

Achieving Competitive Advantage through Operation Support System (OSS) Integration

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Introduction

Place your long distance calls over the Internet. Receive a single bill for all your services. Pay only 5 cents per minute for all the calls you make on Sundays. Use your Caller ID to build phone lists, not just to screen calls. Win prizes by using a dial-around provider. These and dozens of other pitches are being made to your telecommunication customers. These are not random actions. These are calculated attacks by companies to leverage their advantage and exploit the weakness of a competitor. And the fun has only begun. For the telecommunication industry is in the hypercompetitive age.

A hypercompetitive industry is an industry where a series of rapidly escalating competitive actions are constantly redefining the value proposition. The value proposition is what prospective customers use to make their buying decisions, and the proposition can be changed by lowering the price, improving the quality, adding new features, solving a customer need, or improving the customer experience. Change occurs fast, competitive advantage erodes quickly, and no advantage is sustainable. In this environment, the goal is to keep one step ahead, even if it means making your previous advantage obsolete in the process. In the end, the survivors are driven to high quality, low cost, excellent customer service. Those who fail to build these values will fall by the wayside.

Besides these marketing pitches, there are other indications that the telecommunications industry is now hypercompetitive. New technology is being introduced at the same time that existing technology is rapidly improving. Access to the Internet has gone from 9.6 kbps to 56.6 to ISDN to cable modems to xDSL. At the same time, new access technology is trying to win the path to the home to provide local service. Fixed wireless, combination land and satellite, and cable are all trying to take business from the established, twisted pair path into the home. New companies are entering into the market. Starting with few customers, they can leap over the legacy technology and move to current, powerful and inexpensive technology. Incumbents respond by a rash of mergers and acquisitions, from MCI and Worldcom to US West and Quest.

Why is telecommunications in this state of high competition? A variety of forces are at work. The sheer size of the market, over \$200 billion in the US alone, is certainly a draw. The deregulation that resulted from the Telecommunication Act is slowly but inexorably opening a window of opportunity into the local market, just as it did to the long distance market fifteen years earlier. Windows of opportunity close. Competitors must seize the current opportunity. There is another incentive to competition. Established companies with many legacy systems must migrate customers to new products without service interruptions. This makes them vulnerable, as AT&T's history shows. The continual promise of global markets, from the old open markets like Great Britain to the new open markets like Germany, still beckons with opportunity.

Are you winning or losing the war? Does the Information Technology (IT) at your company enable hypercompetitive acts, or is it an obstacle to changing the value proposition? In other words, are you continually leveraging your IT assets to lower price, reduce time to market, quickly introduce new features, and provide high-quality customer experience? If not, how can you change?

The OSS Integration Problem

Companies must focus on market share, profitability, product obsolescence, and customer satisfaction. They must face a daunting set of problems that have remained unsolved for years. Vitria Technology's solutions put IT in a position to support a company's moves in the market place.

Smokestack Systems

Many of the incumbents have built product-based systems. There is often a separate system for ordering, account management, provisioning, billing, and maintenance for each of the company's product lines. More product families demand more systems, even separate networks to support separate product families. This strategy results in numerous and expensive systems doing identical functions. There are companies today that maintain over 500 billing systems. The result is extremely complex customer service processes. A customer care representative must access multiple systems, depending on the product family, to carry out similar but slightly different steps. These systems are difficult to merge and migrate. Consolidated billing remains an elusive and expensive goal.

Legacy Systems

Legacy used to refer to old, mainframe systems that were built decades ago. Now legacy means any system that doesn't meet changing business needs. Often these systems talk to each other via point-to-point interfaces or through huge data set transfers at month-end. The transactions that are of interest to the corporation are locked inside the application or database, accessible only with a great deal of additional processing. Business rules, the most dynamic aspect of software, are often hard-coded into the programs. This meant that changing them requires major changes to the software. The systems become difficult to change since the knowledge of the system is in the heads of those that are retired or those who have moved on. Nevertheless, critical legacy systems must be kept and utilized, since it is impossible to rewrite the systems and still win in the hyper-competitive market.

