E.PIPHANY®

THE E.PIPHANY CUSTOMER RELATIONSHIP BACKBONE

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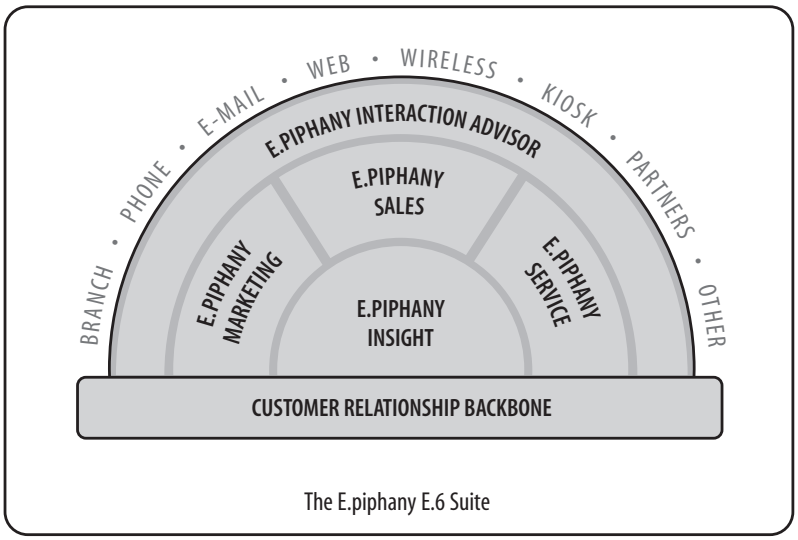
INTRODUCTION

No customer relationship management (CRM) application stands alone. Every CRM application must be integrated with many other systems to build a successful solution. Many vendors attempt to address the integration of individual CRM applications to enterprise resource planning (ERP) and other back-office applications. Until now, no vendor has offered a solution for the number one integration problem affecting CRM: the integration of CRM applications with each other and with back-office systems to build an intelligent whole.



The E.piphany E.6 Suite

To be effective, CRM applications must share customer processes, customer intelligence and customer data. It is desirable, for instance, to integrate marketing functionality into call center applications so that phone agents can provide cross-sell or up-sell offers. The call center application needs access to the processes, intelligence and data that drive effective in-bound marketing offers. To build a customer integrated enterprise, the boundaries between the traditionally separate domains of marketing, sales and service must be broken down.

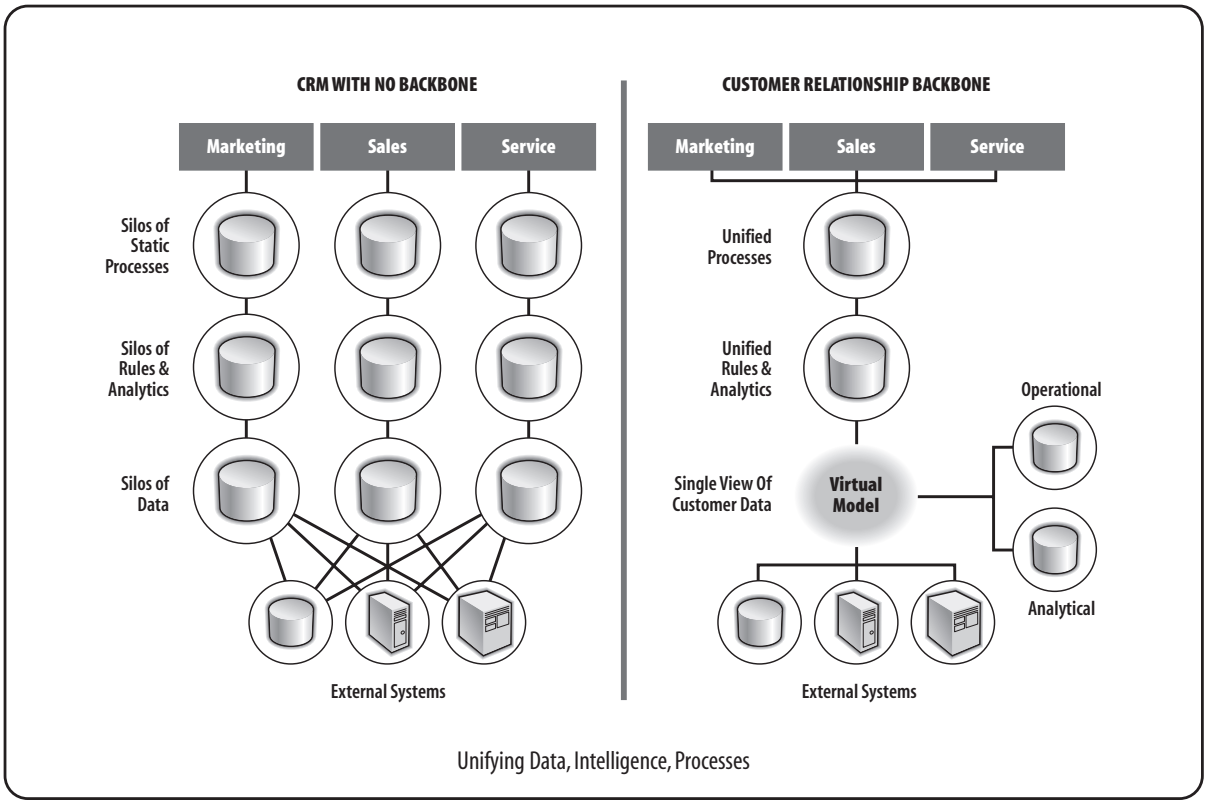
Until now, no CRM vendor has offered a complete solution that unifies customer processes, customer intelligence and customer data to make it accessible and actionable across all front-office and customer-facing applications. The E.piphany Customer Relationship Backbone (CRB) solves this problem for the first time. Built on a flexible, open architecture, the CRB tightly integrates E.piphany applications and other applications, helping organizations drive intelligent customer interactions more quickly and easily than ever before.

