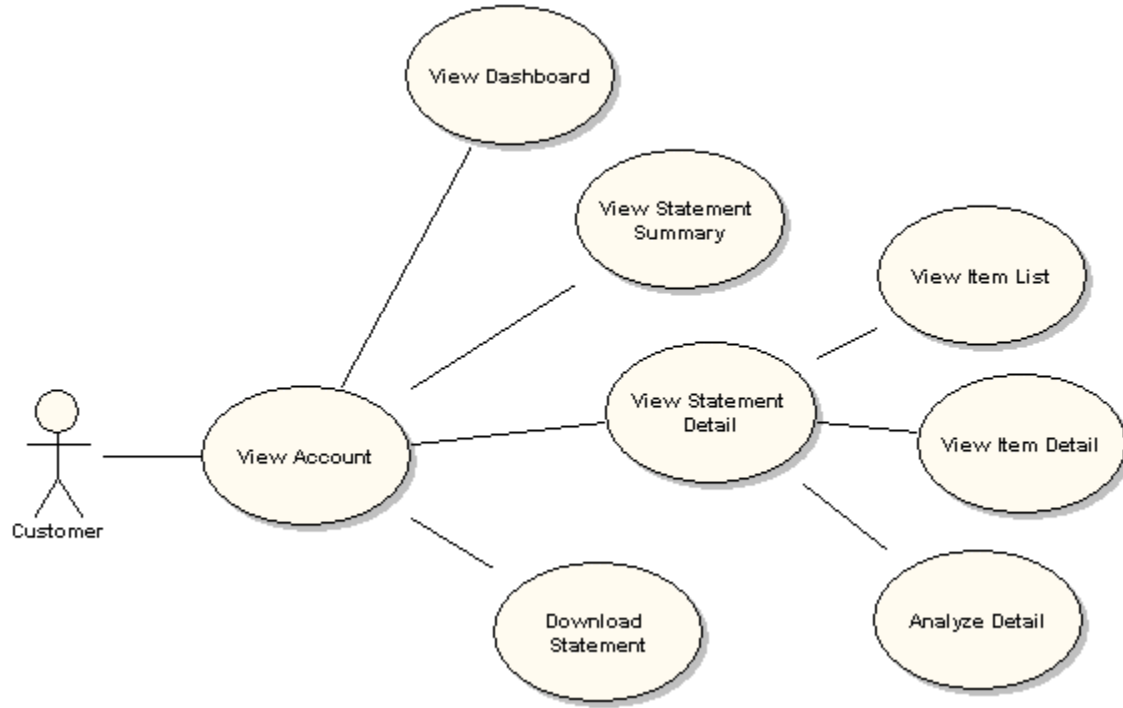
<p>Name:</p>	<p>Forget Password</p>
<p>Brief Description:</p>	<p>Consumer user forgets password and systems presents a password reminder.</p>
<p>Primary Actor:</p>	<p>Consumer user</p>
<p>Main Path:</p>	<ol style="list-style-type: none"> 1. This use case begins when a user has forgotten their password and selects "Forgot Password" feature. 2. System displays a page requesting the user to enter their username. 3. User provides username and submits. 4. System confirms the username exists.

	<ol style="list-style-type: none"> 5. System displays page requesting the user to answer the secret question associated with the username. 6. User answers the secret question and submits. 7. System validates the secret question answer to be correct and displays Password Reset page containing: <ol style="list-style-type: none"> a. New password b. New password confirmation 8. User provides new password and submits. 9. System records new password and logs user in.
Alternative Paths:	<ol style="list-style-type: none"> 4a) Username does not exist: <ol style="list-style-type: none"> 1. System displays error message stating the username is not correct. 7a) System is unable to validate the secret question: <ol style="list-style-type: none"> 1. System redisplay the error message stating the answer is incorrect.
Standard Features:	User Name with secret question is standard.
Configuration Points:	It is expected that authentication and validation can be provided via plug-in to external systems. Fields used in this scenario are configurable based on security guidelines of the client.
Notes:	

3.5 Statement Presentment Use Cases

The statement presentment features lets users to view their account summary and detail information, including:

- **View Dashboard** – Consumer User views the dashboard containing a high-level account overview.
- **View Statement Summary** – Consumer User views the summary of a statement.
- **View Charges** – User views summary charges for an account.
- **View Usage Detail** – User views the detail associated with an account.
- **View Unbilled Activity** – User views activity that has been generated since their most recent billing statement.
- **Print Current View** - User prints the current view.
- **Print Invoice** - User downloads the PDF of the selected bill.
- **Download Report** - User downloads account data.



View Dashboard

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[Overview](#) [Statement](#) [Payments](#) [Reports](#) [Profile](#) [Services](#) [Help](#)

Dashboard

Dashboard
User: Linda Garcia **Account:** 29006120

Account Overview	View Statement	Profile	edit
Statement Breakdown		User: Linda Garcia	
Latest statement from 05/04/04		Email: prajapakshe@edocs.com	
		Address: 293 Turnpike Rd, Westborough	
Monthly Service Charges	33.98		
Usage Charges	291.15		
Other Charges	9.30		
Taxes	29.69		
Total Current Charges	364.12		
Payment due by 06/03/04			

Payments	View Payments								
Last 2 Bill Totals									
Payment by ACH payment at lockbox posted on May 22, 2004									
	<table border="1"> <tr> <td>Previous Balance</td> <td>97.81</td> </tr> <tr> <td>Payment Posted</td> <td>-97.81</td> </tr> <tr> <td>Adjustments</td> <td>0.00</td> </tr> <tr> <td>Past Due Balance Payable Immediately</td> <td>0.00</td> </tr> </table>	Previous Balance	97.81	Payment Posted	-97.81	Adjustments	0.00	Past Due Balance Payable Immediately	0.00
Previous Balance	97.81								
Payment Posted	-97.81								
Adjustments	0.00								
Past Due Balance Payable Immediately	0.00								

Analytics	View Analytics						
Minutes Breakdown							
	<table border="1"> <tr> <td>Weekdays</td> <td>885</td> </tr> <tr> <td>Weeknights and Weekends</td> <td>283</td> </tr> <tr> <td>Total Minutes</td> <td>1168</td> </tr> </table>	Weekdays	885	Weeknights and Weekends	283	Total Minutes	1168
Weekdays	885						
Weeknights and Weekends	283						
Total Minutes	1168						

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Name:	View Account Dashboard
Brief Description:	Consumer user views the dashboard containing a high-level account overview.
Primary Actor:	Consumer user
Main Path:	<ol style="list-style-type: none"> 1. This use case begins when the user invokes the dashboard operation or logs successfully to the application. 2. System displays the Dashboard Screen including an overview and summary of account information.

	<ol style="list-style-type: none"> 3. The user selects to view the statement. 4. System displays the Statement Summary screen for the most recent statement date. 5. The user can select to look at any of the displayed items on the account overview page of the dashboard.
<p>Alternate Paths:</p>	<ol style="list-style-type: none"> 3a) User selects the Edit Profile operation: <ol style="list-style-type: none"> 1. System displays the Profile page. 3b) User selects to view Payments: <ol style="list-style-type: none"> 1. System displays the Payment History page for the most recent payment activity. 3c) User selects to view Analytics: <ol style="list-style-type: none"> 1. System displays the list of available reports to the user. <p>User can also select any of the available tabs</p>
<p>Standard Features:</p>	<ol style="list-style-type: none"> 1. The following components are dashboard modules for e-Billing Manager: <ol style="list-style-type: none"> a) Account Information Summary b) Payment Information Summary c) User Profile d) User Reports Summary
<p>Configuration Points:</p>	<ol style="list-style-type: none"> 1. Graph format is a configurable parameter. 2. Account number may be displayed on dashboard user bar. 3. Additional edocs' products may be integrated and presented on the dashboard.
<p>Notes:</p>	

View Statement Summary

Account Summary
 User: Linda Garcia Account: 29006120

Please Select Statement Date: 05/04/04

Statement Summary Costs

Monthly Service Charges	33.98
Usage Charges	291.15
Other Charges	9.30
Taxes	29.69
Total Current Charges	364.12

Previous Payments

Previous Balance	97.81
Payment by ACH payment at lockbox posted on May 22, 2004	-97.81
Total Balance	\$0.00

Summary Device Charges

Wireless Number	Monthly Service	Usage	Adjustments	Taxes	Other	Total
545-803-9028	29.99	291.15	9.30	29.69	0.00	364.12
Total	29.99	291.15	9.30	29.69	0.00	364.12

Minutes Breakdown

Weekdays	885
Weeknights and Weekends	283
Total Minutes	1168

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Name:	View Statement Summary
Brief Description:	Consumer user views the summary of an account.
Primary Actor:	Consumer user
Main Path:	<ol style="list-style-type: none"> 1. This use case begins when the User wishes to view the Statement Summary and invokes the View Statement operation. 2. System displays Statement Summary Screen with summary information for the most recent statement.
Alternate Paths:	<ol style="list-style-type: none"> 2a) User selects download options: <ol style="list-style-type: none"> 1. System invokes Download use case. 2b) User selects an alternate billing date: <ol style="list-style-type: none"> 1. System displays the Statement Summary page for the selected billing date.
Standard Features:	<ol style="list-style-type: none"> 1. Print Friendly Invoice 2. Download Statement (PDF, CSV, XML)

3 Site Webflows

Configuration Points:	1. The format of the statement is configurable based on the client's billing format.
Notes:	Service consolidation is configurable using multiple data sources, but is not currently demonstrated by the foundation application sample data set.

View Charges

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Overview
Statement
Payments
Reports
Profile
Services
Help

Summary
Charges
Usage
Unbilled

Download: [PDF](#) [GO](#) [Printer Friendly](#)

Device Summary

User: Linda Garcia Account: 29006120

Charges for Device Number

Number: 545-803-9028 Statement Date: 05/04/04

Summary for 545-803-9028

Total Amount Due	\$364.12
-------------------------	-----------------

Rate Plan

	Period	Prorated Charge	Monthly Charge	Total Charge
Easy Plus	05/04-06/03		29.99	29.99
Includes:				
CALL FORWARDING N/C				
CALL HOLD				
CALL WAITING N/C				
CALLER ID N/C				
CLIP PER CALL BLOCK				
THREE PARTY CALL N/C				

Usage Charge Details

Total Usage Charges	\$291.15
----------------------------	-----------------

Optional Services

	Period	Prorated Charge	Monthly Charge	Total Charge
1000 NIGHT/WKND MINS CTH	05/04-06/03		0.00	0.00
VOICE MAIL ALERT	05/04-06/03		0.00	0.00
NATIONWIDE TOLL FREE	05/04-06/03		0.00	0.00
DETAILED BILLING N/C	05/04-06/03		0.00	0.00
LONG DISTANCE ACCESS	05/04-06/03		0.00	0.00
NETWORK ACCESS	05/04-06/03		0.00	0.00
OFF-NETWORK ROAM	05/04-06/03		0.00	0.00
WIRELESS PHONE INS. & SVC FEE	05/04-06/03		3.99	3.99

Credits, Adjustments & Other Charges

FED UNIVERSAL SVC CHARGE	7.83
911 MONTHLY	0.80
REGULATORY COST RECOVERY FEE	0.56
TELECOM RELAY SERVICE SURCHARGE	0.11
Total Other Charges	\$9.30

Taxes

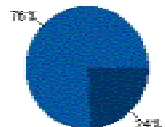
FEDERAL EXCISE TAX	9.81
STATE TELECOM SALES TAX	19.88
Total Taxes	\$29.69

Profile [edit](#)


User: Linda Garcia
Email: prajapakshe@edocs.com
Address: 293 Turnpike Rd, Westborough

Analytics [view](#)

Minutes Breakdown



Weekdays	885
Weeknights and Weekends	283
Total Minutes	1168



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Name:	View Charges
Brief Description:	Consumer user views summary charges for an account.
Primary Actor:	Consumer user
Main Path:	<ol style="list-style-type: none"> 1. This use case begins when the user navigates to the Charges menu. 2. System displays charges data for an account. 3. User selects to view specific charges and invokes View Details use case.
Alternate Paths:	<ol style="list-style-type: none"> 3a) User selects an alternate billing date: <ol style="list-style-type: none"> 1. System redisplay the Charges page for the selected billing date. 3b) User has more than one sub-account: <ol style="list-style-type: none"> 1. System redisplay the Charges page for the selected sub-account. 3c) User selects download options: <ol style="list-style-type: none"> 1. System invokes Download use case.
Standard Features:	<ol style="list-style-type: none"> 1. Print Friendly invoice 2. Download Statement (PDF, CSV, XML)
Configuration Points:	<ol style="list-style-type: none"> 1. The format of the statement is configurable based on the client's billing format.
Notes:	Not all account structures have sub-accounts, but this example demonstrates that an account with sub-accounts is supported.