Customer Fragmentation

Product-based systems have another fundamental problem, customer acquisition. If a new customer buys a product, they are entered into an ordering and account management system as a new customer, and are billed accordingly. If that customer buys a different product that is supported by a different set of systems, the customer is added to this second system as a new customer. Now, instead of one customer buying two services, the company appears to have two customers, each buying one service. This is a fragmented customer. This situation causes many problems. Since the single customer can appear as two or more separate customers in different databases, the fragmented pieces of the customer are used incorrectly for a variety of purposes. The pieces are assigned to multiple sales people, market analysis uses incorrect statistics on the makeup of the market, the best offer isn't made, and so forth. This problem is the key driver behind the bundling of products and the drive to a single bill.

Complex Processes

Business processes in telecommunications are complex, with many subprocesses and many exceptions to the processes. End to end processes could have hundreds of steps. There are often gaps between the functional areas

responsible for portions of the business process; and where there are gaps between systems, the steps are often manual in nature. Often times there is no one at the company who knows about or is responsible for the entire business process. As a result, business automation is difficult to implement across an enterprise.

Migration

Incumbents with an embedded base of customers face another serious problem when they try to migrate customers from one product to another and from one system to another. It's like changing the jet engine while the plane is in flight. Extreme care must be used to avoid disrupting the customer, since disruption is correlated with customer departure.

Volume

Volume is a huge problem in telecommunications. Millions of customers, billions of calls, and trillions of events make even a small change a big deal.

Traditional Solution Approach

A traditional approach to multiple billing systems is to attempt to consolidate down to just one billing system. This leads directly to the idea of having a single customer database to support a single ordering and billing system. To do this, the product offerings have to be reduced and the business processes have to be simplified and re-engineered. A transparent migration plan is needed to protect the customer from any disruption. So the company hires a multitude of consultants, plans a massive re-engineering project, and starts the project. Immediately, the project gets bogged down in details, inconsistencies, and incompatibilities. As the project begins to boil, the company scales back the project and extends the completion date until the business case doesn't make sense any more. The solution doesn't work because the approach was wrong.

The Vitria Solution

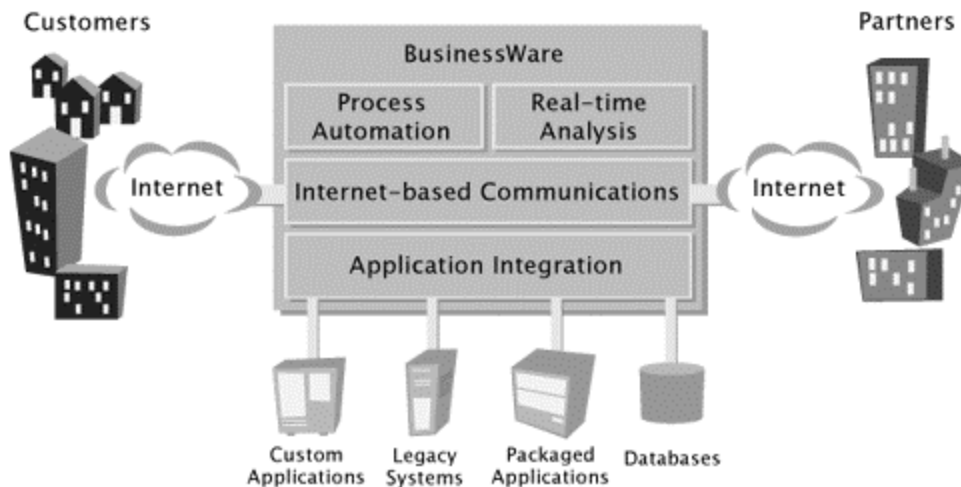


Figure 1. BusinessWare solution

Vitria is a leading provider of eBusiness infrastructure software. Our product, BusinessWare®, combines in a single comprehensive platform, all the components for conducting real-time eBusiness: process automation, real-time analysis, Internet-based communications, and application integration. BusinessWare's process automation functionality empowers companies to define, automate, and manage complex business interactions with partners and customers. Business managers use BusinessWare's real-time analysis capabilities to gather and analyze key business metrics in real-time, and use these results to automatically change business processes. Companies are able to conduct business electronically across corporate networks and over the Internet securely and reliably using Internet standards such as XML. Finally, BusinessWare integrates the underlying IT systems that must work together to support internal and external business processes.