ANATOMY OF CRM INTEGRATION

Larger organizations have many different applications and systems that involve customers. Marketing applications, Web sites, point-of-sale systems and automated kiosks, phone support, email support, sales, telesales, and order management are just some of the application areas, each of which may include multiple systems and each of which may have separate applications in separate corporate divisions. The challenge for business and IT owners alike revolves around bringing these systems together. Effectively integrated, these systems can inform each other and increase overall customer intelligence to create more powerful interactions and to help build more profitable relationships. Poorly integrated, these systems can actually work against an organization's ability to build stronger customer relationships.

One way to avoid detrimental fragmentation is to buy the complete range of enterprise applications from a single vendor. For most organizations, however, this approach is impractical and insufficient. Existing investments need to be leveraged, not ripped out and replaced. In today's world, the coexistence of many systems as part of the overall CRM landscape is both reality and necessity. In this environment, it is often difficult to have an effectively integrated CRM solution, especially since many CRM applications are not designed to easily share data and processes with other applications. It is often a challenge to integrate applications from a single vendor, let alone to integrate multiple third-party applications and home-grown applications.

A better and more effective approach to CRM integration is to build an integration backbone for all CRM applications. A practical solution will be compatible with enterprise integration servers from vendors such as IBM or BEA to enable easy integration to legacy and back-office applications. But the CRM integration backbone must go beyond the capabilities of standard



integration servers to deliver customer intelligence to every application and have the capacity to act on that intelligence. A complete CRM backbone, therefore, should help integrate:

- Customer data, such as contact information or transaction history
- Customer intelligence, such as profitability or likelihood to purchase new products
- Customer processes, such as processes for presenting retention offers or taking orders from high-value customers

Over time, every CRM application can access customer processes, customer intelligence and customer data through the backbone. The backbone serves to link the applications together into a well-integrated solution, and it enables the integrated solution to act as an intelligent whole.

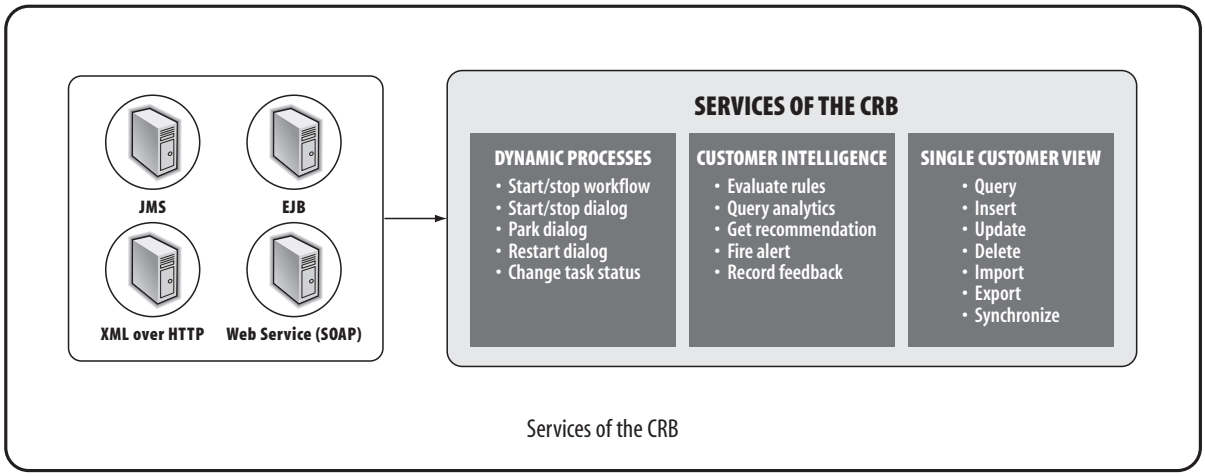
The E.piphany Customer Relationship Backbone provides the necessary services to unify customer processes, customer intelligence and customer data across CRM and other front-office and customer-facing applications, and to use these to drive intelligent customer interactions. It allows organizations to take a realistic and effective approach to application integration, connecting E.piphany applications together with the many other applications that make up the total customer relationship landscape.