View Details

ebillingmanager
Logout | Contact Us | Change Language

Overview
Statement
Payments
Reports
Profile
Services
Help

Summary
Charges
Usage
Unbilled

Download: PDF
80
Printer Friendly

Device Usage

User: Linda Garcia Account: 29006120

Charges for Device Number

Number: Statement Date:

[Address Book Off](#)

1 | 2 | 3 | 4 | 5 Next

Details for 545-803-9028

Date, Time	Number Called	Rate Period	Min	Billed Amount
04/27, 05:56PM	251-947-4980	Weekdays	2	0.00
04/27, 06:14PM	251-989-7375	Weekdays	3	0.00
04/27, 06:49PM	251-989-7375	Weekdays	1	0.00
04/28, 08:59AM	910-660-0010	Weekdays	10	0.00
04/28, 02:32PM	251-978-5888	Weekdays	2	0.00
04/28, 02:50PM	910-577-4561	Weekdays	2	0.00
04/28, 02:52PM	910-450-1627	Weekdays	1	0.00
04/28, 02:53PM	910-450-1627	Weekdays	8	0.00
04/28, 08:29PM	251-978-5888	Weekdays	2	0.00
04/29, 08:05AM	910-660-0010	Weekdays	10	0.00
04/29, 01:08PM	910-353-7219	Weekdays	5	0.00
04/29, 07:34PM	251-989-7375	Weekdays	1	0.00
04/29, 07:44PM	251-978-1133	Weekdays	25	0.00
04/29, 08:17PM	251-989-7375	Weekdays	1	0.00
04/29, 08:19PM	850-937-7117	Weekdays	1	0.00
04/29, 08:32PM	910-381-5431	Weekdays	2	0.00
04/30, 08:24AM	910-660-0010	Weekdays	64	0.00
04/30, 11:11AM	910-353-7219	Weekdays	3	0.00
04/30, 02:59PM	910-353-7219	Weekdays	3	0.00
05/04, 05:18PM	251-989-7375	Weekdays	2	0.00
05/05, 07:24AM	704-451-8989	Weekdays	2	0.00
05/05, 11:46AM	251-978-4508	Weekdays	3	0.00
05/05, 11:52AM	704-451-8989	Weekdays	2	0.00
05/05, 09:40PM	910-660-0010	Weeknights and Weekends	2	0.00
05/06, 01:09PM	251-978-5888	Weekdays	1	0.00
05/06, 04:35PM	251-978-5888	Weekdays	1	0.00
05/06, 01:09PM	251-978-5888	Weekdays	1	0.00
05/06, 04:35PM	251-978-5888	Weekdays	1	0.00
05/06, 06:39PM	251-978-5888	Weekdays	1	0.00
05/07, 06:05AM	704-451-8989	Weeknights and Weekends	2	0.00
05/07, 02:12PM	251-947-7739	Weekdays	2	0.00
05/07, 09:46PM	251-979-2386	Weeknights and Weekends	2	0.00
Totals			1168	291.15

1 | 2 | 3 | 4 | 5 Next

Profile [edit](#)

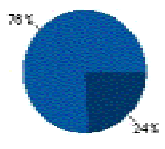
User: Linda Garcia

Email: prajapakshi@edocs.com

Address: 293 Turnpike Rd, Westborough

Analytics [view](#)

Minutes Breakdown



Weekdays	885
Weeknights and Weekends	283
Total Minutes	1168

Rate Code: EDIC1/Easy Plus

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Name:	View Detail
Brief Description:	Consumer user views the charges detail associated with account or sub-account.
Primary Actor:	Consumer user
Main Path:	<ol style="list-style-type: none"> 1. This use case begins when the user selects the view detail operation for a specific account. 2. System displays the detail information for the selected account.
Alternate Paths:	<p>2a) User selects an alternate billing date:</p> <ol style="list-style-type: none"> 1. System redisplay the Charges page for the selected billing date. <p>2b) User has more than one sub-account and chooses to view another sub-account:</p> <ol style="list-style-type: none"> 1. System redisplay the Detail page for the selected sub-account. <p>2c) User selects download options:</p> <ol style="list-style-type: none"> 1. System invokes Download use case.
Standard Features:	<ol style="list-style-type: none"> 1. Download (PDF, CSV, XML) 2. Paging/Sorting 3. Personal Address Book 4. Printer Friendly
Configuration Points:	<ol style="list-style-type: none"> 1. The number, type, and ordering of detail columns. 2. Initial sort order for each column (ascending or descending). 3. Graph type.
Notes:	

View Unbilled Activity for Account

The screenshot displays the 'Unbilled Activity' page in the eBillingManager application. At the top, there are navigation tabs for Overview, Statement, Payments, Reports, Profile, Services, and Help. Below these are sub-tabs for Summary, Charges, Usage, and Unbilled. The main content area shows the account name 'Linda Garcia' and account number '29006120'. A search bar for device numbers is present, along with a 'GO' button. A summary table indicates 7 Peak Minutes, 14 Weekend Minutes, and a total of 21 minutes. A call details table lists two calls to Natick, MA, both unrated, with durations of 7 and 14 minutes. A profile sidebar on the right shows user details and an 'edit' link. An analytics section features a pie chart and a table showing minutes breakdown by day type: Weekdays (885), Weeknights and (283), and Weekends, with a total of 1168 minutes. The edocs logo is visible in the bottom left corner.

Name:	View Unbilled Activity for an Account
Brief Description:	User views activity that has been generated since their most recent billing statement.
Primary Actor	Consumer user
Main Path:	<ol style="list-style-type: none"> 1. This use case begins when the user selects the View Unbilled Activity operation. 2. System displays the Unbilled Activity page including the following information: <ol style="list-style-type: none"> a. Summary of Unbilled Activity b. Detail generated since the most recent billing statement.
Alternate Paths:	<ol style="list-style-type: none"> 2a) User has more than one sub-account and selects to view a different sub-account: <ol style="list-style-type: none"> 1. System redisplay the Unbilled Activity page. 2b) System is unable to retrieve Unbilled Activity: <ol style="list-style-type: none"> 1. System displays a message informing the user that the unbilled data is unavailable at this time.
Standard	<ol style="list-style-type: none"> 1. Download (PDF, CSV, XML)

Features:	<ol style="list-style-type: none"> 2. Paging/Sorting 3. Personal Address Book 4. Printer Friendly
Configuration Points:	<ol style="list-style-type: none"> 1. The number, type, and ordering of call detail columns. 2. Initial sort order for each column (ascending or descending).
Notes:	

Print Current View

The screenshot shows the eBilling Manager interface. At the top, there are navigation tabs: Overview, Statement, Payments, Reports, Profile, Services, and Help. Below these are sub-tabs: Summary, Changes, Usage, and Unbilled. The main content area displays the 'Account Summary' for user Linda Garcia and account 29006120. It includes a 'Statement Summary Costs' table and a 'Profile' section with user details. A 'Print' button is visible in the top right of the main content area. An overlay window titled 'TBM - Print - Microsoft Internet Explorer' is open, showing a detailed print view of the account summary.

Account Summary
 User: Linda Garcia Account: 29006120

Download: [CSV](#) [GO](#) [Printer Friendly](#)

Please Select Statement Date: 05/04/04 [SUBMIT](#)

Statement Summary Costs	
Monthly Service Charges	33.98
Usage Charges	291.15
Other Charges	9.30
Taxes	29.69

Profile [edit](#)
 User: Linda Garcia
 Email: prajapakshe@edocs.com
 Address: 293 Turnpike Rd, Westborough

[Analytics](#) [view](#)
[Minutes Breakdown](#)

TBM - Print - Microsoft Internet Explorer

[Print](#) [Close](#)

Account Detail for Account: 29006120 as of 05/04/04

Statement Summary Costs	
Monthly Service Charges	33.98
Usage Charges	291.15
Other Charges	9.30
Taxes	29.69
Total Current Charges	364.12

Previous Payments

Previous Balance	97.81
Payment by ACH payment at lockbox posted on May 22, 2004	-97.81
Total Balance	\$0.00

Summary Device Charges

Wireless Number	Monthly Service	Usage	Adjustments	Taxes	Other	Total
545-803-9028	29.99	291.15	9.30	29.69	0.00	364.12
Total	29.99	291.15	9.30	29.69	0.00	364.12

Name:	Print Current View
Brief Description:	User prints the current view.
Primary Actor:	Consumer user
Main Path:	<ol style="list-style-type: none"> 1. This use case begins when the user selects the Printer-Friendly operation on a given screen. 2. System opens a new window and displays a printer friendly version of the current view. 3. System displays a print dialog box to the user. 4. User selects the print settings in the print dialog and submits the print request. 5. User closes the printer friendly version and returns to the application.
Alternate Paths:	<ol style="list-style-type: none"> 2a) User closes the printer friendly view and returns to the original view: <ol style="list-style-type: none"> 1. System does not send anything to the printer and leaves the user viewing the application. 4a) User closes the print dialog: <ol style="list-style-type: none"> 1. System does not send anything to the printer and leaves the user viewing the printer friendly page.
Standard Features:	<ol style="list-style-type: none"> 1. The following screens have the Print Friendly option: <ol style="list-style-type: none"> a. All Reports b. Invoice Summary c. Account Details
Configuration Points:	
Notes:	<ol style="list-style-type: none"> 1. Printer Friendly pages do not have any of the navigation information. 2. The page sent to the printer is in greyscale.

Download Account Data

Account Summary
 User: Linda Garcia Account: 29006120

Please Select Statement Date: 05/04/04

Statement Summary Costs

Mont	33.98
Usag	291.15
Othe	9.30
Taxe	29.69
Total	364.12
Pre	
Prev	97.81
Payn	-97.81
Total	\$0.00

Profile [edit](#)
 User: Linda Garcia
 Email: prajapakshe@edocs.com
 Address: 293 Turnpike Rd, Westborough

Analytics [view](#)
Minutes Breakdown

Weekdays	885
Weeknights and Weekends	283
Total Minutes	1168

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Name:	Download Account Data
Brief Description:	A Consumer user downloads account data.
Primary Actor:	Consumer user
Main Path:	<ol style="list-style-type: none"> 1. This use case begins when User downloads account data and selects the download function. 2. System requests user to select data type. 3. User selects the appropriate data type. 4. User confirms selection. 5. Systems display the standard file save or open dialogue box.
Alternate Paths:	<ol style="list-style-type: none"> 4a) User cancels selection <ol style="list-style-type: none"> 1. System returns user to previous location.
Standard Features:	<ol style="list-style-type: none"> 1. Dynamic PDF 2. XML data format 3. CSV data format

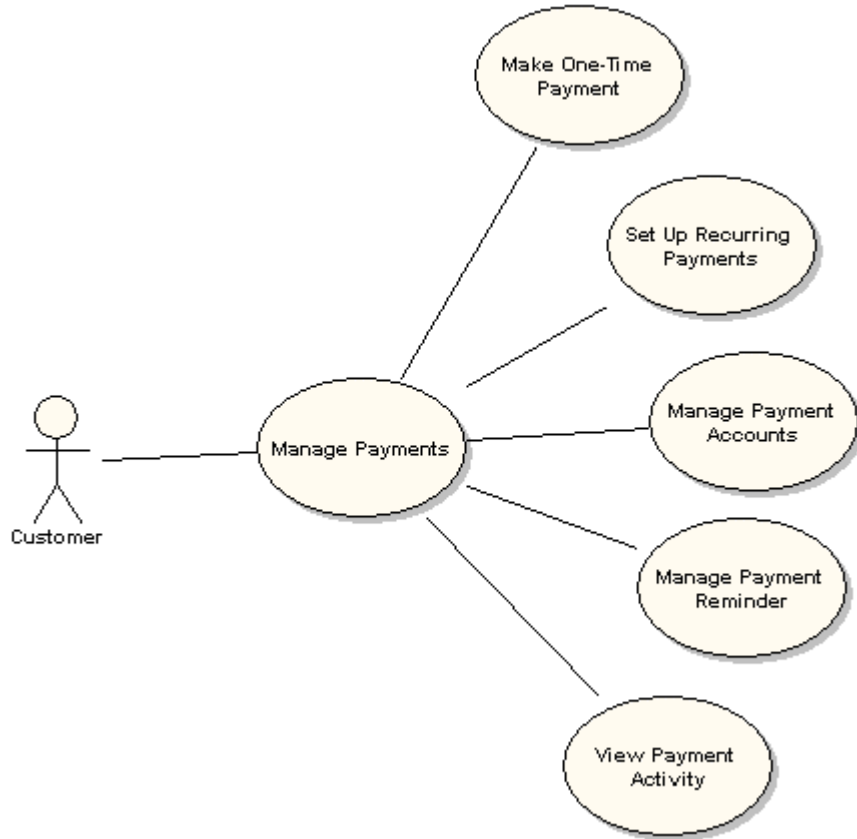
Configuration Points	<ol style="list-style-type: none"> 1. Generation of other formats using XSL 2. Columns of data to be downloaded
Notes:	<ol style="list-style-type: none"> 1. Downloads are available within: <ol style="list-style-type: none"> a. All Reports b. Account Detail c. Unbilled Activity d. Account Summary

3.6 Payment Use Cases

The payment features provide the business requirements for allowing customers to pay charges from their statements. These user-level use cases specify the functionality required to satisfy these requirements in such a way that e-Billing Manager can be configured, rules defined, screens developed, and any custom code developed to fulfill the use cases.

This section describes the following functionality:

- **Make One-Time Payment** – Consumer user makes a one-time payment.
- **Set Up Recurring Payments** – Consumer user configures rules to pay charges automatically on a monthly basis.
- **Manage Payment Accounts** – Consumer user can set up and manage multiple payment accounts for use in account/statement payments.
- **View Payment History** – Consumer user views a their payment activity.