BusinessWare® Components

BusinessWare Modeler.

The Modeler is BusinessWare's process modeling component. Business managers use the Modeler to create graphical models of their business processes using a point-and-click interface. These process models provide an intuitive visual representation of interdependent processing steps. Users can add business rules to each processing step to provide additional modeling flexibility. Once specified and saved in the BusinessWare Repository, process models can be directly executed by the BusinessWare Automator. The Modeler supports advanced modeling constructs that allow users to define and manage complex, real-world business processes. The Modeler supports Unified Modeling Language, the industry standard for business process modeling and automation.

BusinessWare Server.

The BusinessWare Server provides the host environment for five functional components: Automator, Analyzer, Communicator, Connector and Transformer. The BusinessWare Server is designed to provide a set of common services that are shared by each of these components:

- Security: provides rigorous support for authentication, data encryption and access control.
- Transaction management: ensures the integrity of business processes and related updates to underlying IT systems.
- Persistence: provides automatic recovery in the event of system or network failures.
- Repository: stores and manages all BusinessWare metadata, such as process models.

BusinessWare Automator.

Automator is BusinessWare's process automation component. It executes the business process models defined by users in the Modeler and stored in the BusinessWare Repository. Automator automates business processes by coordinating the flow of information among the underlying IT systems.

BusinessWare Analyzer.

Analyzer selectively gathers and analyzes business and process information throughout the extended enterprise. Analyzer provides real-time visibility into key business metrics, that business users need to manage their business effectively. Analyzer also helps companies to rapidly identify processing bottlenecks, thus providing them with the information they need to support their continuous process improvement efforts. Analyzer's results can be automatically fed back into Automator to change business processes in real time.

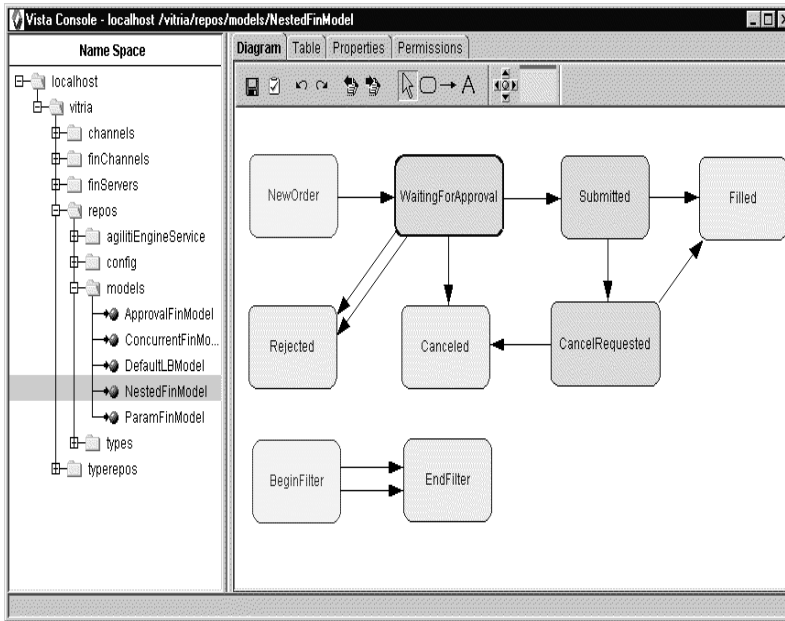


Figure 2. Example of a process model for order fulfillment

BusinessWare Communicator.

Communicator provides the communications backbone that ties together all of the BusinessWare components and the IT systems that they integrate. Communicator provides fast and secure information delivery with multiple quality of service options. Communicator supports Internet standards, such as HTTP and XML. Communicator is designed to interoperate with third-party products, like IBM MQ Series and Microsoft MSMQ.

BusinessWare Connectors and Transformers.

Connectors and Transformers together provide BusinessWare's application integration functionality, enabling heterogeneous IT systems to exchange information.

- Connectors translate business information to Internet standards, such as XML. We provide off-the-shelf Connectors for a number of popular packaged applications, messaging systems and databases. We also provide a toolkit that enables customers to rapidly develop Connectors for custom or legacy systems.
- Transformers map data structures from one IT system to another. In addition to our own transformation components, customers have the option to augment their BusinessWare solution with transformation products from third parties.