A FLEXIBLE BACKBONE

For an integration solution to be effective, first and foremost it must be flexible. Without flexibility, implementing and maintaining a solution is difficult and costly. The following sections describe how the E.piphany Customer Relationship Backbone provides the highest level of flexibility for faster, easier integration, and increased responsiveness to business demands.

Service-Oriented Architecture

The CRB is built using a Java 2 platform, Enterprise Edition (J2EE) service-oriented architecture. Each of the individual services within the CRB is an Enterprise JavaBean (EJB) with a well-defined service interface. Each of these services also has an associated Web service interface. This means that it is extremely easy to integrate the



Services of the CRB

CRB with other J2EE applications or with other applications that are capable of invoking Web services.

From an architecture standpoint, service-orientation provides the maximum flexibility. The full set of functionality in the CRB is broken into smaller services, so that implementers can choose the points and means of integration that are appropriate for them. Also, this provides greater safety in testing and upgrade. Problems within an individual service can be isolated more easily, and individual services can be upgraded without affecting other parts of the system.

Support for Open Standards

By relying on open standards, the CRB provides implementers complete flexibility for integrating other applications with the CRB, whether those applications are also developed on J2EE or whether they are legacy applications or .NET. Also, the use of open standards allows greater flexibility in the choice of tools, since a number of integrated development environments, such as Eclipse or BEA WebLogic Workshop are adding support for Web services and integration standards.

As already mentioned, the CRB is built from a set of J2EE EJBs that are also exposed as Web services. The following is a list of the variety of open standard interfaces that can be used for integrating with the CRB:

- Enterprise JavaBeans
- Web services (SOAP)
- Java Message Service (JMS)
- XML over HTTP

The CRB also supports emerging standards for business process definition such as the Web services business process execution language (WS-BPEL). Business processes within the CRB are stored in an XML format that supports interchange with other standards-based systems and tools. This approach, combined with the CRB's service-oriented architecture, means that CRM processes can be reconfigured using standard tools and skills, and can easily integrate with third-party or homegrown functionality that supports J2EE or Web service standards.

Manageability for Business Owners

In order to be adaptable and responsive to new business requirements, it is important to put control of key customer rules and processes into the hands of the appropriate business owners. The CRB provides the means for business owners to define and deploy rules and processes without the intervention of system implementers or administrators.

While many individual applications allow business owners to define key rules or processes within the specific application, the CRB lets business owners define and deploy CRM-specific rules and processes across applications. A marketer, for instance, can create a new cross-sell offer, match the offer to specific customer segments, and define the process for presenting the offer. With the CRB, this new offer and the rules and process can be immediately activated in any application connected to the CRB, such as the call center or the Web self-service site. In CRM applications without CRB, deploying a new cross-sell offer would usually require implementers to reprogram each application, making for slow responsiveness and taking the control out of the hands of the marketer.

KEY CAPABILITIES OF THE CRB

The E.piphany Customer Relationship Backbone provides a flexible and robust solution for data integration, a core of customer analytics and real-time intelligence, and a set of business process services with CRM-specific features and tight connections with customer intelligence. The following sections describe the key capabilities of the CRB in greater detail.

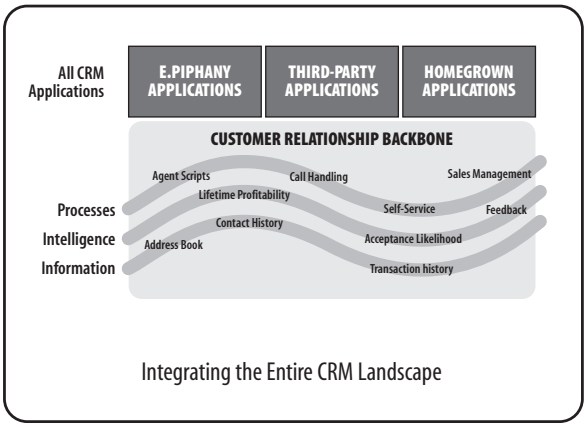
Single Customer View
The data integration capabilities in the CRB allow CRM applications to obtain a single, consistent view of all customer information, whether that information is stored in a local database or in remote systems. This is done by defining a virtual data model in the CRB, then mapping the virtual objects to their physical storage locations. The virtual data model provides the following key advantages:

- Makes it easier to map applications to existing customer data models
- Provides the flexibility to choose which systems will "own" which data elements
- Allows organizations to choose which data elements will be stored local to the CRM applications and which will be remote
- Makes it easy to prototype CRM applications even if data sources are not yet established during implementation and testing
- Makes it faster to alter applications to support changes in back-end data sources

Some of the key features of the virtual data model are:

- Full support for insert, update and delete operations, even for virtual objects mapped to multiple storage systems
- Support for standard data access interfaces such as JDBC, Web services and JMS
- Compatibility with integration middleware from IBM, BEA, TIBCO and other vendors

The CRB provides a complete set of data integration features for a robust and scalable solution. This includes features for key mapping, key generation, caching, and change audit logging. It also includes tools for batch data loading and server-to-server synchronization. Full support for symmetrical clustering provides the highest levels of scalability and reliability.



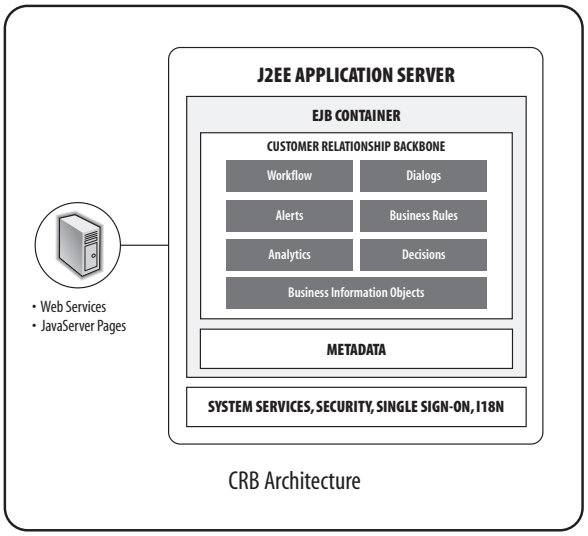
Integrating the Entire CRM Landscape

Customer Intelligence
The real-time customer intelligence capabilities in the CRB allow all CRM applications to share customer intelligence and use it in real-time to optimize every interaction. Built on E.piphany's industry-leading customer analytics and customer relationship optimization capabilities, these features allow applications to identify meaningful measures for individual customers, such as lifetime profitability or likelihood of interest in specific products. This intelligence can then be applied to:

- Provide more effective cross-sell or up-sell offers across all CRM applications
- Identify events that may indicate churn risk in real-time and present retention offers
- Segment customers for tiered levels of service based on profitability or potential lifetime value
- Route work items more appropriately based on customer insight
- Improve customer self-service by detecting the appropriate process for the individual and situation
- Trigger marketing offers based on specific customer events or non-events

The real-time intelligence capabilities of the CRB include the industry's most sophisticated analytic query engine, a rules engine, an alert service, and a unique real-time decision service that provides high-performance decisions based on customer behavior and business parameters. The capabilities also include adaptive learning, so the system can learn from customer activity to more accurately inform every interaction.

With customer intelligence embedded in the CRB, all applications, including homegrown and third-party



CRB Architecture

applications, can benefit. And as customer interactions are tracked through the CRB, the intelligence increases and is immediately shared across all applications.

Dynamic Processes
Processes within the CRB can be centrally managed by business owners, and dynamically activated or driven by real-time customer intelligence. Centralized management allows the appropriate process owners to design and maintain processes across multiple applications. Dynamic activation means that the most appropriate processes are used for each interaction, and it is not necessary to have an application programmer involved to deploy a new process.

Dynamic processes can be distinguished from static processes, which are specific to a single application and which are not dynamically driven by customer intelligence. Some of the advantages of dynamic processes within the CRB are:

- Easier configuration through a flexible and standards-based process architecture
- Increased effectiveness in meeting strategic goals by leveraging real-time intelligence for optimization
- Faster responsiveness by allowing processes to be changed within the CRB without having to alter individual applications

The process capabilities within the CRB are for task-based team workflows and interactive dialogs. These process capabilities focus on enabling CRM-specific processes, such as team-selling methodologies or agent call scripting, and go beyond the standard process capabilities of integration servers. Built using emerging business process standards and J2EE service-oriented architecture, the CRB's process capabilities provide maximum flexibility for integration and extension. (For more on Dynamic Processes, see the E.piphany white paper Dynamic Processes: The Convergence of SOA, BPM and Real-Time Intelligence).

DATA INTEGRATION

The flexible and robust data integration features of the CRB are provided by the Business Information Object (BIO) service and associated utilities. The following sections describe the features in more detail.