Make One-Time Payment

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Overview | **Statement** | **Payments** | **Reports** | **Profile** | **Services** | **Help**

Quick Payment | Recurring Payment | Payment Account | Payment History

Quick Payment
 User: Linda Garcia Account: 29006120

Payment Details
 Payment Account: Personal Visa

Amount
 Total amount due \$364.12
 Specified amount of \$

Payment Date
 Due Date is 06/26/04
 Pay Date: (MM/dd/yyyy)

Notification
 Notify Me by email when a payment occurs

Calendar - ...
 Feb 2005

Su	Mo	Tu	We	Th	Fr	Sa
30	31	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	1	2	3	4	5

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Name:	Make One-Time Payment
Brief Description:	Consumer user completes an online payment
Primary Actor:	Consumer user
Main Path:	<ol style="list-style-type: none"> 1. This use case begins when a User selects the One-Time Payment operation. 2. System displays One-Time Payment screen, which allows the user to provide the following information: <ol style="list-style-type: none"> a. Payment Amount – Amount due or entered by user. b. Amount to Pay (defaults with Amount Due amount) c. The Payment Account: <ol style="list-style-type: none"> i. An enrolled Payment Account d. The Payment Date e. eMail Notification option 3. User makes payment selections using an enrolled payment method and submits. 4. System displays confirmation requesting the user to confirm the payment details along with appropriate terms and conditions (if applicable). 5. User confirms payment data. 6. System processes payment. 7. System validates the request and displays a <i>Payment Confirmation</i> screen with the message of the form "You have scheduled a payment in the amount of <amount> from account <Account Alias> on <date>."
Alternate Path:	<ol style="list-style-type: none"> 1a) User has not enrolled a payment method for Payment <ol style="list-style-type: none"> 1. System sends user to Payment Account screen for enrollment. 3b) User enters invalid information <ol style="list-style-type: none"> 1. System prompts the User to review the information and does not accept the transaction. 3b) User has setup a previous recurring payment <ol style="list-style-type: none"> 1. User is presented with a message warning them of a possible double payment and allows the user to cancel. 3c) User makes payment selection and chooses a new bank or credit card account <ol style="list-style-type: none"> 1. System displays the payment page allowing the user to enter a new account bank or credit card account along with agreeing to the terms and conditions of online payments. System carries over the previously made payment amount selection as an editable item. 2. User makes final selections and submits. 3. System displays confirmation page 4a) System determines one or more pieces of information is/are invalid. <ol style="list-style-type: none"> 1. System displays One-Time Payment page with appropriate error messages. The user can correct the errors.

Standard Features:	1. Date validation
Configuration Points:	1. The system can display any payable billing entity based on the client's permission to process payments accordingly.
	<ol style="list-style-type: none"> The effective date will be calculated based on the system date assuming that the payment should be completed by a specific time in the day in order for it to be processed that day and effective on the next day. System checks if One Time Payment is scheduled during a Recurring Payment window. If a Recurring Payment is scheduled, the system will warn the user that a Recurring Payment is scheduled on date X and that by confirming payment on this screen, a double payment could be made. Payment processing is assumed to occur only on business days.

Set Up Recurring Payment

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Overview Statement Payments Reports Profile Services Help

Quick Payment Recurring Payment Payment Account Payment History

Recurring Payment

User: Linda Garcia Account: 29006120

Setup Recurring Payments

From Payment Account: Personal Visa

Amount

Total amount
 Total amount with a threshold of \$ 100.0
 (you will be notified by e-mail if amount exceeds desired threshold)
 Fixed Amount of \$ 0.0

Transfer Date

0 business days before due date
 On the 1 of every month

Effective Period

Until Cancelled
 For 0 payments
 Until Date 02/03/2005 MM/dd/yyyy

Notification

Notify by e-mail when a payment occurs

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Name:	Setup Recurring Payment
Brief Description:	Consumer user intends to pay charges automatically on a monthly basis.
Primary Actor:	Consumer user
Main Path:	<ol style="list-style-type: none"> 1. This use case begins when the User selects the Recurring Payment operation from the navigation menu. 2. System displays the recurring payment form to the User. 3. User selects an established payment account. 4. User selects Payment Account (defaults to a single Account), Payment Amount preferences, Transfer Date and Effectuated period preferences for the new recurring payment and submits form. 5. System displays a confirmation page requesting the user to confirm the recurring payment. 6. User makes their selections and submits. 7. System validates information and stores the recurring payment and adds recurring payment to list of scheduled recurring payments. 8. System redisplayes the recurring payment page, if successful, and provides the User with a confirmation message..
Alternative Paths:	<p>2a) User has an existing recurring payment set up.</p> <ol style="list-style-type: none"> 1. System displays the recurring payment page allowing the user to edit the existing payment account, change to a new payment account, or cancel the existing recurring payment. <p>3a) User selects to use a new credit card or bank account and submits.</p> <ol style="list-style-type: none"> 1. System displays the Payment Account page, allowing user to execute the Payment Account operation. <p>3b) User navigates to another page before submitting</p> <ol style="list-style-type: none"> 1. System does not record the recurring payment set-up. <p>4a) User enters invalid information</p> <ol style="list-style-type: none"> 1. System prompts the user to review the information and does not accept the transaction. <p>7a) User enters a recurring payment that conflicts with an earlier scheduled recurring payment.</p> <ol style="list-style-type: none"> 1. System displays a notification that a conflict exists with the new payment and a scheduled recurring payment and notifies the user that if the payment is scheduled, a double payment could occur. <ol style="list-style-type: none"> a. User selects option to confirm or cancel payment.
Standard Features:	<ol style="list-style-type: none"> 1. Multiple payment accounts. 2. Payment Amount Options: <ol style="list-style-type: none"> a. Total Amount Due b. Total Amount Within Threshold c. Fixed Amount 3. Payment Date

	<ul style="list-style-type: none"> a. X number of days before due date b. X day of the month <p>4. Recurring Payment Duration</p> <ul style="list-style-type: none"> a. Until cancelled b. X number of payments c. Until X Date <p>5. Email notification of payment event</p>
Configuration Points:	<p>1. Recurring payment options may be suppressed or read-only.</p>
Notes	<p>1. Once the user has configured a recurring payment, a return to this page shows the recurring payment the user set up along with the ability to edit or cancel the recurring payments.</p> <p>2. If a recurring payment has been schedule on an account and is conflicted with a newly set up recurring payment, the system displays a warning message and allows the user to correct/delete recurring payment conflict.</p>

Manage Payment Accounts – Add Credit Card

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Overview | **Statement** | **Payments** | **Reports** | **Profile** | **Services** | **Help**

Quick Payment | Recurring Payment | **Payment Account** | Payment History

Payment Account


User: Linda Garcia Account: 29006120

Current Payment Accounts			
Description	Account Type	Account No.	Actions
Personal Visa	Credit Card	XXXXXXXXXXXX0024	edit delete
Joint Checking Account	Bank Account	XXXXX9843	edit delete

Credit Card Account Details
[ADD ACCOUNT](#)

Bank Account Details
[ADD ACCOUNT](#)

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Overview Statement Payments Reports Profile Services Help

Quick Payment Recurring Payment **Payment Account** Payment History

Payment Account

User: Linda Garcia Account: 29006120

Current Payment Accounts			
Description	Account Type	Account No.	Actions
Personal Visa	Credit Card	XXXXXXXXXXXX0024	edit delete
Joint Checking Account	Bank Account	XXXXX9843	edit delete

Nick Name

Account Number

Account Name

Account Type

Expire Date Format MM/yyyy

Expire Date

CVV Code

Street

City

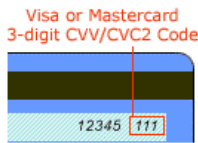
State

ZIP code

Country

edocs

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Name:	Manage Payment Accounts – Add Credit Card
Brief Description:	Consumer user adds credit card
Primary Actor:	Consumer user
Main Path:	<ol style="list-style-type: none"> 1. This use case begins when the user selects the Payment Accounts operation from the navigation menu. 2. System displays a list of existing payment accounts and the ability to add/edit/delete those accounts. 3. User selects to a add credit card account. 4. System displays the form to add a credit card account that contains the following fields. <ol style="list-style-type: none"> a. Account Nick Name b. Account Number c. Account Name

	<ul style="list-style-type: none"> d. Account Type e. Expiration Date f. Card Verification Number (CVV) g. Street Address (Line 1) h. City i. State/Region or Province j. Zip/Postal Code k. Country <p>5. User enters the information and submits the form.</p> <p>6. System validates the information as being correct and updates the list of payment accounts.</p>
<p>Alternate Paths:</p>	<p>3a) User selects to add a bank account:</p> <ul style="list-style-type: none"> 1. See separate use case. <p>3b) User selects edit credit card account:</p> <ul style="list-style-type: none"> 1. See separate use case. <p>3c) User selects edit bank account:</p> <ul style="list-style-type: none"> 1. See separate use case. <p>3d) User selects delete credit card account:</p> <ul style="list-style-type: none"> 1. See separate use case. <p>3e) User selects delete bank account:</p> <ul style="list-style-type: none"> 1. See separate use case. <p>3f) System is unable to validate the information:</p> <ul style="list-style-type: none"> 1. System displays error message to user informing them of the specific issue.
<p>Standard Features:</p>	<ul style="list-style-type: none"> 1. Add, edit, delete bank or credit card accounts 2. Form validation
<p>Configuration Points:</p>	<ul style="list-style-type: none"> 1. Additional payment methods can be configured via the payment cartridge framework.
<p>Notes</p>	<ul style="list-style-type: none"> 1. If a user deletes a payment account the recurring payments that have been setup to use that account are deleted.

Manage Payment Accounts – Add Bank Account

Name:	Manage Payment Accounts – Add Bank Account
Brief Description:	Consumer User adds a bank account
Primary Actor:	Consumer User
Main Path:	<ol style="list-style-type: none"> 1. This use case begins when the User selects the Manage Payment Accounts operation from the navigation menu. 2. System displays a list of existing payment accounts and the ability to add/edit/delete those accounts. 3. User selects to add a bank account 4. System displays the form to add a bank account that contains the following fields. <ol style="list-style-type: none"> a. Account Nick Name b. Bank Account Name c. Account number d. Routing Transit number 5. User enters the information and submits the form. 6. System validates the routing information as being correct and updates the list of payment accounts.
Alternate Paths:	<ol style="list-style-type: none"> 3a) User selects to add a credit card account. <ol style="list-style-type: none"> 1. See separate use case. 3b) User selects edit credit card account.

	<ul style="list-style-type: none"> 1. See separate use case. 3c) User selects edit bank account. <ul style="list-style-type: none"> 1. See separate use case. 3d) User selects delete credit card account. <ul style="list-style-type: none"> 1. See separate use case. 3e) User selects delete bank account. <ul style="list-style-type: none"> 1. See separate use case. 6a) System is unable to validate the information. <ul style="list-style-type: none"> 1. System displays error message to user informing them of the specific issue.
<p>Standard Features:</p>	<ul style="list-style-type: none"> 1. Add, Edit, Delete Bank or Credit Card Accounts 2. Form validation
<p>Configuration Points:</p>	<ul style="list-style-type: none"> 1. Additional payment methods can be configured via the payment cartridge framework.
<p>Notes:</p>	<ul style="list-style-type: none"> 1. If a user deletes a payment account the recurring payments that have been set up to use that account are deleted.

Manage Payment Accounts – Edit Credit Card

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Overview | Statement | **Payments** | Reports | Profile | Services | Help

Quick Payment | Recurring Payment | **Payment Account** | Payment History

Payment Account
 User: Linda Garcia Account: 29006120

Current Payment Accounts			
Description	Account Type	Account No.	Actions
Personal Visa	Credit Card	XXXXXXXXXXXX0024	edit delete
Joint Checking Account	Bank Account	XXXXX9843	edit delete

Nick Name:

Account Number:

Account Name:

Account Type:

Expire Date Format: MM/yyyy

Expire Date:

CVV Code:

Street:

City:

State:

ZIP code:

Country:

Visa or Mastercard
3-digit CVV/CVC2 Code

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Name:	Manage Payment Accounts – Edit Credit Card
Brief Description:	Consumer User edits existing credit card information
Primary Actor:	Consumer User
Main Path:	<ol style="list-style-type: none"> 1. This use case begins when the User selects the Payment Accounts operation from the navigation menu. 2. System displays a list of existing payment accounts and the ability to add/edit/delete accounts. 3. User selects to edit an existing credit card account information 4. System displays the form to edit a credit card account that contains the following fields. <ol style="list-style-type: none"> a. Account Nick Name b. Account Number

	<ul style="list-style-type: none"> c. Account Name d. Account Type e. Expiration Date f. Card Verification Number (CVV) g. Street Address (Line 1) h. City i. State/Region or Province j. Zip/Postal Code k. Country <ol style="list-style-type: none"> 5. User edits the information and submits the form. 6. System validates the information as being correct and updates the list of payment accounts.
<p>Alternate Paths:</p>	<ol style="list-style-type: none"> 3a) User selects to add a bank account. <ol style="list-style-type: none"> 1. See separate use case. 3b) User selects add credit card account. <ol style="list-style-type: none"> 1. See separate use case 3c) User selects edit bank account. <ol style="list-style-type: none"> 1. See separate use case 3d) User selects delete credit card account. <ol style="list-style-type: none"> 1. See separate use case 3e) User selects delete bank account. <ol style="list-style-type: none"> 1. See separate use case 3f) System is unable to validate the information. <ol style="list-style-type: none"> 1. System displays error message to user informing them of the specific issue
<p>Standard Features:</p>	<ol style="list-style-type: none"> 1. Add, Edit, Delete Bank or Credit Card Accounts 2. Form validation
<p>Configuration Points:</p>	<ol style="list-style-type: none"> 1. Additional payment methods can be configured via the payment cartridge framework.
<p>Notes:</p>	<ol style="list-style-type: none"> 1. If a user deletes a payment account the recurring payments that have been set up to use that account are deleted.

Manage Payment Accounts – Edit Bank Account

Payment Account
 User: Linda Garcia Account: 29006120

Description	Account Type	Account No.	Actions
Personal Visa	Credit Card	XXXXXXXXXXXX0024	edit delete
Joint Checking Account	Bank Account	XXXXX9843	edit delete

Nick Name:
 Account Name:
 Account Number:
 Routing Transit:

Memo

089430098 001409843 1438

Routing number Account number

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Name:	Manage Payment Accounts – Edit Bank Account
Brief Description:	Consumer User edits existing bank account information
Primary Actor:	Consumer User
Main Path:	<ol style="list-style-type: none"> 1. This use case begins when the User selects the Payment Accounts operation from the navigation menu. 2. System displays a list of existing payment accounts and the ability to add/edit/delete accounts. 3. User selects to edit an existing bank account information 4. System displays the form to edit a bank account that contains the following fields. <ol style="list-style-type: none"> a. Account Nick Name b. Bank Account Name c. Account number d. Routing Transit number 5. User edits the information and submits the form. 6. System validates the routing information as being correct and updates the list of payment accounts.
Alternate Paths:	<ol style="list-style-type: none"> 3a) User selects to add a bank account. <ol style="list-style-type: none"> 1. See separate use case. 3b) User selects add credit card account.