BusinessWare Administrator.

Administrator is BusinessWare's graphical systems management and monitoring component. Administrator allows systems administrators to perform local and remote administration from any BusinessWare server.

Telecommunication Integration Scenarios

Below are three of many examples of the Vitria BusinessWare solution. Later in the document a few more are briefly discussed, and there are many, many other opportunities beyond those. The first is a typical trouble reporting and handling process. The second is a typical order fulfillment process, and the final example is a lead list management process.

Trouble Ticket Processing

Examine the configuration in Figure 3. It is a typical process flow for the reporting of trouble, opening a trouble ticket, resolving the problem, closing the ticket and notifying the customer. This diagramming technique is a useful way of seeing the architectural solution that Vitria applies. The boxes, such as Customer Interface Management or Service Configuration, are systems that have been event-enabled or are business processes that are publishing and subscribing to events on channels. The channels are subject-oriented and represent channels of interest, such as 'initiate ticket' or 'complete ticket.'

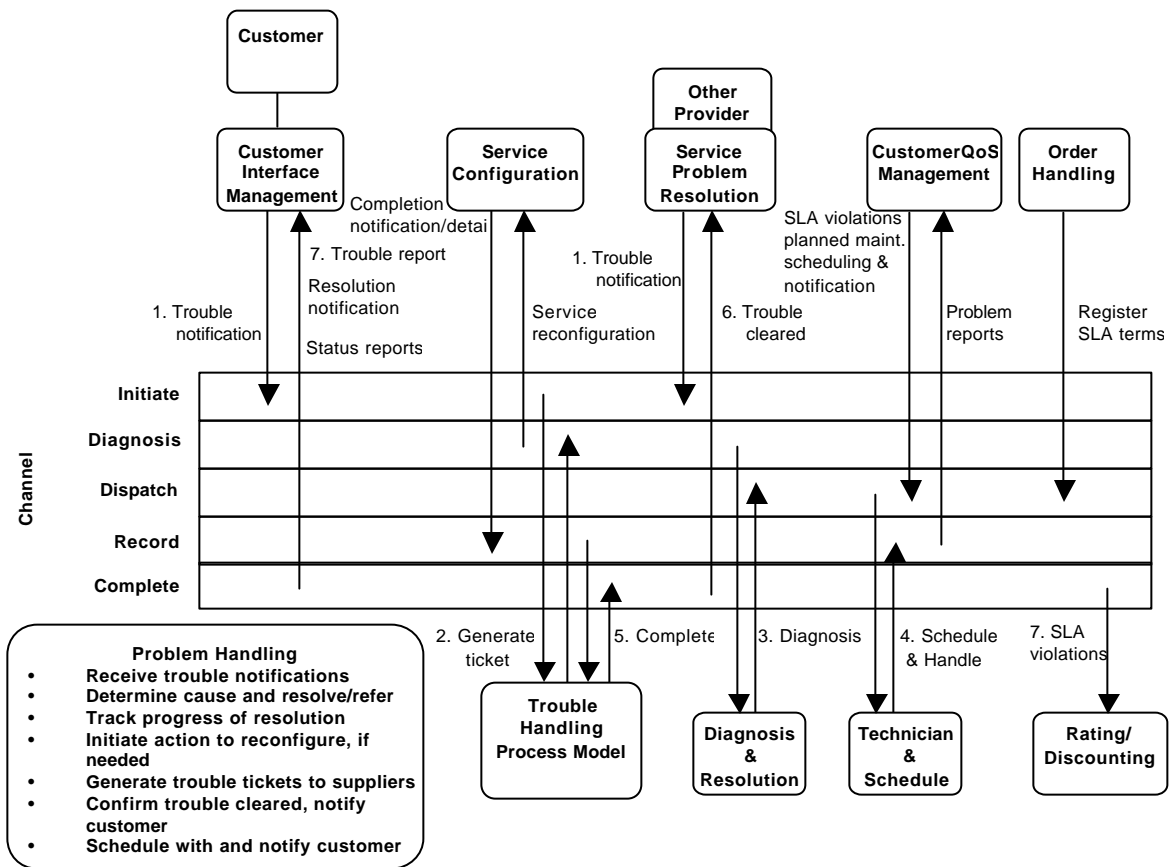


Figure 7. Vitria solution for trouble ticket handling

Following are the steps in this generic process flow:

1. A customer calls the customer service center and tells the representative that they are having a problem. The rep takes the information and an event is published onto the trouble initiation channel.
2. The main trouble ticket handling process (or a vendor's trouble ticket application, since Vitria enables local optimization) listens on the channel for new notifications. It takes the event off the channel and creates a new trouble ticket.
3. The trouble handling system decides to diagnose the problem electronically. It generates an event to the diagnostic process that will try to identify the problem.
4. In this example, the diagnostic equipment could identify the problem but couldn't fix it. Therefore, an event is generated that is sent to the workforce management system to schedule a technician to handle the problem.
5. The technician clears the problem and logs it into the system. This system generates an event that goes back to the trouble handling system where a variety of actions can occur.
6. Other providers are informed, an SLA (Service Level Agreement) violation is identified and logged, billing is informed of the outage, the sales team is informed of the resolution, and the status is updated to the customer.

Order Fulfillment

Figure 4 is a simplified process flow representing a generic 'new order' process on an existing customer. This diagram is the next level of complexity, with two separate sets of channels, one for the ordering domain, and the other for the provisioning domain. In this example, the provisioning model is the point of entry between the ordering and provisioning domains.

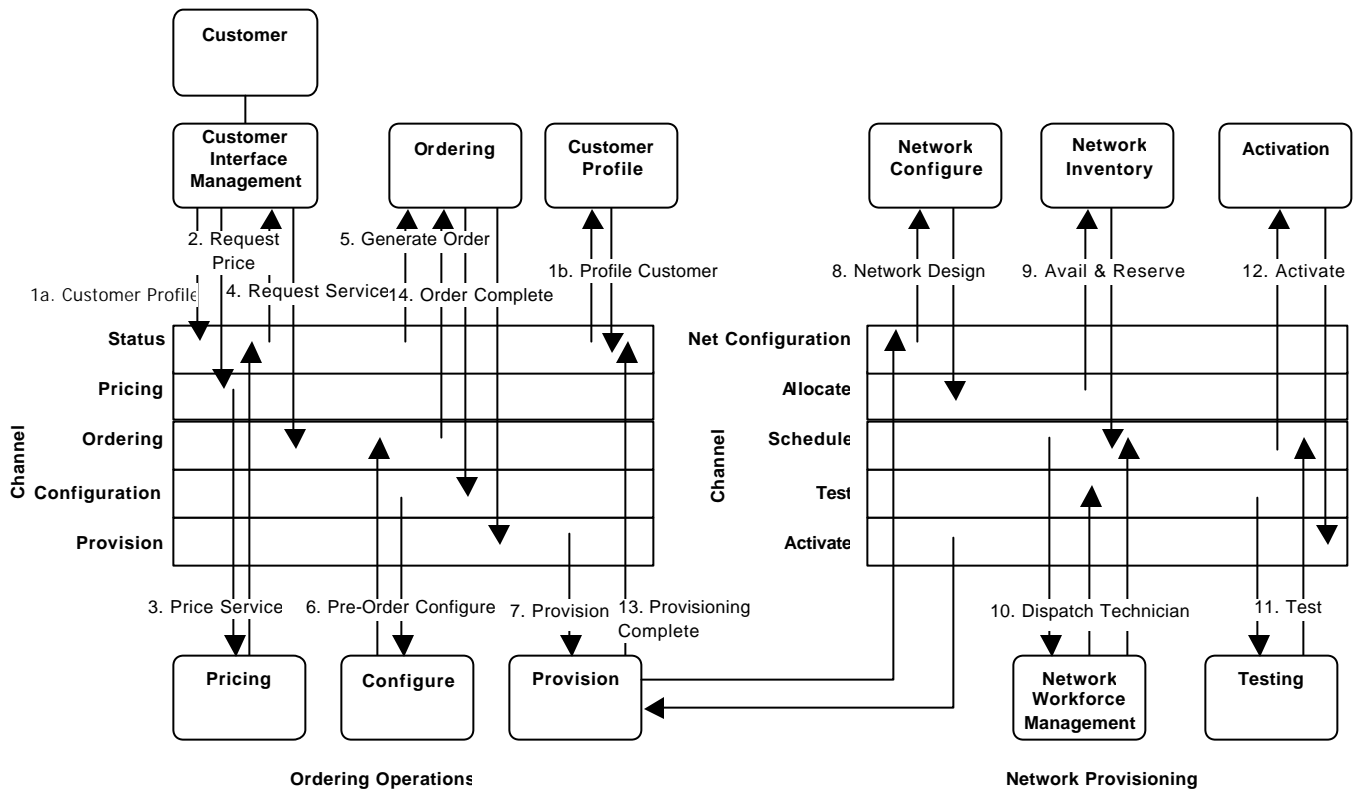


Figure 8. Vitria solution for order processing

The process:

1. A customer calls the customer service center. Customer information is requested via an event and provided to the representative. *Note:* once the process is automated, the customer can access these processes via the Web or even through a dedicated application at the customer's location.
2. The customer requests a price on a service.