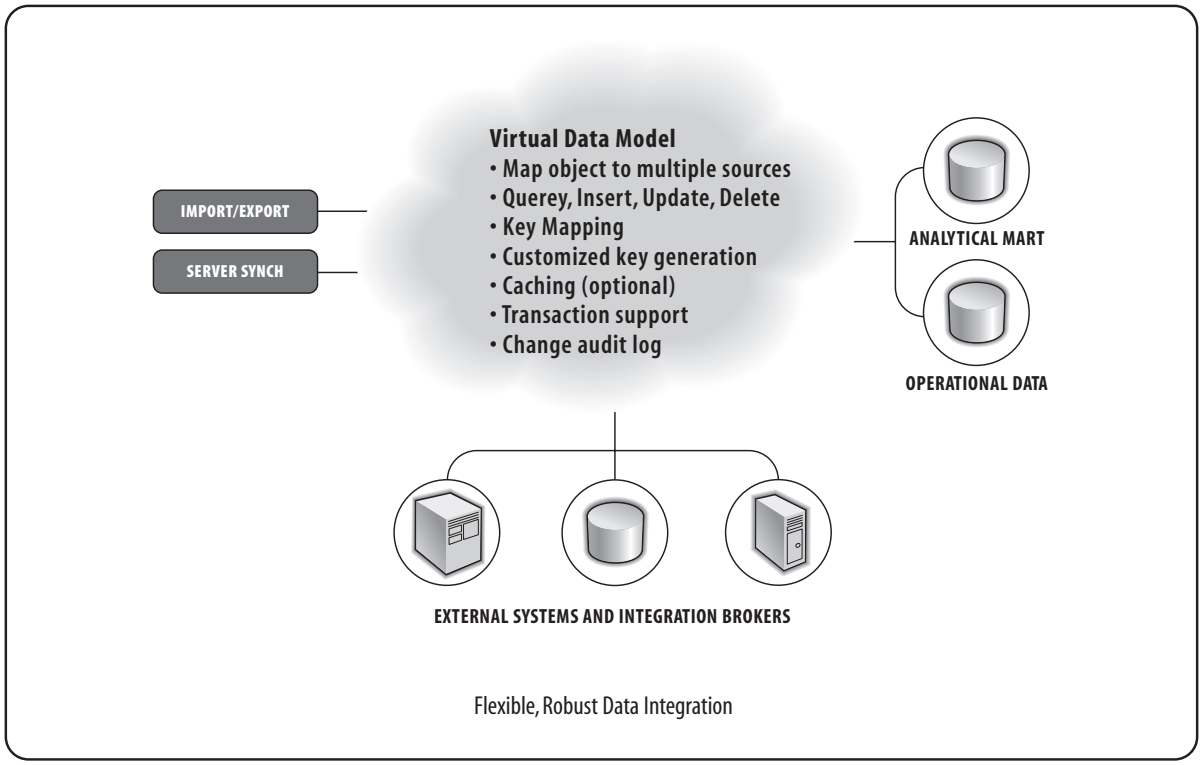
Virtual Data Model
The BIO service allows you to define a virtual data model and map that model to data sources. Definition of the model and mapping is done using E.piphany's configuration tool, E.piphany Studio.

The virtual modeling features include the ability to define static attributes, computed attributes, and relationships between objects. It also includes standard object-oriented relationship capabilities, such as the ability for one virtual object to inherit attributes from another.

Connection to data sources is also defined in E.piphany Studio. It is possible to map individual attributes of a single object to different data sources. The virtual data model supports multiple types of data sources and data access, including JDBC, JMS, SOAP, EAI, and JCA. It provides connections to back-office applications through integration servers such as IBM WebSphere Business Integration and BEA WebLogic Platform Integration. Custom data sources and access methods can also be added by developing a plug-in EJB.

Insert, Update and Delete Support
The virtual data model has rich support for efficient data queries, but it also supports insert, update and delete. Even if a single object, such as a customer profile object, is mapped to multiple data sources, the BIO service will automatically update each of the data sources appropriately.

The query, insert, update, and delete methods, like all methods available in the CRB, can be accessed from a vari-



ety of remote interfaces. This includes EJB, JMS, SOAP or XML over HTTP. Access to methods, objects or specific attributes can be blocked using roles-based security.

Transaction Support

The BIO service wraps every insert, update and delete into a single unit of work. If a virtual object is mapped to multiple data sources, the complete transaction across each data source is contained within the unit of work. For transactions that occur within a single database, the commit and rollback capabilities of the database are used to ensure transactional integrity.

Key Mapping and Key Generation

The virtual data model includes the ability to map information from systems that use different keys. For example, if the customer profile exists in one system and customer purchases exist in a separate system but they use different keys, it is possible to map them together. A "customer" virtual object can be mapped to the first system, a "purchase" virtual object can be mapped to the second system, and a relationship between the two can define how the keys are mapped. Key mapping can be done using a computed algorithm or through a mapping table. When accessing the objects, the caller simply refers to "customer.purchase" without having to understand the key mapping underneath.