	<ol style="list-style-type: none"> 1. See separate use case. 3c) User selects edit credit card account. <ol style="list-style-type: none"> 1. See separate use case. 3d) User selects delete credit card account. <ol style="list-style-type: none"> 1. See separate use case. 3e) User selects delete bank account. <ol style="list-style-type: none"> 1. See separate use case. 3f) System is unable to validate the information. <ol style="list-style-type: none"> 1. System displays error message to user informing them of the specific issue
Standard Features:	<ol style="list-style-type: none"> 1. Add, Edit, Delete Bank or Credit Card Accounts 2. Form validation
Configuration Points:	<ol style="list-style-type: none"> 1. Additional payment methods can be configured via the payment cartridge framework.
Notes:	<ol style="list-style-type: none"> 1. If a user deletes a payment account the recurring payments that have been set up to use that account are deleted.

Manage Payment Accounts – Delete Credit Card

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Payment History

Payment Account

User: Linda Garcia Account: 29006120

Current Payment Accounts			
Description	Account Type	Account No.	Actions
Personal Visa	Credit Card	XXXXXXXXXXXX0024	edit delete
Joint Checking Account	Bank Account	XXXXX9843	edit delete

Nick Name Personal Visa

Account Number XXXXXXXXXXXX0024

Account Name Linda Garcia

Account Type Visa

Expire Date 12/2005

CVV Code 426

Street 12 High Street

City Boston

State MA

ZIP code 02118

Country USA

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Name:	Manage Payment Accounts – Delete Credit Card
Brief Description:	Consumer User deletes credit card account information
Primary Actor:	Consumer User
Main Path:	<ol style="list-style-type: none"> 1. This use case begins when the User selects the Payment Accounts operation from the navigation menu. 2. System displays a list of existing payment accounts and the ability to add/edit/delete accounts. 3. User selects to delete an existing credit card account information 4. System displays a screen to confirm deletion of bank account that contains the following fields. <ol style="list-style-type: none"> a. Account Nick Name b. Account Number c. Account Name d. Account Type e. Expiration Date f. Card Verification Number (CVV) g. Name on Card h. Street Address (Line 1) i. City j. State/Region or Province k. Zip/Postal Code l. Country 5. User confirms the deletion and submits the form. 6. System validates the routing information as being correct and updates the list of payment accounts.
Alternate Paths:	<ol style="list-style-type: none"> 3a) User selects to add a bank account. <ol style="list-style-type: none"> 1. See separate use case. 3b) User selects add credit card account. <ol style="list-style-type: none"> 1. See separate use case. 3c) User selects edit credit card account. <ol style="list-style-type: none"> 1. See separate use case. 3d) User selects edit bank account. <ol style="list-style-type: none"> 1. See separate use case. 3e) User selects delete bank account. <ol style="list-style-type: none"> 1. See separate use case. 3f) Client cancels the deletion, and does not confirm the deletion. <ol style="list-style-type: none"> 1. System does not delete account and returns to Manage Payments screen.
Standard Features:	<ol style="list-style-type: none"> 1. Add, Edit, Delete Bank or Credit Card Accounts 2. Form validation

Configuration Points:	1. Additional payment methods can be configured via the payment cartridge framework.
Notes:	1. If a user deletes a payment account the recurring payments that have been set up to use that account are deleted.

Manage Payment Accounts – Delete Bank Account

Payment Account
 User: Linda Garcia Account: 29006120

Current Payment Accounts

Description	Account Type	Account No.	Actions
Personal Visa	Credit Card	XXXXXXXXXXXX0024	edit delete
Joint Checking Account	Bank Account	XXXXX9843	edit delete

Nick Name: Joint Checking Account
 Account Name: Bank of America
 Account Number: XXXXX9843
 Routing Transit: 089430098

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Name:	Manage Payment Accounts – Delete Bank Account
Brief Description:	Consumer User deletes bank account information
Primary Actor:	Consumer User
Main Path:	<ol style="list-style-type: none"> 1. This use case begins when the User selects the Payment Accounts operation from the navigation menu. 2. System displays a list of existing payment accounts and the ability to add/edit/delete accounts. 3. User selects to delete an existing bank account information 4. System displays the form to delete a bank account that contains the following fields. <ol style="list-style-type: none"> a. Account Nick Name b. Bank Account name c. Account number d. Routing transit number

	<ol style="list-style-type: none"> 5. User edits the information and submits the form. 6. System validates the routing information as being correct and updates the list of payment accounts.
Alternate Paths:	<ol style="list-style-type: none"> 3a) User selects to add a bank account. <ol style="list-style-type: none"> 1. See separate use case. 3b) User selects add credit card account. <ol style="list-style-type: none"> 1. See separate use case. 3c) User selects edit credit card account. <ol style="list-style-type: none"> 1. See separate use case. 3d) User selects edit bank account. <ol style="list-style-type: none"> 1. See separate use case. 3e) User selects delete credit card account. <ol style="list-style-type: none"> 1. See separate use case. 3f) Client cancels the deletion, and does not confirm the deletion. <ol style="list-style-type: none"> 1. System does not delete account and returns to Manage Payments screen
Standard Features:	<ol style="list-style-type: none"> 1. Add, edit, delete bank or credit card accounts 2. Form validation
Configuration Points:	<ol style="list-style-type: none"> 1. Additional payment methods can be configured via the payment cartridge framework.
Notes:	<ol style="list-style-type: none"> 1. If a user deletes a payment account the recurring payments that have been set up to use that account are deleted.

View Payment History

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Overview Statement **Payments** Reports Profile Services Help

Quick Payment Recurring Payment Payment Account **Payment History**

Payment Activity
 User: Linda Garcia Account: 29006120

Reference Number	Pay Date	Amount	Source	Status	Action
1107790766090	02/17/2005	364.12	ⓘ	scheduled	edit - cancel
1107790017645	02/07/2005	200.00	ⓘ	paid	

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Name:	View Payment Activity
Brief Description:	Consumer User views a list of all payments activity for a configurable time period.
Primary Actor:	Consumer user
Main Path:	<ol style="list-style-type: none"> 1. This use case begins when the user wishes to view payment history and selects the Payment Activity operation. 2. System displays Payment Activity Screen that shows the scheduled (pending) payments and historic payment information including the current status. 3. User chooses to edit or cancel a scheduled payment. 4. System requests user to confirm the operation. 5. User confirms. 6. System cancels the pending payment and displays the updated list of payments.
Alternate Paths:	<p>3a) User selects an Action (edit or delete) on a scheduled/pending recurring payment</p> <ol style="list-style-type: none"> 1a) Edit - System displays the recurring payment page <ol style="list-style-type: none"> i. System takes user to Recurring Payment page ii. User updates recurring payment information and submits (information is pre-populated in form).

	<ul style="list-style-type: none"> iii. System validates edited recurring payment details and requests confirmation iv. System displays edited recurring payment details on Recurring Payments page <p>1b) Delete - System displays a delete pop-up and requests confirmation</p> <ul style="list-style-type: none"> a) User confirms or cancels the delete action b) System displays delete confirmation pop-up or cancels delete action and the Recurring Payments page is redisplayed. <p>3b) User invokes the cancel operation on a one-time payment.</p> <ul style="list-style-type: none"> 1. System requests user to confirm and informs them that this operation will cancel the pending payment they have selected. <p>3c) User invokes the edit operation on a pending payment</p> <ul style="list-style-type: none"> 1. System displays the payment details with the editable fields. 2. User edits the information and submits the form.
<p>Standard Features:</p>	<ul style="list-style-type: none"> 1. Edit 2. Delete
<p>Configuration Points:</p>	<ul style="list-style-type: none"> 1. Number of month's history presented. 2. Initial sort order for each column (ascending or descending).
<p>Notes</p>	<ul style="list-style-type: none"> 1. A recurring payment is a schedule of payments to be made. Once recurring payments are processed they become pending payments

Manage Payments – Scheduled Payments

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Overview | **Statement** | **Payments** | **Reports** | **Profile** | **Services** | **Help**

Quick Payment | **Recurring Payment** | Payment Account | Payment History

Recurring Payment

User: Linda Garcia Account: 29006120

Setup Recurring Payments

From Payment Account: Personal Visa

Amount

Total amount

Total amount with a threshold of \$ 100.0
(you will be notified by e-mail if amount exceeds desired threshold)

Fixed Amount of \$ 0.0

Transfer Date

Transfer Date

0 business days before due date

On the 1 of every month

Effective Period

Until Cancelled

For 10 payments

Until Date 02/03/2005 MM/dd/yyyy

Notification

Notify by e-mail when a payment occurs

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Name:	View / Edit / Cancel Automatically Recurring Payment
Brief Description:	User views, edits, or cancels a scheduled recurring payment
Primary Actor:	User of type: Customer User, User Admin
Preconditions	1. The user has already at least one payment account established.
Main Path:	<ol style="list-style-type: none"> 1. User selects Payment Activity 2. System displays Payment Activity page 3. User selects the option to / Edit / Delete a Recurring payment 4. System displays the Recurring Payment page, with the information already filled 5. User modifies all necessary information to update the recurring payment and selects to continue: 6. System validates the request and displays a <i>Payment Verification</i> screen.

	<ol style="list-style-type: none"> 7. The user confirms the information 8. System displays a confirmation page 9. System stores payment settings information in the database and redisplay recurring payment page
<p>Alternate Paths:</p>	<ol style="list-style-type: none"> 4a) The user does not have any established Payment Accounts. <ol style="list-style-type: none"> 1. The system triggers the Payment Account use case. 5a) The user selects to Cancel the Recurring payment <ol style="list-style-type: none"> 1. The system displays a <i>Payment Cancellation</i> page. 2. The user confirms the intention to cancel the recurring payment 3. The system deletes the recurring payment and its future occurrences and displays a <i>Payment Canceled confirmation</i> page. 6a) User cancels the current request <ol style="list-style-type: none"> 1. The system displays the Recurring Payment page 7b) User entered invalid information <ol style="list-style-type: none"> 1. System prompts the User to review the information and displays the <i>Recurring Payment</i> page with the information the user had previously entered 2. User corrects information 3. Resume use case at step #6 of main path.
<p>Configuration:</p>	<ol style="list-style-type: none"> 1. Automatic payments can be set up for all invoice types, including statements. 2. Normally, CSR users (regardless of role) do not setup automatic recurring payments by default. 3. There is no "Due Date" for an invoice or a statement. Therefore the Due Date will be calculated as <ol style="list-style-type: none"> a. Invoice Date + Payment Terms.

Manage Payments – Cancel Scheduled Payment

Name:	Cancel/Delete a Scheduled Payment
Brief Description:	Customer cancels a payment scheduled in the future
Primary Actor:	Customer of type: Customer User, Customer Administrator
Prerequisites	<ol style="list-style-type: none"> 1. The user has at least one payment scheduled in the future.
Main Path:	<ol style="list-style-type: none"> 1. Customer selects main navigational item for Payment 2. User selects the "Payments Activity" operation 3. System displays the scheduled payments 4. User selects to delete a payment. 5. System displays a confirmation page for the deletion of the following scheduled payment (<i>payment data</i>) 6. The user confirms 7. The system displays a confirmation message
Alternate Paths	<ol style="list-style-type: none"> 4a) User selects to change a payment <ol style="list-style-type: none"> 1. Please see edit use case. 4b) User cancels the current request <ol style="list-style-type: none"> 1. The system displays the main Payment Activity page 6b) User entered invalid information <ol style="list-style-type: none"> 1. System prompts the User to review the information and redisplay the page with the information the user had

	<p>previously entered</p> <ol style="list-style-type: none"> 2. User corrects information 3. Resume use case at step #6 of main path. <p>6c) User decides to change information</p> <ol style="list-style-type: none"> 1. User selects "Edit" 2. The system displays the requested payment page with the information the user had previously entered. 3. Please see the Edit use case
Notes:	<p>There can be only one automatic payment per payer. Deleting a scheduled payment removes the entire recurring payment settings for all future occurrences; there is no ability to skip an automated payment by using this feature.</p>

Manage Payments – Change Scheduled Payment

Name:	Change a scheduled payment.
Brief Description:	Customer changes a payment scheduled in the future
Primary Actor:	Customer of type: Customer User, Customer Administrator
Prerequisites	<ol style="list-style-type: none"> 1. The user has at least one payment scheduled in the future.
Main Path:	<ol style="list-style-type: none"> 1. User selects the Payment Activity operation 2. System displays the scheduled payments