3. Depending on the type of service requested, differing pricing engines can process the event and return a priced event.
4. The rep relays that information to the customer (or the system relays the information if the system is distributed to the customer location) and the customer decides to order.
5. The order event is generated in the ordering system, which now will manage the order and be responsible for its completion.
6. At this point, the ordering system may need to configure the sets of services specific to the customer. The system sends an event to a design and configuration tool that will return the required services, and will then be interpreted into orderable components.
7. Ordering sends a provisioning event to the provisioning domain.
8. An event is generated that will be received by the network design tool to configure how the service will be implemented.

9. This in turn will generate a series of events to reserve the available facilities to support the order.
10. If required, an event is sent to the workforce management system to dispatch a technician to install the service.
11. Upon completion, a test request is sent to insure that the service is working end to end.
12. When that is done, and depending on the turn-up date, the service is activated and billing is informed. An event is sent back to the ordering domain and the order is completed, with status back to the customer.

The actual ordering process is often much more complex than the example, with many other process activities required. These include items such as: concurrent execution of business processes, distributed workflow to users, user interacting with the business process, exception handling, problem escalation, tracking and handling milestones, rapid change in business rules, monitoring status, and more.

Lead List Management

The examples so far have been in the Operations Support System (OSS) environment. Vitria BusinessWare extends across the enterprise. The final example is from sales and marketing and involves the lead list process. A lead list process uses outbound telemarketers to call customers identified as candidates for a particular service.