Automatic key generation is also supported. The system has built-in support for global unique identifiers (GUIDs) or an implementer can create a custom extension in Java to generate new keys. The key field is automatically populated using GUID or custom extension whenever a new object is created.

Caching

For improved performance when accessing data from remote systems, the BIO service supports caching. Caching is a configuration option for a defined set of data attributes coming from a specific data source. When caching is turned on, the specified data attributes are cached each time they are accessed. The cache is stored using the same mechanism that caches user session information. A timeout period can be specified that forces data in the cache to be cleared.

Change Audit Log

Changes to individual attributes can be logged for reporting purposes. The log contains information on the user and date of each change. Logging is optional and can easily be turned on or off for any object or attribute.

Server-to-Server Synchronization

The server-to-server synchronization capability relies on a transaction log that records every transaction

performed through the BIO service. Synchronization involves the extraction of appropriate information from the log, the compression of that information and transfer to a remote machine, and then the decompression and playback of those transactions on the remote machine. This is the same synchronization that is used to transfer data to mobile machines.

Multiple machines can be chained together in a synchronization hierarchy. Synchronization jobs can be set up to run on a timed basis. Security to specific pieces of data is enforced and maintained throughout the synchronization process.

Batch Data Loading
An import utility is available for batch loading of data from files. Import jobs can be run on a timed basis. Each import reads records from the file and submits them as potential transactions to the BIO service. The import supports both insert and update.

Errors are logged in a specific error file. For each import job, an administrator can specify how many errors may occur before the job is aborted. Also, the administrator can specify how many items should be inserted or updated before the changes are committed within the system. If a change fails before this transaction boundary is reached, all previous changes within that transaction will be automatically rolled back.

CUSTOMER INTELLIGENCE

Tightly integrated customer intelligence is at the center of the CRB. The real-time intelligence capabilities allow applications to gain added insight from customer data and improve and optimize customer processes. This is the true differentiator between the CRB and any other CRM integration solution. The following sections describe the customer intelligence features within the CRB.

Customer Analytics
The customer analytics capability is enabled by E.piphany's industry-leading analytics query engine. The analytics queries run against E.piphany's customer data mart. The analytics provide historic, predictive, trend, and other types of analysis that provide deep insights into customer behavior. Using the CRB, any application can retrieve specific customer analytics, such as a customer value score, calculated lifetime profitability, or churn risk.

The analytics are deeply embedded into the other capabilities of the CRB, such as the virtual data model or customer processes. This design allows the CRB to take advantage of analytical information about individual customers, and use that insight to optimize customer interactions as they are taking place.

Real-Time Decisions
The E.piphany Real-Time Decision Engine is part of the CRB, providing a sophisticated decision-making facility that can be accessed by processes and rules. Using powerful real-time analytic algorithms, this technology analyzes customer attributes and behaviors to identify the most appropriate offers, rewards, or other treatments appropriate for a specific interaction.

Using an operating-system level core recommendation engine, the highly tuned service provides recommendations in real-time, even when dealing with millions of customers in high-volume environments. The sophisticated decision capabilities rank recommendations based on individual customer characteristics, past or current customer behavior, and business parameters such as the business value or priority ranking of each recommendation option.

The recommendation options and business parameters that drive real-time decisions can be configured and controlled by business owners. A marketer, for instance, can add cross-sell or up-sell offers, and can identify the value of each offer to the business. Or a contact center manager could define offers to extend to loyal customers at the end of service inquiries.

Intelligent Business Rules
E.piphany Intelligent Business Rules is a complete business rules engine that is able to leverage customer intelligence. Business rules can be organized in hierarchical trees, and rule trees can be activated by other events within the CRB, such as a change to an object in the virtual data model. Rules can also be tied to non-events: for instance, a rule might fire if a customer has not recently made a deposit or visited a retail store.

A visual Business Rules Designer puts the control of Intelligent Business Rules in the hands of business analysts. Rules can check customer attributes and analytic attributes to determine the most appropriate action. Rules can be used to launch appropriate processes, route or reassign work items, segment sales opportunities, or fire alerts.

Alerts
The alert capability in the CRB allows alerts to be fired and delivered to a variety of sources. Alerts can be fired by business rules or by calling the CRB's alert service directly. Alert messages can be configured by business analysts or business owners, and can be delivered through email or through gateways to SMS or mobile devices.

The alert capability also includes a sophisticated subscription feature. This feature allows individual users to choose which alerts they want to receive, and how they want to receive them. An account manager, for instance, can specify that they want to receive an alert any time one of their customers places a call into the call center or visits the self-service site. The alert can inform the account manager about what issue the customer was trying to resolve.