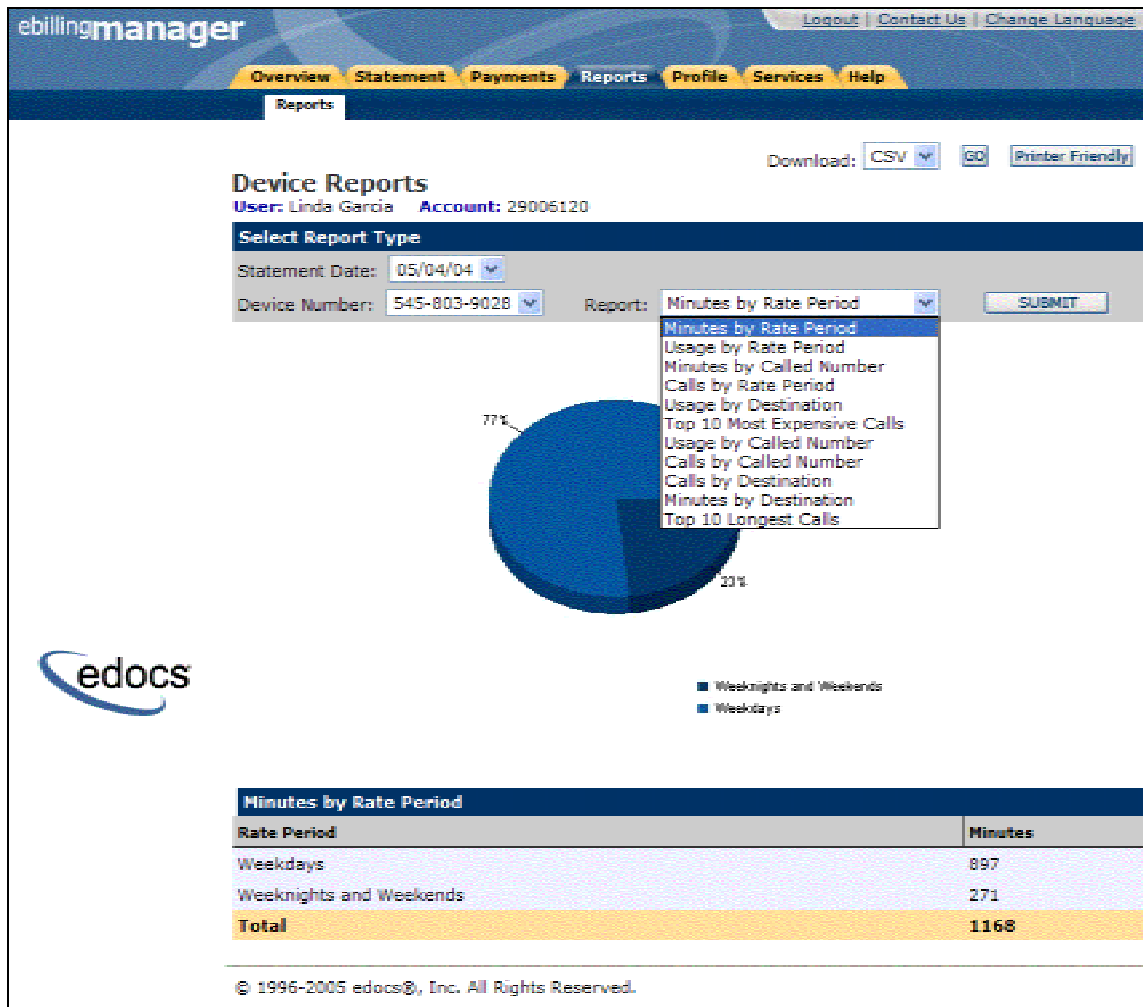
	<ol style="list-style-type: none"> 3. User selects to change a payment. 4. System displays the requested payment page of the form “Quick Payment (<i>payment data</i>) ” 5. The user changes data and confirms 6. The system displays a confirmation page of the form “You have changed the payment (<i>payment data</i>)”
<p>Alternate Paths</p>	<ol style="list-style-type: none"> 4a) User selects to delete a payment <ol style="list-style-type: none"> 1. See separate use case. 4b) User cancels the current request <ol style="list-style-type: none"> 1. The system displays the Payment Activity page 6b) User entered invalid information <ol style="list-style-type: none"> 1. System prompts the User to review the information and redisplay the requested payment page with the information the user had previously entered 2. User corrects information 3. See separate use case.
<p>Notes:</p>	<p>There can be only one automatic payment per payer. Changing a scheduled payment may be done but there may a lock-out window to prevent contention when payments are processing, there is no ability to skip an automated payment by using this feature.</p>

3.7 Analytics Use Cases

e-Billing Manager lets you create the following report:

- **View Report** – Consumer user views various usage reports (screenshot shown)
- **Download Account Data** – Consumer user can download report data

View Report



Name:	View Report
Brief Description:	Consumer user views a report within their account.
Primary Actor:	Consumer user
Main Path:	1. This use case begins when the user selects a report to view.

	<ol style="list-style-type: none"> 2. System displays the report. 3. User changes the statement date. 4. System redisplay the previously selected report for the newly selected statement date. 5. User selects a different report. 6. System redisplay the selected report for the previously selected statement date.
Alternate Paths:	<ol style="list-style-type: none"> 2a) User has access to sub-accounts and selects a different sub-account. <ol style="list-style-type: none"> 1. System redisplay the previously selected report for the newly selected sub-account. 2b) There is no report data available for the selected report/statement date: <ol style="list-style-type: none"> 1. System displays a message stating that there is no data available.
Standard Features:	<ol style="list-style-type: none"> 1. Download (CSV, XML, PDF) 2. Paging/Sorting 3. Print Friendly
Configuration Points:	<ol style="list-style-type: none"> 1. Default support for one account to one or more sub-accounts. 2. Graph type 3. Initial sort order for each column (ascending or descending).
Notes:	<ol style="list-style-type: none"> 1. Reports are based on available customer data: <ol style="list-style-type: none"> a. Reports are dynamic and use XSLt for processing data. b. Graphs are customized based on data and a variety of graph types are supported.

Download Report

Device Reports
 User: Linda Garcia Account: 29006120

Select Report Type
 Statement Date: 05/04/04
 Device Number: 545-803-9028 Report: Minutes by Rate Period

Download: XML GO Printer Friendly

File Download dialog:
 File name: download.xml
 File type: XML Document
 From: tmbuild
 Would you like to open the file or save it to your computer?

 Always ask before opening this type of file

Minutes by Rate Period	Minutes
Weekdays	897
Weeknights a	271
Total	1168

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Name:	Download Account Data
Brief Description:	A Consumer User downloads account data
Primary Actor:	Consumer User
Main Path:	<ol style="list-style-type: none"> 1. This use case begins when a user downloads account data and selects the download function. 2. System request user to select data type. 3. User selects appropriate data type 4. User confirms selection 5. System displays the file save or open dialogue box.
Alternate Paths:	<ol style="list-style-type: none"> 4a) User cancels selection <ol style="list-style-type: none"> 1. System returns user to previous location
Standard	<ol style="list-style-type: none"> 1. XML data format

<p>Features:</p>	<ol style="list-style-type: none"> 2. CSV data format 3. PDF view
<p>Configuration Points:</p>	<ol style="list-style-type: none"> 1. Generation of other formats using XSL 2. Columns of data to be downloaded 3. PDF views are configured and presented dynamically
<p>Notes:</p>	<p>Downloads are available within:</p> <ol style="list-style-type: none"> a. All reports b. Charges detail c. Unbilled detail d. Account Summary

3.8 Profile Management Use Cases

The profile management functionality allows users to set up and manage personal profile, configure and manage monthly e-mail reminders, and change their password

This section describes the following use cases:

- **Manage Personal Profile** – Consumer user can update/edit their user profile.
- **Manage Password** – Consumer user can manage their password.
- **Manage Notifications** – Consumer user can manage the notifications associated with their account.



Manage Personal Profile

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Overview | **Statement** | **Payments** | **Reports** | **Profile** | **Services** | **Help**

Personal Profile | [Password](#) | [Notifications](#) | [Address Book](#)

Personal Profile

User: Linda Garcia **Account:** 29006120

Personal Profile

Click [Edit User](#) to update the profile.

*** required fields**

*** User ID**

*** First Name**

Middle Initials

*** Last Name**

*** Account**

Validation Code

Date of Birth / / (mm/dd/yyyy)

*** Email ID**

*** Street Address**

*** City**

State ▼

*** Zip Code**

*** Country**

Home Telephone

Business Telephone

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Name:	Manage Personal Profile
Brief Description:	Consumer user modifies personal profile information.
Primary Actor:	Consumer user
Main Path:	<ol style="list-style-type: none"> 1. This use case begins when the user selects the profile operation from the navigation menu. 2. System displays a page containing the current profile information in read only format. 3. User selects to edit the profile. 4. System displays page with profile information that may be edited. 5. User edits the profile information and submits form. 6. System validates profile information and displays the updated profile screen to the user.

Alternate Paths:	6a) Customer enters invalid profile information: <ol style="list-style-type: none"> 1. System redisplay the page with the appropriate error message so that customer can correct the information.
Standard Features:	<ol style="list-style-type: none"> 1. The fields have default form validation.
Configuration Parameters:	<ol style="list-style-type: none"> 1. Additional fields can be added to the profile management page based on client requirements. 2. The application supports this feature in its own data model, but it is expected that integration to an external system may be required via a plug-in to a third party system or LDAP repository.
Notes:	<ol style="list-style-type: none"> 1. The Personal Profile collects basic information pertaining to the user. Additional email addresses are collected in the Notifications portion of the application.

Manage Password

The screenshot shows the 'Manage Password' interface in the eBilling Manager application. At the top, there is a navigation bar with 'Password' highlighted. Below this, the user's identity is shown as 'User: Linda Garcia' and 'Account: 29006120'. The main content area is titled 'Manage Password' and contains a 'Current Password' input field. Below that is the 'New Password' section, which includes instructions: 'Please choose a password based on the following criteria and enter it twice to confirm. Password is not message sensitive. Use letters and numbers only when creating your Password. Do not use special characters or spaces.' This section has two input fields: 'New Password: (4-12 Characters)' and 'Confirm New Password:'. At the bottom of the form are 'CANCEL' and 'SUBMIT' buttons. The footer of the page displays the 'edocs' logo and the text '© 1996-2005 edocs®, Inc. All Rights Reserved.'

Name:	Manage Password
Brief Description:	Consumer user updates their password.
Primary Actor:	Consumer user
Main Path:	<ol style="list-style-type: none"> 1. This use case begins when the user wishes to change their password and runs the change password operation from the navigation menu.

	<ol style="list-style-type: none"> 2. User enters in their existing password. 3. User enters in the desired password. 4. User re-enters in the desired password. 5. User submits the password change. 6. System confirms to the user that the password has been changed. 7. System stores updated password.
Alternate Paths:	<ol style="list-style-type: none"> 6a) System identifies that the current password is not valid: <ol style="list-style-type: none"> 1. System error message stating that the password does not match the one on record. 6b) System identifies that the new passwords do not match security standards: <ol style="list-style-type: none"> 1. System responds with a message stating that the new passwords do not meet the required security standards. 6c) System identifies that the new passwords do not match each other: <ol style="list-style-type: none"> 1. System responds with a message stating that the new passwords do not match each other. 6d) User selects to cancel operation: <ol style="list-style-type: none"> 1. User is returned to Personal Profile screen.
Standard Features:	<ol style="list-style-type: none"> 1. Form validation.
Configuration Points:	<ol style="list-style-type: none"> 1. The default password parameters for the edocs product are configurable: <ol style="list-style-type: none"> a. 4-12 characters, alpha-numeric

Manage Notifications

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Overview | **Statement** | **Payments** | **Reports** | **Profile** | **Services** | **Help**

Personal Profile | Password | **Notifications** | Address Book

Manage Notifications

User: Linda Garcia Account: 29006120

Set a New Alert

for an account event... Email SMS

New statement is available.

Payment due in days.

for a payment event...

A payment posts to my account

A payment fails.

for a Credit Card event...

Credit Card expiration reminder.

Alert Destination

You may send all your selected notification alerts to an additional email address. This optional email address will receive alerts in addition to your account profile email address. You may enter the additional email address using the ADD> button below.

Email Address	Actions
todd@edocs.com	Edit Delete

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Name:	Manage Notifications
Brief Description:	Consumer User configures a notification to be sent at a regular interval
Primary Actor:	Consumer User
Main Path:	<ol style="list-style-type: none"> 1. This use case begins when a user selects the notification option in the profile tab. 2. System displays form that has the various options for notifications. 3. User selects the notification and the applicable parameters 4. User selects notification to be active 5. User may add additional email addresses to be included for notifications and alerts 6. System stores the notification information
Alternate Paths:	<ol style="list-style-type: none"> 3a) User sets notification to be inactive. <ol style="list-style-type: none"> 1. System stores the information so that the notification is inactive and no notification will be sent 3a) User edits or deletes additional email addresses. <ol style="list-style-type: none"> 1. System updates additional email addresses for deletions or

	changes
Configuration Points:	<ol style="list-style-type: none"> 1. Giving the user the ability to shut off email notification if they have shut off paper is configurable and a disclaimer can be produced. 2. SMS messages are configured based on SMS gateway integration for messaging requests.
Notes:	

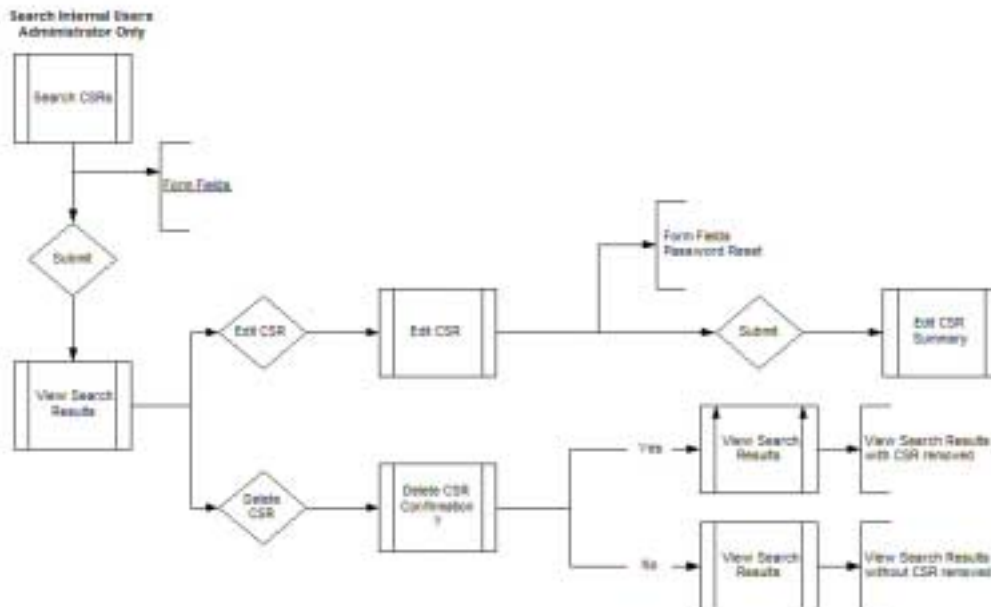
3.9 Customer Service Representative (CSR)