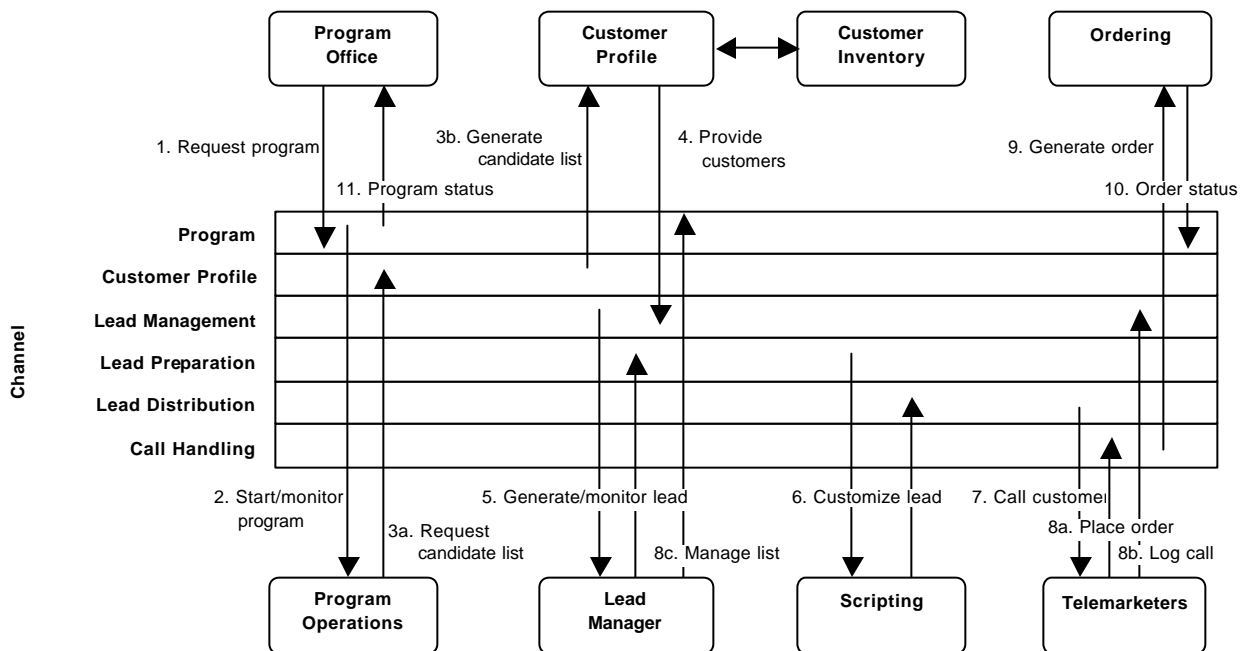


Figure 9. Vitria solution for lead list management

The process is as follows:

1. The marketing program office sends down an event that specifies the program to be run. It includes when the program should start, the type of customers to sell to, what product to sell, and at what price.
2. Program Operations receives the events and begins a new program.
3. Program Operations generates an event to request customers, based on information provided by the program office.
4. The Customer Profile (or account management system) selects the customers, checks to see if they are already part of an ongoing program or are on the 'nixie' (or don't call me!) list, and generates an event of customers.
5. The Lead Manager receives the set of customers and manages the lead distribution to the telemarketers.
6. On the way to the telemarketers, the customer event stops by the scripting module to get any last minute changes to the script that makes it more customized.
7. The event is passed on to the telemarketer, who places the call to the potential customer.
8. Based on the result of the call, events are generated to order the service, log the call, or to update the lead list.
9. If the call is successful, ordering receives an event.
10. Ordering then processes the order request and passes back status, including completion. *Note:* ordering itself is a complex process that is independent of the lead list process and has multiple sources. This is an example of how Vitria can integrate across the enterprise.
11. Finally, with the program in progress, results are provided back to the program office.

Additional Integration Scenarios

Using the fundamental BusinessWare approach of event, condition, and action that is automated in the BusinessWare tools, almost any business process in the enterprise can be automated. Following is a list of some of these processes.

1. **Calling card fraud.** At the moment the calling card database is accessed to validate the user access code, an event is generated to check the usage pattern on that telephone number. If the call is international and to a country with a history of high fraud usage, a business decision is made. Perhaps the first call is logged and allowed to go through. But card fraud is usually very quick with a spike in usage soon after the card theft is seen. That first call instead might generate an event over to the customer care representative who calls the customer, informs the customer of the international usage, and confirms that it is a valid call. If not, an event is generated back to the network to update the database to disallow access to that country and to interrupt the call. This can be done in real-time, reducing international card fraud.
2. **Distributed Data—the fragmented Customer.** Customer information is not only fragmented across the product-based systems as we described earlier, it is also fragmented across the business domains, from sales to maintenance. The sales domain holds different information than the maintenance domain. The sales domain

cares about the corporate structure and decision makers. Maintenance cares about punch-down block ids for circuits. The information is appropriately distributed to the business domains most interested in and most responsible for the 'care and feeding' of that information. It would be a mistake to try to put all the customer data into one huge customer database, since both access and maintenance are difficult to manage in a monolithic database. In addition, new data sources arise that need to be tied in, and they will often be distributed as well. The structure of a distributed customer database resembles an 'octopus', with a central repository that manages the links out to the 'arms' of the business. By querying either an arm or the central repository, the enterprise view of the customer, in any number of ways, can be provided. Vitria can play the role of managing the connectivity between the 'head' and the 'arms,' the business rules and processes around the data management, and the access to the data from the enterprise.