Adaptive Learning
The final piece of the customer intelligence capabilities within the CRB is adaptive learning. Adaptive learning is the ability for the CRB to take feedback, such as customer acceptance of a marketing offer or customer satisfaction rating on service they received, and to factor that in for improved customer intelligence to be applied to future interactions.

This feature allows the customer intelligence within the CRB to adapt and improve without reconfiguration. Another key benefit is in providing customer insight. Reports based on the learning model can inform management about what might be improved in the overall system. If the learning model, for instance, detects that all customers fitting a certain profile are rejecting their cross-sell offers, a report can show marketers that they should define a different cross-sell offer to fit that specific customer profile.

CRM PROCESSES

The business process capabilities within the CRB provide CRM-specific process features that help guide and coordinate interactions with customers. These process capabilities go beyond the process features in standard business process management (BPM) tools to address specific CRM needs and to put process management in the hands of CRM business owners such as marketers and contact center managers. These processes can in fact work together with processes designed in other third-party BPM tools. The following sections describe the business process features in more detail.

Task-Based Team Workflows
The workflow functionality in the CRB allows business analysts to define sets of tasks that will be performed by various individuals in a specified order. This can be used to automate situations such as complex customer support or team selling. The workflow engine creates and assigns tasks as a process proceeds. Integration with customer intelligence allows the workflow process to branch according to specific customer analytics.

The E.piphany Customer Relationship Backbone provides the highest level of flexibility for faster, easier integration, and increased responsiveness to business demands.

Workflows are configured using a visual designer interface through a standard browser. Workflows can include branching, looping, and sub-workflows. They can also be designed to enforce a specific task flow or to be completely flexible. For instance, it is possible to define a team-selling process that can be altered dynamically by the sales team to fit the specific situation.

Interactive Dialogs
E.piphany Dialogs provides the CRB with interactive process capabilities. This feature allows a business owner to design interactive scripts that can be run by an agent or by a customer directly. A marketer, for instance, can design a retention offer dialog or contact center manager can design a dialog for an agent to diagnose customer issues. Dialogs can include questions and answers, and conditional branching that can leverage customer intelligence. Dialogs can also be "parked," so that they can be resumed at a later time.

Like workflows, dialogs are configured using a visual designer interface in a common browser. Dialogs can

call sub-dialogs and they can invoke workflows as well (just as workflows can invoke dialogs). Similar to workflows, dialogs can also be configured to enforce a specific flow or to give the user the choice to jump around in the flow.

INTEGRATION WITH THE ENTERPRISE

The Customer Relationship Backbone is designed to work with enterprise integration servers such as IBM WebSphere Business Integration and BEA WebLogic Platform Integration. These integration servers offer connectors so that process and data definitions within the CRB can be integrated to legacy and back-office applications.

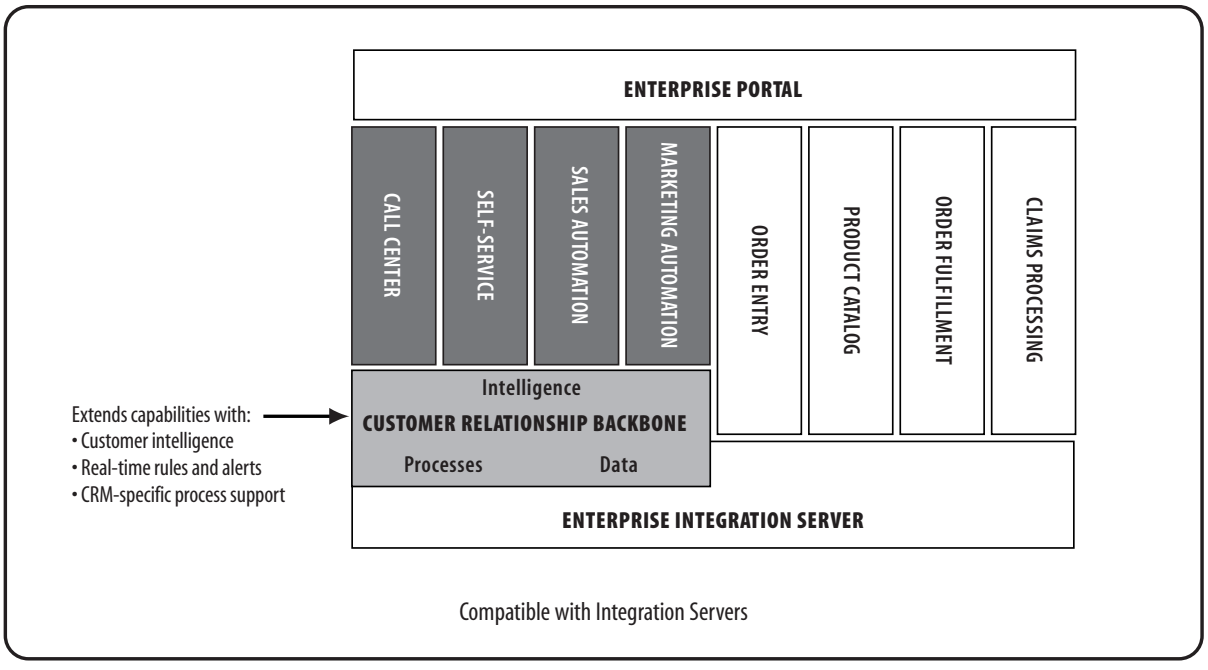
The CRB includes multiple options for connecting to integration servers. The most common connections are through JMS or SOAP. For BEA WebLogic, E.piphany provides BEA WebLogic Workshop controls that provide direct access to the CRB capabilities. Using the standard integration server tools, an implementer can design processes that run within the integration server but invoke data, intelligence or processes from within the CRB. Likewise, the CRB can invoke data or processes from within the integration server.