The customer service use cases allow the provider to effectively manage consumer users. The customer service use case section covers the following use cases:

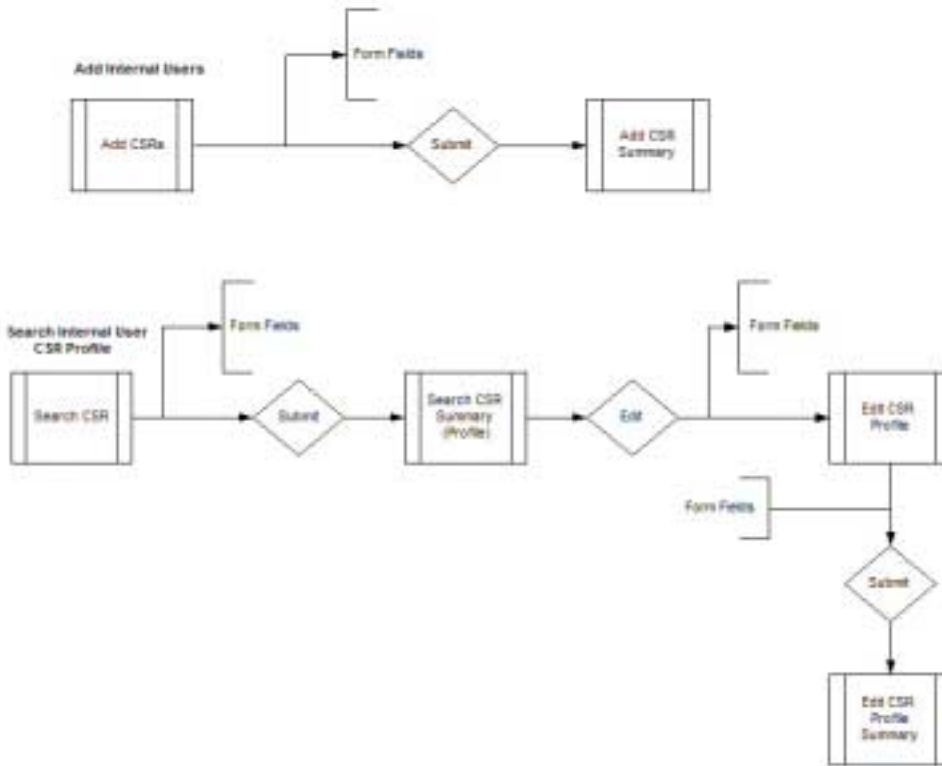
- **Manage Internal Users** – Provider can manage their consumer users.
- **Search for Account** – Provider can search for consumer accounts and invoke the impersonate user feature.
- **Impersonate User** – Provider can impersonate consumer users.

Manage Internal Users

Manage Internal Users



Manage Internal Users - Cont'd



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Logout

Accounts
Manage CSR

Search CSRs
Add CSRs
Profile

Profile

Search CSR Profile

Please input search criteria.

User ID:

First Name:

Last Name:

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Name:	Manage Internal Users
Brief Description:	A Customer service representative administrator, adds, deletes, or modifies other CSRs, so that they can access the application.
Actor:	CSR Administrator
Main Path:	<ol style="list-style-type: none"> 1. This use case begins when an administrator CSR logs in to the application and invokes the Search for users operation. 2. User provides information and submits. 3. System validates the information and displays the updated list of Internal Users to the administrator.
Alternate Paths:	<p>3a) Admin internal user selects user from the list and invokes the Edit User operation.</p> <ol style="list-style-type: none"> 1. System displays User Profile page 2. System displays the updated list of internal users 3. User updates fields and submits the form. 4. System validates the information and updates the profile for the selected user. 5. System displays the updated list of internal users to the administrator. <p>3b) User selects the Delete operation:</p> <ol style="list-style-type: none"> 1. System displays a deletion confirmation page 2. User confirms the operation. 3. System validates the request and logs details of inactivated user and disables the user's access. 4. System displays the updated list of Internal Users <p>6a) System is unable to validate information</p> <ol style="list-style-type: none"> 1. System prompts the user to review the information and does not accept the transaction.
Configuration:	
Notes:	<ol style="list-style-type: none"> 1. Only Administrator CSRs have the ability to manage other CSR users.

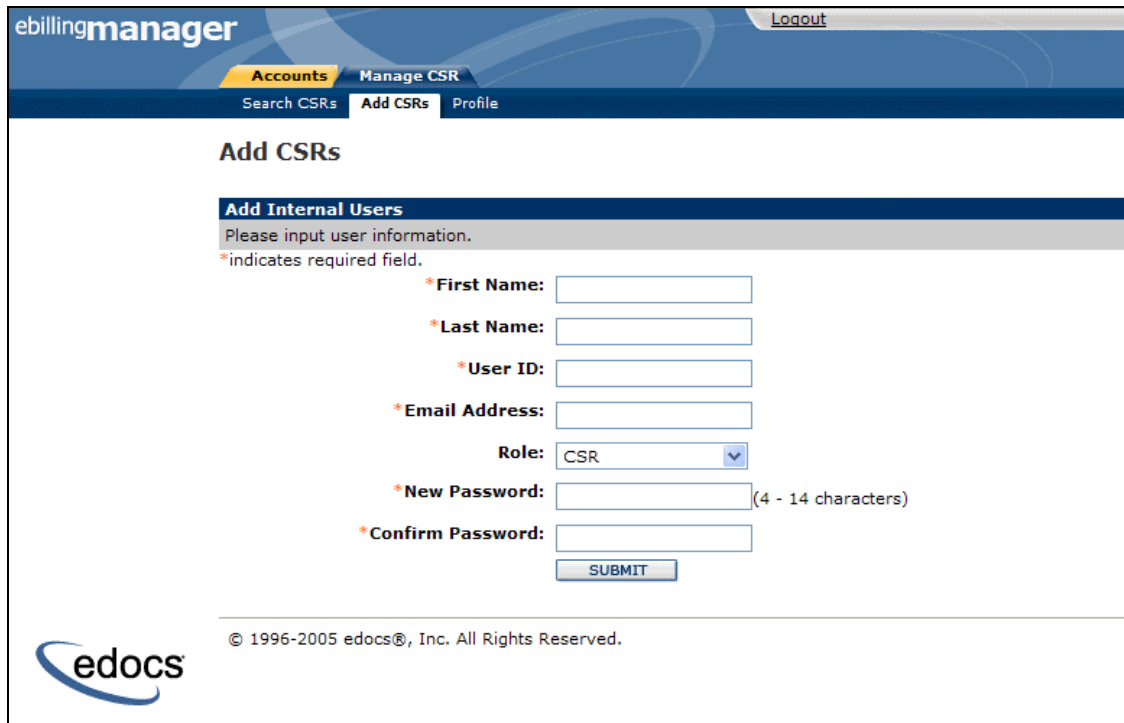
Search Internal User Results



Name:	View Search for Internal User (CSR) Results Summary
Brief Description:	Customer Service Representative views search results for CSR accounts.
Primary Actor:	Customer Service Representative Administrator (CSR Admin)
Main Path:	<ol style="list-style-type: none"> 1. This use case begins when a Customer Service Representative views the search results from the Search CSRs page. 2. User has option to: <ol style="list-style-type: none"> a. Edit CSR User b. Delete CSR User 3. User selections appropriate option. 4. System links to appropriate page based on option selected.
Alternate Paths:	<ol style="list-style-type: none"> 2a) The user is taken to the Edit CSR page. 2b) Admin Internal User selects to do another search: 2c) Admin Internal User selects Delete User: <ol style="list-style-type: none"> 1. System displays a confirmation page with the following information: <ol style="list-style-type: none"> a. Role b. Name 2. Administrator CSR confirms the deletion of the user. 3. System validates the request and logs details of inactivated user and disables the user's access. 4. System displays the updated list of internal users.

Standard Features:	Return list of Names
Configuration Points:	May be configured to return more fields from default profile fields.
Notes:	None

Add Internal Users



Name:	Add Internal Users (CSR)
Brief Description:	A Customer Service Representative Administrator adds other CSRs.
Main Path:	<ol style="list-style-type: none"> 1. This use case begins when an administrator CSR chooses to Add Internal Users. 2. User selects the Add function for a chosen CSR user and enters the user's details. <ol style="list-style-type: none"> a. First Name b. Last Name c. CSR ID d. Email Address e. Role f. Password g. Confirm Password

	<ol style="list-style-type: none"> 3. Admin Internal User enters information and submits the form. 4. System validates the information and displays the summary confirmation for successfully adding a user.
Alternate Paths:	<p>4a) System is unable to validate information</p> <ol style="list-style-type: none"> 1. System prompts the user to review the information and does not accept the transaction.
Standard Features:	Form Validation
Configuration Points:	<ol style="list-style-type: none"> 1. The fields that are displayed on this screen are configurable based on client requirements. 2. CSRs are added and normally immediately active, but this can be configured to be part of an enrollment process for CSRs themselves (Active/ Inactive/ Locked).
Notes:	Only Administrator CSRs have the ability to manage other CSR users.

Add Internal User Summary

ebillingmanager [Logout](#)

Accounts **Manage CSR**

[Search CSRs](#) **Add CSRs** [Profile](#)


Add CSRs

Add Internal Users

Please confirm the information below and click submit.

First Name: John
Last Name: Smith
User ID: jsmith
Email Address: john.smith@edocs.com
Role: CSR
New Password: *****
Confirm Password: *****

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Accounts **Manage CSR**

Search CSRs **Add CSRs** Profile

Add CSRs

Add Internal Users

Your user has been added successfully.

First Name: John
Last Name: Smith
User ID: jsmith
Email Address: john.smith@edocs.com
Role: CSR
New Password: *****
Confirm Password: *****

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Edit Internal User Profile

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Accounts **Manage CSR**

Search CSRs Add CSRs **Profile**

Profile

Edit Profile

Please edit your profile information.
 *indicates required field.

***First Name:**
***Last Name:**
***User ID:**
***Password:**
***Confirm Password:**
***Email Address:**
***Role:**
***Status:**

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Name:	Edit Internal Users Profile
Brief Description:	A Customer Service Representative edits its own CSR profile.

<p>Main Path:</p>	<ol style="list-style-type: none"> 1. This use case begins when a CSR chooses to edit its own Internal Users profile. 2. User selects the edit function for their profile. 3. Administrator CSR chooses to edit the selected details. <ol style="list-style-type: none"> a. First name b. Last name c. User ID d. Password e. email f. Role g. Status (Active/Inactive/Locked) 4. Internal User enters information and submits the form. 5. System validates the information and displays the updated profile of Internal User to the user.
<p>Alternate Paths:</p>	<p>5a) System is unable to validate information</p> <ol style="list-style-type: none"> 1. System prompts the user to review the information and does not accept the transaction.
<p>Standard Features:</p>	<p>Form Validation</p>
<p>Configuration Points:</p>	<ol style="list-style-type: none"> 1. The fields that are displayed on this screen are configurable based on client requirements. 2. The user can only edit its own user profile.
<p>Notes:</p>	<p>None</p>

Edit Internal Users

ebillingmanager [Logout](#)

Accounts **Manage CSR**

[Search CSRs](#) [Add CSRs](#) [Profile](#)

Profile

Edit CSR Profile

Please edit CSR profile information.
*indicates required field.

***First Name:**

***Last Name:**

***User ID:**

***Password:**

***Confirm Password:**

***Email Address:**

***Role:**

***Status:**

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Edit Internal Users Summary

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Accounts **Manage CSR**

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Profile

Edit CSR Profile

Your CSR profile has been edited successfully.

First Name: John

Last Name: Smith

User ID: jsmith

Password: *****

Confirm Password: *****

Email Address: john.smith@edocs.com

Role: CSR

Status: Active

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Name:	Edit Internal Users (CSR)
Brief Description:	A Customer Service Representative Administrator edits other CSRs.
Main Path:	<ol style="list-style-type: none"> 1. This use case begins when an administrator CSR chooses to Edit Internal Users. 2. User selects the edit function for a chosen CSR user. 3. Administrator CSR chooses to edit the selected user's details. <ol style="list-style-type: none"> a. First Name b. Last Name c. User ID d. Email Address e. Role f. Status g. Password h. Confirm Password 4. Admin Internal User enters information and submits the form. 5. System validates the information and displays the confirmation summary page.
Alternate Paths:	<p>5a) System is unable to validate information</p> <ol style="list-style-type: none"> 1. System prompts the user to review the information and does not accept the transaction.
Standard Features:	<ol style="list-style-type: none"> 1. Reset Password 2. Form Validation
Configuration Points:	<ol style="list-style-type: none"> 1. The fields that are displayed on this screen are configurable based on client requirements.
Notes:	Only Administrator CSRs have the ability to manage other CSR users.