3. **Sales cycle.** A full sales cycle starts with events that trigger some sales analysis. These events can be a network outage, a fraud event, a call to a customer care representative, or some other piece of useful information. This event begins the flow of events through the cycle. There are multiple steps in a sales process, some that happen quickly and some that take considerable time. Vitria can manage all of these steps as events around the cycle. These steps include: analyzing the triggering event to validate that it represents a real sales opportunity; validating the opportunity with the customer; determining the best product to sell that meets the customers needs; and so forth around the cycle until it reaches implementation and usage, and starts the cycle anew. At each step in the process a sales event object is moved forward. The sales event object that makes it around the cycle is like an onion, and at each new stage a new layer is added on. So while it starts as a triggering event, in the end it's layered with a sale, a contract, a service, and usage. At the end of the cycle, the actual increase in revenue can be directly attributable to the event that first triggered the cycle. Used in conjunction with the holistic customer (#2, above), some powerful results occur. For the first time, specific leads can be directly tied to specific increases in revenue. All of the customer's current activity, anywhere in the cycle, can be examined and analyzed. Sales projections become based on real numbers taken from the cycle, not on estimations that include a probability of sale. The visibility of the process provides a limitless opportunity for improvement—all enabled by Vitria.
4. **Single bill.** When there are multiple billers that cannot be consolidated in a timely manner, an approach that provides a single bill to a customer is still possible. At the stage of the billing process, when the customer's bill is calculated, an event is generated with a summary result of that bill. That event is sent to a 'new' billing module. At a scheduled time, the new billing module would assemble the summary bills from all the various billing systems for the 'holistic' customer, do it's own calculations, and render a bill to the customer. This layered approach, where you add a veneer on top of the complex legacy billing, doesn't address the fundamental problems, but it provides a place to start with immediate benefit to the customer.

The Vitria BusinessWare solution also addresses issues around SLA processes, risk assessment in new customer acquisition, product development cycles, CPNI (or government mandated privacy protection of network

information), internal communications, real-time executive DSS (decision support systems), usage events flowing off the network, and many others. Please contact Vitria Technology to discuss your specific problems or issues in detail.

Conclusion

This paper has attempted to show potential users of Vitria BusinessWare the power it brings to a company and the caliber of problems and issues it can address. From the previous examples, you can see how BusinessWare enables you to reduce cost, improve customer service, speed up processes, and gather better information with improved quality. In short, Vitria provides the way to change your value proposition, the key to competing in the hyper-competitive environment.

Scope

Vitria BusinessWare allows you to address the problem at different levels of complexity by giving you the power to control scope. First, you can take a limited approach and solve a domain problem, such as the lead list problem. Or you can take a larger view and solve larger problems, such as the fragmented customer or the sales cycle process. You can also integrate the two levels. Think of the value if, when a customer calls in about a product they heard about, an event is generated to query the lead list system to retrieve any lead that is schedule to be worked as an outbound cold call. Close rates go up when the lead is handled as a hot lead by the customer care rep instead. BusinessWare gains its most value when applied at the strategic level. For example, the idea of a sales cycle monitor watching all phases of the sales process provides just the type of information upper management is always demanding and needs to have to make strategic decisions.

New Approaches

Besides scope, Vitria BusinessWare can play other roles. The examples clearly show the ‘glue-like’ role it plays in tying together the various systems and processes. In the brief description of the single billing process, BusinessWare plays the role of a layer over the top of legacy processes that you want to change piecemeal. The decoupling of the event-enabled application from the enterprise that the BusinessWare technology inherently provides allows for local optimization and evolution of that application. That is, BusinessWare supports a transparent migration path for a system to its replacement.

New Ways to Do Business

In addition to scope and use, there is a third way that Vitria BusinessWare enables corporations to compete. New ways of doing business, ways that were just visions a few years ago, are now possible. New ways like real-time billing, customer self-service, knowing customer profitability, and proactively responding to predictions of customer behavior are things that help you win. Things that get you up the next step of the ladder—ahead of your competition.

About Vitria

Vitria Technology Inc. is a leading provider of eBusiness infrastructure software. Vitria's product suite, BusinessWare, combines business process automation and analysis, application integration and Internet-based communications in one comprehensive platform. BusinessWare enables companies to automate their business operations by allowing the information technology systems that support these operations to automatically exchange information using the Internet and other networking technologies. BusinessWare is designed to provide business managers with a software infrastructure that gives them complete control and visibility of their business operations, enabling them to reduce time to market, rapidly respond to change, and manage the growing complexity of business interactions with partners and customers.

Vitria is a privately held, venture-backed company based in Sunnyvale, California. For more information, call 650/237-6900, visit our Web site at www.vitria.com, or send email to info@vitria.com.