The CRB is not a replacement for an enterprise integration server, but rather a complement. It provides the capabilities that are uniquely required for effective CRM integration, such as customer intelligence and CRM-specific process capabilities. Used together, the CRB and an enterprise integration server provide the most complete solution for overall enterprise integration and tightly integrated CRM.

SECURITY

All access to the Customer Relationship Backbone is entirely secure. Each method invocation requires authentication with a user identifier and password. Authentication is done through a standard directory server or a third-party identity management system. E.piphany provides functionality to automatically authenticate credentials against these systems. Access without credentials is not allowed.

Administrators can further limit access using roles-based security. Each of the features within the CRB supports the ability to block access to individual objects. In the case of the virtual data model, access can be controlled at the attribute level. Access is controlled when an administrator assigns or revokes permissions for a specific role. Within the directory server or identity management system, users are mapped to groups. Within the E.piphany administration system, these groups can be mapped to the roles that are used to control access, and the active roles for an individual user are identified each time they log in.



PERFORMANCE AND SCALABILITY

The Customer Relationship Backbone is designed to provide the highest levels of performance and scalability. It serves as the backbone to the E.piphany E.6 product suite, and is used in installations that handle thousands of concurrent users and interact with millions of customers.

The key to scalability is the stateless server model, using stateless session EJBs that allows the CRB to be effectively load-balanced across multiple processors and servers. Running on a J2EE application server, the CRB can be deployed on a wide variety of hardware and operating system platforms, scaling up the very largest multi-processor machines and server clusters.

For performance, the individual functions within the CRB have been tuned to provide efficient responsiveness in the most demanding environments. Configuration information is cached on each server instance to avoid unnecessary data access. All functions are designed and tested to provide the sub-second turnaround required within CRM applications, and this has been proven at customer installations in a variety of industries and situations.

CONCLUSION

As those organizations that have already implemented CRM applications know, integration is not a choice but a requirement. However, companies do have a choice when it comes to the level of integration. An organization can rely on simple but limited methods, such as batch data integration, to connect their CRM applications together. For many organizations, the difficulty and cost of integrating their current products makes this the only choice. But for companies that want more from their CRM applications, and that want their applications to work together as an intelligent whole, there is a better approach. It is to leverage a backbone that tightly integrates customer processes, customer intelligence and customer data across all CRM applications.

There is only one company that has clearly articulated this vision and has delivered the necessary services to realize it. The E.piphany Customer Relationship Backbone is the first and only integration solution that solves the problems standing in the way of more effective CRM. It enables any front-office or customer-facing application to include dynamic customer processes, to leverage global customer intelligence, and to access a unified view of each customer. Built on J2EE using a service-oriented architecture, it allows IT organizations to leverage existing skills for faster productivity, higher responsiveness and lower overall costs. Using CRB, organizations can integrate E.piphany applications and other front-office and customer-facing applications together, to build a true customer-integrated enterprise.

ABOUT E.PIPHANY

The E.piphany® E.6™ Suite of CRM software solutions enables global organizations to create a Customer Integrated Enterprise and align touchpoints, processes and technologies around the customer. Built on the industry's most advanced, service-oriented architecture, the E.6 software solution creates benefits that cross departments and geographies, and result in rapid, measurable ROI. With the E.6 Suite of Marketing, Service and Sales software solutions, every customer interaction is driven by real-time intelligence, enabling businesses to better understand their customers and optimize every interaction from both a revenue generation and customer retention viewpoint. More than 460 companies, including nearly 40 of the Fortune 100, use E.piphany software products to enhance their customers' experiences while, at the same time, realizing the companies' business objectives. With worldwide headquarters in San Mateo, California, E.piphany serves customers in more than 40 countries worldwide. For more information, visit us at www.epiphany.com.

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