Search for an Account

ebillingmanager [Logout](#)

Accounts **Manage CSR**

Search Accounts

Search Accounts

Search Accounts

User First Name:

User Last Name:

User ID:

Account Number:

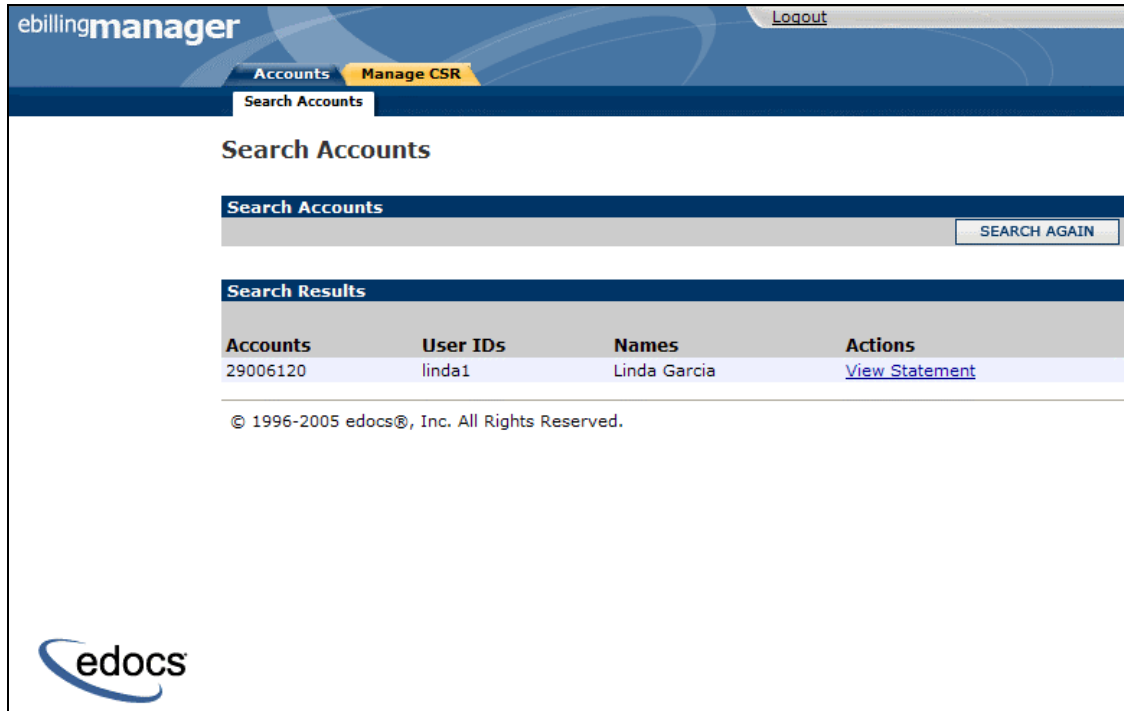
Email address:

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Name:	Search for an Account
Brief Description:	Customer Service Representative searches for an account.
Primary Actor:	Customer Service Representative (CSR)
Main Path:	<ol style="list-style-type: none"> 1. This use case begins when a Customer Service Representative wishes to find a user or account in order to view the account details. 2. System displays search screen. 3. User enters criteria and submits the form. 4. System displays a list of all matching accounts with links for the most recent statement for viewing. See appropriate use case. 5. User selects the Impersonate operation for a specific account. 6. System invokes the Impersonate User use case.
Alternate Paths:	<p>4a) There are no matching accounts found for the given criteria.</p> <ol style="list-style-type: none"> 1. System displays a message stating that there are no matching results.
Standard Features:	<ol style="list-style-type: none"> 1. The following are core fields that are available for search: <ol style="list-style-type: none"> a. Username b. First Name c. Last Name d. Account Number e. Email Address

	2. Partial entry plus wildcard * is possible for all fields options
Configuration Points:	<ol style="list-style-type: none"> 1. The search form that is used by the CSR may be configured based on enrollment information. 2. Required fields must be configured.
Notes	

Search Account Results



Name:	Search Account Results
Brief Description:	Customer Service Representative views results from Search Account screen.
Primary Actor:	Customer Service Representative (CSR)
Main Path:	<ol style="list-style-type: none"> 1. This use case begins when a Customer Service Representative submits a Search Account request. 2. System displays search results screen. 3. User selects to View Statement for a given account. 4. System displays the current statement to the user within the impersonation context.
Alternate Paths:	
Standard	

Features:	
Configuration Points:	
Notes:	

Impersonate User

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[Accounts](#) [Manage CSR](#)

Search Accounts

Impersonate

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[Overview](#) [Statement](#) [Payments](#) [Reports](#) [Profile](#) [Services](#) [Help](#)

Dashboard

User: Linda Garcia Account: 29006120

Account Overview	View Statement	Profile	edit
Statement Breakdown		User: Linda Garcia	
Latest statement from 05/04/04		Email: prajapakshe@edocs.com	
Monthly Service Charges	33.98	Address: 293 Tumpike Rd, Westborough	
Usage Charges	291.15		
Other Charges	9.30		
Taxes	29.69		
Total Current Charges	364.12		
Payment due by 06/03/04			

Payments	View Payments
Last 2 Bill Totals	
Payment by ACH payment at lockbox posted on May 22, 2004	
Previous Balance	97.81
Payment Posted	-97.81
Adjustments	0.00
Past Due Balance Payable Immediately	0.00

Analytics	View Analytics
Minutes Breakdown	
Weekdays	885
Weeknights and Weekends	283
Total Minutes	1168

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Name:	Impersonate User
Brief Description:	A Customer service representative impersonates a user or views a specific account.
Primary Actor:	Customer service representative
Main Path:	<ol style="list-style-type: none"> 1. This use case begins when a CSR selects an account and invokes the impersonate operation. 2. System displays the initial page for the selected user, while maintaining the existing CSR navigation menu. 3. The CSR navigates through the application as a consumer user. 4. CSR exits the impersonated user. 5. System ends impersonation session for the selected user and returns the CSR to the search screen.
Configuration Points:	<ol style="list-style-type: none"> 1. The application can restrict access to customer specific functionality based on a business requirement.
Notes:	<ol style="list-style-type: none"> 1. A CSR inherits the same rights and privileges as the user they are impersonating. 2. All activity logging for all CSR actions are logged for the CSR and not as the Customer.

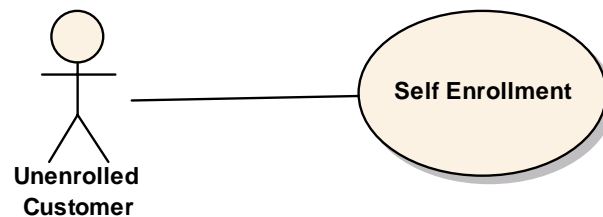
4

4 System Use Cases

4.1 Enrollment and Profile Use Cases

The following use cases describe functionality for enrollment:

- **User Self-Enrollment** – Actor enrolls into application without help from a CSR.
- **SAF Secure Access Framework Use Cases** – Default framework for user roles.



Self-Enrollment

Name:	User Self Enrollment
Brief Description:	User self-enrolls.
Primary Actor:	User type: Un-enrolled user.
Main Path:	<ol style="list-style-type: none">1. System determines the user has not previously enrolled into the e-bill application and displays a <i>self-enrollment page</i>.2. User enters enrollment information.3. User submits the request.4. System validates the request and displays the <i>Enrollment Confirmation</i> screen with the message of the form “You are enrolling (...) ...”.5. User clicks the “Confirm” button.6. System displays a “Thank you” page of the form “You have successfully enrolled (...)...”.7. System stores the user’s enrolment information and updates the user

	<p>profile with enrolment information.</p> <p>8. System stores the users default role of Customer Viewer.</p> <p>9. System displays the e-bill start page the Overview or Dashboard View of his or her account.</p>
Alternate Paths:	<p>5c) User did not enter required or invalid data.</p> <ol style="list-style-type: none"> 1. System displays the Enrollment page with an error message indicating the data in question. <p>8a) User wants to enroll for payment processing</p> <ol style="list-style-type: none"> 1. User must enroll successfully and also self-enroll for payment separately.
Assumptions:	<ol style="list-style-type: none"> 1. The user is enrolled into application.
Notes:	<ol style="list-style-type: none"> 1. Enrollment is provided as an out of the box (OOTB) sample with the application. It is expected to be customized for deployment.

SAF Secure Access Framework Use Cases

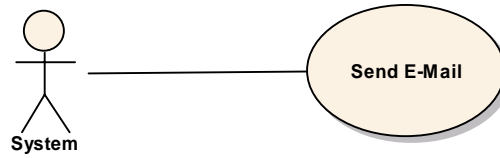
Name:	Secure Access Framework
Brief Description:	Default roles provided with the SAF framework.
Primary Actor:	User of type: enrolled user.
Main Path:	<ol style="list-style-type: none"> 1. System stores the user's enrollment information and updates the user profile including a set of default roles. <ol style="list-style-type: none"> a. Payer – Not used, but may be for some deployments b. User – Full access except CSR c. SuperAdmin – Full CSR access d. CSR – Full CSR access without the ability to create new CSRs 2. System stores the users default role of Customer Viewer. 3. System displays the e-bill start page the Overview or Dashboard View of his or her account.
Alternate Paths:	<p>5c) User did not enter required or invalid data.</p> <ol style="list-style-type: none"> 1. System displays the Enrollment page with an error message indicating the data in question. <p>8a) User wants to enroll for payment processing</p> <ol style="list-style-type: none"> 1. User must enroll successfully and also self –enroll for payment separately. See Payment Section.
Assumptions:	<ol style="list-style-type: none"> 1. The user is enrolled into application.
Notes:	<ol style="list-style-type: none"> 1. Enrollment is provided as an out of the box (OOTB) sample with the application. It is expected to be customized for deployment.

4.2 Payment System Use Cases

Process Recurring Payment

Name:	Process Recurring Payments
Brief Description:	System schedules a recurring payment based on schedule of payments set up by the User
Actor(s):	System, User
Main Path:	<ol style="list-style-type: none"> 1. This use case begins when, at the scheduled time, the System Scheduler identifies recurring payments that are to be processed on that day. 2. System retrieves a list of all accounts that have a recurring payment scheduled. 3. System verifies that information is valid. 4. System generates the payment file containing all recurring payments. 5. System triggers payment notification email event.
Alternative Paths:	<p>1a) System is unable to process recurring payments:</p> <ol style="list-style-type: none"> 1. System records the fault. 2. System alerts the system administrator via a job failure in the Command Center. 3. System places the scheduling job on hold. <p>4a) Payment amount exceeds specified payment threshold:</p> <ol style="list-style-type: none"> 1. System does not process any recurring payments for those accounts that have exceeded a threshold limit. 2. System sends a threshold exceeded email message to customer including text that informs the customer that he/she must manually pay this month's bill. 3. System generates the payment file containing all valid recurring payments.
Standard Features:	<ol style="list-style-type: none"> 1. Email notification for processed and failed payments
Configuration Points:	<ol style="list-style-type: none"> 1. Business rules such as "no duplicate payments can be made in a given day" are configurable parameters.
Notes:	

4.3 E-Mail Notifications



Name:	Send system email notification
Brief Description:	System sends email to notify User of a system event
Actor(s):	System
Trigger(s):	System detects an event that should result in an email to the User.
Alternative Paths:	<ol style="list-style-type: none"> 1. This use case begins when a system notification event has occurred. 2. System generates email message based on one of the following triggering events: <ol style="list-style-type: none"> a. Bill Ready Notification b. Payment Due In Five Days c. Scheduled Payment Paid d. Payment Failed e. Credit Card Expiration Notice 3. System generates list of accounts that will receive email. 4. System generates a file that has the appropriate information. 5. System transfers the file to a location specified in the configuration of the file creation job. 6. The appropriate server processes and generates email file. 7. The server places the file in a location that is specified in the configuration of the email notification job. 8. System processes the file to generate email. 9. System sends email message to SMTP server.
Alternate Paths:	<p>1a: System is unable to start job notification:</p> <ol style="list-style-type: none"> 1. System updates the status of the job to "Failed". <p>2a: Bill Ready Notification (Account & User Level)</p> <ol style="list-style-type: none"> 1. Bill cycle is completed for billing accounts 2. System creates Bill Ready email <p>2e: Schedule Payment Paid (User Level)</p> <ol style="list-style-type: none"> 1. A scheduled payment has been paid 2. System creates a Scheduled Payment Paid email <p>2f: Credit Card Expiration Notice (User Level)</p> <ol style="list-style-type: none"> 1. The credit card expiration date has expired 2. System creates a Credit Card Expiration Notice

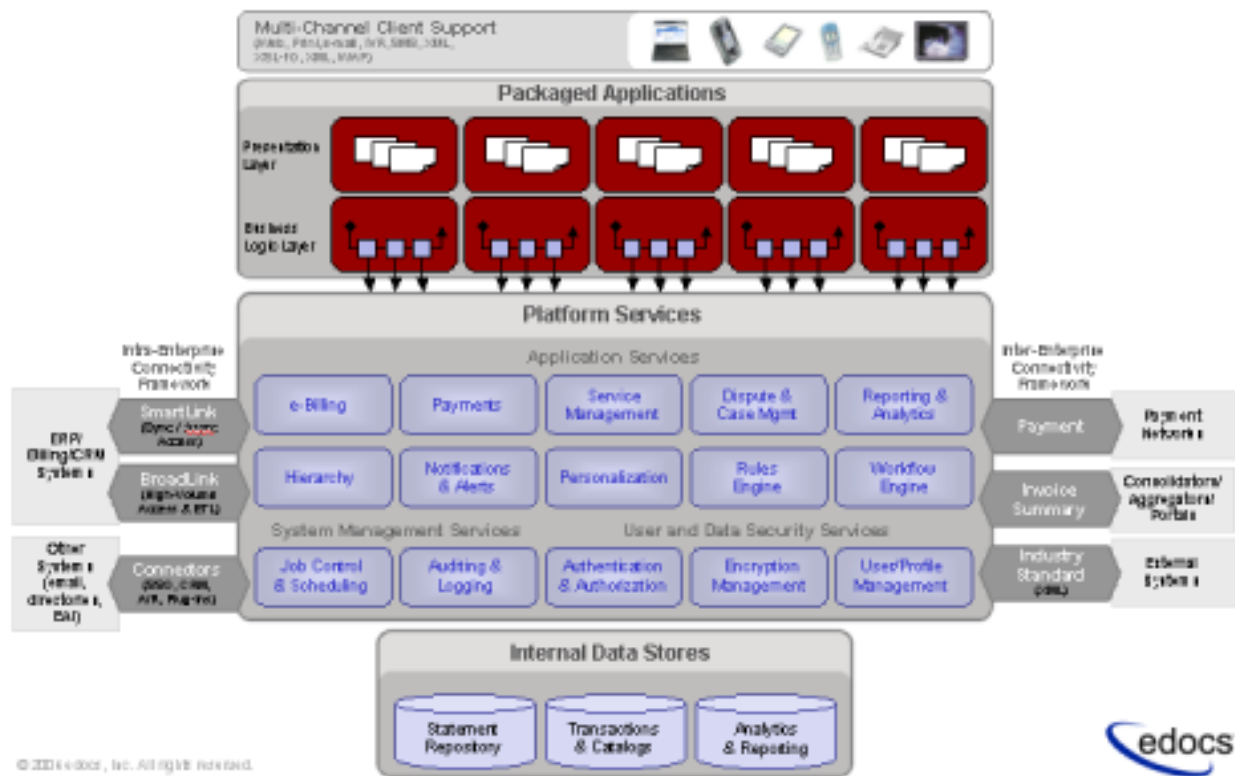
	<p>4a: System is unable to generate the file</p> <ol style="list-style-type: none"> 1. System updates the status of the job to “Failed”. 2. System logs the error and specific error code. <p>6a: The server is unable to generate the file</p> <ol style="list-style-type: none"> 1. System updates the status of the job to “Failed”. 2. System logs the error and specific error code. <p>8a: System is unable to process the file to generate email</p> <ol style="list-style-type: none"> 1. System updates the status of the job to “Failed”. 2. System logs the error and specific error code. <p>9a: Email server is unavailable</p> <ol style="list-style-type: none"> 1. System updates the status of the job to “Failed”. 2. System logs the error and specific error code
<p>Configuration Points:</p>	<ol style="list-style-type: none"> 1. All users with Pay permissions receive notifications (if applicable) <ol style="list-style-type: none"> a. Emails may be sent based on hierarchy level rollup for the Business Edition of the product 2. Manage notifications for emails will have Bill Ready and Payment Rejections selected by default. 3. Emails may be HTML or Text format
<p>Notes:</p>	

5

5 External Interfaces

Overview of Integration Points

The following diagram illustrates the e-Billing Manager's extensible, multi-channel architecture:



The external interfaces are shown eXtensible Multi-channel Architecture (XMA) diagram, above.

These components are customized through the configuration and generation of lower level components within a J2EE infrastructure, including JSP pages, HTML templates, JavaBeans, Struts action classes, Tiles, and Java-based batch processes.

The integration points, as shown in the System Context Diagram in Chapter 2, consist of:

- **Billing data files** – Generated by the billing system following the monthly billing cycle and transferred into an input directory on the IFS system.
- **Daily billing data files** – Generated by the A/R system on a daily basis to provide daily updates to customer accounts.
- **Payment data** – Generated by the system by a scheduled process and transferred to the payment processor.
- **Payment status data** – Generated by the payment processor and returned to the system.
- **A/R payments data** – Generated by the A/R system on processing customer payments.
- **A/R payments reconciliation file** – Generated by the system by a scheduled process and transferred to the A/R system.

Data Files

The e-Billing Manager application can receive billing data in a variety of formats. The edocs application can take print composition formats, raw billing table extracts and other well-structured legacy formats. This data is loaded into the edocs application using a batch scheduling process that is configurable based on specified business rules.

ACH Files

e-Billing Manager provides connections to payment networks. Real-time and batch interfaces to ACH, Credit Card, and proprietary networks using a cartridge based approach yields complete payment flexibility.

A/R Files

e-Billing Manager integrates with your existing infrastructure, updating accounts receivable systems with remittance information, and supports reconciliation processes. e-Billing Manager includes XML-based API's for integration into backend systems.

New Standards and Best Practices

Java 2 Enterprise Edition (J2EE) has become a standard platform for developing enterprise-class web-based solutions. It is well-suited for internet-based applications because it provides many of the underlying services such as the Java Servlet API (for servicing HTTP requests), EJB (for transaction processing), and Java Message Service (for messaging) among others.

J2EE is a more mature and robust technology and is complex. Internet application developers would fail to realize the many benefits promised by J2EE (such as reusability, extensibility, flexibility, scalability etc.) without having a solid understanding of the corresponding technology, and more importantly, a viable application framework upon which the solution is developed.

edocs' e-Billing Manager Architecture is the foundation upon which applications may exploit the J2EE design and development best practices.

One of the guiding principles for the e-Billing Manager Architecture for web-based application is Jakarta Struts. Its architecture and its application to the edocs' suite of products are based on the MVC design pattern. It is a framework by which integrators may deploy web-based application at record speed, with greater re-usability and extensibility, better quality, and better performance.

References

Here are several sources of additional information on the technologies used in the e-Billing Manager framework:

- The Jakarta Struts web site: <http://jakarta.apache.org/struts/>
- An article on using Struts1.1 features:
<http://www.onjava.com/pub/a/onjava/2002/10/30/jakarta.html?page=1>
- The book *Programming Jakarta Struts* by Chuck Cavaness
- An article explaining the synchronizer token concept:
<http://www.javaworld.com/javaworld/jvatips/jw-jvatip136.html>
- Four-part tutorial on Tiles:
http://www.onjava.com/pub/a/onjava/excerpt/progjakstruts_14/index1.html
http://www.onjava.com/pub/a/onjava/excerpt/progjakstruts_14/index2.html
http://www.onjava.com/pub/a/onjava/excerpt/progjakstruts_14/index3.html
http://www.onjava.com/pub/a/onjava/excerpt/progjakstruts_14/index4.html
- Log4j Web Site: <http://jakarta.apache.org/log4j/docs/index.html>
- Core J2EE Patterns: *Best Practices and Design Strategies* by Deepak Alur, John Crupi, Dan Malks

Background

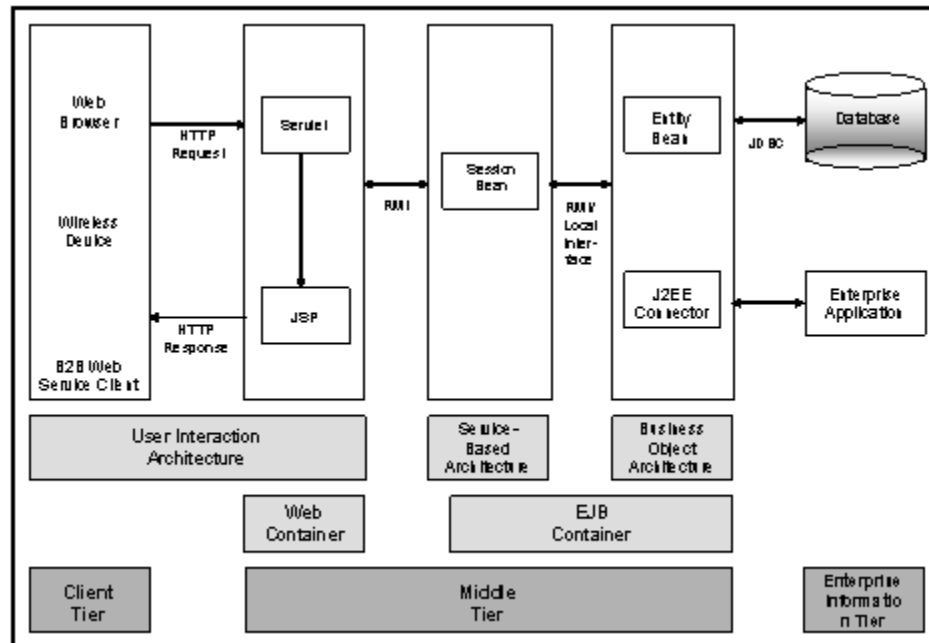
Many web-based applications today, especially those based on J2EE, can be described in terms of their tiers. The application's functionality is separated across these tiers, to provide separation of responsibility and to promote reusability, maintainability, improved scalability and many other benefits.

A brief overview of the J2EE architecture with its multi-tiered components gives the reader a basic understanding of the technology and also describes how the struts components map onto the J2EE application framework.

The J2EE Platform

The J2EE platform provides a component-based approach to implement a multi-tiered software architecture. The components that make up the architecture are executed in runtime environment called containers. Containers are used to provide infrastructure-type services such as memory management, transaction management, security etc. In a web-based environment, the majority of the software resides in two containers, the Web container and the EJB container, running inside of the application server.

The J2EE components are divided into 3 tiers as shown below:



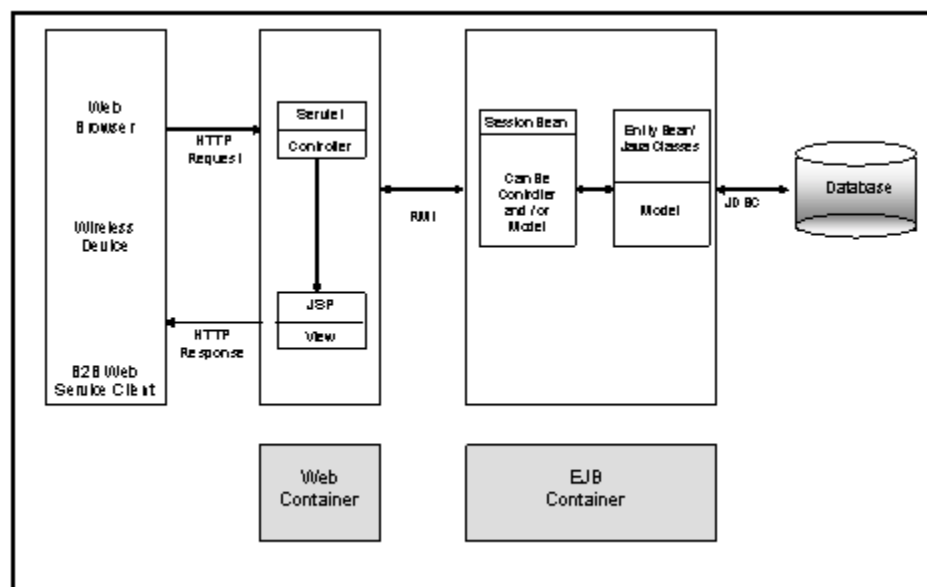
The function of the Web container is to process client requests and generate responses, while the function of the EJB container is to implement the business logic of the application.

The Model-View-Controller Approach

The Model 2 architecture is based on the Model-View-Controller design pattern. MVC is the cornerstone of web-based application development best practices. The patterns are defined as follows:

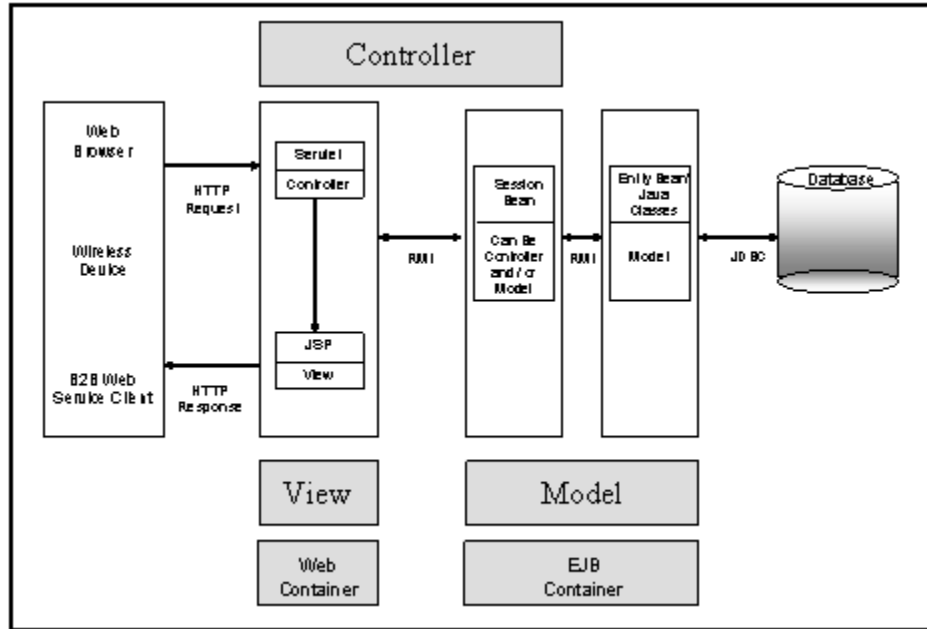
- **View:** The screen presented to the users
- **Controller:** The component that controls the flow and processing of user actions
- **Model:** The application business logic components

The figure below shows a complete picture of how objects in the MVC framework are mapped to the J2EE architecture:



It is important to note that MVC is only a software pattern and does not restrict where components live within the architecture. There are a number of variations of how the MVC pattern can be applied to web-based applications. As can be seen in the figure above, the Controller component can have different functions on the different tiers. A controller component in the Web tier can be used for processing HTTP requests such as form submissions and navigation links. Controller components on the EJB tier can control the flow of the application functionality.

Figure below shows one variation of the MVC pattern in a web-based application:



The e-Billing Manager framework enables speedy deployment of web applications using the edocs product line. e-Billing Manager has been developed using the Jakarta Struts and Tiles frameworks.